Drivetek as
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VOGEL
ANTRIEBSTECHNIK

Mechanical gearboxes

SERVO gears

MECHANICAL gears

INDUSTRIAL gears

WELCOME TO VOGEL ANTRIEBSTECHNIK

We thank you for your interest in our low backlash gearboxes. VOGEL Antriebstechnik has been highly regarded for more than 70 years offering a wide variety of products to a broad range of business sectors with applications that require innovative, dependable gearbox manufacturing technology. We develop high quality products that are very convincing with their precision, long service life and a high power density. We take advantage of a continuous dialogue with our customers and of constant communication with research and scientific sources.

Our primary focus is to supply you, our customer and partner, with the most cost-effective and efficient product solutions for your needs, in order to safeguard your viability in future markets.

Allow our products and services to win you over.

Up-to-date + compact
All product information can be downloaded from
www.vogel-antriebe.de

C O N T E N T S

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PRODUCT MATRIX

Angular gearboxes

Spiral bevel gearboxes

L

ML

H

MH

K

MK

				from page 34	from page 64
		Symbol	**Unit**		
Gearbox figures	**Ratios**	i	[-]	1,0 to 6,0	1,0 to 6,0
	Max. permissible output torque	$T_{2maxzul}$	[Nm]	27 to 3240	27 to 3240
	Nominal torque on output	T_{2Nzul}	[Nm]	10 to 1100	10 to 1100
	Max. backlash	j	[arcmin]	10, 7, (4)	10, 7, (4)
	Max. input speed	$n_{1maxzul}$	[min^{-1}]	3000 to 4500	3000 to 4500
Output variants	**Output flange design**	–	[–]	–	–
	Solid shaft with key	–	[–]	●	●
	Solid shaft without key	–	[–]	○	○
	Splined shaft DIN 5480	–	[–]	○	○
	Hollow shaft with keyway	–	[–]	●	●
	Hollow shaft with shrink disc	–	[–]	○	○
	ATEX design	–	[–]	○	○

Note on use in potentially explosive areas:

European Guideline 94/9/EC for equipment for use in potentially explosive areas (ATEX).
VOGEL spiral bevel gearboxes and VOGEL bevel helical gearboxes are available in an explosion-proof version

Zone Gas	Zone Dust
1	21
2	22

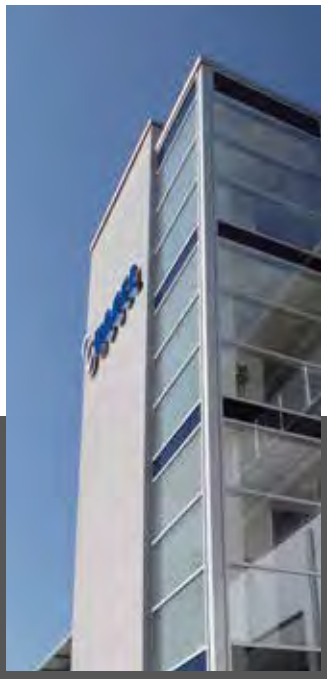
Covered by ATEX gearboxes of the category II 2GD c,k IIB T4 / 120 °C

● marks the standard design
○ marks optionally available designs

Angular gearboxes

Spiral bevel gearboxes		Bevel helical gearboxes	
		KS	MKS
			
LV	LS	KSH	MKSH
			
from page 92	from page 100	from page 108	from page 124
1,0 to 6,0	1/1,5 to 1/2,0	6,0 to 48,0	6,0 to 48,0
27 to 3240	45 to 2160	176 to 5760	176 to 5760
10 to 1100	23 to 720	90 to 2760	90 to 2760
10, 7, (4)	10, 7, (4)	10, 4	10, 4
3000 to 4500	3000 to 4500	3000 to 4500	3000 to 4500
–	–	○	○
●	●	●	●
○	○	○	○
○	○	○	○
–	–	●	●
–	–	○	○
○	○	○	○

● marks the standard design
○ marks optionally available designs



FUTURE IN MOTION

Continuity and development are mutually dependent cornerstones of our corporate tradition. For the past 60 years we have been constantly committed to products and markets with maximum quality consciousness. As a mid-sized, family owned company this sense of continuity is highly important to us; the executive management in its third generation accepts personal responsibility for this.

On the other hand we actively determine the future of gearbox manufacturing through our technological developments, thus ensuring market capability for our customers. Because the only valid constant is change.

PARTNERSHIP FOR TECHNOLOGY

Efficiency and safety from initial discussions of a project to the finished product and beyond – that is the target of our offensive with respect to quality and service management. We initially carry out a thorough, detailed consultation individually in accordance with the requirements of your application. Once the ideal solution is decided upon, we produce flexibly and on schedule, precisely in accordance with your requirements.

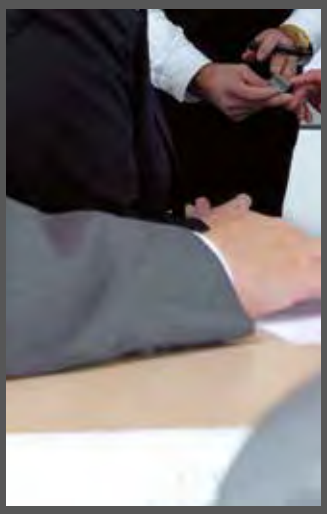
Our customers rightly expect smooth and uninterrupted manufacturing processes. You can count on an almost maintenance-free product over the entire life cycle when using VOGEL gearboxes.

Should you still require our support at some stage, there is a world-wide service network available to assist you as soon as possible with a replacement gearbox or an on-site repair. To keep your production line running!

COMPETENCE IN THE MARKET

VOGEL Antriebstechnik is found everywhere where machinery is built, in all sectors and at all sites. Wherever you manufacture, we will be at your side.

Internationally, our customers are looked after by our distribution and service partner Lenze. That means we have a presence in the important markets and you benefit globally from direct access to our expertise and product ranges.



INDUSTRY SOLUTIONS

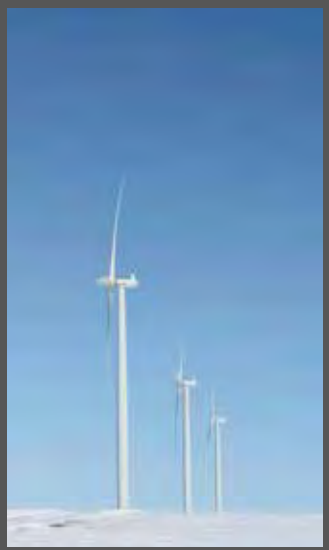
With VOGEL you stay flexible. For example our modular gearbox system offers you the widest variety of combination possibilities. On the basis of these product standards we can also offer you the desired modifications needed for your field of activity. It goes without saying that such services are cost-optimised and in accordance with your specifications. For unusual requirements we offer entirely individual solutions. In such cases we assess application conditions in cooperation with you, advise you reliably and construct special gearboxes for you, including gear manufacturing.

SUCCESSFUL APPLICATIONS

Our gearboxes have a broad and constantly increasing range of applications.

- Drive and automation engineering
- Robotics and handling
- Packaging machinery
- Plastics and film processing machines
- Printing machinery
- Paper processing
- Machine tools
- The food and pharmaceutical industry

and many more



PRODUCT RANGE

The range of VOGEL Antriebstechnik offers nominal output torques of between 10 Nm and 26000 Nm. Our range of standard solutions extends from classic machinery gearboxes, through compact technology for coaxial and right-angle applications, to our own high-precision servo products. Always in mind: dynamic development of all existing series with the aim of creating optimum drives for our customers, technologically and thus economically.

SERVO gears

- High speed
- Short cycle times
- Low backlash

Mechanical gears

- Universal application
- Efficient and reliable

All VOGEL gearboxes can be combined with each other. In this way you benefit from the advantages of various gearbox types.

Industrial gears

- High torques
- Long life time

Customer-specific solutions

- Special spiral bevel gearboxes
- Special solution for mobile drive technology
- Special planetary gearboxes for high-speed applications
- Gearing technology

and many more

VOGEL ANTRIEBSTECHNIK

QUALITY

Our internal high standards of quality often far exceed those commonly found in the industry. Because of this extensive and consistent quality control, we are in a position to offer you especially reliable, low-maintenance and durable gearboxes, a factor confirmed again and again in dialogue with our long-term customers.
Our extensive manufacturing expertise within development and production, guarantees noise- and torque-optimised gearing technology at the highest standards. Upon request we can also supply inspection reports or certification for any gearbox, e.g. with respect to run-out error or backlash.

In this way we ensure for you:

- Highest levels of precision and dynamics
- Long product life
- Maximum flexibility
- Maximum environmental compatibility
- Minimal effort for the complete life cycle
- Unbeatable efficiency
- Excellent energy efficiency

CONSULTATION

In every phase of collaboration with VOGEL you benefit from our unique sector-specific expertise, gathered over decades in close cooperation with our national and international partners. We develop concepts together with you for the cost-effective solutions of your application. In this respect we initially analyse and determine the most important environmental parameters such as application conditions, loads, duration of operation, speeds, motion sequences etc. in order to find the best product solution.

SERVICE

Together with our service and distribution partners we make sure that we are there when you need us, whether for supply of parts, repairs and service or technical support, both on a national scale and internationally.

COMMUNICATION

Up-to-date and comprehensive product information, service manuals, catalogues, technical documentation, contact data and quality documents are available to you in a variety of languages via our website. In addition we can provide you with the relevant information on CD-ROM.
For technical data exchange we offer over 100 different interfaces and guarantee support for all globally current CAD software programmes, thus shortening development cycles.

TRAINING

Upon request you can take advantage of individual product and service training as well as general educational courses on drive and automation technology. In addition. we are also always pleased to inform you of intelligent maintenance strategies that will optimise your manufacturing performance. Simply contact our service team.

SERVICES

PRECISION

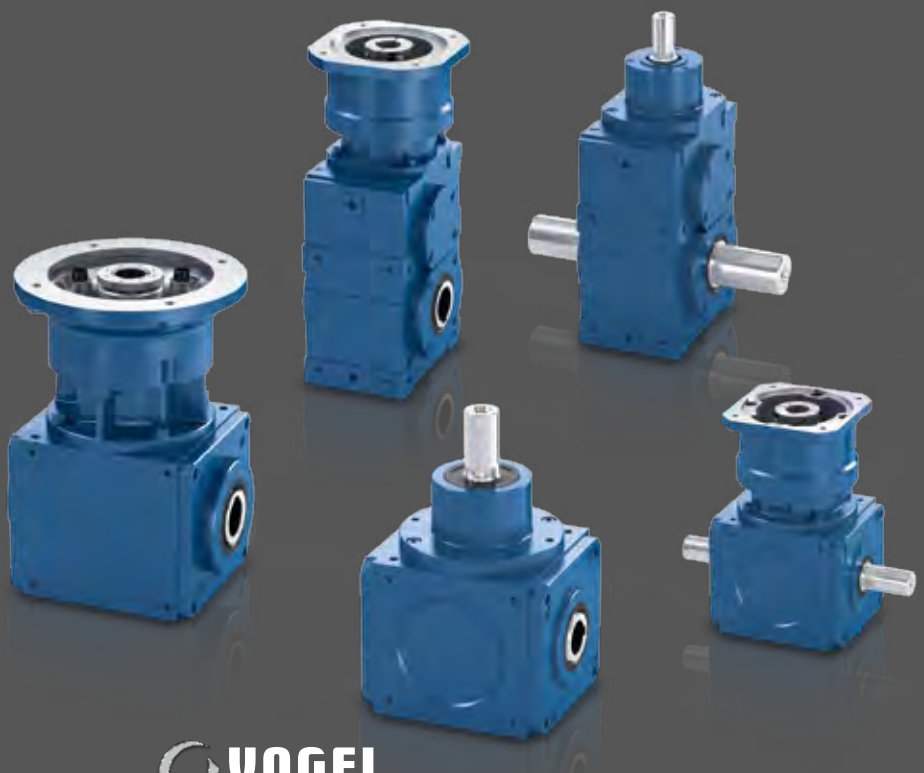
Maximum precision in every detail – that is what sets all VOGEL gearboxes apart. From optimised product geometry and highly precise, fine ground gear teeth to careful mounting. With improved design and minimised tolerances we achieve a remarkably high torsional and tilting rigidity with minimal noise emission and unbeatably quiet running.

FLEXIBILITY

Thanks to their practical design and intelligent construction, our low backlash gearboxes can be used variably across a very wide spectrum of applications. With a large selection of motor adapters, multiple drive combinations are possible. A large ratio range with fine increments renders them absolute all-rounders for all sectors.

COST-EFFICIENCY

A high level of efficiency for maximum cost-effectiveness. With optimised concentration on the smallest possible shaft diameter, we achieve efficient results without friction losses and therefore without loss of energy. Economically, VOGEL also convinces with extremely simple motor mounting – thus saving time, which in turn decisively aids your manufacturing processes.



COMPACTNESS

A compact design, short overall lengths – VOGEL Antriebstechnik offers performance and efficiency on a highly compact scale. This is made possible in no small way by helical gear teeth, allowing greater torques with uniform and low-noise drive motion.

DURABILITY

We place particular emphasis on high quality for all materials, components and parts used. In doing so we are able to guarantee maintenance-free, reliable operation as well as maximum service life even under very high operational stress. Optimal lubrication of gearboxes is guaranteed.

DYNAMICS

With strengthened bearings our gearboxes are able to withstand high forces – even with high speeds and in extreme cases when overloaded. This is possible by the implementation of full needle bearings. Low gearbox weight, combined with compact construction offers enhanced inertia values – further proof of the dynamics of our gearboxes.

Formula symbols and indices

Designation	Unit	Symbol
Size	-	BG
Gearbox life time ∑ cycle times	h	B_h
Torsional rigidity on output	Nm/arcmin	C
Radial load input	N	F_{1rm}
Maximum radial load input	N	F_{1rmax}
Maximum permissible radial load input	N	$F_{1rmaxzul}$
Permissible radial load input (at permissible average input speed)	N	F_{1rmzul}
Radial load output	N	F_{2rm}
Maximum radial load output	N	F_{2rmax}
Maximum permissible radial load output	N	$F_{2rmaxzul}$
Permissible radial load output (at permissible average input speed)	N	F_{2rmzul}
Application factor	-	f_A
Fatigue strength factor	-	f_D
Dynamics factor	-	f_K
Direction of load factor	-	f_L
Start-up factor	-	f_S
Ratio	-	i
Ratio required as per application data	-	i_{erf}
Max. backlash	arcmin	j
Inertia (with reference to input)	kgcm²	J_1
Running noise	dB(A)	L_{PA}
Revolutions under load ∑ gearbox life time	-	L_u
Revolutions under load per cycle	1/Zyk	L_{uz}
Gearbox weight	kg	m

Designation	Unit	Symbol
Nominal input speed	min^{-1}	n_1
Average input speed	min^{-1}	n_{1m}
Maximum input speed	min^{-1}	n_{1max}
Max. input speed	min^{-1}	$n_{1maxzul}$
Nominal speed main engine	min^{-1}	n_{1Mot}
Permissible average input speed	min^{-1}	n_{1mzul}
Nominal output speed	min^{-1}	n_2
Output speed	min^{-1}	n_{2i}
Average output speed	min^{-1}	n_{2m}
Maximum output speed	min^{-1}	n_{2max}
Nominal power main engine	kW	P_{Mot}
Thermal limit power	kW	$P_{thGrenz}$
Output torque	Nm	T_{2i}
Average output torque	Nm	T_{2m}
Time-averaged output torque	Nm	T_{2mz}
Maximum output torque	Nm	T_{2max}
Maximum output torque through main engine	Nm	$T_{2maxMot}$
Maximum permissible output torque	Nm	$T_{2maxzul}$
Nominal output torque through main engine	Nm	T_{2NMot}
Emergency stop torque output	Nm	T_{2Not}
Emergency stop torque	Nm	$T_{2Notzul}$
Nominal torque on output	Nm	T_{2Nzul}
Required nominal torque on output	Nm	$T_{2Nzulerf}$
Total cycle time	s	t_{ges}
Time share	s	t_i
Ambient temperature	°C	t_u
Efficiency	-	η

1 Application values

1.1 Definition of the operational area

↓

1.2 Definition of gearbox
Definition of gearbox type

↓

1.3 Determination of load profile data:
n_{2i}, t_i, T_{2i} for all sections of the load profile
i=1 to n, n=number of sections

↓

1.4 Determination of emergency stop torque of the application
T_{2Not}

↓

1.5 Definition of nominal speed output
n_2

↓

1.6 Determination of loads which occur
F_{1rm}, F_{2rm}, F_{1rmax}, F_{2rmax}

↓

1.7 Determination of drive data of the main engine
P_{Mot}, n_{1Mot}

↓

1.8 Definition of the gearbox life time
B_h

↓

1.9 Definition of the application factors
f_A, f_S, f_L

↓

2

1

2 Calculation of application values

2.1 Determination of max. output speed
n_{2max} (max. value of load profile)

↓

2.2 Determination of max. output torque
T_{2max} (max. value of load profile)

↓

2.3 Calculation of cycle time
$t_{ges} = \sum (t_i)$ Sum of load profile times, incl. idle times

↓

2.4.1 Calculation of average torque from load profile

$$T_{2m} = \sqrt[6,6]{\frac{\sum (n_{2i} * t_i * T_{2i}{}^{6,6})}{\sum (n_{2i} * t_i)}}$$

↓

2.4.2 Calculation of the time-averaged torque

$$T_{2mz} = \frac{\sum (n_{2i} * t_i * T_{2i})}{\sum (n_{2i} * t_i)}$$

↓

2.5 Calculation of average speed from load profile

$$n_{2m} = \frac{\sum (n_{2i} * t_i)}{\sum (t_{ges})}$$

↓

2.6 Calculation of the revolutions under load per cycle > Nominal torque * f_A

$$L_{uz} = \frac{\sum (n_{2i} * t_i)}{60}$$

Valid for all torques $T_{2i} > \frac{T_{2Nzul}}{f_D \text{ aus } 3.4\text{-}3.9}$

↓

2.7 Calculation of revolutions under load

$$L_u = \frac{B_h * 3600}{t_{ges}} * L_{uz}$$

↓

3

3 Determination of gearbox values

3.1 Calculation of required ratio
$i_{erf} = n_{1Mot} / n_2$

3.2 Determination of possible ratio
$i \sim i_{erf}$ (from the technical data of the gearbox type)

3.3 Calculation of required nominal torque on output
$T_{2Nzuler} = T_{2m} * f_A$

3.4 Determination of size
B_G = Selection acc. to $T_{2Nzul} > T_{2Nzulerf}$
(from the technical data of the gearbox type)

3.5 Calculation of nominal speed on input
$n_1 = n_2 * i$

3.6 Calculation of average speed on input
$n_{1m} = n_{2m} * i$

3.7 Calculation of maximum speed on input
$n_{1max} = n_{2max} * i$

3.8 Determination of gearbox efficiency
η (from the technical data of the gearbox type)

3.9 Determination of fatigue strength factor
f_D (fatigue strength factor, as per table)

3.10 Determination of dynamics factor
f_K (dynamics factor, as per table)

3.11 Determination of nominal torque on output
T_{2Nzul} (from the technical data of the gearbox type)

3.12 Determination of maximum permissible output torque
$T_{2maxzul}$ (from the technical data of the gearbox type)

3.13 Determination of emergency stop torque
$T_{2Notzul}$ (from the technical data of the gearbox type)

3.14 Determination of thermal limit power
$P_{thGrenz}$ (from the technical data of the gearbox type)

3.15 Determination of permissible average input speed
n_{1mzul} (from the technical data of the gearbox type)

3.16 Determination of maximum input speed
$n_{1maxzul}$ (from the technical data of the gearbox type)

3.17 Determination of permissible radial load on input
F_{1rmzul} (from the technical data of the gearbox type)

3.18 Determination of permissible radial load output
F_{2rmzul} (from the technical data of the gearbox type)

3.19 Determination of maximum permissible radial load on input
$F_{1rmaxzul}$ (from the technical data of the gearbox type)

3.20 Determination of maximum permissible radial load on output
$F_{2rmaxzul}$ (from the technical data of the gearbox type)

→ 4

4 Determination of main engine

4.1 Calculation of nominal output torque main engine

$$T_{2NMot} = \frac{P_{Mot} * 9550 * \eta * 1}{n_2}$$

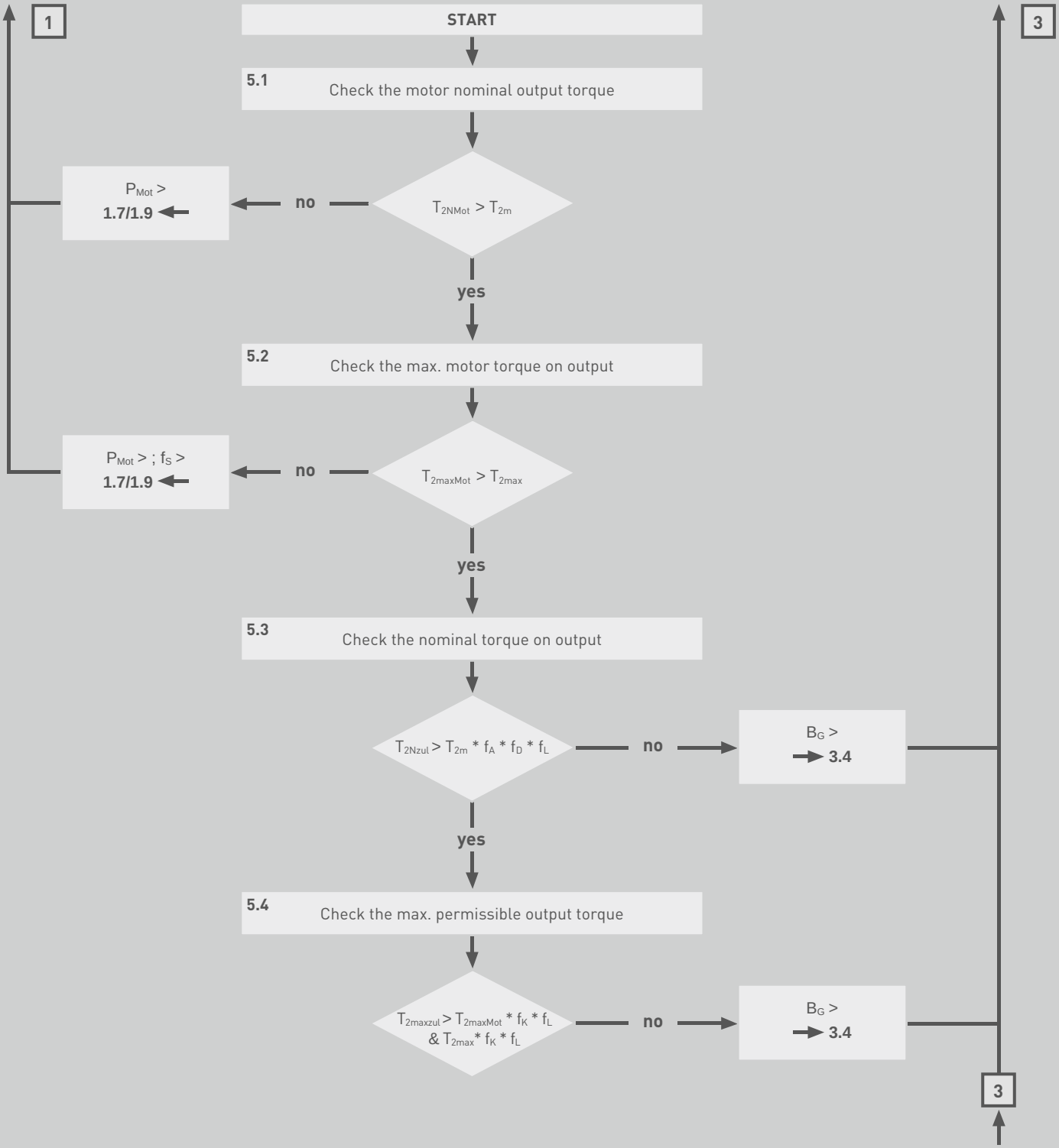
4.2 Calculation of max. output torque main engine

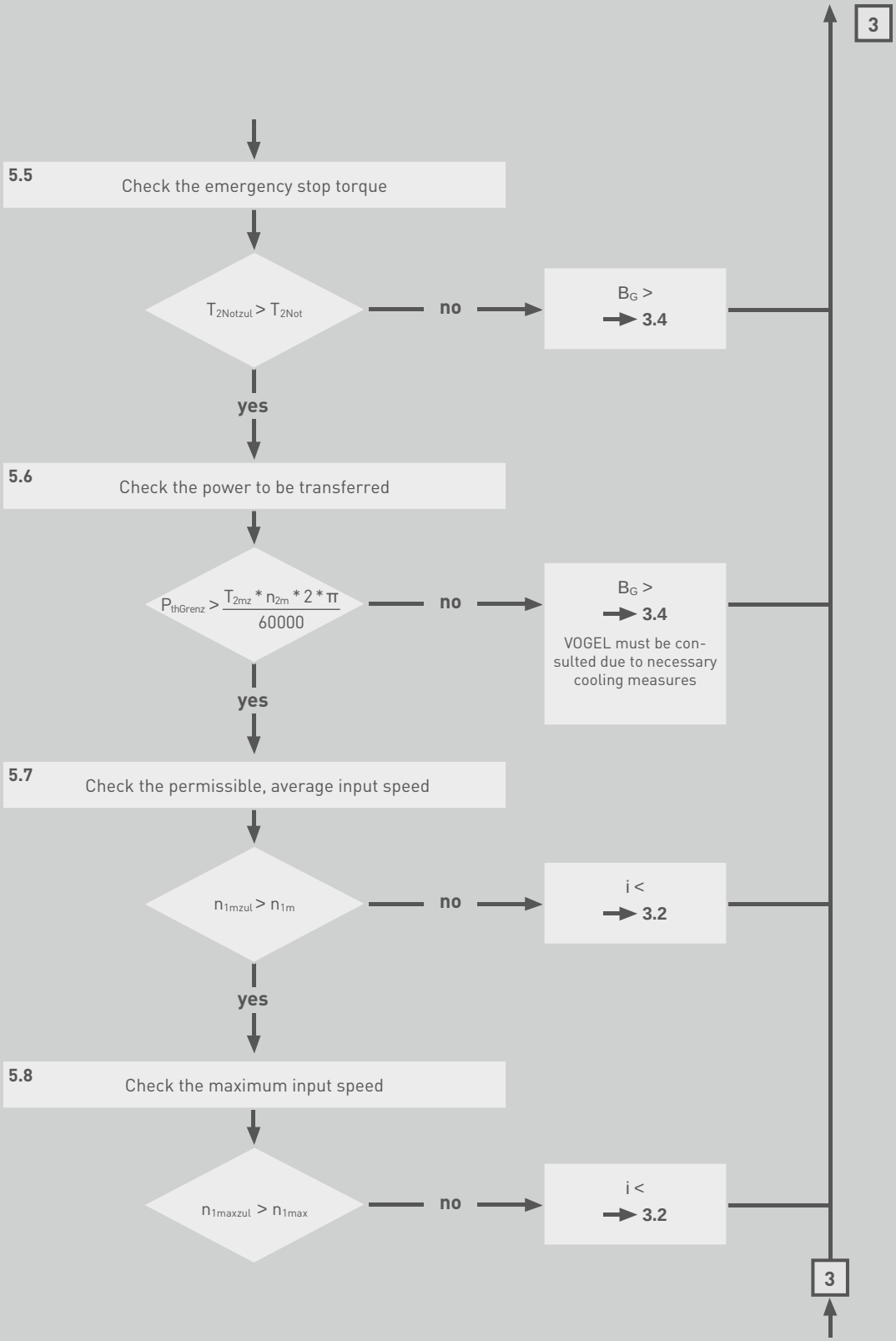
$$T_{2maxMot} = \frac{P_{Mot} * 9550 * \eta * f_S}{n_2}$$

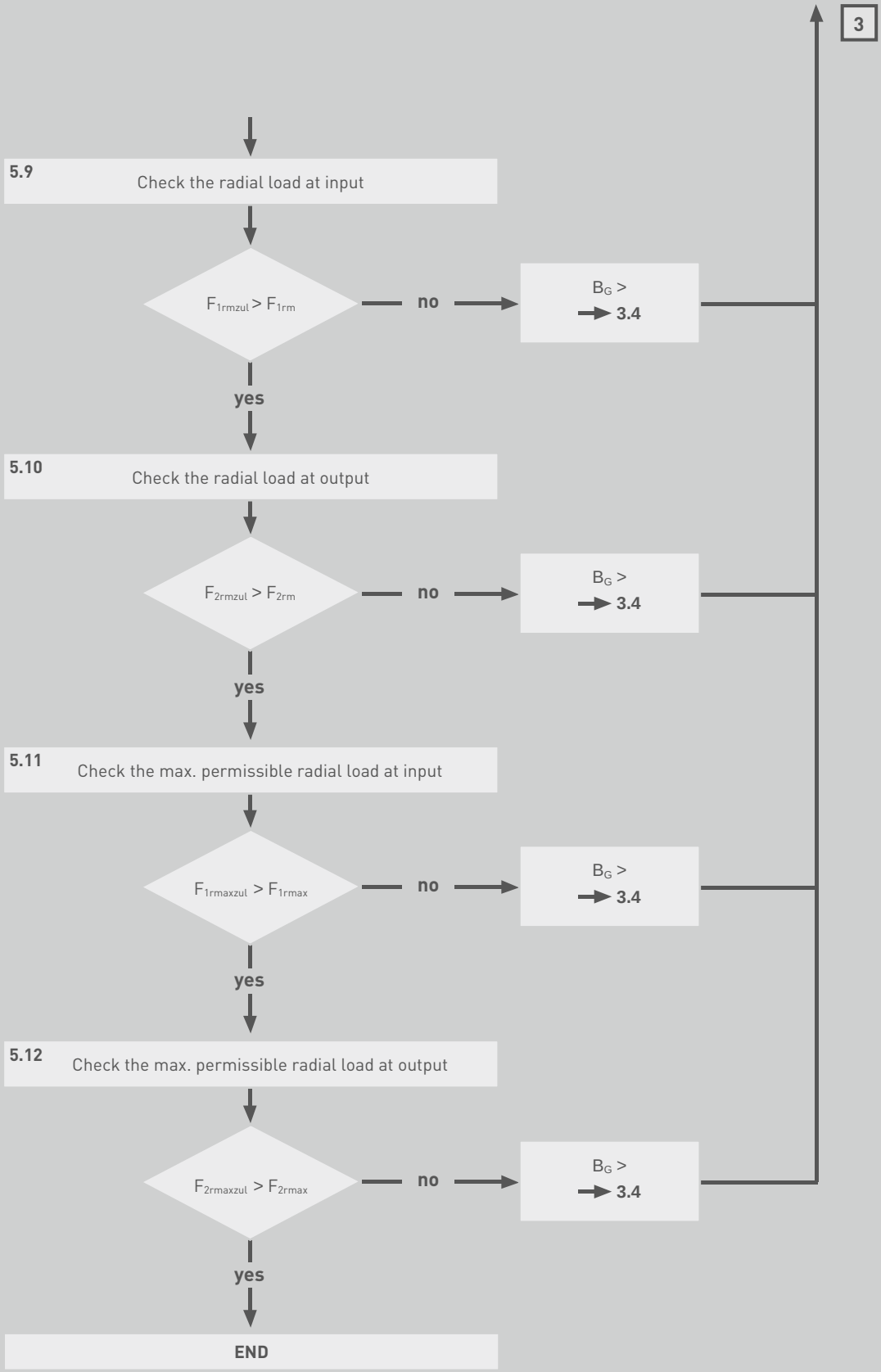
→ 5

← 3

5 Comparison of the gearbox with the application




3
5.5
Check the emergency stop torque
$T_{2Notzul} > T_{2Not}$
no
$B_G >$ → 3.4
yes
5.6
Check the power to be transferred
$P_{thGrenz} > \frac{T_{2mz} * n_{2m} * 2 * \pi}{60000}$
no
$B_G >$ → 3.4
VOGEL must be consulted due to necessary cooling measures
yes
5.7
Check the permissible, average input speed
$n_{1mzul} > n_{1m}$
no
i < → 3.2
yes
5.8
Check the maximum input speed
$n_{1maxzul} > n_{1max}$
no
i < → 3.2
3


3
5.9
Check the radial load at input
$F_{1rmzul} > F_{1rm}$
no
$B_G >$ 3.4
yes
5.10
Check the radial load at output
$F_{2rmzul} > F_{2rm}$
no
$B_G >$ 3.4
yes
5.11
Check the max. permissible radial load at input
$F_{1rmaxzul} > F_{1rmax}$
no
$B_G >$ 3.4
yes
5.12
Check the max. permissible radial load at output
$F_{2rmaxzul} > F_{2rmax}$
no
$B_G >$ 3.4
yes
END

DYNAMICS FACTOR f_K

Gearbox type	L / H / K / ML / MH / MK / LV								
i	Number of possible revolutions under load [Lu]*								
1,00	1.040.000	1.500.000	2.240.000	3.440.000	5.420.000	8.840.000	15.000.000	26.640.000	50.000.000
1,50	700.000	1.000.000	1.500.000	2.300.000	3.600.000	5.900.000	10.000.000	17.760.000	33.340.000
2,00	520.000	760.000	1.120.000	1.720.000	2.720.000	4.420.000	7.500.000	13.320.000	25.000.000
3,00	340.000	500.000	760.000	1.140.000	1.800.000	2.940.000	5.000.000	8.880.000	16.660.000
4,00	260.000	380.000	560.000	860.000	1.360.000	2.200.000	3.760.000	6.660.000	12.500.000
5,00	200.000	300.000	460.000	700.000	1.080.000	1.760.000	3.000.000	5.320.000	10.000.000
6,00	180.000	260.000	380.000	580.000	900.000	1.480.000	2.500.000	4.440.000	8.340.000
f_K	**1,00**	**1,10**	**1,20**	**1,30**	**1,40**	**1,50**	**1,60**	**1,70**	**1,80**

Gearbox type	KS / KSH / KSHF / MKS / MKSH / MKSHF								
i	Number of possible revolutions under load [Lu]*								
6,00	172.195	251.105	374.651	573.610	904.427	1.475.002	2.501.627	4.442.496	8.333.333
7,50	137.756	200.884	299.721	458.888	723.542	1.180.002	2.001.301	3.553.997	6.666.667
9,60	107.622	156.941	234.157	358.506	565.267	921.876	1.563.517	2.776.560	5.208.333
12,00	86.097	125.553	187.325	286.805	452.214	737.501	1.250.813	2.221.248	4.166.667
14,40	71.748	104.627	156.105	239.004	376.845	614.584	1.042.345	1.851.040	3.472.222
16,80	61.498	89.680	133.804	204.861	323.010	526.786	893.438	1.586.606	2.976.190
19,20	53.811	78.470	117.078	179.253	282.634	460.938	781.758	1.388.280	2.604.167
21,60	47.832	69.751	104.070	159.336	251.230	409.723	694.896	1.234.027	2.314.815
24,00	43.049	62.776	93.663	143.402	226.107	368.751	625.407	1.110.624	2.083.333
26,40	39.135	57.069	85.148	130.366	205.552	335.228	568.552	1.009.658	1.893.939
28,80	35.874	52.314	78.052	119.502	188.422	307.292	521.172	925.520	1.736.111
33,60	30.749	44.840	66.902	102.430	161.505	263.393	446.719	793.303	1.488.095
38,40	26.905	39.235	58.539	89.627	141.317	230.469	390.879	694.140	1.302.083
43,20	23.916	34.876	52.035	79.668	125.615	204.861	347.448	617.013	1.157.407
48,00	21.524	31.388	46.831	71.701	113.053	184.375	312.703	555.312	1.041.667
f_K	**1,00**	**1,10**	**1,20**	**1,30**	**1,40**	**1,50**	**1,60**	**1,70**	**1,80**

***** Sum of the revolutions under load for all torques which exceed the nominal torque / f_D. Line i=1 applies for all ratios for gearbox type LS

Start-up factor f_S	
Start-up mode	**f_S**
Direct	1,8 to 3,0
Soft start	1,8
Frequency converter	1,5 to 2,0
Star / Delta	1,3
Fluid coupling	1,6 to 2,0
Hydraulic motor	1,5

Direction of load factor f_L	
Constant direction of load	1,00
Reversing direction of load	1,40

Application factor f_A

		E-machines			Combustion engine ≤ 3 cylinders			Combustion engine > 3 cylinders and hydraulic motors		
	Operating time per day	< 3h	3-10 h	> 10 h	< 3h	3-10 h	> 10 h	< 3h	3-10 h	> 10 h
Wastewater treatment	Rotary surface aerators	-	1,80	2,00	-	2,30	2,50	-	2,05	2,25
	Thickeners	1,15	1,25	1,50	1,65	1,75	2,00	1,40	1,50	1,75
	Vacuum filters	1,15	1,30	1,50	1,65	1,80	2,00	1,40	1,55	1,75
	Collectors	1,15	1,25	1,50	1,65	1,75	2,00	1,40	1,50	1,75
	Screw pumps	-	1,30	1,50	-	1,80	2,00	-	1,55	1,75
	Brush aerators	-	-	2,00	-	-	2,50	-	-	2,25
Mining	Crushers	1,55	1,75	2,00	2,05	2,25	2,50	1,80	2,00	2,25
	Vibrators and screens	1,55	1,75	2,00	2,05	2,25	2,50	1,80	2,00	2,25
	Swing gears	-	1,55	1,80	-	2,05	2,30	-	1,80	2,05
	Bucket wheel excavators	a.)	a.)	a.)	a.)	a.)	a.)	a.)	a.)	a.)
Power technology	Frequency converters	-	1,80	2,00	-	2,30	2,50	-	2,05	2,25
	Water wheels (50 to 200 rpm)	-	-	1,70	-	-	2,20	-	-	1,95
	Water turbines	-	-	a.)	-	-	a.)	-	-	a.)
Conveyor technology	Bucket conveyors	-	1,40	1,50	-	1,90	2,00	-	1,65	1,75
	Vertical conveyors, elevators	-	1,50	1,80	-	2,00	2,30	-	1,75	2,05
	Rubber belt conveyors	1,15	1,25	1,40	1,65	1,75	1,90	1,40	1,50	1,65
	Apron feeders	-	1,25	1,50	-	1,75	2,00	-	1,50	1,75
	Feed screws	1,15	1,25	1,50	1,65	1,75	2,00	1,40	1,50	1,75
	Vibrators and screens	1,55	1,75	2,00	2,05	2,25	2,50	1,80	2,00	2,25
	Moving staircases	1,25	1,25	1,50	1,75	1,75	2,00	1,50	1,50	1,75
	Passenger elevators	a.)	a.)	a.)	a.)	a.)	a.)	a.)	a.)	a.)
Elastomer, thermoset and thermoplastic technology	Extruders	-	1,40	1,60	-	1,90	2,10	-	1,65	1,85
	Drive shafts	1,55	1,75	2,00	2,05	2,25	2,50	1,80	2,00	2,25
	Calenders	-	1,65	1,65	-	2,15	2,15	-	1,90	1,90
	Mills	1,55	1,75	2,00	2,05	2,25	2,50	1,80	2,00	2,25
	Roll mills	a.)	a.)	a.)	a.)	a.)	a.)	a.)	a.)	a.)
	Slab rollers	1,55	1,75	2,00	2,05	2,25	2,50	1,80	2,00	2,25
	Refining rollers	1,55	1,75	2,00	2,05	2,25	2,50	1,80	2,00	2,25
	Tyre machines	a.)	a.)	a.)	a.)	a.)	a.)	a.)	a.)	a.)
Wood engineering	Wood industry	a.)	a.)	a.)	a.)	a.)	a.)	a.)	a.)	a.)
Hoisting technology	Cranes and hoists	a.)	a.)	a.)	a.)	a.)	a.)	a.)	a.)	a.)
Food industry	Crushers and mills	-	-	1,75	-	-	2,25	-	-	2
	Beet cutters	-	1,25	1,50	-	1,75	2,00	-	1,50	1,75
	Drying drums	-	1,25	1,50	-	1,75	2,00	-	1,50	1,75
Metal production and processing	Coilers	-	1,60	1,75	-	2,10	2,25	-	1,85	2,00
	Slitting rollers	1,55	1,75	2,00	2,05	2,25	2,50	1,80	2,00	2,25
	Table conveyors	a.)	a.)	a.)	a.)	a.)	a.)	a.)	a.)	a.)
	Wire drawing machines	1,35	1,50	1,75	1,85	2	2,25	1,60	1,75	2,00
	Rollers	a.)	a.)	a.)	a.)	a.)	a.)	a.)	a.)	a.)

Application factor f_A

		E-machines			Combustion engine ≤ 3 cylinders			Combustion engine > 3 cylinders and hydraulic motors		
	Operating time per day	< 3h	3-10 h	> 10 h	< 3h	3-10 h	> 10 h	< 3h	3-10 h	> 10 h
Mills and drums, drying	Cooling drums, drying drums	-	1,50	1,60	-	2,00	2,10	-	1,75	1,85
	Rotating tubular kilns	-	-	2,00	-	-	2,50	-	-	2,25
	Ball mills	-	-	2,00	-	-	2,50	-	-	2,25
	Coal pulverisers	-	1,50	1,75	-	2,00	2,25	-	1,75	2,00
Pulp technology	Barking	1,55	1,80	-	2,05	2,30	-	1,80	2,05	-
	Rollers	-	1,80	2,00	-	2,30	2,50	-	2,05	2,25
	Drying cylinders	-	1,80	2,00	-	2,30	2,50	-	2,05	2,25
	Calenders	-	1,80	2,00	-	2,30	2,50	-	2,05	2,25
	Filters	-	1,80	2,00	-	2,30	2,50	-	2,05	2,25
	Choppers	1,55	1,75	2,00	2,05	2,25	2,50	1,80	2,00	2,25
	Jordan refiners	-	1,50	1,75	-	2	2,25	-	1,75	2,00
	Presses	-	-	1,75	-	-	2,25	-	-	2,00
	Reel winders	-	-	1,75	-	-	2,25	-	-	2,00
	Pulpers	a.)	a.)	a.)	a.)	a.)	a.)	a.)	a.)	a.)
	Washing filters	-	-	1,50	-	-	2,00	-	-	1,75
	Yankee cylinders (drying technology)	a.)	a.)	a.)	a.)	a.)	a.)	a.)	a.)	a.)
Feed pumps	Centrifugal pumps	1,15	1,35	1,45	1,65	1,85	1,95	1,40	1,60	1,70
	Reciprocating pumps	1,35	1,50	1,80	1,85	2,00	2,30	1,60	1,75	2,05
	Reciprocating pumps (> 1 cylinder)	1,20	1,40	1,50	1,70	1,90	2,00	1,45	1,65	1,75
	Spiral pumps	-	1,25	1,50	-	1,75	2,00	-	1,50	1,75
	Gear pumps, vane pumps	-	-	1,25	-	-	1,75	-	-	1,50
Stirrer and mixing technology	Stirrers for liquids	1,00	1,25	1,50	1,50	1,75	2,00	1,25	1,50	1,75
	Stirrers for liquids (different density)	1,20	1,50	1,65	1,70	2,00	2,15	1,45	1,75	1,90
	Stirrers for solids (different size and density)	1,40	1,60	1,70	1,90	2,10	2,20	1,65	1,85	1,95
	Stirrers for solids (homogeneous)	-	1,35	1,40	-	1,85	1,90	-	1,60	1,65
	Concrete mixers	-	1,50	1,50	-	2,00	2,00	-	1,75	1,75
Haulage tracks	Material tracks	-	1,40	1,50	-	1,90	2,00	-	1,65	1,75
	Pendulum tracks	-	a.)	a.)	-	a.)	a.)	-	a.)	a.)
	T-bar lifts	a.)	a.)	a.)	a.)	a.)	a.)	a.)	a.)	a.)
	Continuous tracks	a.)	a.)	a.)	a.)	a.)	a.)	a.)	a.)	a.)
	Passenger cable cars	a.)	a.)	a.)	a.)	a.)	a.)	a.)	a.)	a.)
Blowers and ventilators	Heat exchangers	1,50	1,50	1,50	2,00	2,00	2,00	1,75	1,75	1,75
	Dry cooling tower	-	-	2,00	-	-	2,50	-	-	2,25
	Wet cooling tower	2,00	2,00	2,00	2,50	2,50	2,50	2,25	2,25	2,25
	Blowers (axial, radial)	1,50	1,50	1,50	2,00	2,00	2,00	1,75	1,75	1,75
Compressor technology	Piston compressors	-	1,80	1,90	-	2,30	2,40	-	2,05	2,15
	Radial flow compressors	-	1,40	1,50	-	1,90	2,00	-	1,65	1,75
	Rotary screw compressors	-	1,50	1,75	-	2,00	2,25	-	1,75	2,00

a.) : Consultation with Vogel necessary

FATIGUE STRENGTH FACTOR f_D

Gearbox type		L / H / K / LV / ML / MH / MK			
Gearbox size	n1	50	100	200	230
i			f_D		
1,0	50	0,56	0,60	0,56	0,65
	250	0,56	0,61	0,61	0,72
	500	0,59	0,65	0,66	0,76
	1000	0,63	0,71	0,81	0,87
	1500	0,71	0,81	0,89	1,00
	2000	0,83	0,91	1,00	1,08
	3000	1,00	1,07	1,22	1,44
1,5	50	0,67	0,66	0,61	0,68
	250	0,67	0,67	0,66	0,71
	500	0,71	0,69	0,72	0,75
	1000	0,75	0,75	0,79	0,84
	1500	0,80	0,83	0,88	0,90
	2000	0,86	0,87	0,93	0,96
	3000	1,00	1,00	1,08	1,13
2,0	50	0,78	0,74	0,66	0,70
	250	0,78	0,76	0,69	0,74
	500	0,78	0,77	0,72	0,78
	1000	0,82	0,82	0,78	0,82
	1500	0,88	0,86	0,86	0,88
	2000	0,93	0,93	0,96	0,93
	3000	1,00	1,00	1,05	1,08
3,0	50	0,69	0,70	0,61	0,63
	250	0,73	0,72	0,66	0,65
	500	0,73	0,74	0,69	0,69
	1000	0,79	0,76	0,77	0,73
	1500	0,85	0,80	0,87	0,85
	2000	0,92	0,88	0,89	0,92
	3000	1,00	1,00	1,12	1,10
4,0	50	0,73	0,76	0,67	0,66
	250	0,73	0,76	0,70	0,68
	500	0,79	0,78	0,73	0,70
	1000	0,85	0,83	0,80	0,77
	1500	0,85	0,85	0,86	0,82
	2000	0,92	0,94	0,94	0,88
	3000	1,00	1,00	1,07	1,15
5,0	50		0,71	0,67	0,60
	250		0,73	0,70	0,62
	500		0,77	0,73	0,66
	1000		0,82	0,80	0,75
	1500		0,90	0,88	0,88
	2000		0,96	0,94	0,95
	3000		1,00	1,07	1,05
6,0	50		0,81	0,76	0,64
	250		0,84	0,80	0,69
	500		0,87	0,81	0,74
	1000		0,90	0,82	0,79
	1500		0,93	0,88	0,86
	2000		0,96	0,93	0,94
	3000		1,00	1,08	1,08

FATIGUE STRENGTH FACTOR f_D

Gearbox type		L / H / K / LV / ML / MH / MK			
Gearbox size	**n1**	**250**	**300**	**370**	**400**
i			**f_D**		
1,0	50	0,61	0,59	0,55	0,62
	250	0,65	0,71	0,72	0,77
	500	0,73	0,82	0,86	0,90
	1000	0,89	1,00	1,08	1,20
	1500	1,09	1,17	1,32	1,46
	2000	1,15	1,37	1,56	1,77
	3000	1,51	1,86	2,15	2,45
1,5	50	0,63	0,59	0,53	0,60
	250	0,65	0,67	0,63	0,72
	500	0,69	0,76	0,77	0,83
	1000	0,77	0,87	0,92	0,98
	1500	0,91	1,00	1,08	1,20
	2000	1,00	1,11	1,21	1,37
	3000	1,18	1,37	1,57	1,77
2,0	50	0,63	0,59	0,52	0,58
	250	0,65	0,64	0,56	0,65
	500	0,67	0,71	0,71	0,74
	1000	0,74	0,82	0,85	0,87
	1500	0,80	0,91	0,97	1,04
	2000	0,91	1,00	1,06	1,16
	3000	1,11	1,17	1,30	1,41
3,0	50	0,55	0,56	0,55	0,45
	250	0,62	0,61	0,59	0,54
	500	0,67	0,67	0,64	0,61
	1000	0,80	0,78	0,77	0,78
	1500	0,89	0,90	0,91	0,90
	2000	0,94	1,00	1,00	1,00
	3000	1,07	1,17	1,23	1,27
4,0	50	0,60	0,58	0,54	0,54
	250	0,62	0,65	0,61	0,58
	500	0,70	0,70	0,67	0,64
	1000	0,80	0,78	0,79	0,76
	1500	0,88	0,88	0,88	0,89
	2000	0,96	1,00	1,00	1,00
	3000	1,05	1,17	1,21	1,24
5,0	50	0,65	0,65	0,58	0,57
	250	0,68	0,71	0,62	0,61
	500	0,74	0,76	0,69	0,65
	1000	0,85	0,85	0,80	0,77
	1500	0,92	0,92	0,90	0,89
	2000	0,94	1,00	1,00	1,00
	3000	1,06	1,13	1,12	1,15
6,0	50	0,74	0,74	0,70	0,60
	250	0,78	0,78	0,72	0,61
	500	0,82	0,81	0,74	0,68
	1000	0,84	0,86	0,81	0,77
	1500	0,91	0,93	0,90	0,88
	2000	0,97	1,00	1,00	1,00
	3000	1,03	1,14	1,19	1,20

FATIGUE STRENGTH FACTOR f_D

Gearbox type		LS						
Gearbox size	**n1**	**100**	**200**	**230**	**250**	**300**	**370**	**400**
i				**f_D**				
1 / 1,5	50	0,67	0,62	0,68	0,62	0,59	0,54	0,61
	250	0,69	0,70	0,73	0,67	0,72	0,70	0,79
	500	0,71	0,76	0,80	0,72	0,83	0,84	0,90
	1000	0,81	0,88	0,90	0,90	1,00	1,07	1,20
	1500	0,90	0,96	1,00	1,02	1,15	1,31	1,44
	2000	1,00	1,08	1,11	1,18	1,37	1,53	-
	3000	1,16	1,26	1,25	1,48	-	-	-
1 / 2,0	50	0,76	0,67	0,71	0,63	0,60	0,53	0,60
	250	0,79	0,73	0,78	0,67	0,71	0,70	0,74
	500	0,84	0,78	0,82	0,74	0,82	0,85	0,87
	1000	0,95	0,96	0,93	0,91	1,00	1,06	1,16
	1500	1,00	1,05	1,08	1,11	1,17	1,30	1,41
	2000	1,12	1,13	1,17	1,28	-	-	-
	3000	1,27	-	-	-	-	-	-

FATIGUE STRENGTH FACTOR f_D

Gearbox type	KS / KSH / KSHF / MKS / MKSH / MKSHF						
Gearbox size	n1	1	2	4	8	16	32
i				f_D			
6,0	50	0,95	0,89	0,90	0,79	0,81	0,82
	500	0,95	0,91	0,92	0,82	0,85	0,87
	1000	0,95	0,94	0,93	0,87	0,89	0,91
	1500	0,95	0,96	0,96	0,93	0,94	0,96
	2000	0,95	0,98	0,99	0,98	1,00	1,06
	3000	1,00	1,00	1,01	1,03	1,05	1,14
7,5	50	0,95	0,90	0,90	0,84	0,83	0,83
	500	0,95	0,91	0,92	0,85	0,86	0,87
	1000	0,95	0,94	0,93	0,88	0,89	0,92
	1500	0,95	0,95	0,96	0,93	0,94	0,97
	2000	0,95	0,97	0,98	0,95	1,00	1,05
	3000	1,00	1,00	1,02	1,05	1,04	1,15
9,6	50	0,76	0,70	0,86	0,87	0,88	0,84
	500	0,76	0,76	0,89	0,90	0,90	0,90
	1000	0,76	0,84	0,94	0,91	0,93	0,95
	1500	0,81	0,89	0,98	0,94	0,98	0,98
	2000	0,88	0,92	0,99	0,96	1,00	1,03
	3000	1,00	1,00	1,01	1,04	1,05	1,11
12,0	50	0,75	0,86	0,89	0,87	0,86	0,86
	500	0,75	0,88	0,90	0,89	0,87	0,89
	1000	0,75	0,90	0,92	0,92	0,93	0,95
	1500	0,81	0,93	0,94	0,95	0,96	0,99
	2000	0,88	0,95	0,98	0,97	1,00	1,02
	3000	1,00	1,00	1,03	1,03	1,02	1,08
14,4	50	0,79	0,82	0,87	0,88	0,86	0,85
	500	0,79	0,87	0,88	0,89	0,87	0,88
	1000	0,79	0,91	0,92	0,92	0,93	0,93
	1500	0,79	0,95	0,95	0,94	0,97	0,96
	2000	0,88	0,98	0,98	0,98	1,00	1,00
	3000	1,00	1,00	1,03	1,03	1,07	1,07
16,8	50	1,00	0,84	0,86	0,85	0,84	0,85
	500	1,00	0,86	0,89	0,87	0,86	0,88
	1000	1,00	0,90	0,91	0,90	0,94	0,93
	1500	1,00	0,93	0,91	0,95	0,97	0,96
	2000	1,00	0,95	0,96	0,97	1,00	1,00
	3000	1,00	1,00	1,02	1,03	1,06	1,07
19,2	50	1,00	0,86	0,84	0,85	0,85	0,85
	500	1,00	0,88	0,88	0,89	0,88	0,88
	1000	1,00	0,90	0,93	0,91	0,93	0,93
	1500	1,00	0,93	0,95	0,95	0,96	0,96
	2000	1,00	0,95	0,97	0,98	1,00	1,00
	3000	1,00	1,00	1,03	1,02	1,07	1,07
21,6	50	1,00	0,87	0,88	0,83	0,85	0,85
	500	1,00	0,90	0,90	0,88	0,86	0,88
	1000	1,00	0,92	0,93	0,94	0,93	0,93
	1500	1,00	0,94	0,97	0,96	0,96	0,97
	2000	1,00	0,95	0,98	0,99	1,00	1,00
	3000	1,00	1,00	1,02	1,01	1,06	1,07

FATIGUE STRENGTH FACTOR f_D

Gearbox type	KS / KSH / KSHF / MKS / MKSH / MKSHF						
Gearbox size	n1	1	2	4	8	16	32
i	f_D						
24,0	50	1,00	0,84	0,85	0,76	0,83	0,85
	500	1,00	0,90	0,89	0,81	0,86	0,88
	1000	1,00	0,91	0,91	0,85	0,92	0,92
	1500	1,00	0,94	0,95	0,92	0,96	0,96
	2000	1,00	0,98	0,98	0,97	1,00	1,00
	3000	1,00	1,00	1,02	1,03	1,06	1,06
26,4	50	1,00	0,75	0,86	0,83	0,88	0,82
	500	1,00	0,77	0,91	0,87	0,89	0,86
	1000	1,00	0,81	0,93	0,90	0,90	0,91
	1500	1,00	0,84	0,96	0,94	0,93	0,96
	2000	1,00	0,91	0,99	0,99	1,00	1,00
	3000	1,00	1,00	1,01	1,02	1,08	1,08
28,8	50	1,00	0,85	0,84	0,88	0,85	0,85
	500	1,00	0,87	0,90	0,91	0,87	0,88
	1000	1,00	0,89	0,92	0,92	0,92	0,93
	1500	1,00	0,91	0,96	0,95	0,96	0,97
	2000	1,00	0,93	0,97	0,97	1,00	1,00
	3000	1,00	1,00	1,03	1,03	1,06	1,07
33,6	50	1,00	0,77	0,87	0,87	0,86	0,83
	500	1,00	0,81	0,90	0,90	0,87	0,86
	1000	1,00	0,85	0,92	0,92	0,90	0,91
	1500	1,00	0,89	0,96	0,95	0,94	0,96
	2000	1,00	0,94	0,97	0,98	1,00	1,00
	3000	1,00	1,00	1,03	1,03	1,07	1,06
38,4	50	1,00	0,83	0,90	0,91	0,84	0,83
	500	1,00	0,87	0,94	0,91	0,87	0,88
	1000	1,00	0,89	0,95	0,92	0,92	0,91
	1500	1,00	0,92	0,98	0,94	0,96	0,94
	2000	1,00	0,95	0,99	0,98	1,00	1,00
	3000	1,00	1,00	1,01	1,03	1,07	1,07
43,2	50	1,00	0,73	0,89	0,87	0,88	0,82
	500	1,00	0,75	0,91	0,89	0,89	0,87
	1000	1,00	0,80	0,94	0,91	0,94	0,90
	1500	1,00	0,86	0,96	0,93	0,96	0,94
	2000	1,00	0,92	0,99	0,98	1,00	1,00
	3000	1,00	1,00	1,01	1,03	1,07	1,07
48,0	50	1,00	0,80	0,83	0,83	0,83	0,76
	500	1,00	0,86	0,90	0,89	0,88	0,81
	1000	1,00	0,89	0,93	0,92	0,93	0,88
	1500	1,00	0,92	0,95	0,94	0,96	0,92
	2000	1,00	0,95	0,97	0,98	1,00	1,00
	3000	1,00	1,00	1,03	1,02	1,07	1,10

CALCULATION EXAMPLE

1. Application values

= Customer parameters

= Calculations

Application	Traction drive toothed rack system
Gearbox	Spiral bevel gearboxes
Gearbox type	MH

Collektive	Description	Output speed [n_{2i}]* min^{-1}	Time share [t_i] s	Output torque [t_{2i}] Nm
1	Start-up	145	1	1200
2	Transport	290	300	450
3	Stop	145	1	1200
4	Idle	0	300	0
5				
6				
7				
8				
9				
10				

* Half the final speed or initial speed are used as a basis for acceleration and deceleration procedures

Emergency stop torque output	T_{2Not}	N_m	1600
Nominal output speed	n_2	min^{-1}	290
Radial load input	F_{1rm}	N	0
Radial load output	F_{2rm}	N	3000
Maximum radial load input	F_{1rmax}	N	0
Maximum radial load output	F_{2rmax}	N	8000
Nominal power main engine	P_{Mot}	kW	15,0
Nominal speed main engine	n_{1Mot}	min^{-1}	1455
Gearbox life time	B_h	h	20000
Definition of application factor	f_A	-	1,20
Definition of start-up factor	f_S	-	2,80
Definition of direction of load factor	f_L	-	1,00

2. Calculation of application values

Determination of output speed max.	n_{2max}	min^{-1}	290	Max. value of load profile	1
Determination of output torque max.	T_{2max}	Nm	1200	Max. value of load profile	1
Calculation of total cycle time	t_{ges}	s	602	$\sum (t_i)$	2
Calculation of average output torque from load profile	T_{2m}	Nm	535	$\sqrt[6,6]{\frac{\sum (n_{2i} * t_i * T_{2i}{}^{6,6})}{\sum (n_{2i} * t_i)}}$	3
Calculation of the time-averaged output torque	T_{2mz}	Nm	452	$\frac{\sum (n2i * t_i * T_{2i})}{\sum (n2i * t_i)}$	3
Calculation of average output speed from load profile	n_{2m}	min^{-1}	145	$\frac{\sum (n2i * t_i)}{\sum (t_{ges})}$	4
Calculation of revolutions under load per cycle $T_{2i} > \frac{T_{2Nzul}}{f_D}$ (values from block 3 required)	L_{uz}	1 / Zyk	4,83	$\frac{\sum (n_{2i} * t_i)}{60}$	5
Calculation of revolutions under load	L_u	-	578073	$\frac{Bh * 3600}{t_{ges} * L_{uz}}$	5

3. Determination of gearbox values

Calculation of ratio required	i_{erf}	-	5,017	$\frac{n_{1Mot}}{n_2}$	
Determination of possible ratio	i	-	5		6
Calculation of required nominal torque on output	$T_{2Nzulerf}$	Nm	642	$T_{2m} * f_A$	
Determination of size	BG	-	370	Auswahl nach T_{2Nzul} > $T_{2Nzulerf}$	6
Calculation of nominal speed on input	n_1	min^{-1}	1450	$n_2 * i$	
Calculation of average speed on input	n_{1m}	min^{-1}	725	$n_{2m} * i$	
Calculation of maximum speed on input	n_{1max}	min^{-1}	1450	$n_{2max} * i$	
Determination of gearbox efficiency	η	-	0,97		6
Determination of fatigue strength factor as per table	f_D	-	0,8		7
Determination of dynamic factor	f_K	-	1,3		8
Determination of nominal torque on output	T_{2Nzul}	Nm	560		6
Determination of maximum permissible output torque	$T_{2maxzul}$	Nm	1746		6
Determination of emergency stop torque	$T_{2Notzul}$	Nm	1940		6
Determination of thermal limit power	$P_{thGrenz}$	kW	14,4		6
Determination of permissible, average input speed	n_{1mzul}	min^{-1}	2000		6
Determination of maximum input speed	$n_{1maxzul}$	min^{-1}	3000		6
Determination of permissible radial load at input	F_{1rmzul}	N	3810		9
Determination of permissible radial load at output	F_{2rmzul}	N	10486		9
Determination of maximum permissible radial load at input	$F_{1rmaxzul}$	N	11000		6
Determination of maximum permissible radial load at output	$F_{2rmaxzul}$	N	18500		6

4. Determination of motor values

Calculation of motor nominal output torque	T_{2NMot}	Nm	479	$\frac{P_{Mot} * 9550 * \eta * 1}{n_2}$
Calculation of max. motor torque on output	$T_{2maxMot}$	Nm	1342	$\frac{P_{Mot} * 9550 * \eta * f_S}{n_2}$

5. Comparison of the gearbox with the application

					Condition
Check the motor nominal output torque	T_{2NMot}	Nm	479 > 452	T_{2mz}	fulfilled
Check the max. motor torque on output	$T_{2maxMot}$	Nm	1342 > 1200	T_{2max}	fulfilled
Check the nominal torque on output	T_{2Nzul}	Nm	560 > 514	$T_{2m} * f_A * f_D * f_L$	fulfilled
Check the max. permissible output torque (motor)	$T_{2maxzul}$	Nm	1746 > 1744	$T_{2maxMot} * f_K * f_L$	fulfilled
Check the max. permissible output torque (application)	$T_{2maxzul}$	Nm	1746 > 1560	$T_{2maxMot} * f_K * f_L$	fulfilled
Check the emergency stop torque	$T_{2Notzul}$	Nm	1940 > 1600	T_{2Not}	fulfilled
Check the power to be transferred	$P_{thGrenz}$	kW	14,4 > 7,1	$\frac{T_{2mz} * n_{2m} * 2 * \pi}{60000}$	fulfilled
Check the permissible, average input speed	n_{1mzul}	min^{-1}	2000 > 725	n_{1m}	fulfilled
Check the maximum input speed	$n_{1maxzul}$	min^{-1}	3000 > 1450	n_{1max}	fulfilled
Check the radial load at input	F_{1rmzul}	N	3810 > 0	F_{1rm}	fulfilled
Check the radial load at output	F_{2rmzul}	N	10486 > 3000	F_{2rm}	fulfilled
Check the maximum permissible radial load at input	$F_{1rmaxzul}$	N	11000 > 0	F_{1rmax}	fulfilled
Check the maximum permissible radial load at output	$F_{2rmaxzul}$	N	18500 > 8000	F_{2rmax}	fulfilled

1 Max. value of load profile
2 Sum of times in the load profile, including idle time
3 Equivalent torque from load profile
4 Average speed from load profile
5 Valid for all torques $T_{2i} > T_{2m} * f_A$
6 From the technical data of the gearbox type
7 Fatigue strength factor as per table
8 Dynamics factor as per table
9 From the technical data of the gearbox type, at permissible average input speed

L

TECHNICAL DATA

Technical specifications on this page and in the tables on the following four pages are intended only for rough preselection.

Gear teeth:	Klingelnberg spiral bevel gear teeth
Direction of rotation:	The opposite direction when facing C and A
Life time:	20000 h L_{10h}
Permissible gearbox temperature at housing:	-10 °C to +80 °C (deviating temperature ranges on request)
Lubrication:	Oil lubrication/grease lubrication
Mounting position:	Any, specify when ordering
Surface protection:	Primer coat RAL 7035 Light grey
Protection rating:	IP 54

L

TECHNICAL DATA

The following technical specifications in the table are intended only for rough preselection

L			050				
Ratio	i		1,0	1,5	2,0	3,0	4,0
Max. permissible output torque	$T_{2maxzul}$	Nm	33	33	33	29	27
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	10	12	14	11	11
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	36	36	36	32	30
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	3000				
Max. input speed	$n_{1maxzul}$	min^{-1}	4500				
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)				
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	179				
Maximum permissible radial load input	$F_{1rmaxzul}$	N	550				
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	291	328	358	405	442
Max. permissible radial load output	$F_{2rmaxzul}$	N	900				
Efficiency	η	-	0,97				
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	1,23				
Weight	m	kg	1,7				
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75				
Inertia D1 (with reference to input)	J_1	$kgcm^2$	0,633	0,455	0,201	0,110	0,073

L			100						
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	90	90	90	72	54	54	41
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	30	33	37	28	29	27	23
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	100	100	100	80	60	60	46
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	2500	3000	3000	3000	3000	3000	3000
Max. input speed	$n_{1maxzul}$	min^{-1}	4300	4500	4500	4500	4500	4500	4500
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	295	280	280	280	280	280	280
Maximum permissible radial load input	$F_{1rmaxzul}$	N	880						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	491	526	573	648	708	757	800
Max. permissible radial load output	$F_{2rmaxzul}$	N	1450						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	2,3						
Weight	m	kg	5						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia D1 (with reference to input)	J_1	$kgcm^2$	3,607	2,246	0,885	0,601	0,531	0,529	0,491

* measured with 2 % nominal torque on output shaft

L

TECHNICAL DATA

L			200						
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	234	234	234	171	171	135	90
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	73	79	86	58	64	64	50
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	260	260	260	190	190	150	100
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	2000	2500	2500	2500	2500	2500	2500
Max. input speed	$n_{1maxzul}$	min^{-1}	3500	3750	3750	3750	3750	3750	3750
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	486	455	455	455	455	455	455
Maximum permissible radial load input	$F_{1rmaxzul}$	N	1400						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	821	868	947	1071	1168	1250	1321
Max. permissible radial load output	$F_{2rmaxzul}$	N	2200						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	4,05						
Weight	m	kg	12,5						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia D1 (with reference to input)	J_1	$kgcm^2$	12,156	8,201	4,247	2,875	2,462	2,408	2,109

L			230						
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	360	360	360	315	315	270	171
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	230	130	135	140	110	115	105
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	400	400	400	350	350	300	190
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	1500	2250	2500	2500	2500	2500	2500
Max. input speed	$n_{1maxzul}$	min^{-1}	2800	3750	3750	3750	3750	3750	3750
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	840	743	720	720	720	720	720
Maximum permissible radial load input	$F_{1rmaxzul}$	N	2050						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	1434	1434	1515	1713	1869	2000	2114
Max. permissible radial load output	$F_{2rmaxzul}$	N	3800						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	5,45						
Weight	m	kg	18						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia D1 (with reference to input)	J_1	$kgcm^2$	33,383	27,731	22,080	7,804	6,008	5,908	5,428

* measured with 2 % nominal torque on output shaft

L

TECHNICAL DATA

The following technical specifications in the table are intended only for rough preselection

L			250						
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	576	576	576	522	369	288	234
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	196	200	200	160	168	160	130
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	640	640	640	580	410	320	260
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	1300	1950	2500	2500	2500	2500	2500
Max. input speed	$n_{1maxzul}$	min^{-1}	2300	3450	3750	3750	3750	3750	3750
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	1385	1225	1136	1136	1136	1136	1136
Maximum permissible radial load input	$F_{1rmaxzul}$	N	3200						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	2545	2545	2576	2912	3178	3400	3593
Max. permissible radial load output	$F_{2rmaxzul}$	N	6500						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	7,1						
Weight	m	kg	25						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia D1 (with reference to input)	J_1	$kgcm^2$	56,493	37,428	27,326	12,025	10,653	9,485	9,133

L			300						
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	1260	1260	1260	900	864	900	612
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	410	410	410	280	280	340	250
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	1400	1400	1400	1000	960	1000	680
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	1000	1500	2000	2000	2000	2000	2000
Max. input speed	$n_{1maxzul}$	min^{-1}	2000	3000	3000	3000	3000	3000	3000
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	2600	2299	2107	2107	2107	2107	2107
Maximum permissible radial load input	$F_{1rmaxzul}$	N	5800						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	4093	4093	4093	4628	5050	5403	5710
Max. permissible radial load output	$F_{2rmaxzul}$	N	10000						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	10,9						
Weight	m	kg	45						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia D1 (with reference to input)	J_1	$kgcm^2$	150,200	99,935	49,877	31,151	25,140	23,627	21,175

* measured with 2 % nominal torque on output shaft

L

TECHNICAL DATA

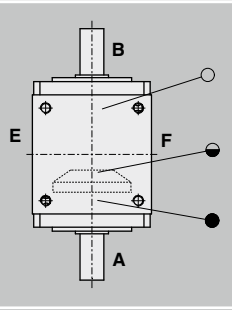
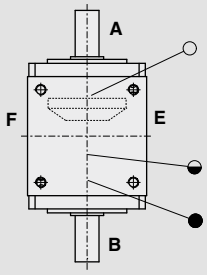
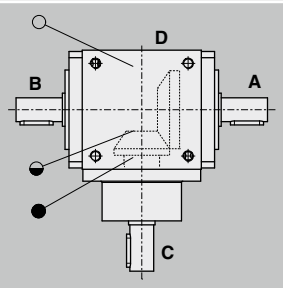
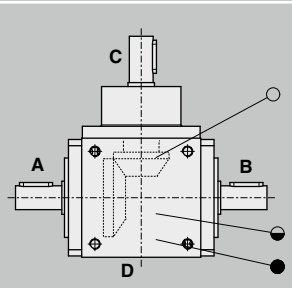
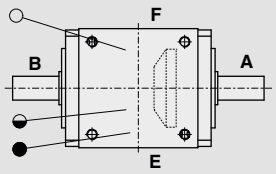
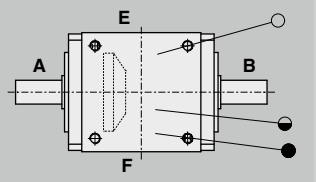
L			370						
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	2250	2340	2340	1566	1728	1746	945
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	688	690	676	480	520	560	430
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	2500	2600	2600	1740	1920	1940	1050
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	850	1275	1700	2000	2000	2000	2000
Max. input speed	$n_{1maxzul}$	min^{-1}	1700	2550	3000	3000	3000	3000	3000
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	4937	4366	4002	3810	3810	3810	3810
Maximum permissible radial load input	$F_{1rmaxzul}$	N	11000						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	6386	6386	6386	6874	7500	8025	8481
Max. permissible radial load output	$F_{2rmaxzul}$	N	15500						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	14,4						
Weight	m	kg	70						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia D1 (with reference to input)	J_1	$kgcm^2$	477,920	292,410	166,900	81,320	62,115	56,665	50,326

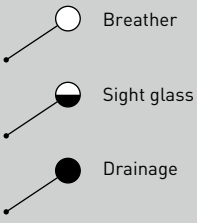
L			400						
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	3150	3240	3240	2970	2880	2700	1800
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	1080	1080	1040	760	870	850	600
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	3500	3600	3600	3300	3200	3000	2000
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	700	1050	1400	2000	2000	2000	2000
Max. input speed	$n_{1maxzul}$	min^{-1}	1400	2100	2800	3000	3000	3000	3000
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	10027	8868	8128	7295	7295	7295	7295
Maximum permissible radial load input	$F_{1rmaxzul}$	N	20000						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	13997	13997	13997	14206	15500	16584	17526
Max. permissible radial load output	$F_{2rmaxzul}$	N	27000						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	18,2						
Weight	m	kg	100						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia D1 (with reference to input)	J_1	$kgcm^2$	891,830	485,690	279,550	153,100	124,790	102,950	93,340

* measured with 2 % nominal torque on output shaft

L

MOUNTING POSITION AND LUBRICATION

L			
Side view			
Mounting position (underside)	**A**	**B**	**C**
Side of oil fittings*	**D** - E - F	**D** - E - F	**E** - F
Side view			
Mounting position (underside)	**D**	**E**	**F**
Side of oil fittings*	**E** - F	**D**	**D**

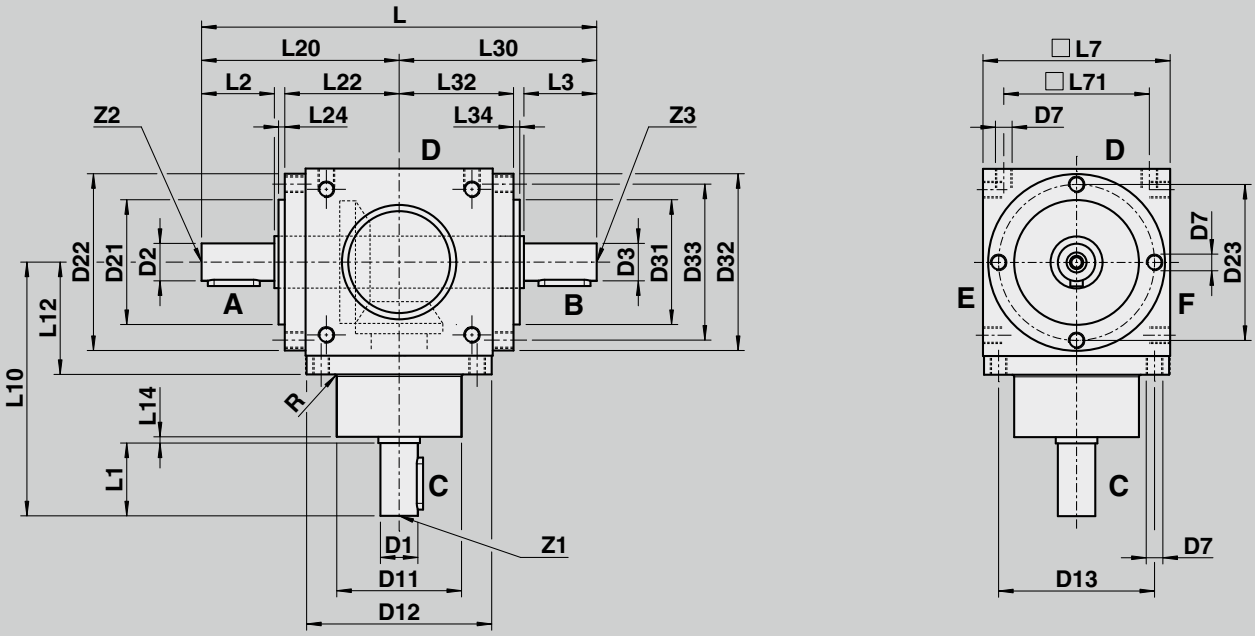


* Unless specified otherwise, the oil fittings are attached to the sides printed in bold type

L 0 5 0 – L 2 0 0

D I M E N S I O N S

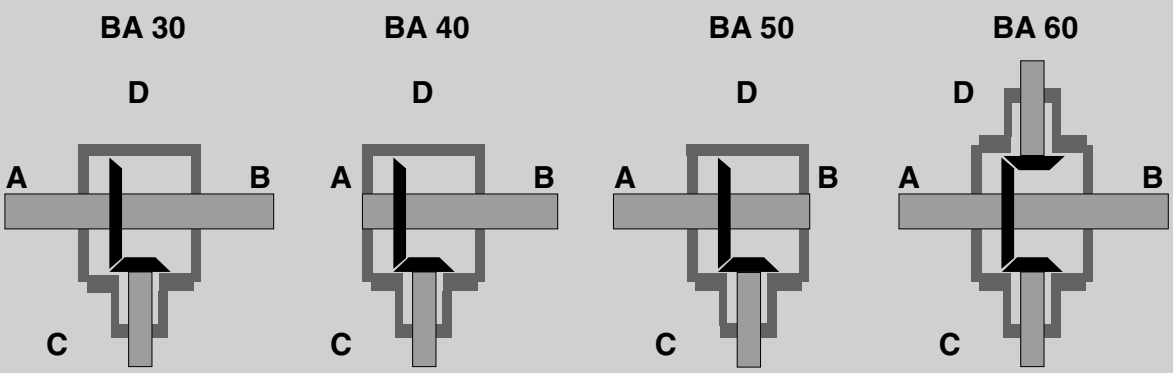
L 050



Size	Ratio	D1	D2	D3	D7	D8	D11	D12	D13	D21	D22	D23	D31	D32	D33	L	L1	L2	L3
		j6	j6	j6			f7	f7		f7			f7						
050	1 - 2 3 + 4	12	12	12	M 6	-	44	64,5*	54	44	64,5	54	44	64,5	54	144	26	26	26
100	1 - 2	18	18	18	M 8	9	60	89	75	60	-	-	60	-	-	190	35	35	35
	3 + 4	15															30		
	5 + 6	12															25		
200	1 - 2	25	25	25	M10	11	80	119	100	80	-	-	80	-	-	244	45	45	45
	3 + 4	20															40		
	5 + 6	15															30		

* General tolerance DIN ISO 2768-1

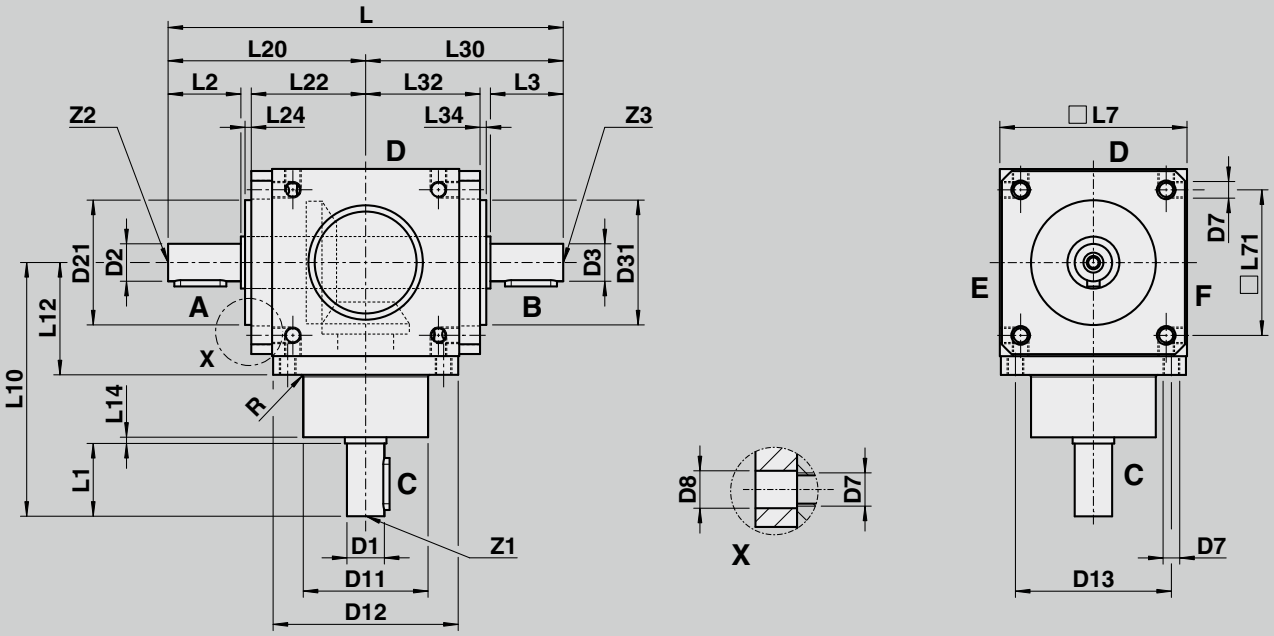
Design



L 050 – L 200

DIMENSIONS

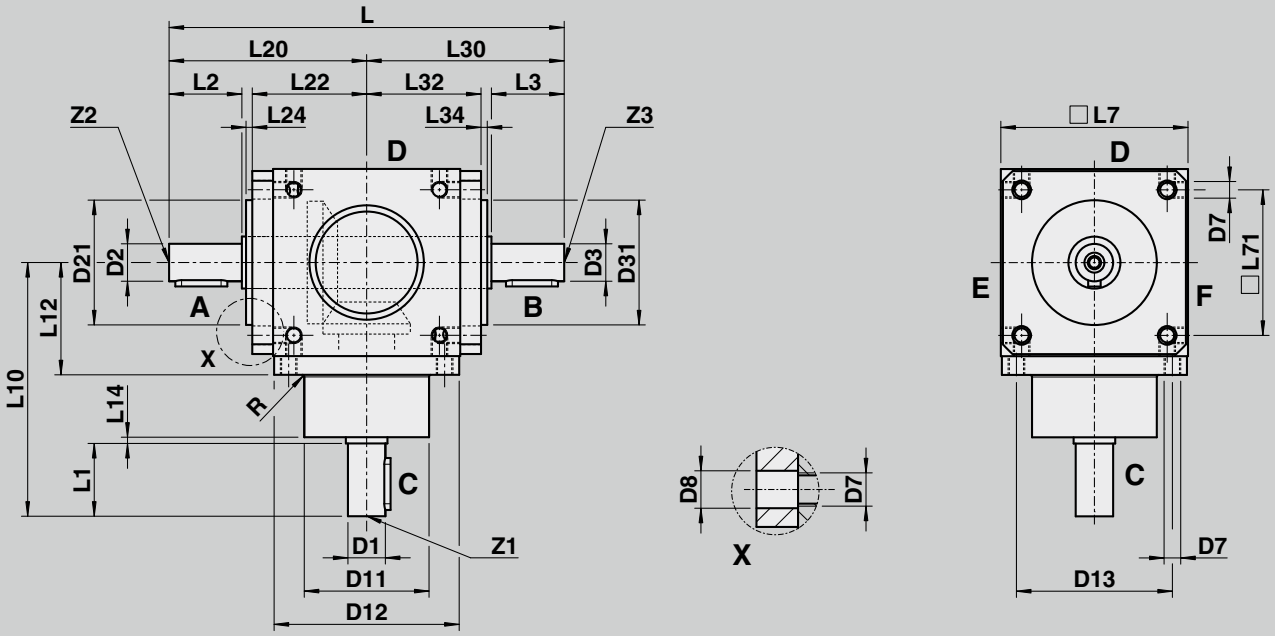
L 100 – 200



L7	L10	L12	L14	L20	L22	L24	L30	L32	L34	L71	R	Key D1 according to DIN 6885/1	Key D2/D3 according to DIN 6885/1	Z1 DIN 332	Z2 DIN 332	Z3 DIN 332
65	100	42	2	72	42	2	72	42	2	45	0,8	4 x 4 x 20	4 x 4 x 20	D M 4	D M 4	D M 4
	115															
90	127	55	2	95	55	3	95	55	3	70	1	6 x 6 x 25	6 x 6 x 25	D M 6	D M 6	D M 6
	122											5 x 5 x 20		D M 5		
	162											4 x 4 x 16		D M 4		
120	157	75	2	122	72	3	122	72	3	100	1	8 x 7 x 36	8 x 7 x 36	D M10	D M10	D M10
	147											6 x 6 x 30		D M 6		
	180											5 x 5 x 20		D M 5		

L 230 – L 400

DIMENSIONS

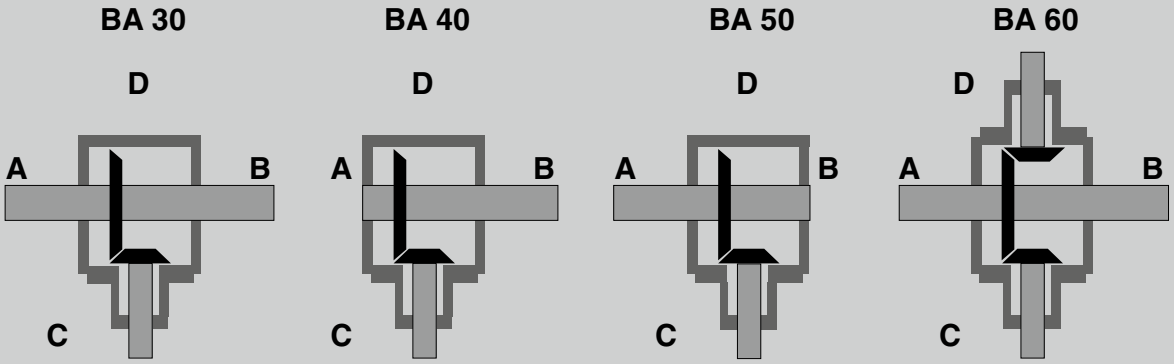


Size	Ratio	D1	D2	D3	D7	D8	D11	D12	D13	D21	D31	L	L1	L2	L3	L7	L10
		j6	j6	j6			f7	f7		f7	f7						
230	1 - 2	32	32	32	M10	11,0	95	135	115	100	100	274	50	50	50	140	180
	3 + 4	28															195
	5 + 6	24															
250	1 - 2	35	35	35	M12	13,5	110	156	135	110	110	320	60	60	60	160	212
	3 + 4	28											55				227
	5 + 6	24											50				222
300	1 - 2	42	42	42	M12	13,5	120	198	175	120	120	406	80	80	80	200	273
	3 + 4	35											68				261
	5 + 6	28											55				248
370	1 - 2	55	55	55	M16	17,5	150	225	200	150	150	460	90	90	90	230	305
	3 + 4	40					140						80				310
	5 + 6	35											70				300
400	1 - 2	60	60	60	M16	17,5	160	258	230	180	180	570	110	110	110	260	380
	3 + 4	50											90				360
	5 + 6	45															

L 230 – L 400

DIMENSIONS

Design



L12	L14	L20	L22	L24	L30	L32	L34	L71	R	Key D1 according to DIN 6885/1	Key D2/D3 according to DIN 6885/1	Z1 DIN 332	Z2 DIN 332	Z3 DIN 332
83	2	137	82	3	137	82	3	110	2	10 x 8 x 45	10 x 8 x 45	D M12	D M12	D M12
										8 x 7 x 40		D M10		
										8 x 7 x 40		D M 8		
95	2	160	95	3	160	95	3	120	2	10 x 8 x 45	10 x 8 x 45	D M12	D M12	D M12
										8 x 7 x 45		D M10		
										8 x 7 x 40		D M 8		
120	3	203	117	4	203	117	4	160	3	12 x 8 x 60	12 x 8 x 60	D M16	D M16	D M16
	2									10 x 8 x 45		D M12		
										8 x 7 x 45		D M10		
135	2	230	132	6	230	132	6	180	5	16 x 10 x 80	16 x 10 x 80	D M20	D M20	D M20
										12 x 8 x 60		D M16		
										10 x 8 x 50		D M12		
150	5	285	150	22	285	150	22	220	5	18 x 11 x 90	18 x 11 x 90	D M20	D M20	D M20
									10	14 x 9 x 70		D M16		
										14 x 9 x 70		D M16		

H

TECHNICAL DATA

Technical specifications on this page and in the tables on the following pages are intended only for rough preselection.

Gear teeth:	Klingelnberg spiral bevel gear teeth
Direction of rotation:	The opposite direction when facing C and A
Life time:	20000 h L_{10h}
Permissible gearbox temperature at housing:	-10 °C to +80 °C (deviating temperature ranges on request)
Lubrication:	Oil lubrication/grease lubrication
Mounting position:	Any, specify when ordering
Surface protection:	Primer coat RAL 7035 Light grey
Protection rating:	IP 54

H

TECHNICAL DATA

The following technical specifications in the table are intended only for rough preselection

H			050				
Ratio	i		1,0	1,5	2,0	3,0	4,0
Max. permissible output torque	$T_{2maxzul}$	Nm	33	33	33	29	27
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	10	12	14	11	11
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	36	36	36	32	30
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	3000				
Max. input speed	$n_{1maxzul}$	min^{-1}	4500				
Max. backlash*	j	arcmin	Standard ≤ 10 / Redced ≤ 7 (4)				
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	179				
Maximum permissible radial load input	$F_{1rmaxzul}$	N	550				
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	378	427	466	527	575
Max. permissible radial load output	$F_{2rmaxzul}$	N	1300				
Efficiency	ŋ	-	0,97				
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	1,23				
Weight	m	kg	1,7				
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75				
Inertia D1 (with reference to input)	J_1	$kgcm^2$	0,633	0,455	0,201	0,110	0,073

H			100						
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	90	90	90	72	54	54	41
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	30	33	37	28	29	27	23
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	100	100	100	80	60	60	46
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	2500	3000	3000	3000	3000	3000	3000
Max. input speed	$n_{1maxzul}$	min^{-1}	4300	4500	4500	4500	4500	4500	4500
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	295	280	280	280	280	280	280
Maximum permissible radial load input	$F_{1rmaxzul}$	N	880						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	614	657	717	811	884	946	1000
Max. permissible radial load output	$F_{2rmaxzul}$	N	1900						
Efficiency	ŋ	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	2,3						
Weight	m	kg	5						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia D1 (with reference to input)	J_1	$kgcm^2$	4,293	2,676	1,058	0,677	0,574	0,557	0,505

* measured with 2 % nominal torque on output shaft

H

TECHNICAL DATA

H			200						
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	234	234	234	171	171	135	90
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	73	79	86	58	64	64	50
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	260	260	260	190	190	150	100
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	2000	2500	2500	2500	2500	2500	2500
Max. input speed	$n_{1maxzul}$	min^{-1}	3500	3750	3750	3750	3750	3750	3750
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	486	455	455	455	455	455	455
Maximum permissible radial load input	$F_{1rmaxzul}$	N	1400						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	1051	1111	1212	1371	1495	1600	1691
Max. permissible radial load output	$F_{2rmaxzul}$	N	3000						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	4,05						
Weight	m	kg	12,5						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia D1 (with reference to input)	J_1	$kgcm^2$	16,646	10,968	5,289	3,057	2,572	2,475	2,225

H			230						
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	360	360	360	315	315	270	171
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	230	130	135	140	110	115	105
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	400	400	400	350	350	300	190
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	1500	2250	2500	2500	2500	2500	2500
Max. input speed	$n_{1maxzul}$	min^{-1}	2800	3750	3750	3750	3750	3750	3750
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	840	743	720	720	720	720	720
Maximum permissible radial load input	$F_{1rmaxzul}$	N	2050						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	1864	1864	1970	2227	2430	2600	2748
Max. permissible radial load output	$F_{2rmaxzul}$	N	4800						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	5,45						
Weight	m	kg	18						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia D1 (with reference to input)	J_1	$kgcm^2$	34,967	28,704	22,44	7,248	6,107	5,958	5,463

* measured with 2 % nominal torque on output shaft

H

TECHNICAL DATA

The following technical specifications in the table are intended only for rough preselection

H			250						
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	576	576	576	522	369	288	234
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	196	200	200	160	168	160	130
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	640	640	640	580	410	320	260
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	1300	1950	2500	2500	2500	2500	2500
Max. input speed	$n_{1maxzul}$	min^{-1}	2300	3450	3750	3750	3750	3750	3750
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	1385	1225	1136	1136	1136	1136	1136
Maximum permissible radial load input	$F_{1rmaxzul}$	N	3200						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	3294	3294	3333	3769	4112	4400	4650
Max. permissible radial load output	$F_{2rmaxzul}$	N	8000						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	7,1						
Weight	m	kg	25						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia D1 (with reference to input)	J_1	$kgcm^2$	59,826	38,862	29,898	14,542	12,451	11,621	10,303

H			300						
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	1260	1260	1260	900	864	900	612
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	410	410	410	280	280	340	250
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	1400	1400	1400	1000	960	1000	680
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	1000	1500	2000	2000	2000	2000	2000
Max. input speed	$n_{1maxzul}$	min^{-1}	2000	3000	3000	3000	3000	3000	3000
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	2600	2299	2107	2107	2107	2107	2107
Maximum permissible radial load input	$F_{1rmaxzul}$	N	5800						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	5593	5593	5593	6324	6900	7383	7802
Max. permissible radial load output	$F_{2rmaxzul}$	N	14500						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	10,9						
Weight	m	kg	45						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia D1 (with reference to input)	J_1	$kgcm^2$	161,170	106,410	51,638	32,933	27,581	24,909	22,370

* measured with 2 % nominal torque on output shaft

H

TECHNICAL DATA

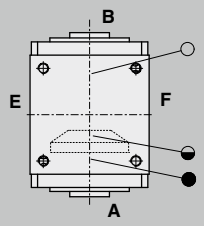
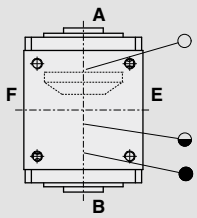
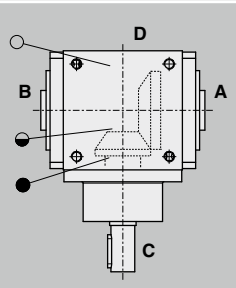
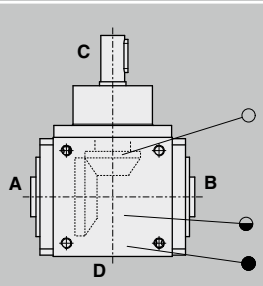
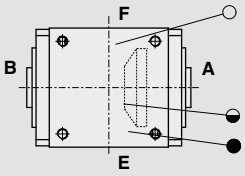
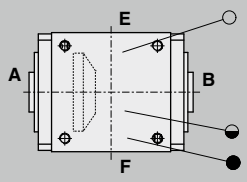
H			370						
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	2250	2340	2340	1566	1728	1746	945
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	688	690	676	480	520	560	430
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	2500	2600	2600	1740	1920	1940	1050
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	850	1275	1700	2000	2000	2000	2000
Max. input speed	$n_{1maxzul}$	min^{-1}	1700	2550	3000	3000	3000	3000	3000
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	4937	4366	4002	3810	3810	3810	3810
Maximum permissible radial load input	$F_{1rmaxzul}$	N	11000						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	8344	8344	8344	8982	9800	10486	11081
Max. permissible radial load output	$F_{2rmaxzul}$	N	18500						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	14,4						
Weight	m	kg	70						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia D1 (with reference to input)	J_1	$kgcm^2$	517,280	312,020	176,740	85,690	64,578	58,230	51,420

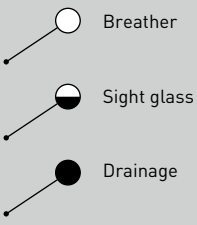
H			400						
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	3150	3240	3240	2970	2880	2700	1800
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	1080	1080	1040	760	870	850	600
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	3500	3600	3600	3300	3200	3000	2000
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	700	1050	1400	2000	2000	2000	2000
Max. input speed	$n_{1maxzul}$	min^{-1}	1400	2100	2800	3000	3000	3000	3000
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	10027	8868	8128	7295	7295	7295	7295
Maximum permissible radial load input	$F_{1rmaxzul}$	N	20000						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	16255	16255	16255	16497	18000	19259	20353
Max. permissible radial load output	$F_{2rmaxzul}$	N	34000						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	18,2						
Weight	m	kg	100						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia D1 (with reference to input)	J_1	$kgcm^2$	947,620	520,560	293,500	180,990	149,970	90,850	80,540

* measured with 2 % nominal torque on output shaft

H

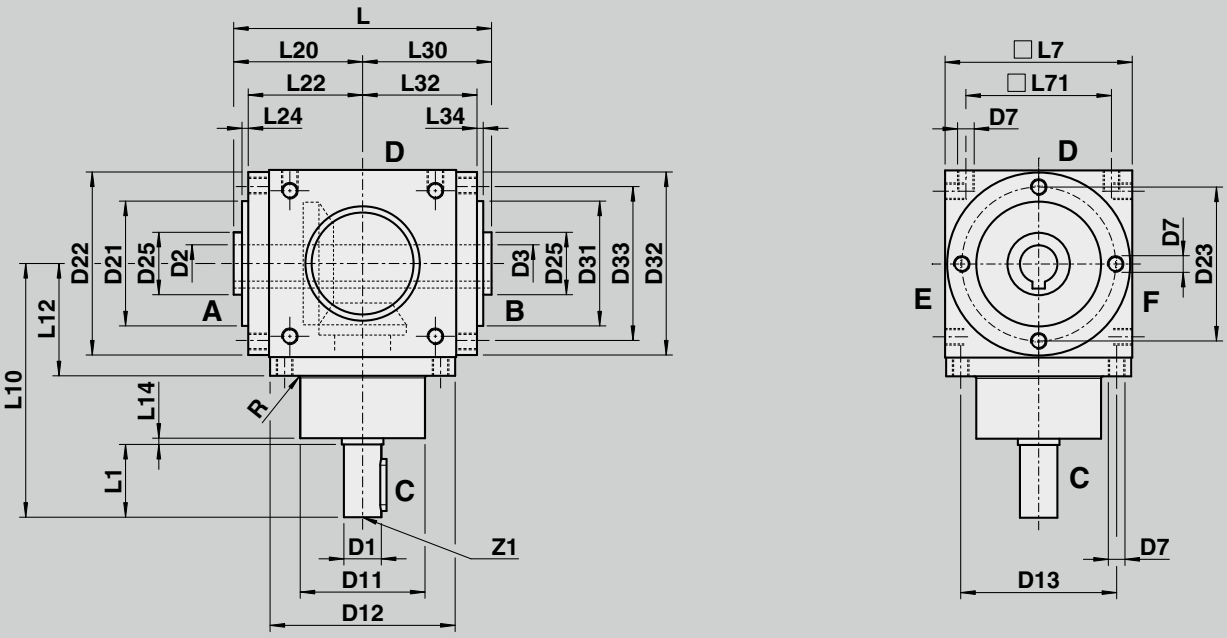
MOUNTING POSITION AND LUBRICATION

H			
Side view			
Mounting position (underside)	**A**	**B**	**C**
Side of oil fittings*	**D** - E - F	**D** - E - F	**E** - F
Side view			
Mounting position (underside)	**D**	**E**	**F**
Side of oil fittings*	**E** - F	**D**	**D**



* Unless specified otherwise, the oil fittings are attached to the sides printed in bold type

H 050

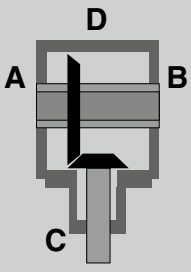


Size	Ratio	D1	D2	D3	D7	D8	D11	D12	D13	D21	D22	D23	D25	D31	D32	D33	L
		j6	H7	H7			f7	f7		f7				f7			
050	1 - 2 3 + 4	12	12	12	M6	-	44	64,5*	54	44	64,5	54	20	44	64,5	54	92
100	1 - 2	18	18	18	M8	9	60	89	75	60	-	-	30	60	-	-	124
	3 + 4	15															
	5 + 6	12															
200	1 - 2	25	25	25	M10	11	80	119	100	80	-	-	40	80	-	-	170
	3 + 4	20															
	5 + 6	15															

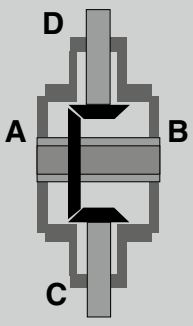
* General tolerance DIN ISO 2768-1

Design

BA 70



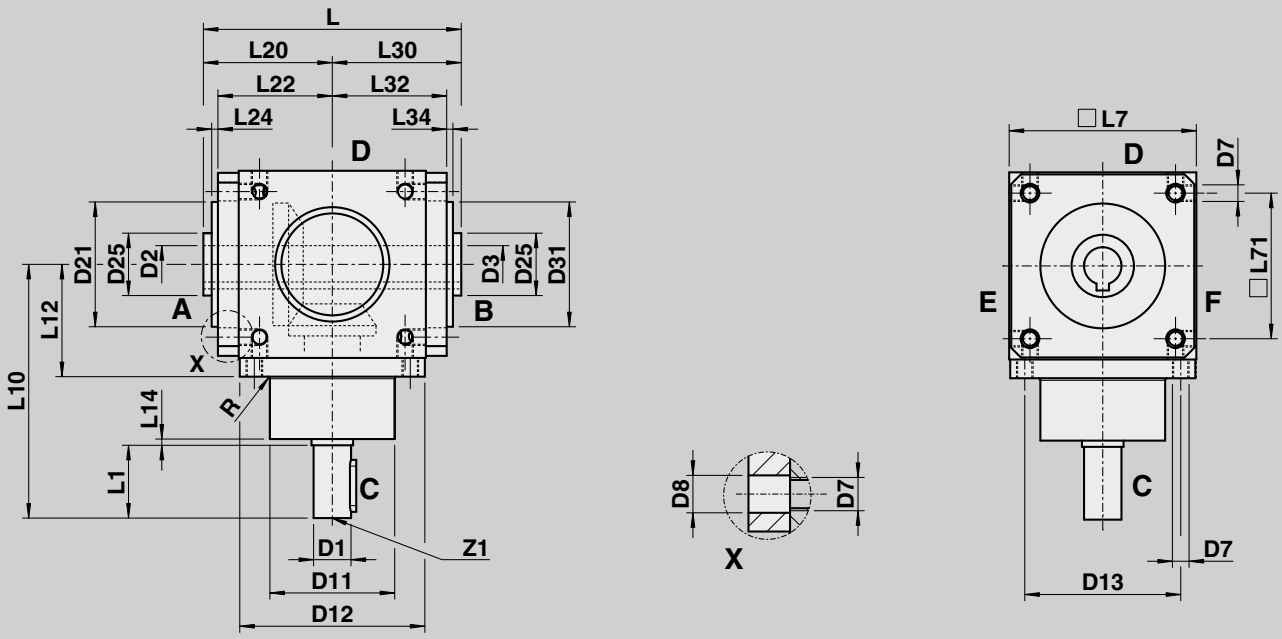
BA 80



H 050 – H 200

DIMENSIONS

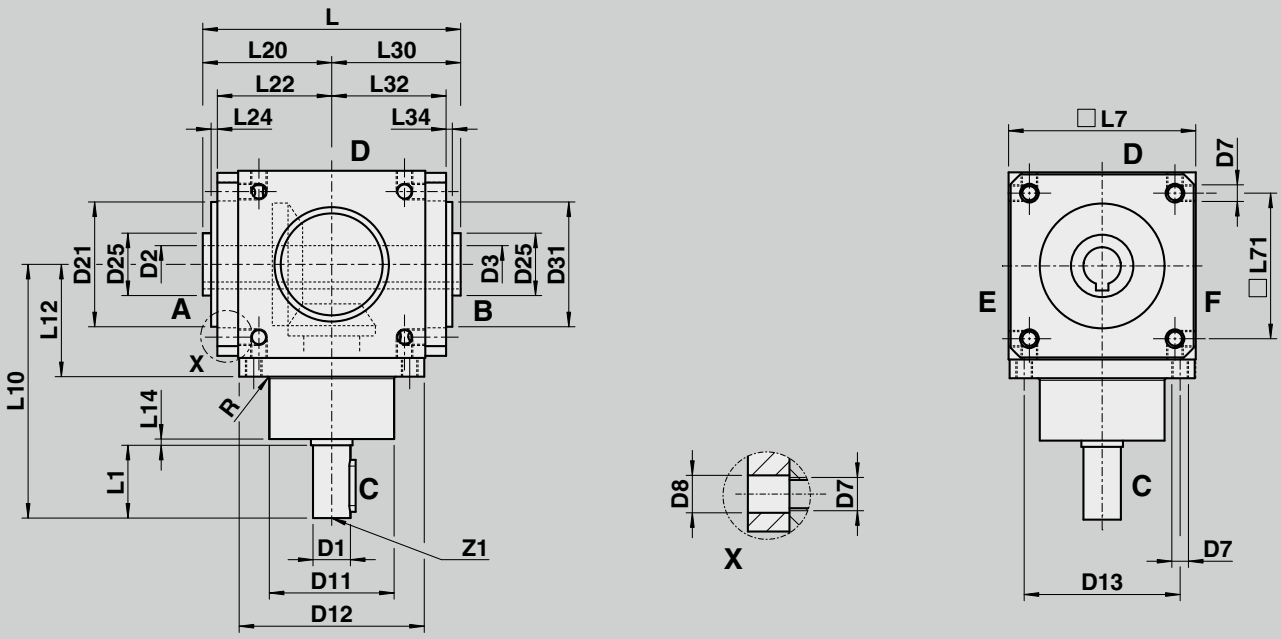
H 100 – 200



L1	L7	L10	L12	L14	L20	L22	L24	L30	L32	L34	L71	R	Key D1 according to DIN 6885/1	Key D2/D3 according to DIN 6885/1	Z1 DIN 332
														JS9	
26	65	100 115	42	2	46	42	2	46	42	2	45	0,8	4 x 4 x 20	4	D M 4
35		122											6 x 6 x 25		D M 6
30	90	127	55	2	62	55	3	62	55	3	70	1	5 x 5 x 20	6	D M 5
25		122											4 x 4 x 16		D M 4
45		162											8 x 7 x 36		D M10
40	120	157	75	2	85	77	5	85	77	5	100	1	6 x 6 x 30	8	D M 6
30		147											5 x 5 x 20		D M 5

H 230 – H 400

DIMENSIONS



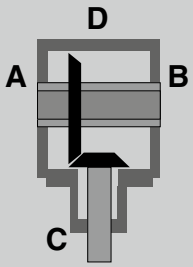
Size	Ratio	D1	D2	D3	D7	D8	D11	D12	D13	D21	D25	D31	L	L1	L7
		j6	H7	H7			f7	f7		f7					
230	1 - 2	32	32	32	M10	11,0	95	135	115	100	45	100	174	50	140
	3 + 4	28													
	5 + 6	24													
250	1 - 2	35	35	35	M12	13,5	110	156	135	110	50	110	206	60	160
	3 + 4	28												55	
	5 + 6	24												50	
300	1 - 2	42	42	42	M12	13,5	120	198	175	120	60	120	250	80	200
	3 + 4	35												68	
	5 + 6	28												55	
370	1 - 2	55	55	55	M16	17,5	150	225	200	150	80	150	300	90	230
	3 + 4	40					140							80	
	5 + 6	35												70	
400	1 - 2	60	60	60	M16	17,5	160	258	230	180	85	180	350	110	260
	3 + 4	50												90	
	5 + 6	45													

H 230 – H 400

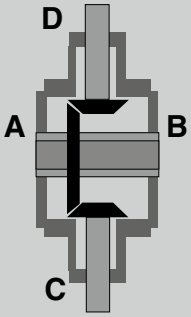
DIMENSIONS

Design

BA 70



BA 80



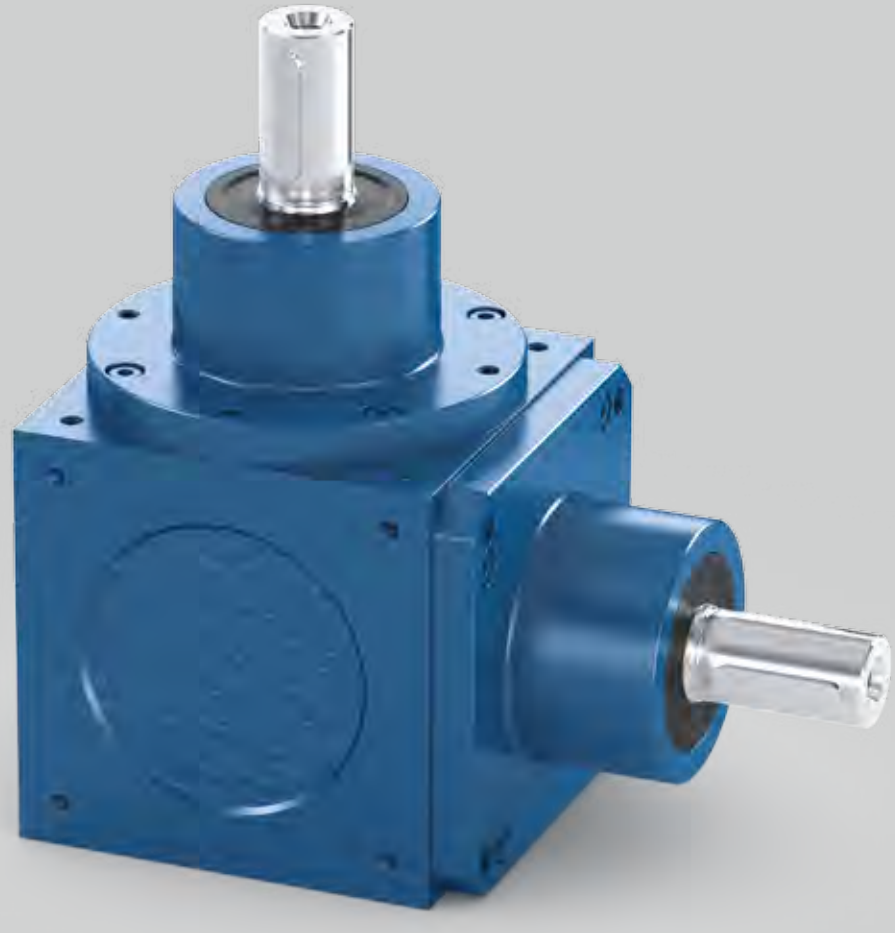
L10	L12	L14	L20	L22	L24	L30	L32	L34	L71	R	Key D1 according to DIN 6885/1	Key D2/D3 according to DIN 6885/1	Z1 DIN 332
												JS9	
180	83	2	87	82	3	87	82	3	110	2	10 x 8 x 45	10	D M12
195											8 x 7 x 40		D M10
											8 x 7 x 40		D M 8
212	95	2	103	95	5	103	95	5	120	2	10 x 8 x 45	10	D M12
227											8 x 7 x 45		D M10
222											8 x 7 x 40		D M 8
273	120	3	125	117	6	125	117	6	160	3	12 x 8 x 60	12	D M16
261		2									10 x 8 x 45		D M12
248											8 x 7 x 45		D M10
305	135	2	150	140	7	150	140	7	180	5	16 x 10 x 80	16	D M20
310											12 x 8 x 60		D M16
300											10 x 8 x 50		D M12
380	150	5	175	150	22	175	150	22	220	5	18 x 11 x 90	18	D M20
360										10	14 x 9 x 70		D M16
											14 x 9 x 70		D M16

K

TECHNICAL DATA

Technical specifications on this page and in the tables on the following pages are intended only for rough preselection.

Gear teeth:	Klingelnberg spiral bevel gear teeth
Direction of rotation:	The opposite direction when facing C and A
Life time:	20000 h L_{10h}
Permissible gearbox temperature at housing:	-10 °C to +80 °C (deviating temperature ranges on request)
Lubrication:	Oil lubrication/grease lubrication
Mounting position:	Any, specify when ordering
Surface protection:	Primer coat RAL 7035 Light grey
Protection rating:	IP 54



K

TECHNICAL DATA

The following technical specifications in the table are intended only for rough preselection

K			050				
Ratio	i		1,0	1,5	2,0	3,0	4,0
Max. permissible output torque	$T_{2maxzul}$	Nm	33	33	33	29	27
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	10	12	14	11	11
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	36	36	36	32	30
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	3000				
Max. input speed	$n_{1maxzul}$	min^{-1}	4500				
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)				
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	179				
Maximum permissible radial load input	$F_{1rmaxzul}$	N	550				
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	179	203	221	250	273
Max. permissible radial load output	$F_{2rmaxzul}$	N	550				
Efficiency	η	-	0,97				
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	1,23				
Weight	m	kg	1,7				
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75				
Inertia D1 (with reference to input)	J_1	$kgcm^2$	0,475	0,439	0,127	0,099	0,063

K			100						
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	90	90	90	72	54	54	41
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	30	33	37	28	29	27	23
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	100	100	100	80	60	60	46
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	2500	3000	3000	3000	3000	3000	3000
Max. input speed	$n_{1maxzul}$	min^{-1}	4300	4500	4500	4500	4500	4500	4500
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	295	280	280	280	280	280	280
Maximum permissible radial load input	$F_{1rmaxzul}$	N	880						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	295	316	345	390	426	455	481
Max. permissible radial load output	$F_{2rmaxzul}$	N	880						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	2,3						
Weight	m	kg	5						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia D1 (with reference to input)	J_1	$kgcm^2$	3,302	2,059	0,818	0,570	0,513	0,158	0,478

* measured with 2 % nominal torque on output shaft

K			**200**						
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	234	234	234	171	171	135	90
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	73	79	86	58	64	64	50
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	260	260	260	190	190	150	100
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	2000	2500	2500	2500	2500	2500	2500
Max. input speed	$n_{1maxzul}$	min^{-1}	3500	3750	3750	3750	3750	3750	3750
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	486	455	455	455	455	455	455
Maximum permissible radial load input	$F_{1rmaxzul}$	N	1400						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	486	514	561	634	692	740	782
Max. permissible radial load output	$F_{2rmaxzul}$	N	1400						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	4,05						
Weight	m	kg	12,5						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia D1 (with reference to input)	J_1	$kgcm^2$	11,394	7,735	4,076	2,478	2,218	2,180	1,990

K			**230**						
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	360	360	360	315	315	270	171
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	230	130	135	140	110	115	105
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	400	400	400	350	350	300	190
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	1500	2250	2500	2500	2500	2500	2500
Max. input speed	$n_{1maxzul}$	min^{-1}	2800	3750	3750	3750	3750	3750	3750
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	850	743	720	720	720	720	720
Maximum permissible radial load input	$F_{1rmaxzul}$	N	2050						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	840	840	888	1004	1095	1172	1239
Max. permissible radial load output	$F_{2rmaxzul}$	N	2050						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	5,45						
Weight	m	kg	18						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia D1 (with reference to input)	J_1	$kgcm^2$	30,599	22,974	21,384	6,763	5,834	5,758	3,325

* measured with 2 % nominal torque on output shaft

K

TECHNICAL DATA

The following technical specifications in the table are intended only for rough preselection

K			250						
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	576	576	576	522	369	288	234
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	196	200	200	160	168	160	130
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	640	640	640	580	410	320	260
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	1300	1950	2500	2500	2500	2500	2500
Max. input speed	$n_{1maxzul}$	min^{-1}	2300	3450	3750	3750	3750	3750	3750
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	1385	1225	1136	1136	1136	1136	1136
Maximum permissible radial load input	$F_{1rmaxzul}$	N	3200						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	1385	1385	1402	1585	1730	1851	1956
Max. permissible radial load output	$F_{2rmaxzul}$	N	3200						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	7,1						
Weight	m	kg	25						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia D1 (with reference to input)	J_1	$kgcm^2$	52,127	29,133	24,388	11,350	9,409	8,351	8,025

K			300						
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	1260	1260	1260	900	864	900	612
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	410	410	410	280	280	340	250
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	1400	1400	1400	1000	960	1000	680
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	1000	1500	2000	2000	2000	2000	2000
Max. input speed	$n_{1maxzul}$	min^{-1}	2000	3000	3000	3000	3000	3000	3000
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	2600	2299	2107	2107	2107	2107	2107
Maximum permissible radial load input	$F_{1rmaxzul}$	N	5800						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	2600	2600	2600	2940	3208	3432	3627
Max. permissible radial load output	$F_{2rmaxzul}$	N	5800						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	10,9						
Weight	m	kg	45						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia D1 (with reference to input)	J_1	$kgcm^2$	142,260	95,250	48,240	29,422	23,750	21,365	19,993

* measured with 2 % nominal torque on output shaft

K

TECHNICAL DATA

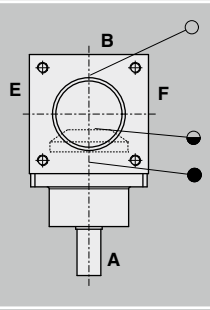
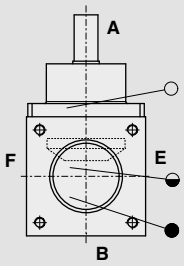
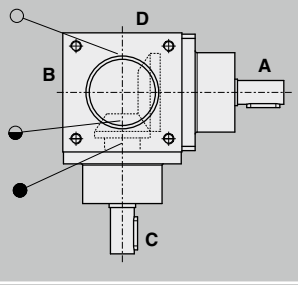
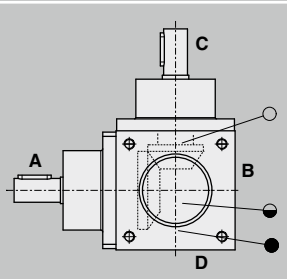
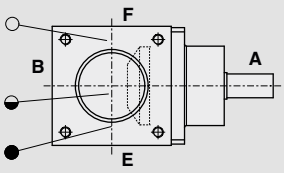
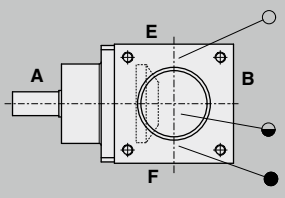
K			370						
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	2250	2340	2340	1566	1728	1746	945
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	688	690	676	480	520	560	430
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	2500	2600	2600	1740	1920	1940	1050
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	850	1275	1700	2000	2000	2000	2000
Max. input speed	$n_{1maxzul}$	min^{-1}	1700	2550	3000	3000	3000	3000	3000
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	4937	4366	4002	3810	3810	3810	3810
Maximum permissible radial load input	$F_{1rmaxzul}$	N	11000						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	4937	4937	4937	5314	5799	6204	6557
Max. permissible radial load output	$F_{2rmaxzul}$	N	11000						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	14,4						
Weight	m	kg	70						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia D1 (with reference to input)	J_1	$kgcm^2$	437,516	267,159	156,102	76,830	59,589	55,048	49,204

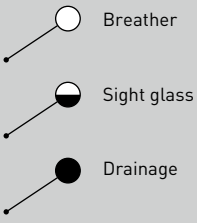
K			400						
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	3150	3240	3240	2970	2880	2700	1800
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	1080	1080	1040	760	870	850	600
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	3500	3600	3600	3300	3200	3000	2000
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	700	1050	1400	2000	2000	2000	2000
Max. input speed	$n_{1maxzul}$	min^{-1}	1400	2100	2800	3000	3000	3000	3000
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	10027	8868	8128	7295	7295	7295	7295
Maximum permissible radial load input	$F_{1rmaxzul}$	N	20000						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	10027	10027	10027	10177	11104	11880	12555
Max. permissible radial load output	$F_{2rmaxzul}$	N	20000						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	18,2						
Weight	m	kg	100						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia D1 (with reference to input)	J_1	$kgcm^2$	810,230	425,130	259,150	165,720	119,690	100,450	91,070

* measured with 2 % nominal torque on output shaft

K

MOUNTING POSITION AND LUBRICATION

K			
Side view			
Mounting position (underside)	**A**	**B**	**C**
Side of oil fittings*	**D** - E - F	**D** - E - F	**E** - F
Side view			
Mounting position (underside)	**D**	**E**	**F**
Side of oil fittings*	**E** - F	**D**	**D**

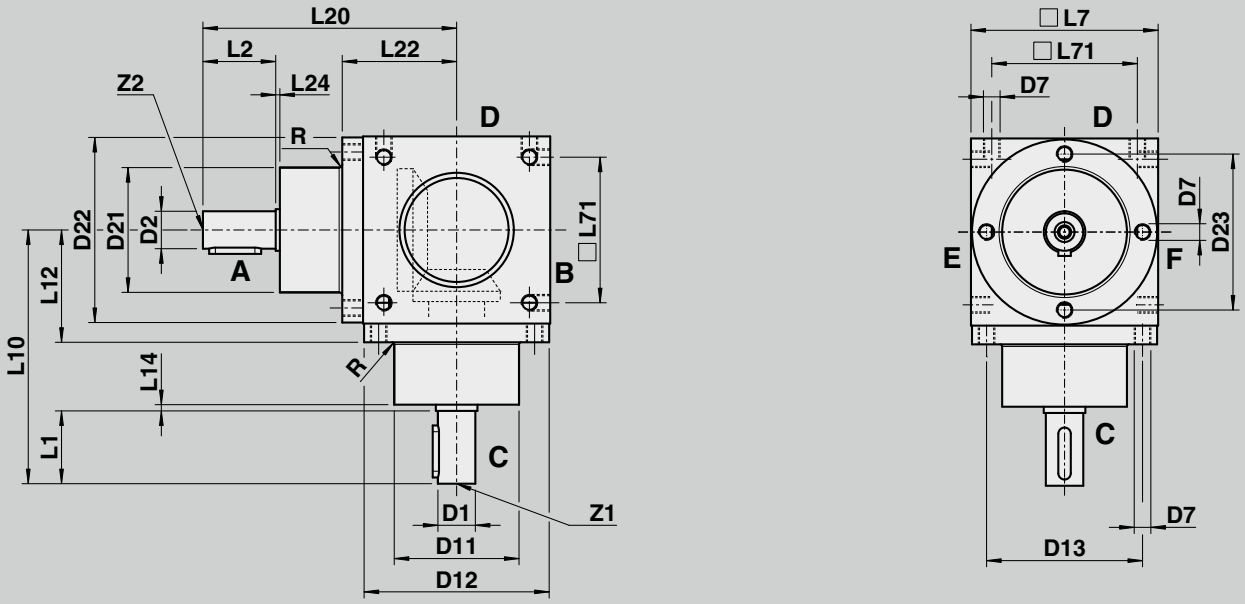


* Unless specified otherwise, the oil fittings are attached to the sides printed in bold type

K 050 – K 200

DIMENSIONS

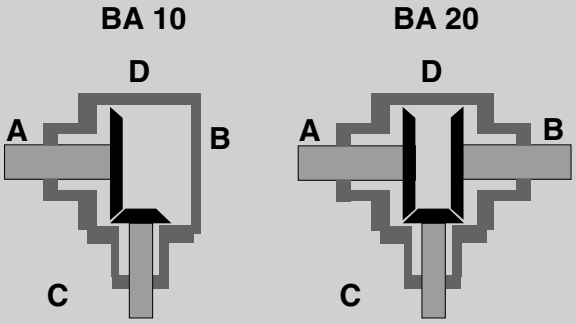
K 050



Size	Ratio	D1	D2	D7	D8	D11	D12	D13	D21	D22	D23	L1	L2
		j6	j6			f7	f7		f7				
050	1 - 2 3 + 4	12	12	M 6	-	44	64,5*	54	44	64,5	54	26	26
100	1 - 2	18	18	M 8	9	60	89	75	60	-	-	35	35
	3 + 4	15										30	
	5 + 6	12										25	
200	1 - 2	25	25	M10	11	80	119	100	80	-	-	45	45
	3 + 4	20										40	
	5 + 6	15										30	

* General tolerance DIN ISO 2768-1

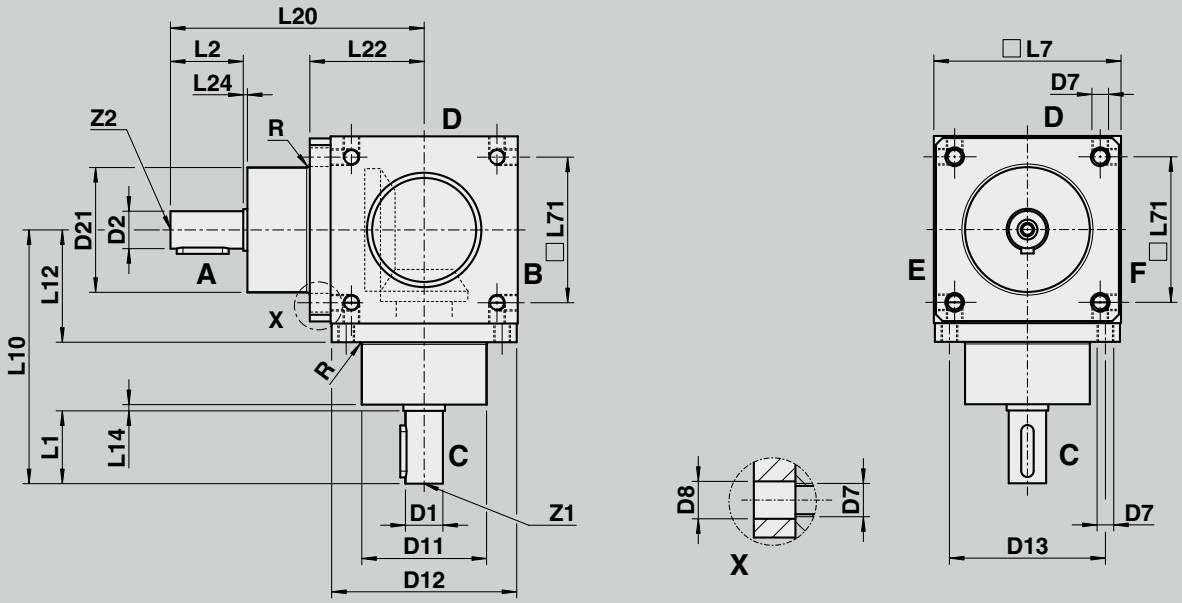
Design



K 050 – K 200

DIMENSIONS

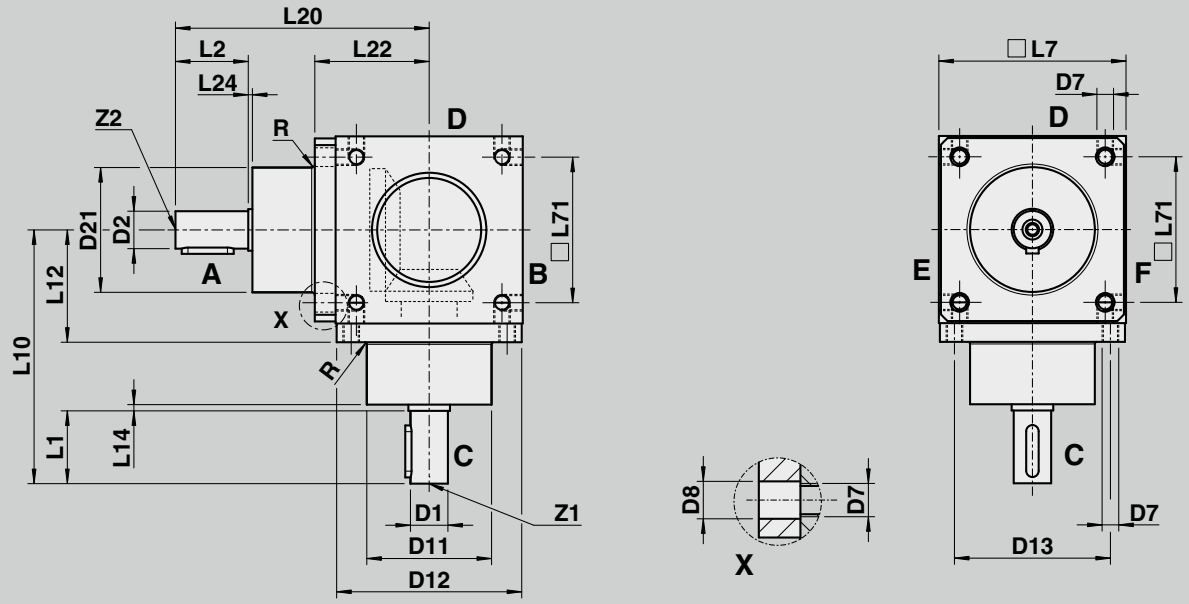
K 100 – 200



L7	L10	L12	L14	L20	L22	L24	L71	R	Key D1 according to DIN 6885/1	Key D2/D3 according to DIN 6885/1	Z1 DIN 332	Z2 DIN 332
										JS9		
65	100	42	2	100	42	2	45	0,8	4 x 4 x 20	4 x 4 x 20	D M 4	D M 4
	115											
90	122	55	2	122	55	2	70	1	6 x 6 x 25	6 x 6 x 25	D M 6	D M 6
	127								5 x 5 x 20		D M 5	
	122								4 x 4 x 16		D M 4	
120	162	75	2	162	75	2	100	1	8 x 7 x 36	8 x 7 x 36	D M10	D M10
	157								6 x 6 x 30		D M 6	
	147								5 x 5 x 20		D M 5	

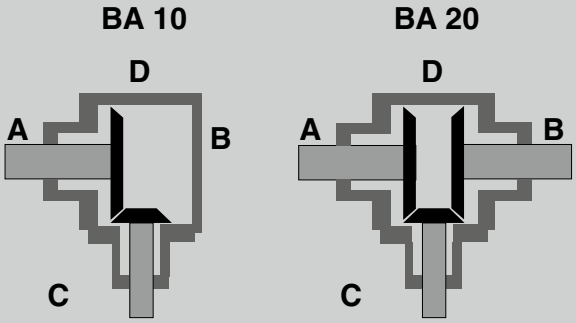
K 230 – K 400

DIMENSIONS



Size	Ratio	D1	D2	D7	D8	D11	D12	D13	D21	L1	L2	L7	L10
		j6	j6			f7	f7		f7				
230	1 - 2	32	32	M10	11,0	95	135	115	95	50	50	140	180
	3 + 4	28											195
	5 + 6	24											
250	1 - 2	35	35	M12	13,5	110	156	135	110	60	60	160	212
	3 + 4	28								55			227
	5 + 6	24								50			222
300	1 - 2	42	42	M12	13,5	120	198	175	120	80	80	200	273
	3 + 4	35								68			261
	5 + 6	28								55			248
370	1 - 2	55	55	M16	17,5	150	225	200	150	90	90	230	305
	3 + 4	40				140				80			310
	5 + 6	35								70			300
400	1 - 2	60	60	M16	17,5	160	258	230	160	110	110	260	380
	3 + 4	50								90			360
	5 + 6	45											

Design



L12	L14	L20	L22	L24	L71	R	Key D1 according to DIN 6885/1	Key D2/D3 according to DIN 6885/1	Z1 DIN 332	Z2 DIN 332
83	2	180	83	2	110	2	10 x 8 x 45	10 x 8 x 45	D M12	D M12
							8 x 7 x 40		D M10	
							8 x 7 x 40		D M 8	
95	2	212	95	2	120	2	10 x 8 x 45	10 x 8 x 45	D M12	D M12
							8 x 7 x 45		D M10	
							8 x 7 x 40		D M 8	
120	3	273	120	3	160	3	12 x 8 x 60	12 x 8 x 60	D M16	D M16
	2						10 x 8 x 45		D M12	
							8 x 7 x 45		D M10	
135	2	305	135	2	180	5	16 x 10 x 80	16 x 10 x 80	D M20	D M20
							12 x 8 x 60		D M16	
							10 x 8 x 50		D M12	
150	5	380	150	5	220	5	18 x 11 x 90	18 x 11 x 90	D M20	D M20
						10	14 x 9 x 70		D M16	
							14 x 9 x 70		D M16	

M L

T E C H N I C A L D A T A

Technical specifications on this page and in the tables on the following pages are intended only for rough preselection.

Gear teeth:	Klingelnberg spiral bevel gear teeth
Direction of rotation:	The opposite direction when facing C and A
Life time:	20000 h L_{10h}
Permissible gearbox temperature at housing:	-10 °C to +80 °C (deviating temperature ranges on request)
Lubrication:	Oil lubrication/grease lubrication
Mounting position:	Any, specify when ordering
Surface protection:	Primer coat RAL 7035 Light grey
Protection rating:	IP 54

M L

T E C H N I C A L D A T A

The following technical specifications in the table are intended only for rough preselection

ML				050				
Ratio		i		1,0	1,5	2,0	3,0	4,0
Max. permissible output torque		$T_{2maxzul}$	Nm	33	33	33	29	27
Nominal torque on output (with n_{1mzul})		T_{2Nzul}	Nm	10	12	14	11	11
Emergency stop torque (permissible 1000 times during gearbox life time)		$T_{2Notzul}$	Nm	36	36	36	32	30
Permissible average input speed (with T_{2Nzul})		n_{1mzul}	min^{-1}	3000				
Max. input speed		$n_{1maxzul}$	min^{-1}	4500				
Max. backlash*		j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)				
Permissible radial load output (at permissible average input speed)		F_{2rmzul}	N	291	328	358	405	442
Max. permissible radial load output		$F_{2rmaxzul}$	N	900				
Efficiency		ŋ	-	0,97				
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)		$P_{thGrenz}$	kW	1,23				
Weight		m	kg	2				
Running noise (with n_{1mzul})		L_{PA}	dB(A)	75				
Inertia (with reference to input)	Ø d 9	J_1	$kgcm^2$	0,597	0,529	0,450	0,177	0,151
	Ø d 11	J_1	$kgcm^2$	0,648	0,580	0,501	0,228	0,202

ML				100						
Ratio		i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque		$T_{2maxzul}$	Nm	90	90	90	72	54	54	41
Nominal torque on output (with n_{1mzul})		T_{2Nzul}	Nm	30	33	37	28	29	27	23
Emergency stop torque (permissible 1000 times during gearbox life time)		$T_{2Notzul}$	Nm	100	100	100	80	60	60	46
Permissible average input speed (with T_{2Nzul})		n_{1mzul}	min^{-1}	2500	3000	3000	3000	3000	3000	3000
Max. input speed		$n_{1maxzul}$	min^{-1}	4300	4500	4500	4500	4500	4500	4500
Max. backlash*		j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load output (at permissible average input speed)		F_{2rmzul}	N	491	526	573	648	708	757	800
Max. permissible radial load output		$F_{2rmaxzul}$	N	1450						
Efficiency		ŋ	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)		$P_{thGrenz}$	kW	2,3						
Weight		m	kg	5,5						
Running noise (with n_{1mzul})		L_{PA}	dB(A)	75						
Inertia (with reference to input)	Ø d 9	J_1	$kgcm^2$	3,808	2,447	1,086	0,800	0,731	0,729	0,686
	Ø d 11	J_1	$kgcm^2$	3,873	2,480	1,086	0,866	0,796	0,794	0,752
	Ø d 14	J_1	$kgcm^3$	3,997	2,636	1,275	1,181	0,920	0,919	0,876
	Ø d 19	J_1	$kgcm^4$	4,472	3,115	1,758	1,473	1,403	1,402	1,358

* measured with 2 % nominal torque on output shaft

M L

T E C H N I C A L D A T A

ML						**200**			
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	234	234	234	171	171	135	90
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	73	79	86	58	64	64	50
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	260	260	260	190	190	150	100
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	2000	2500	2500	2500	2500	2500	2500
Max. input speed	$n_{1maxzul}$	min^{-1}	3500	3750	3750	3750	3750	3750	3750
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	821	868	947	1071	1168	1250	1321
Max. permissible radial load output	$F_{2rmaxzul}$	N	2200						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	4,05						
Weight	m	kg	14						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia (with reference to input) Ø d 14	J_1	$kgcm^2$	13,353	9,398	5,448	4,909	4,565	4,407	4,308
Ø d 19	J_1	$kgcm^2$	13,841	9,887	5,933	5,395	5,053	4,995	4,896
Ø d 24	J_1	$kgcm^3$	14,808	10,854	6,899	6,362	6,020	5,962	5,763
Ø d 28	J_1	$kgcm^4$	17,030	11,965	9,122	8,587	8,242	8,184	7,995

ML						**230**			
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	360	360	360	315	315	270	171
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	230	130	135	140	110	115	105
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	400	400	400	350	350	300	190
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	1500	2250	2500	2500	2500	2500	2500
Max. input speed	$n_{1maxzul}$	min^{-1}	2800	3750	3750	3750	3750	3750	3750
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	1434	1434	1515	1713	1869	2000	2114
Max. permissible radial load output	$F_{2rmaxzul}$	N	3800						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	5,45						
Weight	m	kg	24						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia (with reference to input) Ø d 9	J_1	$kgcm^2$	45,750	40,225	34,200	20,224	19,050	18,755	18,135
Ø d 11	J_1	$kgcm^2$	47,506	41,215	36,888	22,015	20,955	20,655	20,215
Ø d 14	J_1	$kgcm^3$	50,775	45,328	40,550	25,110	24,800	24,113	23,485
Ø d 19	J_1	$kgcm^4$	52,023	46,555	40,887	26,115	25,875	24,755	24,325

* measured with 2 % nominal torque on output shaft

M L

T E C H N I C A L D A T A

The following technical specifications in the table are intended only for rough preselection

ML						250			
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	576	576	576	522	369	288	234
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	196	200	200	160	168	160	130
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	640	640	640	580	410	320	260
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	1300	1950	2500	2500	2500	2500	2500
Max. input speed	$n_{1maxzul}$	min^{-1}	2300	3450	3750	3750	3750	3750	3750
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	2545	2545	2576	2912	3178	3400	3593
Max. permissible radial load output	$F_{2rmaxzul}$	N	6500						
Efficiency	ŋ	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	7,1						
Weight	m	kg	35						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia (with reference to input) Ø d 9	J_1	$kgcm^2$	63,222	54,345	40,022	30,665	28,445	26,305	26,123
Ø d 11	J_1	$kgcm^2$	89,103	60,750	46,875	44,442	33,545	31,896	30,025
Ø d 14	J_2	$kgcm^3$	93,775	64,236	50,275	48,300	40,675	38,225	37,665
Ø d 19	J_3	$kgcm^4$	103,222	71,200	59,663	52,785	48,336	47,475	46,099

ML						300			
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	1260	1260	1260	900	864	900	612
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	410	410	410	280	280	340	250
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	1400	1400	1400	1000	960	1000	680
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	1000	1500	2000	2000	2000	2000	2000
Max. input speed	$n_{1maxzul}$	min^{-1}	2000	3000	3000	3000	3000	3000	3000
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	4093	4093	4093	4628	5050	5403	5710
Max. permissible radial load output	$F_{2rmaxzul}$	N	10000						
Efficiency	ŋ	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	10,9						
Weight	m	kg	57						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia (with reference to input) Ø d 9	J_1	$kgcm^2$	188,150	137,050	87,785	67,890	61,850	61,133	58,650
Ø d 11	J_1	$kgcm^2$	201,950	151,780	101,400	81,580	75,556	75,125	71,850
Ø d 14	J_2	$kgcm^3$	206,600	156,300	106,300	86,522	80,750	79,850	76,255
Ø d 19	J_3	$kgcm^4$	220,980	170,680	120,850	100,400	95,705	94,094	90,693

* measured with 2 % nominal torque on output shaft

M L

T E C H N I C A L D A T A

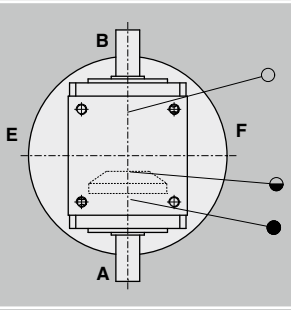
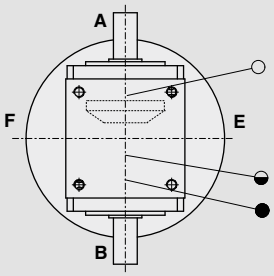
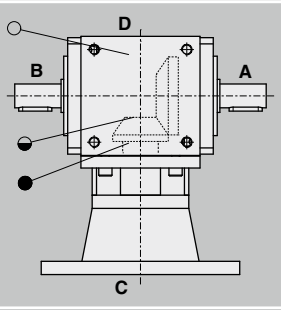
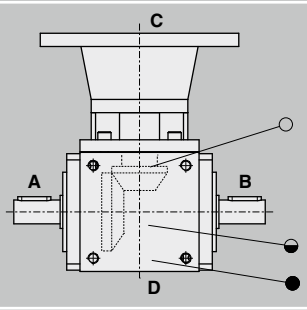
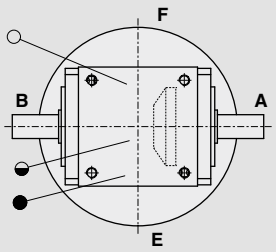
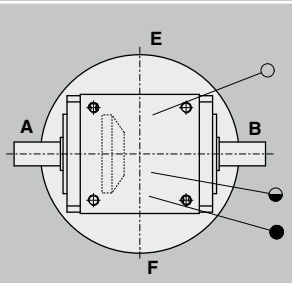
ML				370						
Ratio		i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque		$T_{2maxzul}$	Nm	2250	2340	2340	1566	1728	1746	945
Nominal torque on output (with n_{1mzul})		T_{2Nzul}	Nm	688	690	676	480	520	560	430
Emergency stop torque (permissible 1000 times during gearbox life time)		$T_{2Notzul}$	Nm	2500	2600	2600	1740	1920	1940	1050
Permissible average input speed (with T_{2Nzul})		n_{1mzul}	min^{-1}	850	1275	1700	2000	2000	2000	2000
Max. input speed		$n_{1maxzul}$	min^{-1}	1700	2550	3000	3000	3000	3000	3000
Max. backlash*		j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load output (at permissible average input speed)		F_{2rmzul}	N	6386	6386	6386	6874	7500	8025	8481
Max. permissible radial load output		$F_{2rmaxzul}$	N	15500						
Efficiency		η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)		$P_{thGrenz}$	kW	14,4						
Weight		m	kg	87						
Running noise (with n_{1mzul})		L_{PA}	dB(A)	75						
Inertia (with reference to input)	Ø d 38	J_1	$kgcm^2$	523,330	338,250	212,660	135,900	116,750	112,250	105,670
	Ø d 42	J_1	$kgcm^2$	525,350	339,480	214,880	137,050	118,650	113,900	107,660
	Ø d 48	J_2	$kgcm^3$	533,850	347,050	222,500	145,640	126,740	121,380	115,800
	Ø d 55	J_3	$kgcm^4$	545,750	360,560	235,900	158,440	138,400	133,750	127,850

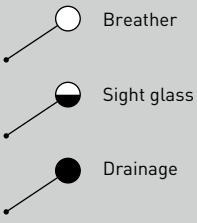
ML				400						
Ratio		i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque		$T_{2maxzul}$	Nm	3150	3240	3240	2970	2880	2700	1800
Nominal torque on output (with n_{1mzul})		T_{2Nzul}	Nm	1080	1080	1040	760	870	850	600
Emergency stop torque (permissible 1000 times during gearbox life time)		$T_{2Notzul}$	Nm	3500	3600	3600	3300	3200	3000	2000
Permissible average input speed (with T_{2Nzul})		n_{1mzul}	min^{-1}	700	1050	1400	2000	2000	2000	2000
Max. input speed		$n_{1maxzul}$	min^{-1}	1400	2100	2800	3000	3000	3000	3000
Max. backlash*		j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load output (at permissible average input speed)		F_{2rmzul}	N	13997	13997	13997	14206	15500	16584	17526
Max. permissible radial load output		$F_{2rmaxzul}$	N	27000						
Efficiency		η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)		$P_{thGrenz}$	kW	18,2						
Weight		m	kg	135						
Running noise (with n_{1mzul})		L_{PA}	dB(A)	75						
Inertia (with reference to input)	Ø d 42	J_1	$kgcm^2$	982,410	576,270	370,130	248,020	219,710	150,460	150,840
	Ø d 48	J_1	$kgcm^2$	990,150	584,010	377,870	255,760	227,450	168,210	158,580
	Ø d 55	J_2	$kgcm^3$	1010,600	604,470	398,350	276,240	247,930	188,680	179,070
	Ø d 60	J_3	$kgcm^4$	1008,800	602,650	364,500	274,380	246,080	186,830	177,210

* measured with 2 % nominal torque on output shaft

M L

M O U N T I N G P O S I T I O N A N D L U B R I C A T I O N

ML			
Side view			
Mounting position (underside)	**A**	**B**	**C**
Side of oil fittings*	**D** - E - F	**D** - E - F	**E** - F
Side view			
Mounting position (underside)	**D**	**E**	**F**
Side of oil fittings*	**E** - F	**D**	**D**



* Unless specified otherwise, the oil fittings are attached to the sides printed in bold type

M H

TECHNICAL DATA

Technical specifications on this page and in the tables on the following pages are intended only for rough preselection.

Gear teeth:	Klingelnberg spiral bevel gear teeth
Direction of rotation:	The opposite direction when facing C and A
Life time:	20000 h L_{10h}
Permissible gearbox temperature at housing:	-10 °C to +80 °C (deviating temperature ranges on request)
Lubrication:	Oil lubrication/grease lubrication
Mounting position:	Any, specify when ordering
Surface protection:	Primer coat RAL 7035 Light grey
Protection rating:	IP 54

M H

T E C H N I C A L D A T A

The following technical specifications in the table are intended only for rough preselection

MH				050				
Ratio		i		1,0	1,5	2,0	3,0	4,0
Max. permissible output torque		$T_{2maxzul}$	Nm	33	33	33	29	27
Nominal torque on output (with n_{1mzul})		T_{2Nzul}	Nm	10	12	14	11	11
Emergency stop torque (permissible 1000 times during gearbox life time)		$T_{2Notzul}$	Nm	36	36	36	32	30
Permissible average input speed (with T_{2Nzul})		n_{1mzul}	min^{-1}	3000				
Max. input speed		$n_{1maxzul}$	min^{-1}	4500				
Max. backlash*		j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)				
Permissible radial load output (at permissible average input speed)		F_{2rmzul}	N	378	427	466	527	575
Max. permissible radial load output		$F_{2rmaxzul}$	N	1300				
Efficiency		ŋ	-	0,97				
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)		$P_{thGrenz}$	kW	1,23				
Weight		m	kg	2				
Running noise (with n_{1mzul})		L_{PA}	dB(A)	75				
Inertia (with reference to input)	Ø d 9	J_1	$kgcm^2$	0,597	0,529	0,450	0,177	0,151
	Ø d 11	J_1	$kgcm^2$	0,648	0,580	0,501	0,228	0,202

MH				100						
Ratio		i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque		$T_{2maxzul}$	Nm	90	90	90	72	54	54	41
Nominal torque on output (with n_{1mzul})		T_{2Nzul}	Nm	30	33	37	28	29	27	23
Emergency stop torque (permissible 1000 times during gearbox life time)		$T_{2Notzul}$	Nm	100	100	100	80	60	60	46
Permissible average input speed (with T_{2Nzul})		n_{1mzul}	min^{-1}	2500	3000	3000	3000	3000	3000	3000
Max. input speed		$n_{1maxzul}$	min^{-1}	4300	4500	4500	4500	4500	4500	4500
Max. backlash*		j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load output (at permissible average input speed)		F_{2rmzul}	N	614	657	717	811	884	946	1000
Max. permissible radial load output		$F_{2rmaxzul}$	N	1900						
Efficiency		ŋ	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)		$P_{thGrenz}$	kW	2,3						
Weight		m	kg	5,5						
Running noise (with n_{1mzul})		L_{PA}	dB(A)	75						
Inertia (with reference to input)	Ø d 9	J_1	$kgcm^2$	4,361	2,810	1,259	0,878	0,775	0,757	0,706
	Ø d 11	J_1	$kgcm^2$	4,426	2,875	1,325	0,943	0,840	0,822	0,771
	Ø d 14	J_1	$kgcm^3$	4,550	2,999	1,449	1,067	0,964	0,947	0,895
	Ø d 19	J_1	$kgcm^4$	5,033	3,482	1,932	1,550	1,446	1,429	1,378

* measured with 2 % nominal torque on output shaft

M H

T E C H N I C A L D A T A

MH						200			
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	234	234	234	171	171	135	90
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	73	79	86	58	64	64	50
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	260	260	260	190	190	150	100
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	2000	2500	2500	2500	2500	2500	2500
Max. input speed	$n_{1maxzul}$	min^{-1}	3500	3750	3750	3750	3750	3750	3750
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	1051	1111	1212	1371	1495	1600	1691
Max. permissible radial load output	$F_{2rmaxzul}$	N	3000						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	4,05						
Weight	m	kg	14						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia (with reference to input) Ø d 14	J_1	$kgcm^2$	17,843	12,160	6,478	5,383	4,826	4,774	4,524
Ø d 19	J_1	$kgcm^2$	18,331	12,653	6,975	6,165	5,314	5,253	5,012
Ø d 24	J_1	$kgcm^3$	19,298	13,620	7,942	7,332	6,303	6,229	5,979
Ø d 28	J_1	$kgcm^4$	21,520	15,842	10,164	9,099	8,569	8,451	8,201

MH						230			
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	360	360	360	315	315	270	171
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	230	130	135	140	110	115	105
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	400	400	400	350	350	300	190
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	1500	2250	2500	2500	2500	2500	2500
Max. input speed	$n_{1maxzul}$	min^{-1}	2800	3750	3750	3750	3750	3750	3750
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	1864	1864	1970	2227	2430	2600	2748
Max. permissible radial load output	$F_{2rmaxzul}$	N	4800						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	5,45						
Weight	m	kg	24						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Massenträgheitsmoment (bezogen auf den Antrieb) Ø d 9	J_1	$kgcm^2$	47,562	42,329	34,856	20,225	18,950	18,675	18,250
Ø d 11	J_1	$kgcm^2$	49,150	42,333	36,658	22,570	20,925	20,750	20,335
Ø d 14	J_1	$kgcm^3$	52,222	45,125	37,875	25,752	24,337	24,250	23,857
Ø d 19	J_1	$kgcm^4$	53,875	50,654	45,025	27,223	24,977	24,750	24,127

* measured with 2 % nominal torque on output shaft

M H

T E C H N I C A L D A T A

The following technical specifications in the table are intended only for rough preselection

MH				250						
Ratio	i			1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm		576	576	576	522	369	288	234
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm		196	200	200	160	168	160	130
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm		640	640	640	580	410	320	260
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}		1300	1950	2500	2500	2500	2500	2500
Max. input speed	$n_{1maxzul}$	min^{-1}		2300	3450	3750	3750	3750	3750	3750
Max. backlash*	j	arcmin		Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N		3294	3294	3333	3769	4112	4400	4650
Max. permissible radial load output	$F_{2rmaxzul}$	N		8000						
Efficiency	ŋ	-		0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW		7,1						
Weight	m	kg		35						
Running noise (with n_{1mzul})	L_{PA}	dB(A)		75						
Inertia (with reference to input)	Ø d 24	J_1	$kgcm^2$	74,222	59,125	43,875	31,124	29,955	27,421	27,354
	Ø d 28	J_1	$kgcm^2$	91,550	64,557	48,321	35,555	34,228	32,785	31,345
	Ø d 32	J_2	$kgcm^3$	94,125	68,775	52,491	39,441	41,882	40,455	38,135
	Ø d 38	J_3	$kgcm^4$	104,223	74,025	60,225	53,132	49,755	48,125	47,675

MH				300						
Ratio	i			1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm		1260	1260	1260	900	864	900	612
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm		410	410	410	280	280	340	250
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm		1400	1400	1400	1000	960	1000	680
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}		1000	1500	2000	2000	2000	2000	2000
Max. input speed	$n_{1maxzul}$	min^{-1}		2000	3000	3000	3000	3000	3000	3000
Max. backlash*	j	arcmin		Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N		5593	5593	5593	6324	6900	7383	7802
Max. permissible radial load output	$F_{2rmaxzul}$	N		14500						
Efficiency	ŋ	-		0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW		10,9						
Weight	m	kg		57						
Running noise (with n_{1mzul})	L_{PA}	dB(A)		75						
Inertia (with reference to input)	Ø d 32	J_1	$kgcm^2$	198,350	144,650	89,364	68,366	61,950	61,500	59,850
	Ø d 38	J_1	$kgcm^2$	212,850	158,360	103,570	82,275	75,540	75,025	71,520
	Ø d 42	J_2	$kgcm^3$	217,850	162,260	107,540	86,785	80,255	79,555	76,485
	Ø d 48	J_3	$kgcm^4$	231,250	177,250	122,750	101,590	94,285	94,025	90,888

* measured with 2 % nominal torque on output shaft

M H

T E C H N I C A L D A T A

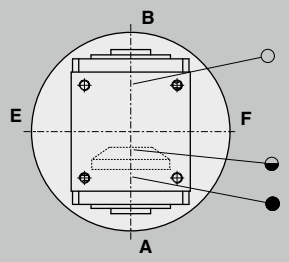
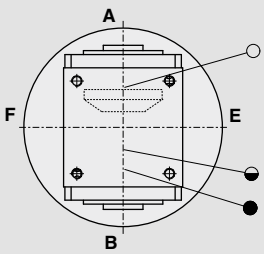
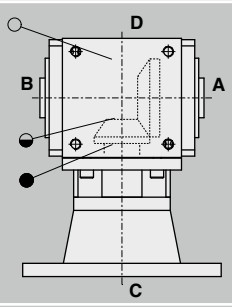
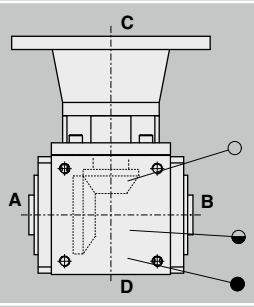
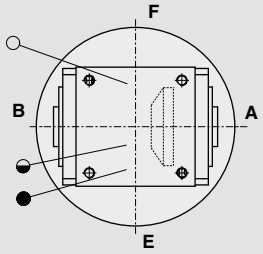
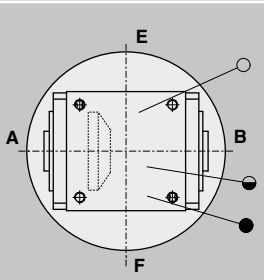
MH				370						
Ratio		i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque		$T_{2maxzul}$	Nm	2250	2340	2340	1566	1728	1746	945
Nominal torque on output (with n_{1mzul})		T_{2Nzul}	Nm	688	690	676	480	520	560	430
Emergency stop torque (permissible 1000 times during gearbox life time)		$T_{2Notzul}$	Nm	2500	2600	2600	1740	1920	1940	1050
Permissible average input speed (with T_{2Nzul})		n_{1mzul}	min^{-1}	850	1275	1700	2000	2000	2000	2000
Max. input speed		$n_{1maxzul}$	min^{-1}	1700	2550	3000	3000	3000	3000	3000
Max. backlash*		j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load output (at permissible average input speed)		F_{2rmzul}	N	8344	8344	8344	8982	9800	10486	11081
Max. permissible radial load output		$F_{2rmaxzul}$	N	18500						
Efficiency		η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)		$P_{thGrenz}$	kW	14,4						
Weight		m	kg	87						
Running noise (with n_{1mzul})		L_{PA}	dB(A)	75						
Inertia (with reference to input)	Ø d 38	J_1	$kgcm^2$	563,550	350,880	222,520	135,050	120,750	111,330	105,550
	Ø d 42	J_1	$kgcm^2$	564,880	357,650	217,750	137,900	118,250	118,250	107,500
	Ø d 48	J_2	$kgcm^3$	572,250	364,450	227,900	145,500	126,480	126,480	115,800
	Ø d 55	J_3	$kgcm^4$	584,350	376,500	234,050	158,520	138,670	138,670	127,500

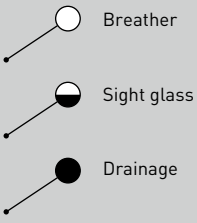
MH				400						
Ratio		i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque		$T_{2maxzul}$	Nm	3150	3240	3240	2970	2880	2700	1800
Nominal torque on output (with n_{1mzul})		T_{2Nzul}	Nm	1080	1080	1040	760	870	850	600
Emergency stop torque (permissible 1000 times during gearbox life time)		$T_{2Notzul}$	Nm	3500	3600	3600	3300	3200	3000	2000
Permissible average input speed (with T_{2Nzul})		n_{1mzul}	min^{-1}	700	1050	1400	2000	2000	2000	2000
Max. input speed		$n_{1maxzul}$	min^{-1}	1400	2100	2800	3000	3000	3000	3000
Max. backlash*		j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load output (at permissible average input speed)		F_{2rmzul}	N	16255	16255	16255	16497	18000	19259	20353
Max. permissible radial load output		$F_{2rmaxzul}$	N	34000						
Efficiency		η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)		$P_{thGrenz}$	kW	18,2						
Weight		m	kg	135						
Running noise (with n_{1mzul})		L_{PA}	dB(A)	75						
Inertia (with reference to input)	Ø d 42	J_1	$kgcm^2$	1038,200	610,810	383,420	254,220	223,200	162,690	152,390
	Ø d 48	J_1	$kgcm^2$	1045,900	618,530	391,180	261,950	230,940	170,440	160,130
	Ø d 55	J_2	$kgcm^3$	1066,400	639,020	411,640	282,440	251,420	190,920	180,620
	Ø d 60	J_3	$kgcm^4$	1064,500	637,140	409,780	280,580	249,560	189,060	178,760

* measured with 2 % nominal torque on output shaft

M H

MOUNTING POSITION AND LUBRICATION

MH			
Side view			
Mounting position (underside)	**A**	**B**	**C**
Side of oil fittings*	**D** - E - F	**D** - E - F	**E** - F
Side view			
Mounting position (underside)	**D**	**E**	**F**
Side of oil fittings*	**E** - F	**D**	**D**

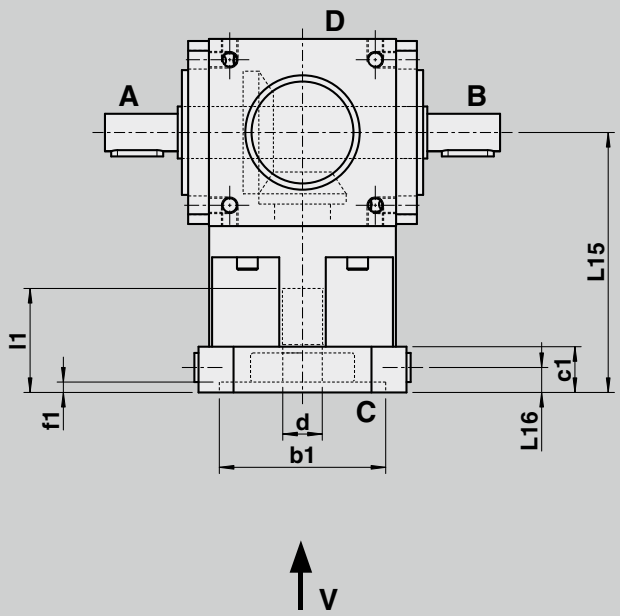


* Unless specified otherwise, the oil fittings are attached to the sides printed in bold type

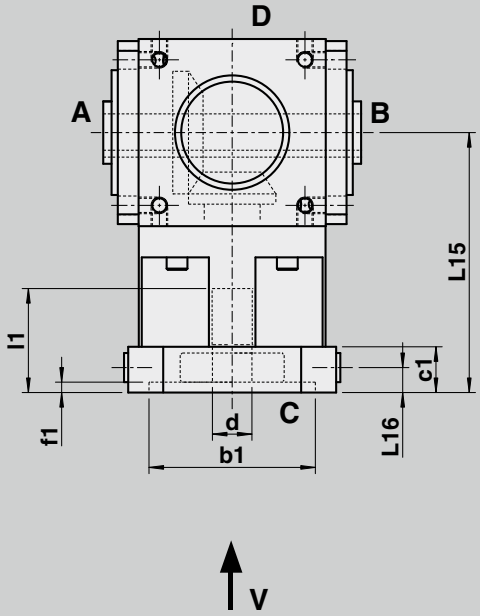
M L / M H 0 5 0 – 2 0 0

D I M E N S I O N S M O T O R M O U N T I N G

ML

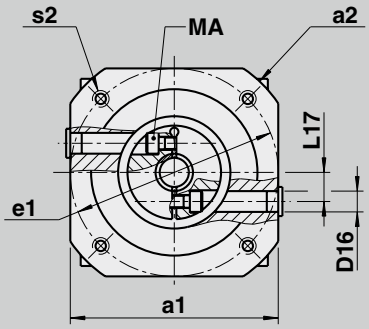


MH



Gearbox dimensions				
d x l1	**Size**	**Ratio**	**L15**	**Version**
G7				
9 x 20 11 x 23 14 x 30	**050**	1 - 4	90	C
9 x 20 11 x 23 14 x 30 19 x 40	**100**	1 - 6	125	C
11 x 23 14 x 30 19 x 40 24 x 50 28 x 60	**200**	1 - 6	145	C

View V



Motor dimensions										
a1		75	90	95	95	115	125	125	130	140
a2		100	120	105	120	140	140	140	160	190
b1	G8	70	80	70	80	95	80	95	110	130
e1		85	100	85	100	115	100	115	130	165
s2*		4x M6 / Ø7	4x M6 / Ø7	4x M6 / Ø7	4x M6 / Ø7	4x M8 / Ø9	4x M6 / Ø7	4x M8 / Ø9	4x M8 / Ø9	4x M10 / Ø11
c1		16	16	16	16	16	25	25	25	25
f1		4,5	4,5	4,5	4,5	4,5	5	5	5	5

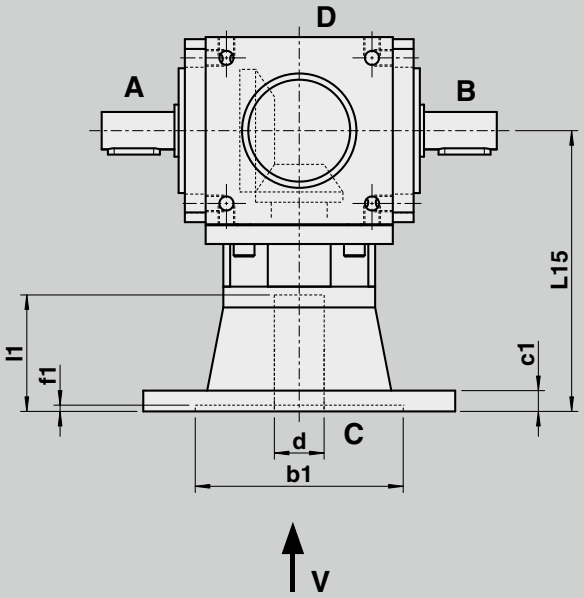
		x	x			x				
		x	x			x				
		x	x			x				
				x	x	x			x	
				x	x	x			x	
				x	x	x			x	
				x	x	x			x	
							x	x	x	x
							x	x	x	x
							x	x	x	x
							x	x	x	x
							x	x	x	x

* Depth of thread: 2 x Ø or flange thickness

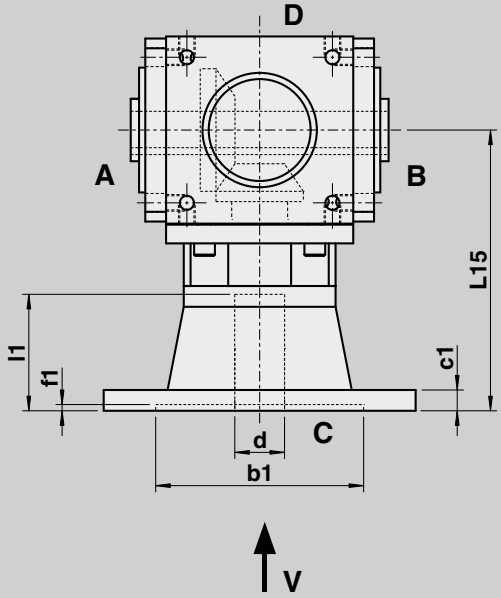
ML / MH 230 – 400

DIMENSIONS MOTOR MOUNTING

ML



MH

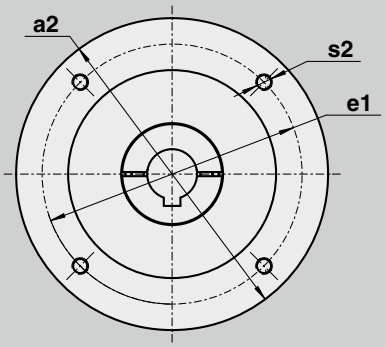


Gearbox dimensions				
d x l1	**Size**	**Ratio**	**L15**	**Version**
G7				
19 x 40 24 x 50 28 x 60 32 x 60 38 x 80	**230**	1 - 6	215	A
19 x 40 24 x 50 28 x 60 32 x 60	**250**	1 - 6	230	A
38 x 80			250	
28 x 60 32 x 60 38 x 80	**300**	1 - 6	280	A
42 x 110 48 x 110			310	
32 x 60 38 x 80	**370**	1 - 6	305	A
42 x 110 48 x 110 55 x 110			335	
38 x 80 42 x 110 48 x 110 55 x 110 60 x 140	**400**	1 - 6	370	B

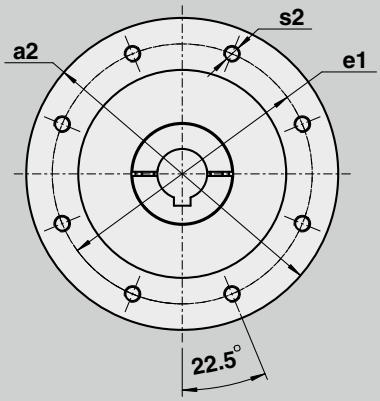
M L / M H 2 3 0 – 4 0 0

D I M E N S I O N S M O T O R M O U N T I N G

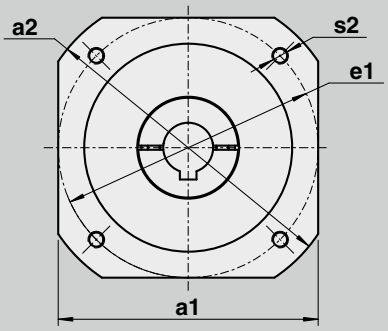
View V



4x threaded mounting bores



8x threaded mounting bores

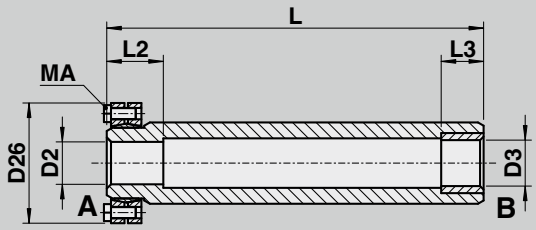


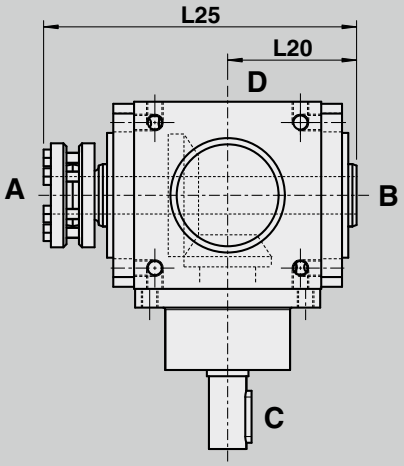
Motor dimensions																			
a1			145		145		200		242			260			345				
a2		145	160	160	190	200	250	250	300	300	300	350	350	350	400	400	400	450	
b1	H7	95	110	110	130	130	180	180	230	230	230	250	250	250	300	300	300	350	
e1		115	130	130	165	165	215	215	265	265	265	300	300	300	350	350	350	400	
s2*		4x M8 / Ø9	4x M8 / Ø9	4x M8 / Ø9	4x M10 / Ø11	4x M10/Ø11	4x M12	4x M12	4x M12	4x M12	4x M12	4x M16	4x M16	4x M16	4x M16	4x M16	4x M16	8x M16	
c1		12	12	12	15	15	18	18	18	18	24	24	24	25	24	24	25	25	
f1		5	5	5	5	5	5	5	5	5	7	6	6	7	6	6	7	7	
		x	x	x	x	x	x	x	x	x									
		x	x	x	x	x	x	x	x	x									
		x	x	x	x	x	x	x	x	x									
		x	x	x	x	x	x	x	x	x									
		x	x	x	x	x	x	x	x	x									
					x	x	x	x	x	x									
					x	x	x	x	x	x									
					x	x	x	x	x	x									
					x	x	x	x	x	x									
					x	x	x	x	x	x									
							x	x	x	x		x	x						
							x	x	x	x		x	x						
							x	x	x	x		x	x						
							x	x	x	x		x	x						
							x	x	x	x		x	x						
									x	x		x	x		x	x			
									x	x		x	x		x	x			
									x	x		x	x		x	x			
									x	x		x	x		x	x			
									x	x		x	x		x	x			
											x			x			x	x	
											x			x			x	x	
											x			x			x	x	
											x			x			x	x	
											x			x			x	x	

* Depth of thread: 2 x Ø or flange thickness

H, MH 050 – 400 SHRINK DISC

DIMENSIONS





Order details: Side A (or B) with shrink disc.
Not suitable for cantilever load. A counter bearing or bearing of the shaft is required for radial load.

Size	D2/D3	D26	L	L20	L25	L2/L3	MA
	H7						Nm
050	12	41	110	46	115	22 / 12	The required clamping torques MA can be found on the shrink disc.
100	18	50	147	62	148	21	
200	25	60	198	85	199	24 / 21	
230	32	80	207	87	209	35 / 21	
250	35	80	237	103	240	28 / 31	
300	42	100	285	125	287	34 / 31	
370	55	138	340	150	340	50 / 41	
400	60	138	392	175	394	42 / 61	

Shaft material for the insert shaft: minimum yield strength approx. 360 N/mm².
Recommended shaft fit h6

M K

T E C H N I C A L D A T A

Technical specifications on this page and in the tables on the following pages are intended only for rough preselection.

Gear teeth:	Klingelnberg spiral bevel gear teeth
Direction of rotation:	The opposite direction when facing C and A
Life time:	20000 h L_{10h}
Permissible gearbox temperature at housing:	-10 °C to +80 °C (deviating temperature ranges on request)
Lubrication:	Oil lubrication/grease lubrication
Mounting position:	Any, specify when ordering
Surface protection:	Primer coat RAL 7035 Light grey
Protection rating:	IP 54

M K

T E C H N I C A L D A T A

The following technical specifications in the table are intended only for rough preselection

MK				050				
Ratio		i		1,0	1,5	2,0	3,0	4,0
Max. permissible output torque		$T_{2maxzul}$	Nm	33	33	33	29	27
Nominal torque on output (with n_{1mzul})		T_{2Nzul}	Nm	10	12	14	11	11
Emergency stop torque (permissible 1000 times during gearbox life time)		$T_{2Notzul}$	Nm	36	36	36	32	30
Permissible average input speed (with T_{2Nzul})		n_{1mzul}	min^{-1}	3000				
Max. input speed		$n_{1maxzul}$	min^{-1}	4500				
Max. backlash*		j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)				
Permissible radial load output (at permissible average input speed)		F_{2rmzul}	N	179	203	221	250	273
Max. permissible radial load output		$F_{2rmaxzul}$	N	550				
Efficiency		ŋ	-	0,97				
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)		$P_{thGrenz}$	kW	1,23				
Weight		m	kg	2				
Running noise (with n_{1mzul})		L_{PA}	dB(A)	75				
Inertia (with reference to input)	Ø d 9	J_1	$kgcm^2$	0,514	0,439	0,404	0,189	0,166
	Ø d 11	J_1	$kgcm^2$	0,565	0,490	0,455	0,240	0,217

MK				100						
Ratio		i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque		$T_{2maxzul}$	Nm	90	90	90	72	54	54	41
Nominal torque on output (with n_{1mzul})		T_{2Nzul}	Nm	30	33	37	28	29	27	23
Emergency stop torque (permissible 1000 times during gearbox life time)		$T_{2Notzul}$	Nm	100	100	100	80	60	60	46
Permissible average input speed (with T_{2Nzul})		n_{1mzul}	min^{-1}	2500	3000	3000	3000	3000	3000	3000
Max. input speed		$n_{1maxzul}$	min^{-1}	4300	4500	4500	4500	4500	4500	4500
Max. backlash*		j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load output (at permissible average input speed)		F_{2rmzul}	N	295	316	345	390	426	455	481
Max. permissible radial load output		$F_{2rmaxzul}$	N	880						
Efficiency		ŋ	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)		$P_{thGrenz}$	kW	2,3						
Weight		m	kg	5,5						
Running noise (with n_{1mzul})		L_{PA}	dB(A)	75						
Inertia (with reference to input)	Ø d 9	J_1	$kgcm^2$	3,503	2,261	1,018	0,771	0,714	0,718	0,679
	Ø d 11	J_1	$kgcm^2$	3,568	2,326	1,084	0,836	0,779	0,783	0,744
	Ø d 14	J_1	$kgcm^3$	3,692	2,449	1,208	0,960	0,903	0,908	0,868
	Ø d 19	J_1	$kgcm^4$	4,176	2,933	1,690	1,443	1,368	1,392	1,351

* measured with 2 % nominal torque on output shaft

M K

T E C H N I C A L D A T A

MK					200				
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	234	234	234	171	171	135	90
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	73	79	86	58	64	64	50
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	260	260	260	190	190	150	100
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	2000	2500	2500	2500	2500	2500	2500
Max. input speed	$n_{1maxzul}$	min^{-1}	3500	3750	3750	3750	3750	3750	3750
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	486	514	561	634	692	740	782
Max. permissible radial load output	$F_{2rmaxzul}$	N	1400						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	4,05						
Weight	m	kg	14						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia (with reference to input) Ø d 14	J_1	$kgcm^2$	12,591	8,932	5,273	4,783	4,422	4,369	4,089
Ø d 19	J_1	$kgcm^2$	13,079	9,420	5,761	5,271	4,910	4,867	4,677
Ø d 24	J_1	$kgcm^3$	14,046	10,387	6,728	6,218	5,877	5,635	5,544
Ø d 28	J_1	$kgcm^4$	16,268	12,609	8,950	8,460	8,099	7,956	7,766

MK					230				
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	360	360	360	315	315	270	171
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	230	130	135	140	110	115	105
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	400	400	400	350	350	300	190
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	1500	2250	2500	2500	2500	2500	2500
Max. input speed	$n_{1maxzul}$	min^{-1}	2800	3750	3750	3750	3750	3750	3750
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	840	840	888	1004	1095	1172	1239
Max. permissible radial load output	$F_{2rmaxzul}$	N	2050						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	5,45						
Weight	m	kg	24						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia (with reference to input) Ø d 9	J_1	$kgcm^2$	43,327	38,522	34,375	29,235	18,536	18,400	18,275
Ø d 11	J_1	$kgcm^2$	45,232	40,025	36,572	32,845	20,855	20,666	20,328
Ø d 14	J_1	$kgcm^3$	48,555	42,375	37,025	36,375	23,890	23,722	20,375
Ø d 19	J_1	$kgcm^4$	50,033	43,998	40,750	37,555	24,850	24,650	24,250

* measured with 2 % nominal torque on output shaft

M K

T E C H N I C A L D A T A

The following technical specifications in the table are intended only for rough preselection

MK				250						
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	576	576	576	522	369	288	234
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	196	200	200	160	168	160	130
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	640	640	640	580	410	320	260
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	1300	1950	2500	2500	2500	2500	2500
Max. input speed	$n_{1maxzul}$	min^{-1}	2300	3450	3750	3750	3750	3750	3750
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	1385	1385	1402	1585	1730	1851	1956
Max. permissible radial load output	$F_{2rmaxzul}$	N	3200						
Efficiency	ŋ	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	7,1						
Weight	m	kg	35						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia (with reference to input) Ø d 24	J_1	$kgcm^2$	59,885	46,775	37,843	28,255	26,194	25,556	24,810
Ø d 28	J_1	$kgcm^2$	87,235	50,750	42,665	36,412	31,223	30,147	29,475
Ø d 32	J_2	$kgcm^3$	93,125	57,333	49,225	42,675	38,369	36,215	35,550
Ø d 38	J_3	$kgcm^4$	102,333	65,875	57,745	51,335	46,336	45,228	44,642

MK				300						
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	1260	1260	1260	900	864	900	612
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	410	410	410	280	280	340	250
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	1400	1400	1400	1000	960	1000	680
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	1000	1500	2000	2000	2000	2000	2000
Max. input speed	$n_{1maxzul}$	min^{-1}	2000	3000	3000	3000	3000	3000	3000
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	2600	2600	2600	2940	3208	3432	3627
Max. permissible radial load output	$F_{2rmaxzul}$	N	5800						
Efficiency	ŋ	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	10,9						
Weight	m	kg	57						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia (with reference to input) Ø d 32	J_1	$kgcm^2$	180,025	132,548	85,873	66,255	61,055	60,860	57,750
Ø d 38	J_1	$kgcm^2$	194,250	146,250	99,765	75,883	74,875	74,025	71,505
Ø d 42	J_2	$kgcm^3$	198,220	151,650	104,270	81,025	79,850	79,225	76,575
Ø d 48	J_3	$kgcm^4$	213,150	165,750	128,500	99,234	94,562	93,255	90,689

* measured with 2 % nominal torque on output shaft

M K

T E C H N I C A L D A T A

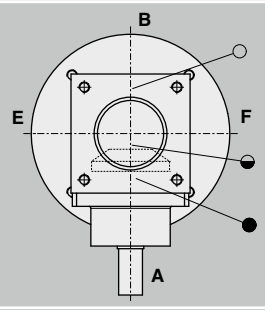
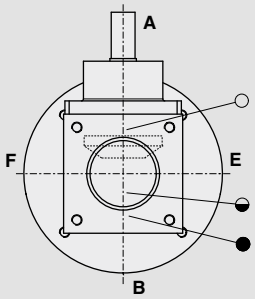
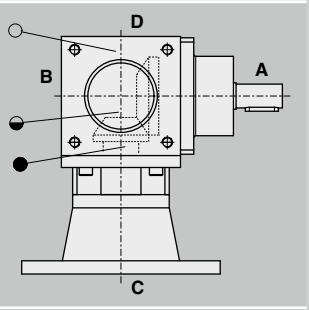
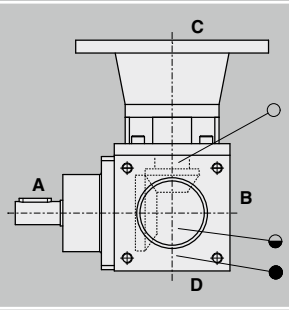
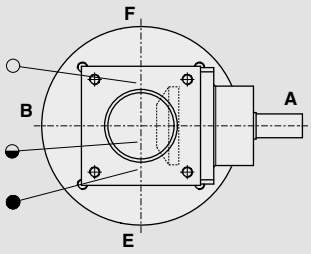
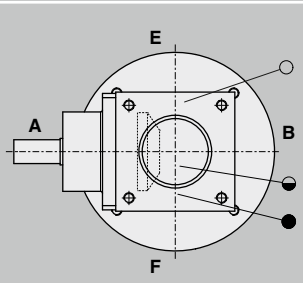
MK				370						
Ratio		i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque		$T_{2maxzul}$	Nm	2250	2340	2340	1566	1728	1746	945
Nominal torque on output (with n_{1mzul})		T_{2Nzul}	Nm	688	690	676	480	520	560	430
Emergency stop torque (permissible 1000 times during gearbox life time)		$T_{2Notzul}$	Nm	2500	2600	2600	1740	1920	1940	1050
Permissible average input speed (with T_{2Nzul})		n_{1mzul}	min^{-1}	850	1275	1700	2000	2000	2000	2000
Max. input speed		$n_{1maxzul}$	min^{-1}	1700	2550	3000	3000	3000	3000	3000
Max. backlash*		j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load output (at permissible average input speed)		F_{2rmzul}	N	4937	4937	4937	5314	5799	6204	6557
Max. permissible radial load output		$F_{2rmaxzul}$	N	11000						
Efficiency		ŋ	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)		$P_{thGrenz}$	kW	14,4						
Weight		m	kg	87						
Running noise (with n_{1mzul})		L_{PA}	dB(A)	75						
Inertia (with reference to input)	Ø d 38	J_1	$kgcm^2$	483,330	312,750	202,500	131,050	114,880	110,400	104,050
	Ø d 42	J_1	$kgcm^2$	484,750	314,600	204,500	132,750	115,320	111,850	105,990
	Ø d 48	J_2	$kgcm^3$	492,550	322,050	212,750	141,090	133,550	119,750	114,640
	Ø d 55	J_3	$kgcm^4$	505,050	334,750	224,450	154,040	136,440	132,540	126,650

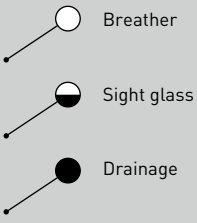
MK				400						
Ratio		i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque		$T_{2maxzul}$	Nm	3150	3240	3240	2970	2880	2700	1800
Nominal torque on output (with n_{1mzul})		T_{2Nzul}	Nm	1080	1080	1040	760	870	850	600
Emergency stop torque (permissible 1000 times during gearbox life time)		$T_{2Notzul}$	Nm	3500	3600	3600	3300	3200	3000	2000
Permissible average input speed (with T_{2Nzul})		n_{1mzul}	min^{-1}	700	1050	1400	2000	2000	2000	2000
Max. input speed		$n_{1maxzul}$	min^{-1}	1400	2100	2800	3000	3000	3000	3000
Max. backlash*		j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load output (at permissible average input speed)		F_{2rmzul}	N	10027	10027	10027	10177	11104	11880	12555
Max. permissible radial load output		$F_{2rmaxzul}$	N	20000						
Efficiency		ŋ	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)		$P_{thGrenz}$	kW	18,2						
Weight		m	kg	135						
Running noise (with n_{1mzul})		L_{PA}	dB(A)	75						
Inertia (with reference to input)	Ø d 42	J_1	$kgcm^2$	900,790	524,860	349,730	238,950	214,610	157,200	148,570
	Ø d 48	J_1	$kgcm^2$	908,540	532,730	357,470	246,690	222,350	164,940	156,320
	Ø d 55	J_2	$kgcm^3$	929,030	553,480	377,950	267,170	242,840	185,420	176,800
	Ø d 60	J_3	$kgcm^4$	927,160	551,550	376,090	265,310	240,970	193,560	174,940

* measured with 2 % nominal torque on output shaft

M K

M O U N T I N G P O S I T I O N A N D L U B R I C A T I O N

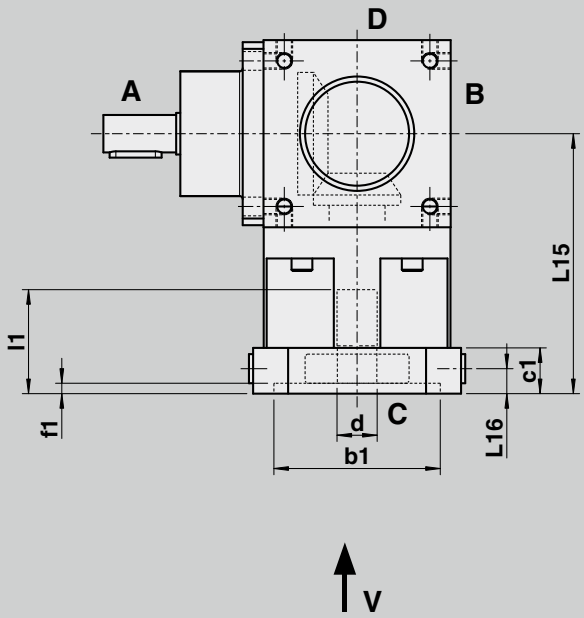
MK			
Side view			
Mounting position (underside)	**A**	**B**	**C**
Side of oil fittings*	**D** - E - F	**D** - E - F	**E** - F
Side view			
Mounting position (underside)	**D**	**E**	**F**
Side of oil fittings*	**E** - F	**D**	**D**



* Unless specified otherwise, the oil fittings are attached to the sides printed in bold type

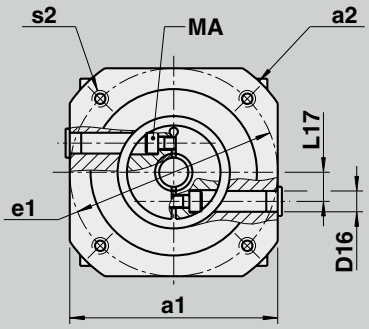
MK 050 – 200

DIMENSIONS MOTOR MOUNTING



Gearbox dimensions				
d x l1	**Size**	**Ratio**	**L15**	**Version**
G7				
9 x 20 11 x 23 14 x 30	**050**	1 - 4	90	C
9 x 20 11 x 23 14 x 30 19 x 40	**100**	1 - 6	125	C
11 x 23 14 x 30 19 x 40 24 x 50 28 x 60	**200**	1 - 6	145	C

View V



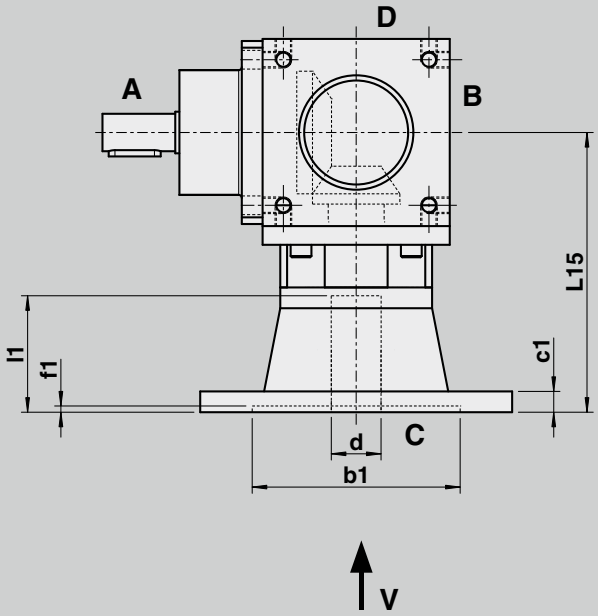
Motor dimensions										
a1		75	90	95	95	115	125	125	130	140
a2		100	120	105	120	140	140	140	160	190
b1	G8	70	80	70	80	95	80	95	110	130
e1		85	100	85	100	115	100	115	130	165
s2*		4x M6 / Ø7	4x M6 / Ø7	4x M6 / Ø7	4x M6 / Ø7	4x M8 / Ø9	4x M6 / Ø7	4x M8 / Ø9	4x M8 / Ø9	4x M10 / Ø11
c1		16	16	16	16	16	25	25	25	25
f1		4,5	4,5	4,5	4,5	4,5	5	5	5	5

x	x			x					
x	x			x					
x	x			x					
		x	x	x				x	
		x	x	x				x	
		x	x	x				x	
		x	x	x				x	
					x	x	x	x	
					x	x	x	x	
					x	x	x	x	
					x	x	x	x	
					x	x	x	x	

* Depth of thread: 2 x Ø or flange thickness

MK 230 – 400

DIMENSIONS MOTOR MOUNTING

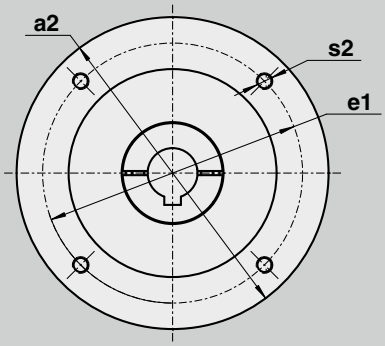


Gearbox dimensions				
d x l1	**Size**	**Ratio**	**L15**	**Version**
G7				
19 x 40 24 x 50 28 x 60 32 x 60 38 x 80	**230**	1 - 6	215	A
19 x 40 24 x 50 28 x 60 32 x 60	**250**	1 - 6	230	A
38 x 80			250	
28 x 60 32 x 60 38 x 80	**300**	1 - 6	280	A
42 x 110 48 x 110			310	
32 x 60 38 x 80	**370**	1 - 6	305	A
42 x 110 48 x 110 55 x 110			335	
38 x 80 42 x 110 48 x 110 55 x 110 60 x 140	**400**	1 - 6	370	B

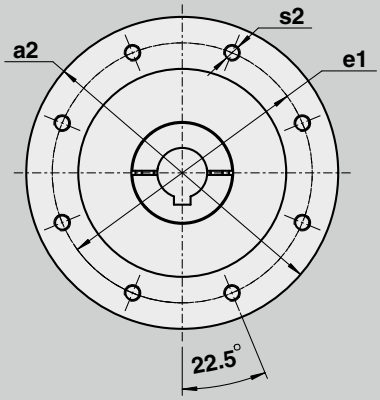
MK 230 – 400

DIMENSIONS MOTOR MOUNTING

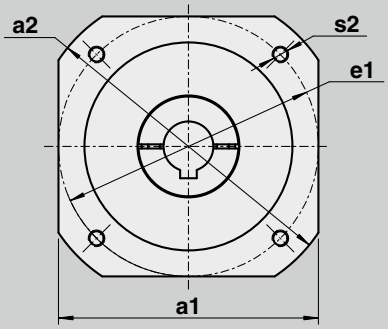
View V



4x Anschraubbohrungen



8x Anschraubbohrungen



Motor dimensions																			
a1			145		145		200		242			260			345				
a2		145	160	160	190	200	250	250	300	300	300	350	350	350	400	400	400	450	
b1	H7	95	110	110	130	130	180	180	230	230	230	250	250	250	300	300	300	350	
e1		115	130	130	165	165	215	215	265	265	265	300	300	300	350	350	350	400	
s2*		4x M8 / Ø9	4x M8 / Ø9	4x M8 / Ø9	4x M10 / Ø11	4x M10 /Ø11	4x M12	4x M12	4x M12	4x M12	4x M12	4x M16	4x M16	4x M16	4x M16	4x M16	4x M16	8x M16	
c1		12	12	12	15	15	18	18	18	18	24	24	24	25	24	24	25	25	
f1		5	5	5	5	5	5	5	5	5	7	6	6	7	6	6	7	7	

		x	x	x	x	x	x	x	x	x									
		x	x	x	x	x	x	x	x	x									
		x	x	x	x	x	x	x	x	x									
		x	x	x	x	x	x	x	x	x									
		x	x	x	x	x	x	x	x	x									
					x	x	x	x	x	x									
					x	x	x	x	x	x									
					x	x	x	x	x	x									
					x	x	x	x	x	x									
					x	x	x	x	x	x									
							x	x	x	x		x	x						
							x	x	x	x		x	x						
							x	x	x	x		x	x						
							x	x	x	x		x	x						
							x	x	x	x		x	x						
									x	x		x	x		x	x			
									x	x		x	x		x	x			
									x	x		x	x		x	x			
									x	x		x	x		x	x			
									x	x		x	x		x	x			
											x			x			x	x	
											x			x			x	x	
											x			x			x	x	
											x			x			x	x	
											x			x			x	x	

* Depth of thread: 2 x Ø or flange thickness

L V

T E C H N I C A L D A T A

Technical specifications on this page and in the tables on the following pages are intended only for rough preselection.

Gear teeth:	Klingelnberg spiral bevel gear teeth
Direction of rotation:	The opposite direction when facing C and A
Life time:	20000 h L_{10h}
Permissible gearbox temperature at housing:	-10 °C to +80 °C (deviating temperature ranges on request)
Lubrication:	Oil lubrication/grease lubrication
Mounting position:	Any, specify when ordering
Surface protection:	Primer coat RAL 7035 Light grey
Protection rating:	IP 54

L V

T E C H N I C A L D A T A

The following technical specifications in the table are intended only for rough preselection

LV			**050**				
Ratio	i		1,0	1,5	2,0	3,0	4,0
Max. permissible output torque	$T_{2maxzul}$	Nm	33	33	33	29	27
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	10	12	14	11	11
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	36	36	36	32	30
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	3000				
Max. input speed	$n_{1maxzul}$	min^{-1}	4500				
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)				
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	378	427	466	527	575
Maximum permissible radial load input	$F_{1rmaxzul}$	N	1300				
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N					
Max. permissible radial load output	$F_{2rmaxzul}$	N					
Efficiency	ŋ	-	0,97				
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	1,23				
Weight	m	kg	1,7				
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75				
Inertia D1 (with reference to input)	J_1	$kgcm^2$	0,641	0,459	0,203	0,111	0,074

LV			**100**						
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	90	90	90	72	54	54	41
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	30	33	37	28	29	27	23
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	100	100	100	80	60	60	46
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	2500	3000	3000	3000	3000	3000	3000
Max. input speed	$n_{1maxzul}$	min^{-1}	4300	4500	4500	4500	4500	4500	4500
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	295	280	280	280	280	280	280
Maximum permissible radial load input	$F_{1rmaxzul}$	N	880						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	614	657	717	811	884	946	1000
Max. permissible radial load output	$F_{2rmaxzul}$	N	1900						
Efficiency	ŋ	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	2,3						
Weight	m	kg	5						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia D1 (with reference to input)	J_1	$kgcm^2$	4,209	2,514	1,036	0,668	0,569	0,553	0,508

* measured with 2 % nominal torque on output shaft

L V

T E C H N I C A L D A T A

LV			200						
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	234	234	234	171	171	135	90
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	73	79	86	58	64	64	50
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	260	260	260	190	190	150	100
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	2000	2500	2500	2500	2500	2500	2500
Max. input speed	$n_{1maxzul}$	min^{-1}	3500	3750	3750	3750	3750	3750	3750
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	486	455	455	455	455	455	455
Maximum permissible radial load input	$F_{1rmaxzul}$	N	1400						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	1051	1111	1212	1371	1495	1600	1691
Max. permissible radial load output	$F_{2rmaxzul}$	N	3000						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	4,05						
Weight	m	kg	12,5						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia D1 (with reference to input)	J_1	$kgcm^2$	16,276	10,032	5,277	3,333	2,720	2,573	2,223

LV			230						
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	360	360	360	315	315	270	171
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	230	130	135	140	110	115	105
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	400	400	400	350	350	300	190
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	1500	2250	2500	2500	2500	2500	2500
Max. input speed	$n_{1maxzul}$	min^{-1}	2800	3750	3750	3750	3750	3750	3750
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	840	743	720	720	720	720	720
Maximum permissible radial load input	$F_{1rmaxzul}$	N	2050						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	1864	1864	1970	2227	2430	2600	2748
Max. permissible radial load output	$F_{2rmaxzul}$	N	4800						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	5,45						
Weight	m	kg	18						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia D1 (with reference to input)	J_1	$kgcm^2$	37,703	29,651	23,160	8,284	6,278	6,081	5,548

* measured with 2 % nominal torque on output shaft

L V

T E C H N I C A L D A T A

The following technical specifications in the table are intended only for rough preselection

LV			**250**						
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	576	576	576	522	369	288	234
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	196	200	200	160	168	160	130
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	640	640	640	580	410	320	260
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	1300	1950	2500	2500	2500	2500	2500
Max. input speed	$n_{1maxzul}$	min^{-1}	2300	3450	3750	3750	3750	3750	3750
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	1385	1225	1136	1136	1136	1136	1136
Maximum permissible radial load input	$F_{1rmaxzul}$	N	3200						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	3294	3294	3333	3769	4112	4400	4650
Max. permissible radial load output	$F_{2rmaxzul}$	N	8000						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	7,1						
Weight	m	kg	25						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia D1 (with reference to input)	J_1	$kgcm^2$	62,615	40,149	28,857	12,705	11,036	9,730	9,303

LV			**300**						
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	1260	1260	1260	900	864	900	612
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	410	410	410	280	280	340	250
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	1400	1400	1400	1000	960	1000	680
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	1000	1500	2000	2000	2000	2000	2000
Max. input speed	$n_{1maxzul}$	min^{-1}	2000	3000	3000	3000	3000	3000	3000
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	2600	2299	2107	2107	2107	2107	2107
Maximum permissible radial load input	$F_{1rmaxzul}$	N	5800						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	5593	5593	5593	6324	6900	7383	7802
Max. permissible radial load output	$F_{2rmaxzul}$	N	14500						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	10,9						
Weight	m	kg	45						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia D1 (with reference to input)	J_1	$kgcm^2$	164,840	106,442	53,537	32,778	26,055	24,213	21,582

* measured with 2 % nominal torque on output shaft

L V

T E C H N I C A L D A T A

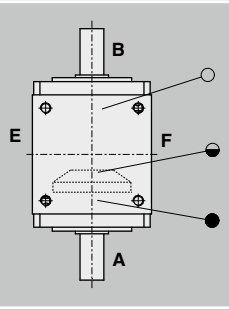
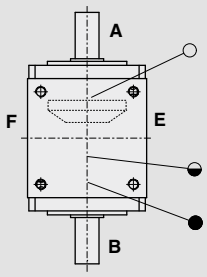
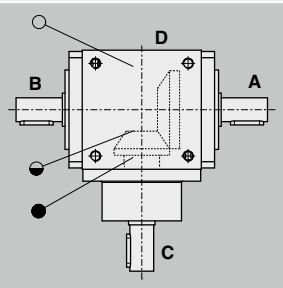
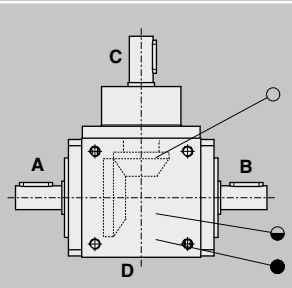
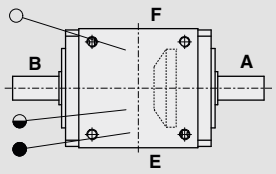
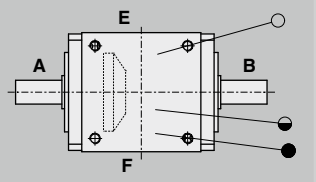
LV			370						
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	2250	2340	2340	1566	1728	1746	945
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	688	690	676	480	520	560	430
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	2500	2600	2600	1740	1920	1940	1050
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	850	1275	1700	2000	2000	2000	2000
Max. input speed	$n_{1maxzul}$	min^{-1}	1700	2550	3000	3000	3000	3000	3000
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	4937	4366	4002	3810	3810	3810	3810
Maximum permissible radial load input	$F_{1rmaxzul}$	N	11000						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	8344	8344	8344	8982	9800	10486	11081
Max. permissible radial load output	$F_{2rmaxzul}$	N	18500						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	14,4						
Weight	m	kg	70						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia D1 (with reference to input)	J_1	$kgcm^2$	574,510	335,339	191,048	92,052	68,152	60,529	53,009

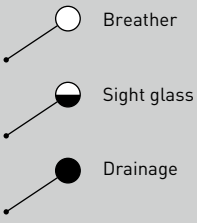
LV			400						
Ratio	i		1,0	1,5	2,0	3,0	4,0	5,0	6,0
Max. permissible output torque	$T_{2maxzul}$	Nm	3150	3240	3240	2970	2880	2700	1800
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	1080	1080	1040	760	870	850	600
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	3500	3600	3600	3300	3200	3000	2000
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	700	1050	1400	2000	2000	2000	2000
Max. input speed	$n_{1maxzul}$	min^{-1}	1400	2100	2800	3000	3000	3000	3000
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)						
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	10027	8868	8128	7295	7295	7295	7295
Maximum permissible radial load input	$F_{1rmaxzul}$	N	20000						
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	16255	16255	16255	16497	18000	19259	20353
Max. permissible radial load output	$F_{2rmaxzul}$	N	34000						
Efficiency	η	-	0,97						
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	18,2						
Weight	m	kg	100						
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75						
Inertia D1 (with reference to input)	J_1	$kgcm^2$	1038,800	551,010	316,293	169,430	133,976	108,829	97,423

* measured with 2 % nominal torque on output shaft

L V

M O U N T I N G P O S I T I O N A N D L U B R I C A T I O N

LV			
Side view			
Mounting position (underside)	**A**	**B**	**C**
Side of oil fittings*	**D** - E - F	**D** - E - F	**E** - F
Side view			
Mounting position (underside)	**D**	**E**	**F**
Side of oil fittings*	**E** - F	**D**	**D**

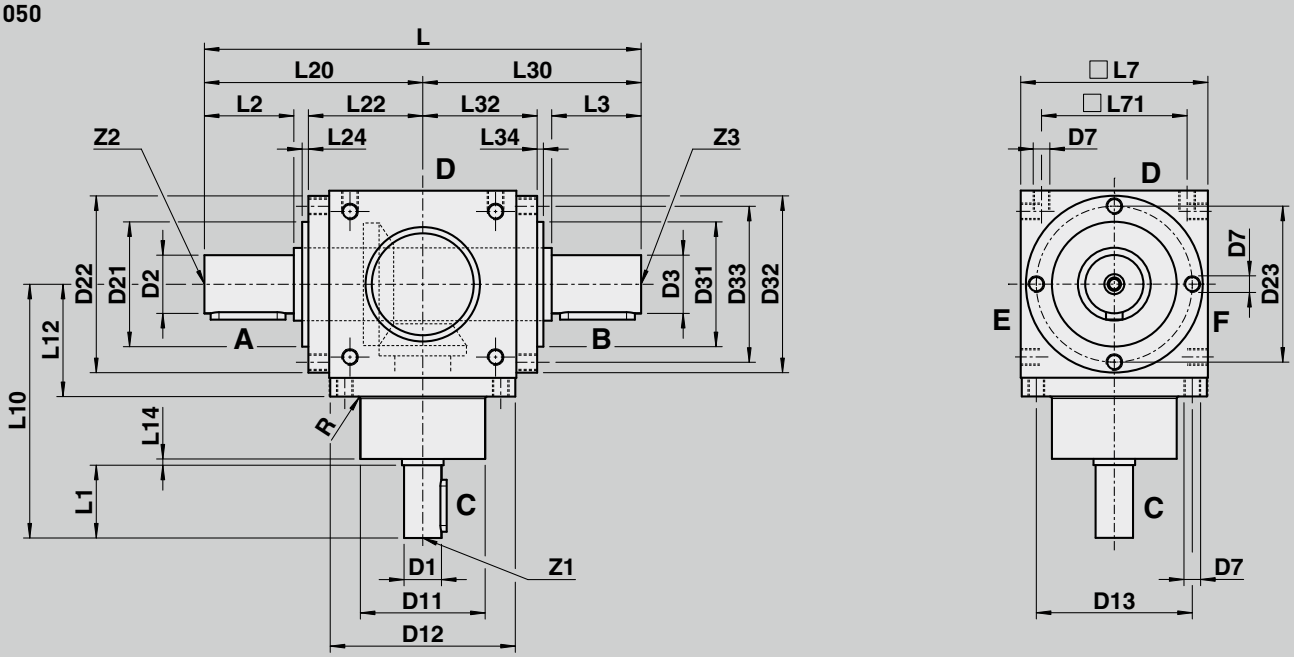


* Unless specified otherwise, the oil fittings are attached to the sides printed in bold type

LV 050 – LV 400

DIMENSIONS

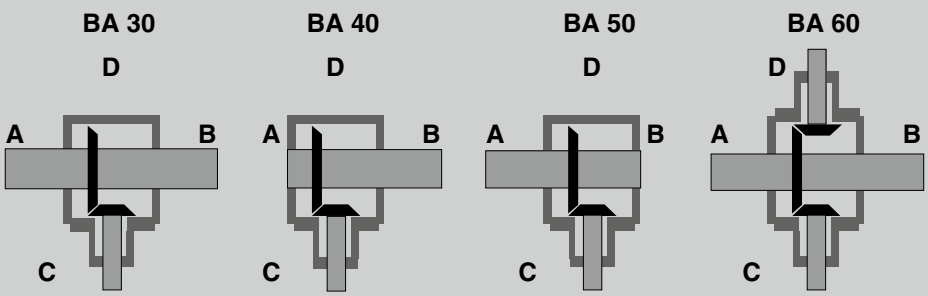
LV 050



Size	Ratio	D1	D2	D3	D7	D8	D11	D12	D13	D21	D22	D23	D31	D32	D33	L	L1	L2	L3	L7
		j6	j6	j6			f7	f7		f7			f7							
050	1 - 2 3 + 4	12	14	14	M6	-	44	64,5*	54	44	64,5	54	44	64,5	54	152	26	30	30	65
100	1 - 2	18	24	24	M8	9,0	60	89	75	60	-	-	60	-	-	210	35	45	45	90
	3 + 4	15															30			
	5 + 6	12															25			
200	1 - 2	25	32	32	M10	11,0	80	119	100	80	-	-	80	-	-	286	45	60	60	120
	3 + 4	20															40			
	5 + 6	15															30			
230	1 - 2	32	38	38	M10	11,0	95	135	115	100	-	-	100	-	-	314	50	70	70	140
	3 + 4	28																		
	5 + 6	24																		
250	1 - 2	35	42	42	M12	13,5	110	156	135	110	-	-	110	-	-	362	60	80	80	160
	3 + 4	28															55			
	5 + 6	24															50			
300	1 - 2	42	55	55	M12	13,5	120	198	175	120	-	-	120	-	-	448	80	100	100	200
	3 + 4	35															68			
	5 + 6	28															55			
370	1 - 2	55	70	70	M16	17,5	150	225	200	150	-	-	150	-	-	540	90	120	120	230
	3 + 4	40					140										80			
	5 + 6	35															70			
400	1 - 2	60	75	75	M16	17,5	160	258	230	180	-	-	180	-	-	634	110	140	140	260
	3 + 4	50															90			
	5 + 6	45																		

* General tolerance DIN ISO 2768-1

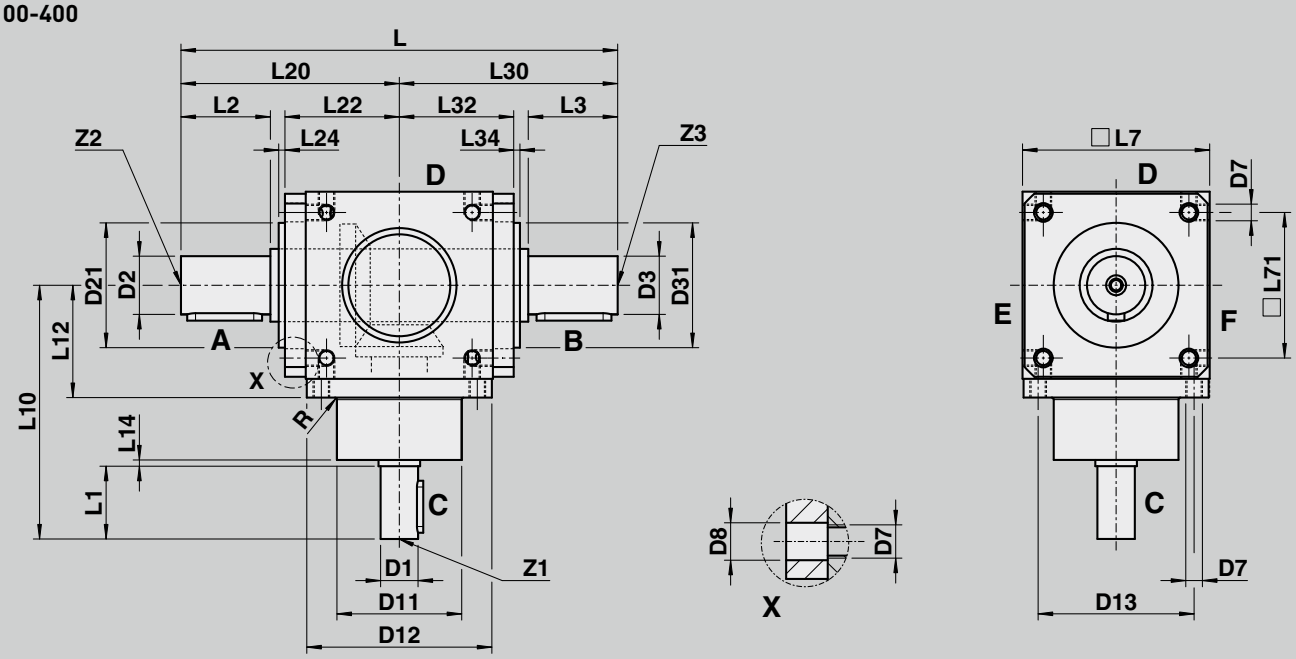
Design



L V 0 5 0 – L V 4 0 0

D I M E N S I O N S

LV 100-400



L10	L12	L14	L20	L22	L24	L30	L32	L34	L71	R	Key D1 according to DIN 6885/1	Key D2/D3 according to DIN 6885/1	Z1 DIN 332	Z2 DIN 332	Z3 DIN 332
100	42	2	76	42	2	76	42	2	45	0,8	4 x 4 x 20	5 x 5 x 25	D M 4	D M 5	D M 5
115															
122	55	2	105	55	4	105	55	4	70	1	6 x 6 x 25	8 x 7 x 36	D M 6	D M 8	D M 8
127											5 x 5 x 20		D M 5		
122											4 x 4 x 16		D M 4		
162	75	2	143	77	5	143	77	5	100	1	8 x 7 x 36	10 x 8 x 45	D M10	D M12	D M12
157											6 x 6 x 30		D M 6		
147											5 x 5 x 20		D M 5		
180	83	2	157	82	3	157	82	3	110	2	10 x 8 x 45	10 x 8 x 60	D M12	D M12	D M12
195											8 x 7 x 40		D M10		
											8 x 7 x 40		D M 8		
212	95	2	181	95	5	181	95	5	120	2	10 x 8 x 45	12 x 8 x 60	D M12	D M16	D M16
227											8 x 7 x 45		D M10		
222											8 x 7 x 40		D M 8		
273	120	3	224	117	6	224	117	6	160	3	12 x 8 x 60	16 x 10 x 80	D M16	D M20	D M20
261		2									10 x 8 x 45		D M12		
248											8 x 7 x 45		D M10		
305	135	2	270	140	7	270	140	7	180	5	16 x 10 x 80	20 x 12 x 100	D M20	D M20	D M70
310											12 x 8 x 60		D M16		
300											10 x 8 x 50		D M12		
380	150	5	317	150	22	317	150	22	220	5	18 x 11 x 90	20 x 12 x 100	D M20	D M20	D M20
360										10	14 x 9 x 70		D M16		
											14 x 9 x 70		D M16		

L S

T E C H N I C A L D A T A

Technical specifications on this page and in the tables on the following pages are intended only for rough preselection.

Gear teeth:	Klingelnberg spiral bevel gear teeth
Direction of rotation:	The opposite direction when facing C and A
Life time:	20000 h L_{10h}
Permissible gearbox temperature at housing:	-10 °C to +80 °C (deviating temperature ranges on request)
Lubrication:	Oil lubrication/grease lubrication
Mounting position:	Any, specify when ordering
Surface protection:	Primer coat RAL 7035 Light grey
Protection rating:	IP 54

L S

T E C H N I C A L D A T A

The following technical specifications in the table are intended only for rough preselection

LS			100	
Ratio	i		1 / 1,5	1 / 2,0
Max. permissible output torque	$T_{2maxzul}$	Nm	60	45
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	22	19
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	67	50
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	2000	1500
Max. input speed	$n_{1maxzul}$	min^{-1}	3000	2250
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)	
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	316	345
Maximum permissible radial load input	$F_{1rmaxzul}$	N	880	
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	490	490
Max. permissible radial load output	$F_{2rmaxzul}$	N	1450	
Efficiency	η	-	0,97	
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	2,3	
Weight	m	kg	5	
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75	
Inertia D1 (with reference to input)	J_1	$kgcm^2$	on request	

LS			200	
Ratio	i		1 / 1,5	1 / 2,0
Max. permissible output torque	$T_{2maxzul}$	Nm	156	117
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	53	43
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	173	130
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	1667	1250
Max. input speed	$n_{1maxzul}$	min^{-1}	2500	1875
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)	
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	514	561
Maximum permissible radial load input	$F_{1rmaxzul}$	N	1400	
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	792	792
Max. permissible radial load output	$F_{2rmaxzul}$	N	2200	
Efficiency	η	-	0,97	
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	4,05	
Weight	m	kg	12,5	
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75	
Inertia D1 (with reference to input)	J_1	$kgcm^2$	on request	

* measured with 2 % nominal torque on output shaft

L S

T E C H N I C A L D A T A

LS			230	
Ratio	i		1 / 1,5	1 / 2,0
Max. permissible output torque	$T_{2maxzul}$	Nm	240	180
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	90	70
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	267	200
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	1500	1250
Max. input speed	$n_{1maxzul}$	min^{-1}	2500	1875
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)	
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	840	888
Maximum permissible radial load input	$F_{1rmaxzul}$	N	2050	
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	1360	1321
Max. permissible radial load output	$F_{2rmaxzul}$	N	3800	
Efficiency	η	-	0,97	
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	5,45	
Weight	m	kg	18	
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75	
Inertia D1 (with reference to input)	J_1	$kgcm^2$	on request	

LS			250	
Ratio	i		1 / 1,5	1 / 2,0
Max. permissible output torque	$T_{2maxzul}$	Nm	384	288
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	133	100
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	427	320
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	1300	1250
Max. input speed	$n_{1maxzul}$	min^{-1}	2300	1875
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)	
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	1357	1374
Maximum permissible radial load input	$F_{1rmaxzul}$	N	3200	
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	2308	2219
Max. permissible radial load output	$F_{2rmaxzul}$	N	6500	
Efficiency	η	-	0,97	
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	7,1	
Weight	m	kg	25	
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75	
Inertia D1 (with reference to input)	J_1	$kgcm^2$	on request	

* measured with 2 % nominal torque on output shaft

L S

T E C H N I C A L D A T A

LS			300	
Ratio	i		1 / 1,5	1 / 2,0
Max. permissible output torque	$T_{2maxzul}$	Nm	840	630
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	273	205
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	933	700
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	1000	
Max. input speed	$n_{1maxzul}$	min^{-1}	2000	1500
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)	
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	2713	2713
Maximum permissible radial load input	$F_{1rmaxzul}$	N	5800	
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	3900	3574
Max. permissible radial load output	$F_{2rmaxzul}$	N	10000	
Efficiency	η	-	0,97	
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	10,9	
Weight	m	kg	45	
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75	
Inertia D1 (with reference to input)	J_1	$kgcm^2$	on request	

LS			370	
Ratio	i		1 / 1,5	1 / 2,0
Max. permissible output torque	$T_{2maxzul}$	Nm	1560	1170
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	460	338
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	1733	1300
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	850	850
Max. input speed	$n_{1maxzul}$	min^{-1}	1700	1500
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)	
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	4988	4988
Maximum permissible radial load input	$F_{1rmaxzul}$	N	11000	
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	6302	5726
Max. permissible radial load output	$F_{2rmaxzul}$	N	15500	
Efficiency	η	-	0,97	
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	14,4	
Weight	m	kg	70	
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75	
Inertia D1 (with reference to input)	J_1	$kgcm^2$	on request	

* measured with 2 % nominal torque on output shaft

L S

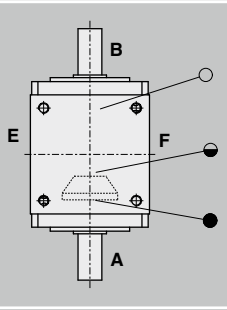
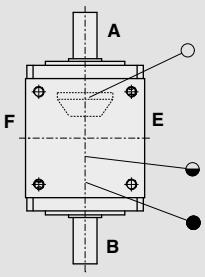
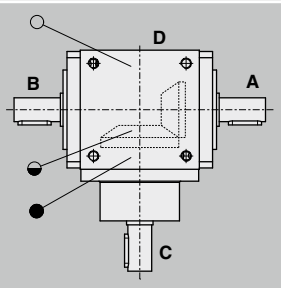
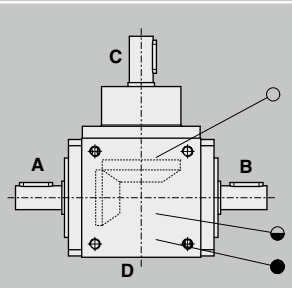
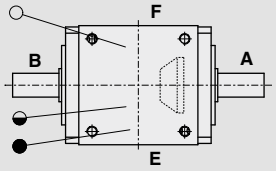
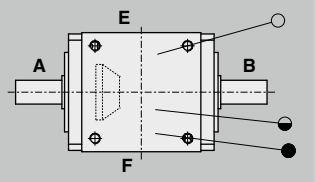
T E C H N I C A L D A T A

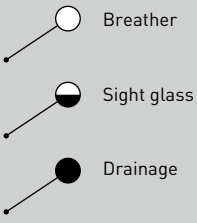
LS			400	
Ratio	i		1 / 1,5	1 / 2,0
Max. permissible output torque	$T_{2maxzul}$	Nm	2160	1620
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	720	520
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	2400	1800
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	700	
Max. input speed	$n_{1maxzul}$	min^{-1}	1400	
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 7 (4)	
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	10027	10027
Maximum permissible radial load input	$F_{1rmaxzul}$	N	20000	
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	12809	11232
Max. permissible radial load output	$F_{2rmaxzul}$	N	27000	
Efficiency	η	-	0,97	
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	18,2	
Weight	m	kg	100	
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75	
Inertia D1 (with reference to input)	J_1	$kgcm^2$	on request	

* measured with 2 % nominal torque on output shaft

L S

M O U N T I N G P O S I T I O N A N D L U B R I C A T I O N

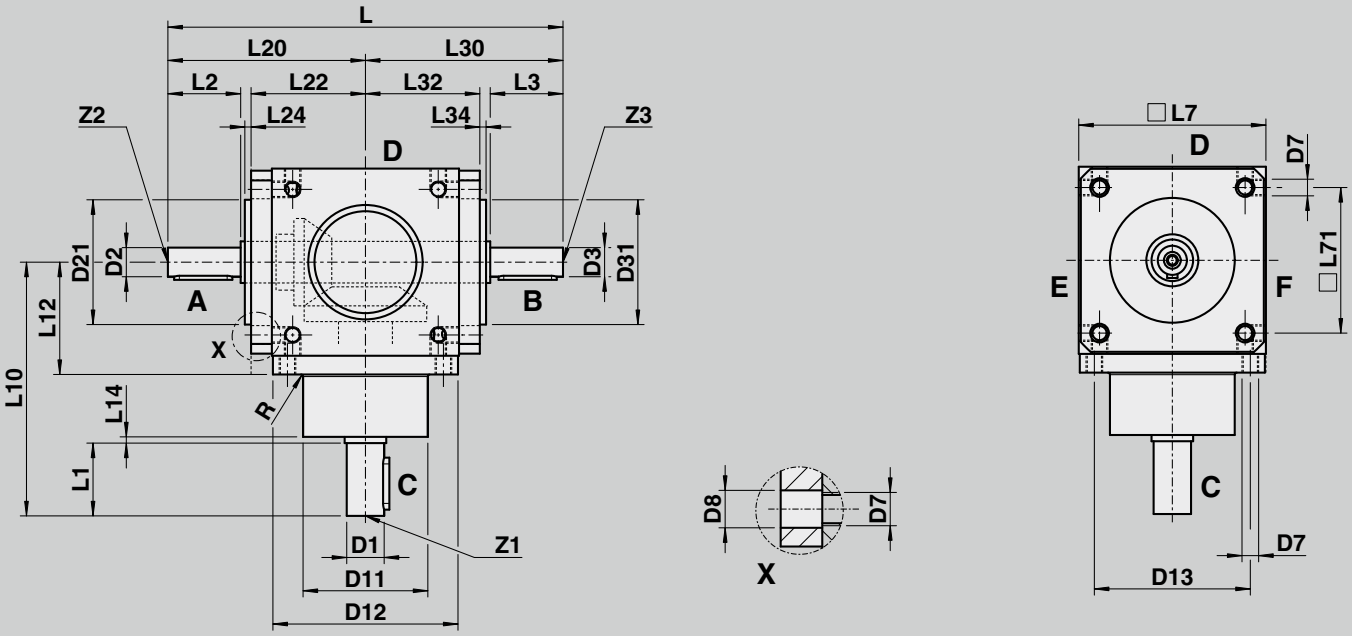
LS			
Side view			
Mounting position (underside)	**A**	**B**	**C**
Side of oil fittings*	**D** - E - F	**D** - E - F	**E** - F
Side view			
Mounting position (underside)	**D**	**E**	**F**
Side of oil fittings*	**E** - F	**D**	**D**



* Unless specified otherwise, the oil fittings are attached to the sides printed in bold type

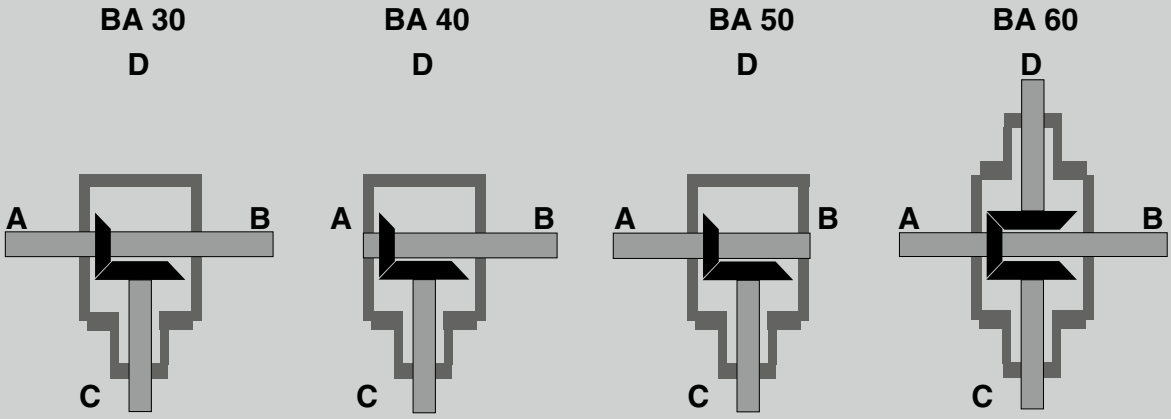
LS 100 – LS 400

DIMENSIONS



Size	Ratio	D1	D2	D3	D7	D8	D11	D12	D13	D21	D31	L	L1	L2	L3	L7	L10	L12
		j6	j6	j6			f7	f7		f7	f7							
100	1,5 + 2	18	14	14	M8	9,00	60	89	75	60	60	190	35	35	35	90	122	55
200	1,5 + 2	25	16	16	M10	11,0	80	119	100	80	80	244	45	45	45	120	162	75
230	1,5 + 2	32	20	20	M10	11,0	95	135	115	100	100	274	50	50	50	140	180	83
250	1,5 + 2	35	25	25	M12	13,5	110	156	135	110	110	320	60	60	60	160	212	95
300	1,5 + 2	42	42	42	M12	13,5	120	198	175	120	120	406	80	80	80	200	273	120
370	1,5 + 2	55	45	45	M16	17,5	150	225	200	150	150	460	90	90	90	230	305	135
400	1,5 + 2	60	50	50	M16	17,5	160	258	230	180	180	530	110	90	90	260	380	150

Design



L14	L20	L22	L24	L30	L32	L34	L71	R	Key D1 according to DIN 6885/1	Key D2/D3 according to DIN 6885/1	Z1 DIN 332	Z2 DIN 332	Z3 DIN 332
2	95	55	3	95	55	3	70	1	6 x 6 x 25	5 x 5 x 25	D M6	D M5	D M5
2	122	72	3	122	72	3	100	1	8 x 7 x 36	5 x 5 x 36	D M10	D M5	D M5
2	137	82	3	137	82	3	110	2	10 x 8 x 45	6 x 6 x 40	D M12	D M6	D M6
2	160	95	3	160	95	3	120	2	10 x 8 x 45	8 x 7 x 45	D M12	D M10	D M10
3	203	117	4	203	117	4	160	3	12 x 8 x 60	12 x 8 x 60	D M16	D M16	D M16
2	230	132	6	230	132	6	180	5	16 x 10 x 80	14 x 9 x 70	D M20	D M16	D M16
5	265	150	22	265	150	22	220	5	18 x 11 x 90	14 x 9 x 70	D M20	D M16	D M16

Technical specifications on this page and in the tables on the following pages are intended only for rough preselection.

Gear teeth:	Klingelnberg spiral bevel gear teeth
Direction of rotation:	The opposite direction when facing C and A
Life time:	20000 h L_{10h}
Permissible gearbox temperature at housing:	-10 °C to +80 °C (deviating temperature ranges on request)
Lubrication:	Oil lubrication
Mounting position:	Any, specify when ordering
Surface protection:	Primer coat RAL RAL 9005 Black
Protection rating:	IP 54

K S

T E C H N I C A L D A T A

The following technical specifications in the table are intended only for rough preselection

KS			**1**														
Axle offset	A		**without**											**with**			
Ratio	i		6,0	7,5	9,6	12,0	14,4	16,8	19,2	21,6	24,0	26,4	28,8	33,6	38,4	43,2	48,0
Combination	i		2x3	2,5x3	2x4,8	2,5x4,8	3x4,8	3,5x4,8	4x4,8	4,5x4,8	5x4,8	5,5x4,8	6x4,8	7x4,8	8x4,8	9x4,8	10x4,8
Max. permissible output torque	$T_{2maxzul}$	Nm	189	189	216	218	227	176	169	176	216	232	198	212	198	198	189
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	100	100	91	91	100	98	94	98	120	129	110	118	110	110	105
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	210	210	240	242	252	196	188	196	240	258	220	236	220	220	210
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	3000														
Max. input speed	$n_{1maxzul}$	min^{-1}	4500														
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 4														
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	280														
Maximum permissible radial load input	$F_{1rmaxzul}$	N	880														
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	2240	2396	2582	2763	2920	3060	3186	3302	3409	3509	3603	3775	3931	4074	4206
Max. permissible radial load output	$F_{2rmaxzul}$	N	4800														
Efficiency	η	-	0,96											0,935			
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	2,65											1,63			
Weight	m	kg	9,0														
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75														
Inertia D1 (with reference to input)	J_1	$kgcm^2$	0,816	0,826	0,969	0,525	0,638	0,667	0,635	0,589	0,631	0,581	0,557	0,555	0,557	0,555	0,549

KS			**2**														
Axle offset	A		**without**											**with**			
Ratio	i		6,0	7,5	9,6	12,0	14,4	16,8	19,2	21,6	24,0	26,4	28,8	33,6	38,4	43,2	48,0
Combination	i		2x3	2,5x3	2x4,8	2,5x4,8	3x4,8	3,5x4,8	4x4,8	4,5x4,8	5x4,8	5,5x4,8	6x4,8	7x4,8	8x4,8	9x4,8	10x4,8
Max. permissible output torque	$T_{2maxzul}$	Nm	346	378	396	387	441	405	396	387	342	360	432	396	378	297	324
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	170	190	155	185	200	190	190	188	160	150	205	170	174	120	144
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	384	420	440	430	490	450	440	430	380	400	480	440	420	330	360
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	3000														
Max. input speed	$n_{1maxzul}$	min^{-1}	4500														
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 4														
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	280														
Maximum permissible radial load input	$F_{1rmaxzul}$	N	880														
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	3086	3302	3558	3807	4023	4216	4390	4549	4697	4834	4964	5201	5416	5613	5795
Max. permissible radial load output	$F_{2rmaxzul}$	N	6500														
Efficiency	η	-	0,96											0,935			
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	3,75											2,32			
Weight	m	kg	13,5														
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75														
Inertia D1 (with reference to input)	J_1	$kgcm^2$	2,156	1,540	1,775	0,970	0,932	0,785	0,690	0,657	0,700	0,588	0,658	0,592	0,583	0,573	0,559

* measured with 2 % nominal torque on output shaft

K S

T E C H N I C A L D A T A

KS			4														
Axle offset	A		without											with			
Ratio	i		6,0	7,5	9,6	12,0	14,4	16,8	19,2	21,6	24,0	26,4	28,8	33,6	38,4	43,2	48,0
Combination	i		2x3	2,5x3	2x4,8	2,5x4,8	3x4,8	3,5x4,8	4x4,8	4,5x4,8	5x4,8	5,5x4,8	6x4,8	7x4,8	8x4,8	9x4,8	10x4,8
Max. permissible output torque	$T_{2maxzul}$	Nm	792	756	819	828	846	810	792	747	738	720	882	855	792	756	828
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	395	378	390	410	410	387	370	367	347	345	412	412	395	375	380
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	880	840	910	920	940	900	880	830	820	800	980	950	880	840	920
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	2500														
Max. input speed	$n_{1maxzul}$	min^{-1}	3750														
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 4														
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	455														
Maximum permissible radial load input	$F_{1rmaxzul}$	N	1400														
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	4997	5346	5762	6165	6515	6826	7108	7367	7606	7828	8038	8422	8770	9088	9383
Max. permissible radial load output	$F_{2rmaxzul}$	N	10000														
Efficiency	η	-	0,96											0,935			
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	5,7											3,48			
Weight	m	kg	23,5														
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75														
Inertia D1 (with reference to input)	J_1	$kgcm^2$	7,556	6,064	6,528	5,443	3,594	3,063	2,743	2,285	2,448	2,189	2,092	1,946	1,880	1,819	1,701

KS			8														
Axle offset	A		without											with			
Ratio	i		6,0	7,5	9,6	12,0	14,4	16,8	19,2	21,6	24,0	26,4	28,8	33,6	38,4	43,2	48,0
Combination	i		2x3	2,5x3	2x4,8	2,5x4,8	3x4,8	3,5x4,8	4x4,8	4,5x4,8	5x4,8	5,5x4,8	6x4,8	7x4,8	8x4,8	9x4,8	10x4,8
Max. permissible output torque	$T_{2maxzul}$	Nm	1404	1350	1485	1647	1638	1566	1458	1440	1494	1440	1683	1674	1588	1620	1656
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	615	630	718	795	800	740	685	665	632	660	822	810	800	780	765
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	1560	1500	1650	1830	1820	1740	1620	1600	1660	1600	1870	1860	1764	1800	1840
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	2500														
Max. input speed	$n_{1maxzul}$	min^{-1}	3750														
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 4														
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	720														
Maximum permissible radial load input	$F_{1rmaxzul}$	N	2050														
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	7364	7879	8491	9085	9601	10060	10475	10856	11208	11537	11845	12411	12924	13393	13828
Max. permissible radial load output	$F_{2rmaxzul}$	N	15000														
Efficiency	η	-	0,96											0,935			
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	8,55											5,25			
Weight	m	kg	48,5														
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75														
Inertia D1 (with reference to input)	J_1	$kgcm^2$	17,967	11,995	14,972	9,735	6,865	5,288	4,525	3,819	3,337	2,934	2,721	2,229	1,948	1,940	1,854

* measured with 2 % nominal torque on output shaft

K S

T E C H N I C A L D A T A

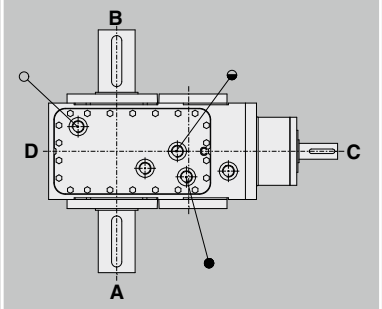
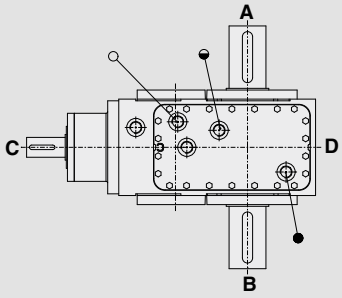
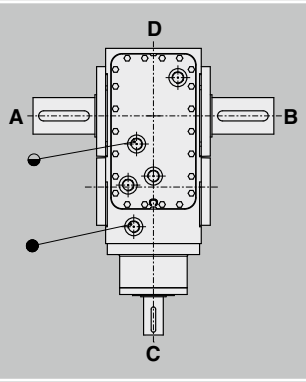
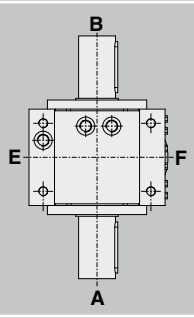
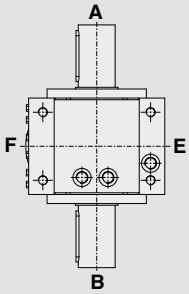
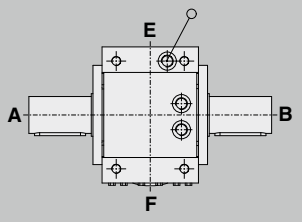
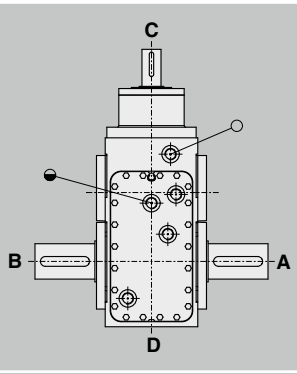
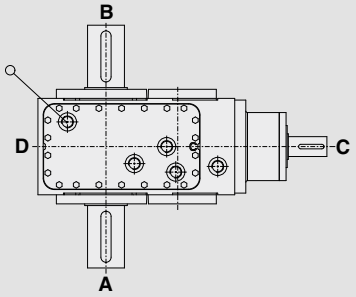
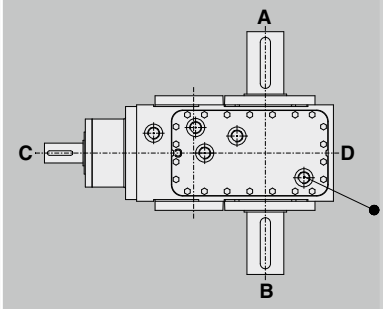
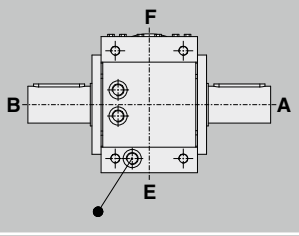
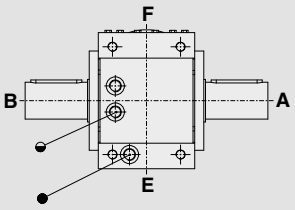
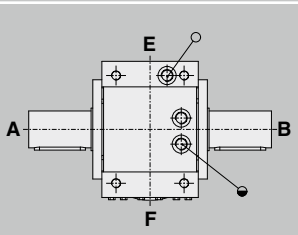
KS			16														
Axle offset	A		without											with			
Ratio	i		6,0	7,5	9,6	12,0	14,4	16,8	19,2	21,6	24,0	26,4	28,8	33,6	38,4	43,2	48,0
Combination	i		2x3	2,5x3	2x4,8	2,5x4,8	3x4,8	3,5x4,8	4x4,8	4,5x4,8	5x4,8	5,5x4,8	6x4,8	7x4,8	8x4,8	9x4,8	10x4,8
Max. permissible output torque	$T_{2maxzul}$	Nm	2916	2898	2970	2970	2925	2484	2232	2160	2070	2880	3150	2925	2772	2664	2808
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	1320	1330	1445	1425	1390	1160	1060	1020	950	1400	1490	1390	1300	1295	1290
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	3240	3220	3300	3300	3250	2760	2480	2400	2300	3200	3500	3250	3080	2960	3120
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	2000														
Max. input speed	$n_{1maxzul}$	min^{-1}	3000														
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 4														
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	2107														
Maximum permissible radial load input	$F_{1rmaxzul}$	N	5800														
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	13506	14451	15574	16663	17610	18452	19214	19912	20558	21161	21726	22765	23705	24566	25363
Max. permissible radial load output	$F_{2rmaxzul}$	N	26000														
Efficiency	η	-	0,96											0,935			
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	12,35											7,6			
Weight	m	kg	73														
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75														
Inertia D1 (with reference to input)	J_1	$kgcm^2$	46,842	34,777	35,426	27,475	23,289	19,302	18,352	12,705	12,388	10,269	9,510	8,557	7,727	7,430	6,724

KS			32														
Axle offset	A		without											with			
Ratio	i		6,0	7,5	9,6	12,0	14,4	16,8	19,2	21,6	24,0	26,4	28,8	33,6	38,4	43,2	48,0
Combination	i		2x3	2,5x3	2x4,8	2,5x4,8	3x4,8	3,5x4,8	4x4,8	4,5x4,8	5x4,8	5,5x4,8	6x4,8	7x4,8	8x4,8	9x4,8	10x4,8
Max. permissible output torque	$T_{2maxzul}$	Nm	3780	3780	5760	5760	5760	5580	5238	4680	4374	5850	5760	5400	5310	5130	5220
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	1732	1740	2698	2760	2720	2630	2480	2220	2060	2680	2715	2500	2450	2350	2200
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	4200	4200	6400	6400	6400	6200	5820	5200	4860	6500	6400	6000	5900	5700	5800
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	1700	1700	1700	1700	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Max. input speed	$n_{1maxzul}$	min^{-1}	3000														
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 4														
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	4002	4002	4002	4002	3810	3810	3810	3810	3810	3810	3810	3810	3810	3810	3810
Maximum permissible radial load input	$F_{1rmaxzul}$	N	11000														
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	21874	23404	25222	26986	27149	28447	29622	30698	31694	32623	33494	35096	36545	37873	39102
Max. permissible radial load output	$F_{2rmaxzul}$	N	40000														
Efficiency	η	-	0,96											0,935			
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	17											10,5			
Weight	m	kg	120														
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75														
Inertia D1 (with reference to input)	J_1	$kgcm^2$	116,283	94,875	97,522	80,818	54,758	43,495	36,133	30,113	29,794	25,936	23,736	20,094	17,728	15,560	14,556

* measured with 2 % nominal torque on output shaft

K S

M O U N T I N G P O S I T I O N A N D L U B R I C A T I O N

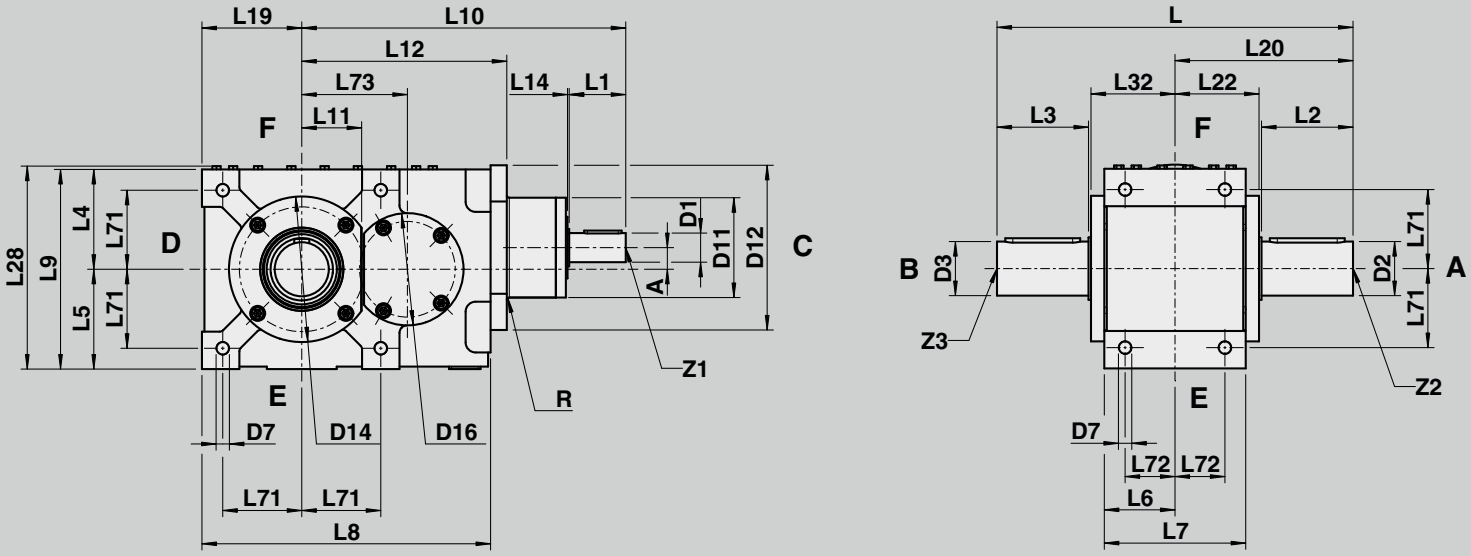
KS			
View side F			
View side D			
Mounting position (underside)	**A**	**B**	**C**
Side of oil fittings Breather - Sight glass - Drainage	**F - F - F**	**F - F - F**	**D - F - F**
View side F			
View side D			
Mounting position (underside)	**D**	**E**	**F**
Side of oil fittings Breather - Sight glass - Drainage	**F - F - D**	**F - D - D**	**D - D - F**

Breather Sight glass Drainage

The gearbox sizes 1 / 2 / 4 are delivered without vent

K S 1 – K S 32

D I M E N S I O N S



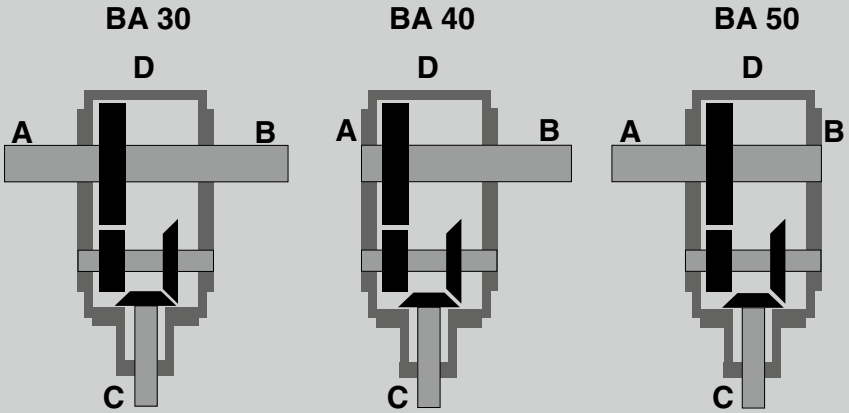
Size	Ratio	D1	D2	D3	D7*	D11	D12	D14	D16	Key D1 according to DIN 6885/1	Key D2 / D3 according to DIN 6885/1	L	L1	L2	L3	L4
		j6	j6	j6		f7	f7	f7								
	6,0 + 9,6	18								6 x 6 x 25			35			
1	7,5 + 12 - 19,2	15	30	30	M 8	60	89	88	72	5 x 5 x 20	8 x 7 x 40	200	30	47	47	58
	21,6 - 48,0	12								4 x 4 x 16			25			
	6,0 + 9,6	18								6 x 6 x 25			35			
2	7,5 + 12 - 19,2	15	35	35	M10	60	89	100	75	5 x 5 x 20	10 x 8 x 50	230	30	55	55	70
	21,6 - 48,0	12								4 x 4 x 16			25			
	6,0 + 9,6	25								8 x 7 x 36			45			
4	7,5 + 12 - 19,2	20	45	45	M12	80	119	127	90	6 x 6 x 30	14 x 9 x 60	280	40	70	70	85
	21,6 - 48,0	15								5 x 5 x 20			30			
	6,0 + 9,6	32								10 x 8 x 45						
8	7,5 + 12 - 19,2	28	55	55	M16	95	135	148	110	8 x 7 x 40	16 x 10 x 80	348	50	85	85	105
	21,6 - 48,0	24								8 x 7 x 40						
	6,0 + 9,6	42								12 x 8 x 60			80			
16	7,5 + 12 - 19,2	35	65	65	M16	120	198	175	135	10 x 8 x 45	18 x 11 x 90	428	68	110	110	120
	21,6 - 48,0	28								8 x 7 x 45			55			
	6,0 + 9,6	55				150				16 x 10 x 80			90			
32	7,5 + 12 - 19,2	40	80	80	M16	140	225	195	170	12 x 8 x 60	22 x 14 x 110	508	80	130	130	140
	21,6 - 48,0	35								10 x 8 x 50			70			

* Depth of thread: 1,5 x Ø

K S 1 – K S 3 2

D I M E N S I O N S

Design



L5	L6	L7	L8	L9	L10	L11	L12	L14	L19	L20	L22	L28	L32	L71	L72	L73	A*	R	Z1 DIN 332	Z2 DIN 332	Z3 DIN 332
					177														M 6		
55	37,5	75	155	113	182	33	110	2	55	100	51	116,5	51	44	28	55	12/0	1	M 5	M10	M10
					177														M 4		
					187														M 6		
70	45	90	180	140	192	39	120	2	70	115	58	145	58	55	30	65	12/0	1	M 5	M12	M12
					187														M 4		
					244														M10		
85	55	110	227	170	239	50	157	2	85	140	68	175	68	67	37	82	18/0	1	M 6	M16	M16
					229														M 5		
					280														M12		
105	70	140	275	210	295	59	183	2	105	174	86	215	86	85	50	100	22/0	2	M10	M20	M20
					295														M 8		
					400			3											M16		
120	85	170	347	240	388	72	247	2	120	214	101	246	101	95	60	127	26/0	3	M12	M20	M20
					375														M10		
					449														M20		
140	105	210	399	280	454	76	279	2	140	254	121	286	121	110	75	144	32/0	3	M16	M20	M20
					444														M12		

A* Axle offset from ratio 33.6 otherwise 0

K S H

T E C H N I C A L D A T A

Technical specifications on this page and in the tables on the following pages are intended only for rough preselection.

Gear teeth:	Klingelnberg spiral bevel gear teeth
Direction of rotation:	The opposite direction when facing C and A
Life time:	20000 h L_{10h}
Permissible gearbox temperature at housing:	-10 °C to +80 °C (deviating temperature ranges on request)
Lubrication:	Oil lubrication
Mounting position:	Any, specify when ordering
Surface protection:	Primer coat RAL RAL 9005 Black
Protection rating:	IP 54

K S H

T E C H N I C A L D A T A

The following technical specifications in the table are intended only for rough preselection

KSH			**1**														
Axle offset	A		**ohne**											**mit**			
Ratio	i		6,0	7,5	9,6	12,0	14,4	16,8	19,2	21,6	24,0	26,4	28,8	33,6	38,4	43,2	48,0
Combination	i		2x3	2,5x3	2x4,8	2,5x4,8	3x4,8	3,5x4,8	4x4,8	4,5x4,8	5x4,8	5,5x4,8	6x4,8	7x4,8	8x4,8	9x4,8	10x4,8
Max. permissible output torque	$T_{2maxzul}$	Nm	189	189	216	218	227	176	169	176	216	232	198	212	198	198	189
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	100	100	91	91	100	98	94	98	120	129	110	118	110	110	105
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	210	210	240	242	252	196	188	196	240	258	220	236	220	220	210
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	3000														
Max. input speed	$n_{1maxzul}$	min^{-1}	4500														
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 4														
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	280														
Maximum permissible radial load input	$F_{1rmaxzul}$	N	880														
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	2240	2396	2582	2763	2920	3060	3186	3302	3409	3509	3603	3775	3931	4074	4206
Max. permissible radial load output	$F_{2rmaxzul}$	N	4800														
Efficiency	η	-	0,96											0,935			
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	2,65											1,63			
Weight	m	kg	9,0														
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75														
Inertia D1 (with reference to input)	J_1	$kgcm^2$	0,816	0,826	0,969	0,525	0,638	0,667	0,635	0,589	0,631	0,581	0,557	0,555	0,557	0,555	0,549

KSH			**2**														
Axle offset	A		**ohne**											**mit**			
Ratio	i		6,0	7,5	9,6	12,0	14,4	16,8	19,2	21,6	24,0	26,4	28,8	33,6	38,4	43,2	48,0
Combination	i		2x3	2,5x3	2x4,8	2,5x4,8	3x4,8	3,5x4,8	4x4,8	4,5x4,8	5x4,8	5,5x4,8	6x4,8	7x4,8	8x4,8	9x4,8	10x4,8
Max. permissible output torque	$T_{2maxzul}$	Nm	346	378	396	387	441	405	396	387	342	360	432	396	378	297	324
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	170	190	155	185	200	190	190	188	160	150	205	170	174	120	144
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	384	420	440	430	490	450	440	430	380	400	480	440	420	330	360
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	3000														
Max. input speed	$n_{1maxzul}$	min^{-1}	4500														
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 4														
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	280														
Maximum permissible radial load input	$F_{1rmaxzul}$	N	880														
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	3086	3302	3558	3807	4023	4216	4390	4549	4697	4834	4964	5201	5416	5613	5795
Max. permissible radial load output	$F_{2rmaxzul}$	N	6500														
Efficiency	η	-	0,96											0,935			
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	3,75											2,32			
Weight	m	kg	13,5														
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75														
Inertia D1 (with reference to input)	J_1	$kgcm^2$	2,156	1,540	1,775	0,970	0,932	0,785	0,690	0,657	0,700	0,588	0,658	0,592	0,583	0,573	0,559

* measured with 2 % nominal torque on output shaft

KSH			**4**														
Axle offset	A		**without**											**with**			
Ratio	i		6,0	7,5	9,6	12,0	14,4	16,8	19,2	21,6	24,0	26,4	28,8	33,6	38,4	43,2	48,0
Combination	i		2x3	2,5x3	2x4,8	2,5x4,8	3x4,8	3,5x4,8	4x4,8	4,5x4,8	5x4,8	5,5x4,8	6x4,8	7x4,8	8x4,8	9x4,8	10x4,8
Max. permissible output torque	$T_{2maxzul}$	Nm	792	756	819	828	846	810	792	747	738	720	882	855	792	756	828
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	395	378	390	410	410	387	370	367	347	345	412	412	395	375	380
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	880	840	910	920	940	900	880	830	820	800	980	950	880	840	920
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	2500														
Max. input speed	$n_{1maxzul}$	min^{-1}	3750														
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 4														
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	455														
Maximum permissible radial load input	$F_{1rmaxzul}$	N	1400														
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	4997	5346	5762	6165	6515	6826	7108	7367	7606	7828	8038	8422	8770	9088	9383
Max. permissible radial load output	$F_{2rmaxzul}$	N	10000														
Efficiency	η	-	0,96											0,935			
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	5,7											3,48			
Weight	m	kg	23,5														
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75														
Inertia D1 (with reference to input)	J_1	$kgcm^2$	7,556	6,064	6,528	5,443	3,594	3,063	2,743	2,285	2,448	2,189	2,092	1,946	1,880	1,819	1,701

KSH			**8**														
Axle offset	A		**without**											**with**			
Ratio	i		6,0	7,5	9,6	12,0	14,4	16,8	19,2	21,6	24,0	26,4	28,8	33,6	38,4	43,2	48,0
Combination	i		2x3	2,5x3	2x4,8	2,5x4,8	3x4,8	3,5x4,8	4x4,8	4,5x4,8	5x4,8	5,5x4,8	6x4,8	7x4,8	8x4,8	9x4,8	10x4,8
Max. permissible output torque	$T_{2maxzul}$	Nm	1404	1350	1485	1647	1638	1566	1458	1440	1494	1440	1683	1674	1588	1620	1656
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	615	630	718	795	800	740	685	665	632	660	822	810	800	780	765
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	1560	1500	1650	1830	1820	1740	1620	1600	1660	1600	1870	1860	1764	1800	1840
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	2500														
Max. input speed	$n_{1maxzul}$	min^{-1}	3750														
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 4														
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	720														
Maximum permissible radial load input	$F_{1rmaxzul}$	N	2050														
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	7364	7879	8491	9085	9601	10060	10475	10856	11208	11537	11845	12411	12924	13393	13828
Max. permissible radial load output	$F_{2rmaxzul}$	N	15000														
Efficiency	η	-	0,96											0,935			
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	8,55											5,25			
Weight	m	kg	48,5														
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75														
Inertia D1 (with reference to input)	J_1	$kgcm^2$	17,967	11,995	14,972	9,735	6,865	5,288	4,525	3,819	3,337	2,934	2,721	2,229	1,948	1,940	1,854

* measured with 2 % nominal torque on output shaft

KSH

TECHNICAL DATA

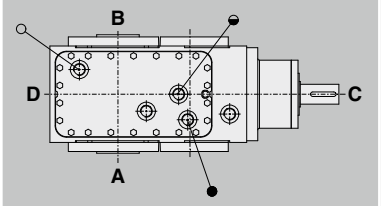
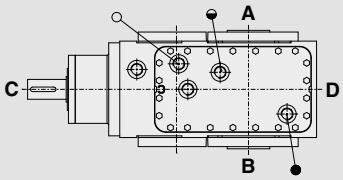
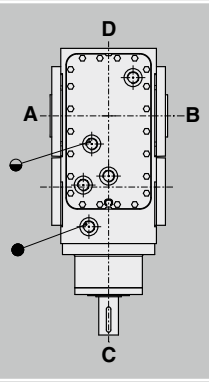
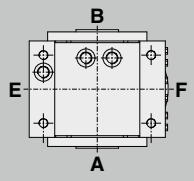
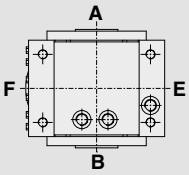
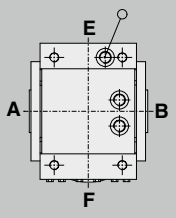
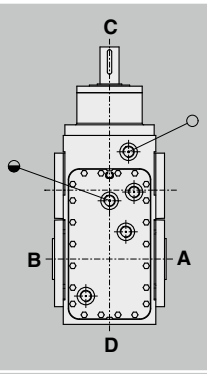
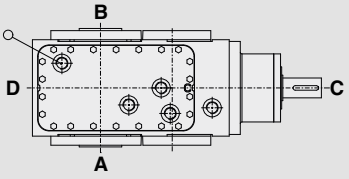
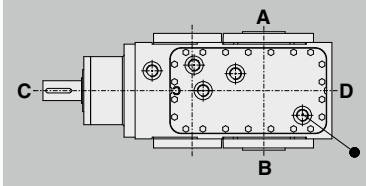
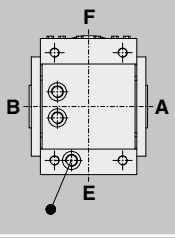
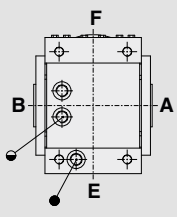
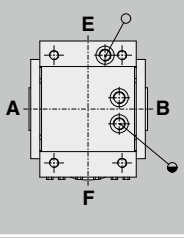
KSH			16														
Axle offset	A		without											with			
Ratio	i		6,0	7,5	9,6	12,0	14,4	16,8	19,2	21,6	24,0	26,4	28,8	33,6	38,4	43,2	48,0
Combination	i		2x3	2,5x3	2x4,8	2,5x4,8	3x4,8	3,5x4,8	4x4,8	4,5x4,8	5x4,8	5,5x4,8	6x4,8	7x4,8	8x4,8	9x4,8	10x4,8
Max. permissible output torque	$T_{2maxzul}$	Nm	2916	2898	2970	2970	2925	2484	2232	2160	2070	2880	3150	2925	2772	2664	2808
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	1320	1330	1445	1425	1390	1160	1060	1020	950	1400	1490	1390	1300	1295	1290
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	3240	3220	3300	3300	3250	2760	2480	2400	2300	3200	3500	3250	3080	2960	3120
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	2000														
Max. input speed	$n_{1maxzul}$	min^{-1}	3000														
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 4														
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	2107														
Maximum permissible radial load input	$F_{1rmaxzul}$	N	5800														
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	13506	14451	15574	16663	17610	18452	19214	19912	20558	21161	21726	22765	23705	24566	25363
Max. permissible radial load output	$F_{2rmaxzul}$	N	26000														
Efficiency	η	-	0,96											0,935			
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	12,35											7,6			
Weight	m	kg	73														
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75														
Inertia D1 (with reference to input)	J_1	$kgcm^2$	46,842	34,777	35,426	27,475	23,289	19,302	18,352	12,705	12,388	10,269	9,510	8,557	7,727	7,430	6,724

KSH			32														
Axle offset	A		without											with			
Ratio	i		6,0	7,5	9,6	12,0	14,4	16,8	19,2	21,6	24,0	26,4	28,8	33,6	38,4	43,2	48,0
Combination	i		2x3	2,5x3	2x4,8	2,5x4,8	3x4,8	3,5x4,8	4x4,8	4,5x4,8	5x4,8	5,5x4,8	6x4,8	7x4,8	8x4,8	9x4,8	10x4,8
Max. permissible output torque	$T_{2maxzul}$	Nm	3780	3780	5760	5760	5760	5580	5238	4680	4374	5850	5760	5400	5310	5130	5220
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	1732	1740	2698	2760	2720	2630	2480	2220	2060	2680	2715	2500	2450	2350	2200
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	4200	4200	6400	6400	6400	6200	5820	5200	4860	6500	6400	6000	5900	5700	5800
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	1700	1700	1700	1700	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Max. input speed	$n_{1maxzul}$	min^{-1}	3000														
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 4														
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	4002	4002	4002	4002	3810	3810	3810	3810	3810	3810	3810	3810	3810	3810	3810
Maximum permissible radial load input	$F_{1rmaxzul}$	N	11000														
Permissible radial load output (at permissible average input speed)	F_{2rmzul}	N	21874	23404	25222	26986	27149	28447	29622	30698	31694	32623	33494	35096	36545	37873	39102
Max. permissible radial load output	$F_{2rmaxzul}$	N	40000														
Efficiency	η	-	0,96											0,935			
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	17											10,5			
Weight	m	kg	120														
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75														
Inertia D1 (with reference to input)	J_1	$kgcm^2$	116,283	94,875	97,522	80,818	54,758	43,495	36,133	30,113	29,794	25,936	23,736	20,094	17,728	15,560	14,556

* measured with 2 % nominal torque on output shaft

K S H

M O U N T I N G P O S I T I O N A N D L U B R I C A T I O N

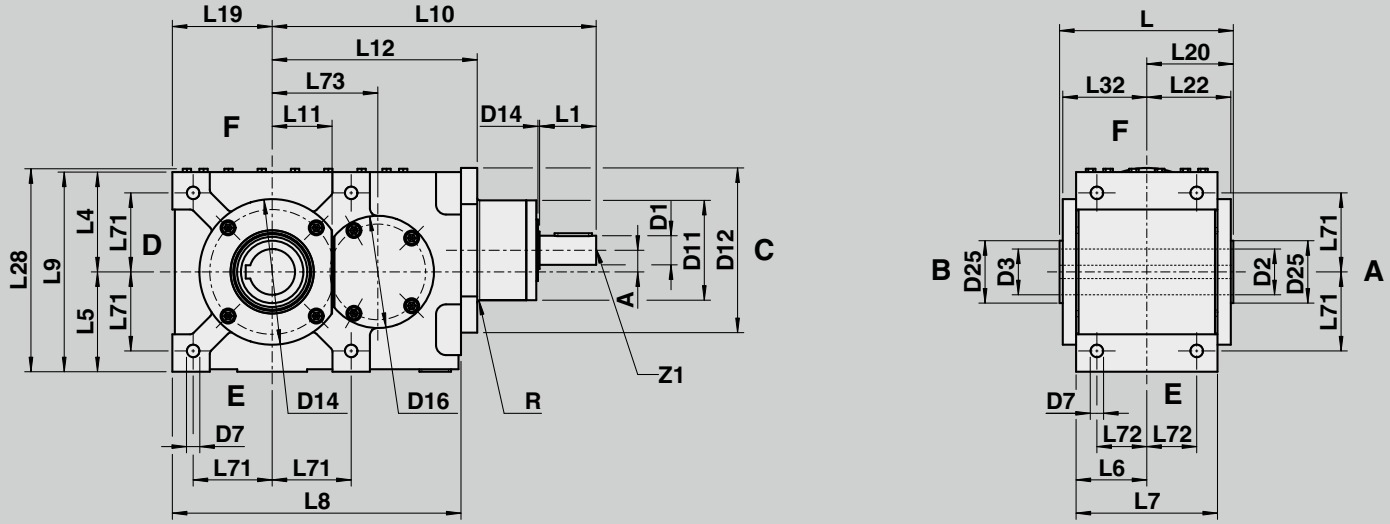
KSH			
View side F			
View side D			
Mounting position (underside)	**A**	**B**	**C**
Side of oil fittings Breather - Sight glass - Drainage	**F - F - F**	**F - F - F**	**D - F - F**
View side F			
View side D			
Mounting position (underside)	**D**	**E**	**F**
Side of oil fittings Breather - Sight glass - Drainage	**F - F - D**	**F - D - D**	**D - D - F**

Breather Sight glass Drainage

The gearbox sizes 1 / 2 / 4 are delivered without vent

KSH 1 – KHS 32

DIMENSIONS



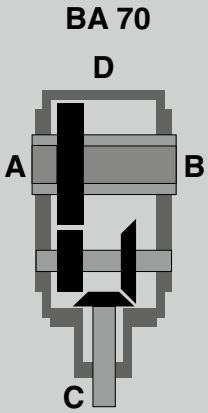
Size	Ratio	D1	D2	D3	D7*	D11	D12	D14	D16	D25	Key D1 according to DIN 6885/1	Keyway to DIN 6885/1	L	L1	L4
		j6	H7	H7		f7	f7	f7				JS9			
	6,0 + 9,6	18									6 x 6 x 25			35	
1	7,5 + 12 - 19,2	15	22	22	M 8	60	89	88	72	35	5 x 5 x 20	6	106	30	58
	21,6 - 48,0	12									4 x 4 x 16			25	
	6,0 + 9,6	18									6 x 6 x 25			35	
2	7,5 + 12 - 19,2	15	28	28	M10	60	89	100	75	40	5 x 5 x 20	8	120	30	70
	21,6 - 48,0	12									4 x 4 x 16			25	
	6,0 + 9,6	25									8 x 7 x 36			45	
4	7,5 + 12 - 19,2	20	38	38	M12	80	119	127	90	55	6 x 6 x 30	10	140	40	85
	21,6 - 48,0	15									5 x 5 x 20			30	
	6,0 + 9,6	32									10 x 8 x 45				
8	7,5 + 12 - 19,2	28	45	45	M16	95	135	148	110	65	8 x 7 x 40	14	178	50	105
	21,6 - 48,0	24									8 x 7 x 40				
	6,0 + 9,6	42									12 x 8 x 60			80	
16	7,5 + 12 - 19,2	35	55	55	M16	120	198	175	135	75	10 x 8 x 45	16	208	68	120
	21,6 - 48,0	28									8 x 7 x 45			55	
	6,0 + 9,6	55				150					16 x 10 x 80			90	
32	7,5 + 12 - 19,2	40	65	65	M16	140	225	195	170	85	12 x 8 x 60	18	248	80	140
	21,6 - 48,0	35									10 x 8 x 50			70	

* Depth of thread: 1,5 x Ø

KSH 1 – KHS 32

DIMENSIONS

Design



L5	L6	L7	L8	L9	L10	L11	L12	L14	L19	L20	L22	L28	L32	L71	L72	L73	A*	R	Z1 DIN 332
55	37,5	75	155	113	177	33	110	2	55	53	51	116,5	51	44	28	55	12/0	1	M 6
					182														M 5
					177														M 4
70	45	90	180	140	187	39	120	2	70	60	58	145	58	55	30	65	12/0	1	M 6
					192														M 5
					187														M 4
85	55	110	227	170	244	50	157	2	85	70	68	175	68	67	37	82	18/0	1	M10
					239														M 6
					229														M 5
105	70	140	275	210	280	59	183	2	105	89	86	215	86	85	50	100	22/0	2	M12
					295														M10
					295														M 8
120	85	170	347	240	400	72	247	3	120	104	101	246	101	95	60	127	26/0	3	M16
					388			2											M12
					375														M10
140	105	210	399	280	449	76	279	2	140	124	121	286	121	110	75	144	32/0	3	M20
					454														M16
					444														M12

A* Axle offset from ratio 33.6 otherwise 0

M K S

T E C H N I C A L D A T A

Technical specifications on this page and in the tables on the following pages are intended only for rough preselection.

Gear teeth:	Klingelnberg spiral bevel gear teeth
Direction of rotation:	The opposite direction when facing C and A
Life time:	20000 h L_{10h}
Permissible gearbox temperature at housing:	-10 °C to +80 °C (deviating temperature ranges on request)
Lubrication:	Oil lubrication
Mounting position:	Any, specify when ordering
Surface protection:	Primer coat RAL RAL 9005 Black
Protection rating:	IP 54

MKS

TECHNICAL DATA

The following technical specifications in the table are intended only for rough preselection

MKS			1														
Axle offset	A		without											with			
Ratio	i		6,0	7,5	9,6	12,0	14,4	16,8	19,2	21,6	24,0	26,4	28,8	33,6	38,4	43,2	48,0
Combination	i		2x3	2,5x3	2x4,8	2,5x4,8	3x4,8	3,5x4,8	4x4,8	4,5x4,8	5x4,8	5,5x4,8	6x4,8	7x4,8	8x4,8	9x4,8	10x4,8
Max. permissible output torque	$T_{2maxzul}$	Nm	189	189	216	218	227	176	169	176	216	232	198	212	198	198	189
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	100	100	91	91	100	98	94	98	120	129	110	118	110	110	105
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	210	210	240	242	252	196	188	196	240	258	220	236	220	220	210
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	3000														
Max. input speed	$n_{1maxzul}$	min^{-1}	4500														
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 4														
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	2240	2396	2582	2763	2920	3060	3186	3302	3409	3509	3603	3775	3931	4074	4206
Max. permissible radial load output	$F_{2rmaxzul}$	N	4800														
Efficiency	η	-	0,96											0,935			
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	2,65											1,63			
Weight	m	kg	9,0														
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75														
Inertia (with reference to input) Ø d 9	J_1	$kgcm^2$	1,156	1,190	1,197	0,943	0,787	0,815	0,814	0,741	0,775	0,753	0,751	0,713	0,707	0,700	0,685
Inertia (with reference to input) Ø d 11	J_1	$kgcm^2$	1,210	1,253	1,255	0,997	0,841	0,869	0,912	0,804	0,838	0,816	0,802	0,766	0,764	0,760	0,753
Inertia (with reference to input) Ø d 14	J_1	$kgcm^2$	1,335	1,378	1,385	1,122	0,959	0,994	1,025	0,929	0,963	0,941	0,940	0,902	0,893	0,885	0,873
Inertia (with reference to input) Ø d 19	J_1	$kgcm^2$	1,699	1,742	1,750	1,486	1,310	1,358	1,493	1,330	1,398	1,387	1,356	1,265	1,256	1,243	1,240

MKS			2														
Axle offset	A		without											with			
Ratio	i		6,0	7,5	9,6	12,0	14,4	16,8	19,2	21,6	24,0	26,4	28,8	33,6	38,4	43,2	48,0
Combination	i		2x3	2,5x3	2x4,8	2,5x4,8	3x4,8	3,5x4,8	4x4,8	4,5x4,8	5x4,8	5,5x4,8	6x4,8	7x4,8	8x4,8	9x4,8	10x4,8
Max. permissible output torque	$T_{2maxzul}$	Nm	346	378	396	387	441	405	396	387	342	360	432	396	378	297	324
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	170	190	155	185	200	190	190	188	160	150	205	170	174	120	144
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	384	420	440	430	490	450	440	430	380	400	480	440	420	330	360
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	3000														
Max. input speed	$n_{1maxzul}$	min^{-1}	4500														
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 4														
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	3086	3302	3558	3807	4023	4216	4390	4549	4697	4834	4964	5201	5416	5613	5795
Max. permissible radial load output	$F_{2rmaxzul}$	N	6500														
Efficiency	η	-	0,96											0,935			
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	3,75											2,32			
Weight	m	kg	13,5														
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75														
Inertia (with reference to input) Ø d 9	J_1	$kgcm^2$	2,087	1,570	1,707	1,010	1,148	1,000	0,906	0,875	0,846	0,840	0,756	0,745	0,735	0,728	0,705
Inertia (with reference to input) Ø d 11	J_1	$kgcm^2$	2,149	1,633	1,770	1,065	1,211	1,063	0,969	0,938	0,909	0,903	0,878	0,808	0,798	0,791	0,768
Inertia (with reference to input) Ø d 14	J_1	$kgcm^2$	2,274	1,758	1,895	1,193	1,336	1,188	1,094	1,063	1,034	1,028	1,003	0,933	0,923	0,916	0,893
Inertia (with reference to input) Ø d 19	J_1	$kgcm^2$	2,638	2,122	2,259	1,554	1,700	1,552	1,632	1,427	1,403	1,398	1,367	1,297	1,287	1,280	1,257

* measured with 2 % nominal torque on output shaft

MKS

TECHNICAL DATA

MKS			4														
Axle offset	A		without											with			
Ratio	i		6,0	7,5	9,6	12,0	14,4	16,8	19,2	21,6	24,0	26,4	28,8	33,6	38,4	43,2	48,0
Combination	i		2x3	2,5x3	2x4,8	2,5x4,8	3x4,8	3,5x4,8	4x4,8	4,5x4,8	5x4,8	5,5x4,8	6x4,8	7x4,8	8x4,8	9x4,8	10x4,8
Max. permissible output torque	$T_{2maxzul}$	Nm	792	756	819	828	846	810	792	747	738	720	882	855	792	756	828
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	395	378	390	410	410	387	370	367	347	345	412	412	395	375	380
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	880	840	910	920	940	900	880	830	820	800	980	950	880	840	920
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	2500														
Max. input speed	$n_{1maxzul}$	min^{-1}	3750														
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 4														
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	4997	5346	5762	6165	6515	6826	7108	7367	7606	7828	8038	8422	8770	9088	9383
Max. permissible radial load output	$F_{2rmaxzul}$	N	10000														
Efficiency	η	-	0,96											0,935			
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	5,7											3,48			
Weight	m	kg	23,5														
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75														
Inertia (with reference to input) Ø d 9	J_1	$kgcm^2$	7,616	8,103	6,480	5,302	4,622	3,984	3,748	3,216	3,328	2,998	3,024	2,794	2,678	2,604	2,567
Ø d 11	J_1	$kgcm^2$	7,645	8,200	6,509	5,365	4,685	4,047	3,811	3,279	3,391	3,061	3,087	2,857	2,741	2,540	2,530
Ø d 14	J_1	$kgcm^2$	7,795	8,324	6,659	5,490	4,810	4,172	3,936	3,404	3,516	3,186	3,212	2,982	2,866	2,792	2,755
Ø d 19	J_1	$kgcm^2$	8,284	8,688	7,148	5,854	5,174	4,536	4,300	3,768	3,880	3,550	3,576	3,346	3,230	3,156	3,119
Ø d 24	J_1	$kgcm^2$	9,374	9,643	8,203	6,909	6,229	5,591	5,355	4,823	4,762	4,605	4,631	4,401	4,354	4,211	4,174
Ø d 28	J_1	$kgcm^2$	11,601	11,837	10,465	9,104	8,424	7,786	7,550	7,018	7,130	6,800	6,826	6,596	6,480	6,406	6,369
Ø d 32	J_1	$kgcm^2$	12,205	12,430	10,999	9,750	8,955	8,235	7,963	7,625	7,638	7,400	7,375	7,175	6,985	9,950	6,875

MKS			8														
Axle offset	A		without											with			
Ratio	i		6,0	7,5	9,6	12,0	14,4	16,8	19,2	21,6	24,0	26,4	28,8	33,6	38,4	43,2	48,0
Combination	i		2x3	2,5x3	2x4,8	2,5x4,8	3x4,8	3,5x4,8	4x4,8	4,5x4,8	5x4,8	5,5x4,8	6x4,8	7x4,8	8x4,8	9x4,8	10x4,8
Max. permissible output torque	$T_{2maxzul}$	Nm	1404	1350	1485	1647	1638	1566	1458	1440	1494	1440	1683	1674	1588	1620	1656
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	615	630	718	795	800	740	685	665	632	660	822	810	800	780	765
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	1560	1500	1650	1830	1820	1740	1620	1600	1660	1600	1870	1860	1764	1800	1840
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	2500														
Max. input speed	$n_{1maxzul}$	min^{-1}	3750														
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 4														
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	7364	7879	8491	9085	9601	10060	10475	10856	11208	11537	11845	12411	12924	13393	13828
Max. permissible radial load output	$F_{2rmaxzul}$	N	15000														
Efficiency	η	-	0,96											0,935			
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	8,55											5,25			
Weight	m	kg	48,5														
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75														
Inertia (with reference to input) Ø d 11	J_1	$kgcm^2$	29,445	23,225	25,025	21,785	20,554	18,500	17,985	17,135	16,785	16,325	15,954	15,222	14,225	14,113	14,075
Ø d 14	J_1	$kgcm^2$	30,775	24,666	27,885	23,775	21,877	18,225	17,445	17,665	16,889	16,875	16,025	15,750	15,220	14,950	14,777
Ø d 19	J_1	$kgcm^2$	30,999	25,666	26,525	23,997	22,023	19,845	19,224	18,245	17,333	17,115	17,025	16,775	16,448	15,888	15,035
Ø d 24	J_1	$kgcm^2$	33,333	28,225	29,356	26,975	24,336	22,875	22,456	21,679	21,075	20,665	20,112	19,750	19,335	19,133	18,099
Ø d 28	J_1	$kgcm^2$	37,563	31,015	33,225	30,015	27,666	26,889	25,746	24,556	24,225	23,500	24,227	22,875	22,742	22,115	21,886
Ø d 32	J_1	$kgcm^2$	37,779	31,025	33,114	30,225	27,995	27,563	27,014	26,995	24,887	24,556	24,504	23,455	23,225	23,025	22,322

* measured with 2 % nominal torque on output shaft

M K S

T E C H N I C A L D A T A

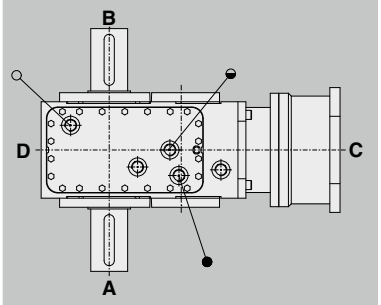
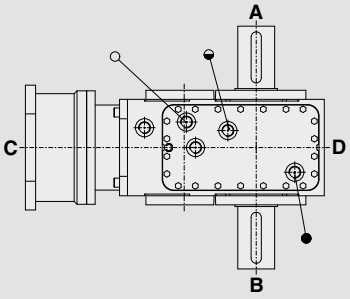
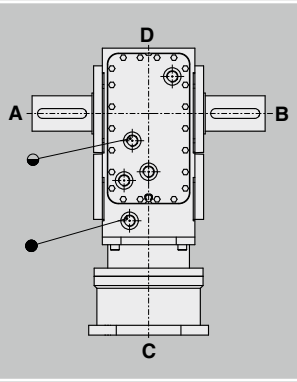
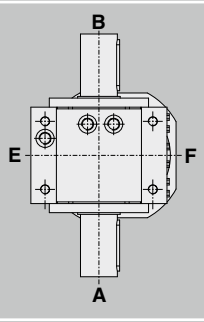
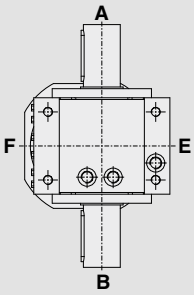
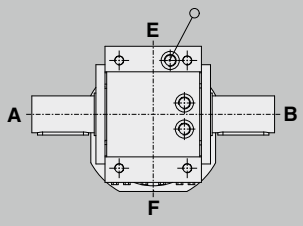
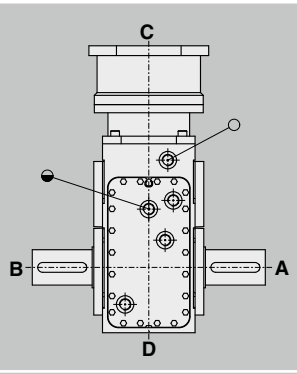
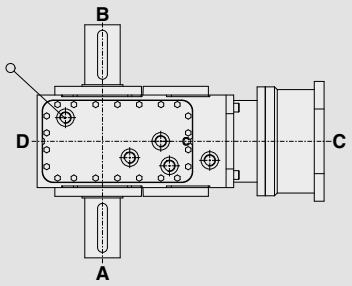
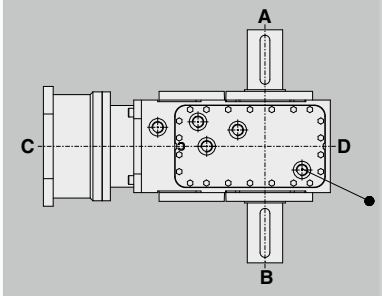
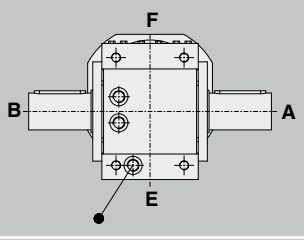
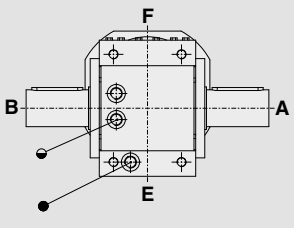
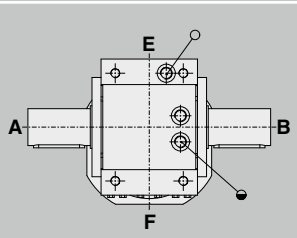
MKS			16														
Axle offset	A		without											with			
Ratio	i		6,0	7,5	9,6	12,0	14,4	16,8	19,2	21,6	24,0	26,4	28,8	33,6	38,4	43,2	48,0
Combination	i		2x3	2,5x3	2x4,8	2,5x4,8	3x4,8	3,5x4,8	4x4,8	4,5x4,8	5x4,8	5,5x4,8	6x4,8	7x4,8	8x4,8	9x4,8	10x4,8
Max. permissible output torque	$T_{2maxzul}$	Nm	2916	2898	2970	2970	2925	2484	2232	2160	2070	2880	3150	2925	2772	2664	2808
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	1320	1330	1445	1425	1390	1160	1060	1020	950	1400	1490	1390	1300	1295	1290
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	3240	3220	3300	3300	3250	2760	2480	2400	2300	3200	3500	3250	3080	2960	3120
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	2000														
Max. input speed	$n_{1maxzul}$	min^{-1}	3000														
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 4														
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	13506	14451	15574	16663	17610	18452	19214	19912	20558	21161	21726	22765	23705	24566	25363
Max. permissible radial load output	$F_{2rmaxzul}$	N	26000														
Efficiency	η	-	0,96											0,935			
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	12,35											7,6			
Weight	m	kg	73														
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75														
Inertia (with reference to input) Ø d 19	J_1	$kgcm^2$	97,85	80,35	86,24	72,36	65,66	64,05	59,53	57,34	56,75	55,38	54,63	32,77	32,73	32,34	31,87
Ø d 24	J_1	$kgcm^2$	104,25	85,13	91,65	77,56	70,53	69,35	64,23	62,35	61,36	60,23	60,85	57,85	57,64	57,36	57,00
Ø d 28	J_1	$kgcm^2$	109,20	91,33	97,05	84,63	76,55	75,83	70,95	69,25	67,66	66,50	65,33	64,22	63,90	63,77	63,12
Ø d 32	J_1	$kgcm^2$	113,22	94,33	101,66	87,05	80,75	79,30	74,52	72,05	70,44	69,11	68,35	68,00	67,88	67,25	66,85
Ø d 38	J_1	$kgcm^2$	119,02	101,33	108,65	94,25	89,25	86,34	81,84	79,66	78,63	76,20	67,05	74,50	74,35	74,15	73,68
Ø d 42	J_1	$kgcm^2$	126,30	108,55	114,22	101,75	93,44	92,80	88,88	86,44	84,65	83,90	82,65	81,50	80,88	80,65	80,25
Ø d 48	J_1	$kgcm^2$	135,65	117,78	124,35	110,25	103,75	102,30	97,65	95,75	93,55	92,87	92,55	90,44	90,35	89,76	89,45

MKS			32														
Axle offset	A		without											with			
Ratio	i		6,0	7,5	9,6	12,0	14,4	16,8	19,2	21,6	24,0	26,4	28,8	33,6	38,4	43,2	48,0
Combination	i		2x3	2,5x3	2x4,8	2,5x4,8	3x4,8	3,5x4,8	4x4,8	4,5x4,8	5x4,8	5,5x4,8	6x4,8	7x4,8	8x4,8	9x4,8	10x4,8
Max. permissible output torque	$T_{2maxzul}$	Nm	3780	3780	5760	5760	5760	5580	5238	4680	4374	5850	5760	5400	5310	5130	5220
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	1732	1740	2698	2760	2720	2630	2480	2220	2060	2680	2715	2500	2450	2350	2200
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	4200	4200	6400	6400	6400	6200	5820	5200	4860	6500	6400	6000	5900	5700	5800
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	1700														
Max. input speed	$n_{1maxzul}$	min^{-1}	3000														
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 4														
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	21874	23404	25222	26986	27149	28447	29622	30698	31694	32623	33494	35096	36545	37873	39102
Max. permissible radial load output	$F_{2rmaxzul}$	N	40000														
Efficiency	η	-	0,96											0,935			
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	17											10,5			
Weight	m	kg	120														
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75														
Inertia (with reference to input) Ø d 28	J_1	$kgcm^2$	187,22	149,05	168,63	138,22	103,88	108,35	103,25	95,30	96,35	91,50	90,75	92,65	84,75	82,45	81,75
Ø d 32	J_1	$kgcm^2$	188,05	150,33	169,45	139,88	124,63	109,44	103,50	96,25	97,15	92,00	91,30	88,25	85,68	83,45	82,55
Ø d 38	J_1	$kgcm^2$	193,55	156,22	179,05	146,75	130,31	115,00	108,65	101,66	102,55	97,50	97,35	93,25	91,80	89,00	88,50
Ø d 42	J_1	$kgcm^2$	200,88	152,05	181,35	150,90	136,65	121,68	115,35	108,68	109,65	104,55	103,35	100,20	97,55	95,61	94,65
Ø d 48	J_1	$kgcm^2$	209,35	172,65	190,88	160,55	146,36	131,44	124,75	117,52	118,33	113,22	113,65	109,90	107,25	104,66	103,50
Ø d 55	J_1	$kgcm^2$	219,75	182,05	200,95	170,40	156,35	141,55	134,75	127,06	128,44	123,50	123,48	119,75	117,35	115,00	114,75

* measured with 2 % nominal torque on output shaft

M K S

M O U N T I N G P O S I T I O N A N D L U B R I C A T I O N

MKS			
View side F			
View side D			
Mounting position (underside)	**A**	**B**	**C**
Side of oil fittings Breather - Sight glass - Drainage	**F - F - F**	**F - F - F**	**D - F - F**
View side F			
View side D			
Mounting position (underside)	**D**	**E**	**F**
Side of oil fittings Breather - Sight glass - Drainage	**F - F - D**	**F - D - D**	**D - D - F**

Breather Sight glass Drainage

The gearbox sizes 1 / 2 / 4 are delivered without vent

M K S H

T E C H N I C A L D A T A

Technical specifications on this page and in the tables on the following pages are intended only for rough preselection.

Gear teeth:	Klingelnberg spiral bevel gear teeth
Direction of rotation:	The opposite direction when facing C and A
Life time:	20000 h L_{10h}
Permissible gearbox temperature at housing:	-10 °C to +80 °C (deviating temperature ranges on request)
Lubrication:	Oil lubrication
Mounting position:	Any, specify when ordering
Surface protection:	Primer coat RAL RAL 9005 Black
Protection rating:	IP 54

MKSH

TECHNICAL DATA

The following technical specifications in the table are intended only for rough preselection

MKSH			1														
Axle offset	A		ohne											mit			
Ratio	i		6,0	7,5	9,6	12,0	14,4	16,8	19,2	21,6	24,0	26,4	28,8	33,6	38,4	43,2	48,0
Combination	i		2x3	2,5x3	2x4,8	2,5x4,8	3x4,8	3,5x4,8	4x4,8	4,5x4,8	5x4,8	5,5x4,8	6x4,8	7x4,8	8x4,8	9x4,8	10x4,8
Max. permissible output torque	$T_{2maxzul}$	Nm	189	189	216	218	227	176	169	176	216	232	198	212	198	198	189
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	100	100	91	91	100	98	94	98	120	129	110	118	110	110	105
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	210	210	240	242	252	196	188	196	240	258	220	236	220	220	210
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	3000														
Max. input speed	$n_{1maxzul}$	min^{-1}	4500														
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 4														
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	2240	2396	2582	2763	2920	3060	3186	3302	3409	3509	3603	3775	3931	4074	4206
Max. permissible radial load output	$F_{2rmaxzul}$	N	4800														
Efficiency	η	-	0,96											0,935			
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	2,65											1,63			
Weight	m	kg	9,0														
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75														
Inertia (with reference to input) Ø d 9	J_1	$kgcm^2$	1,156	1,190	1,197	0,943	0,787	0,815	0,814	0,741	0,775	0,753	0,751	0,713	0,707	0,700	0,685
Inertia (with reference to input) Ø d 11	J_1	$kgcm^2$	1,210	1,253	1,255	0,997	0,841	0,869	0,912	0,804	0,838	0,816	0,802	0,766	0,764	0,760	0,753
Inertia (with reference to input) Ø d 14	J_1	$kgcm^2$	1,335	1,378	1,385	1,122	0,959	0,994	1,025	0,929	0,963	0,941	0,940	0,902	0,893	0,885	0,873
Inertia (with reference to input) Ø d 19	J_1	$kgcm^2$	1,699	1,742	1,750	1,486	1,310	1,358	1,493	1,330	1,398	1,387	1,356	1,265	1,256	1,243	1,240

MKSH			2														
Axle offset	A		ohne											mit			
Ratio	i		6,0	7,5	9,6	12,0	14,4	16,8	19,2	21,6	24,0	26,4	28,8	33,6	38,4	43,2	48,0
Combination	i		2x3	2,5x3	2x4,8	2,5x4,8	3x4,8	3,5x4,8	4x4,8	4,5x4,8	5x4,8	5,5x4,8	6x4,8	7x4,8	8x4,8	9x4,8	10x4,8
Max. permissible output torque	$T_{2maxzul}$	Nm	346	378	396	387	441	405	396	387	342	360	432	396	378	297	324
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	170	190	155	185	200	190	190	188	160	150	205	170	174	120	144
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	384	420	440	430	490	450	440	430	380	400	480	440	420	330	360
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	3000														
Max. input speed	$n_{1maxzul}$	min^{-1}	4500														
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 4														
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	3086	3302	3558	3807	4023	4216	4390	4549	4697	4834	4964	5201	5416	5613	5795
Max. permissible radial load output	$F_{2rmaxzul}$	N	6500														
Efficiency	η	-	0,96											0,935			
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	3,75											2,32			
Weight	m	kg	13,5														
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75														
Inertia (with reference to input) Ø d 9	J_1	$kgcm^2$	2,087	1,570	1,707	1,010	1,148	1,000	0,906	0,875	0,846	0,840	0,756	0,745	0,735	0,728	0,705
Inertia (with reference to input) Ø d 11	J_1	$kgcm^2$	2,149	1,633	1,770	1,065	1,211	1,063	0,969	0,938	0,909	0,903	0,878	0,808	0,798	0,791	0,768
Inertia (with reference to input) Ø d 14	J_1	$kgcm^2$	2,274	1,758	1,895	1,193	1,336	1,188	1,094	1,063	1,034	1,028	1,003	0,933	0,923	0,916	0,893
Inertia (with reference to input) Ø d 19	J_1	$kgcm^2$	2,638	2,122	2,259	1,554	1,700	1,552	1,632	1,427	1,403	1,398	1,367	1,297	1,287	1,280	1,257

* measured with 2 % nominal torque on output shaft

MKSH

TECHNICAL DATA

MKSH			4														
Axle offset	A		without											with			
Ratio	i		6,0	7,5	9,6	12,0	14,4	16,8	19,2	21,6	24,0	26,4	28,8	33,6	38,4	43,2	48,0
Combination	i		2x3	2,5x3	2x4,8	2,5x4,8	3x4,8	3,5x4,8	4x4,8	4,5x4,8	5x4,8	5,5x4,8	6x4,8	7x4,8	8x4,8	9x4,8	10x4,8
Max. permissible output torque	$T_{2maxzul}$	Nm	792	756	819	828	846	810	792	747	738	720	882	855	792	756	828
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	395	378	390	410	410	387	370	367	347	345	412	412	395	375	380
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	880	840	910	920	940	900	880	830	820	800	980	950	880	840	920
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	2500														
Max. input speed	$n_{1maxzul}$	min^{-1}	3750														
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 4														
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	4997	5346	5762	6165	6515	6826	7108	7367	7606	7828	8038	8422	8770	9088	9383
Max. permissible radial load output	$F_{2rmaxzul}$	N	10000														
Efficiency	η	-	0,96											0,935			
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	5,7											3,48			
Weight	m	kg	23,5														
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75														
Inertia (with reference to input) Ø d 9	J_1	$kgcm^2$	7,616	8,103	6,480	5,302	4,622	3,984	3,748	3,216	3,328	2,998	3,024	2,794	2,678	2,604	2,567
Ø d 11	J_1	$kgcm^2$	7,645	8,200	6,509	5,365	4,685	4,047	3,811	3,279	3,391	3,061	3,087	2,857	2,741	2,540	2,530
Ø d 14	J_1	$kgcm^2$	7,795	8,324	6,659	5,490	4,810	4,172	3,936	3,404	3,516	3,186	3,212	2,982	2,866	2,792	2,755
Ø d 19	J_1	$kgcm^2$	8,284	8,688	7,148	5,854	5,174	4,536	4,300	3,768	3,880	3,550	3,576	3,346	3,230	3,156	3,119
Ø d 24	J_1	$kgcm^2$	9,374	9,643	8,203	6,909	6,229	5,591	5,355	4,823	4,762	4,605	4,631	4,401	4,354	4,211	4,174
Ø d 28	J_1	$kgcm^2$	11,601	11,837	10,465	9,104	8,424	7,786	7,550	7,018	7,130	6,800	6,826	6,596	6,480	6,406	6,369
Ø d 32	J_1	$kgcm^2$	12,205	12,430	10,999	9,750	8,955	8,235	7,963	7,625	7,638	7,400	7,375	7,175	6,985	9,950	6,875

MKSH			8														
Axle offset	A		without											with			
Ratio	i		6,0	7,5	9,6	12,0	14,4	16,8	19,2	21,6	24,0	26,4	28,8	33,6	38,4	43,2	48,0
Combination	i		2x3	2,5x3	2x4,8	2,5x4,8	3x4,8	3,5x4,8	4x4,8	4,5x4,8	5x4,8	5,5x4,8	6x4,8	7x4,8	8x4,8	9x4,8	10x4,8
Max. permissible output torque	$T_{2maxzul}$	Nm	1404	1350	1485	1647	1638	1566	1458	1440	1494	1440	1683	1674	1588	1620	1656
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	615	630	718	795	800	740	685	665	632	660	822	810	800	780	765
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	1560	1500	1650	1830	1820	1740	1620	1600	1660	1600	1870	1860	1764	1800	1840
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	2500														
Max. input speed	$n_{1maxzul}$	min^{-1}	3750														
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 4														
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	7364	7879	8491	9085	9601	10060	10475	10856	11208	11537	11845	12411	12924	13393	13828
Max. permissible radial load output	$F_{2rmaxzul}$	N	15000														
Efficiency	η	-	0,96											0,935			
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	8,55											5,25			
Weight	m	kg	48,5														
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75														
Inertia (with reference to input) Ø d 11	J_1	$kgcm^2$	29,445	23,225	25,025	21,785	20,554	18,500	17,985	17,135	16,785	16,325	15,954	15,222	14,225	14,113	14,075
Ø d 14	J_1	$kgcm^2$	30,775	24,666	27,885	23,775	21,877	18,225	17,445	17,665	16,889	16,875	16,025	15,750	15,220	14,950	14,777
Ø d 19	J_1	$kgcm^2$	30,999	25,666	26,525	23,997	22,023	19,845	19,224	18,245	17,333	17,115	17,025	16,775	16,448	15,888	15,035
Ø d 24	J_1	$kgcm^2$	33,333	28,225	29,356	26,975	24,336	22,875	22,456	21,679	21,075	20,665	20,112	19,750	19,335	19,133	18,099
Ø d 28	J_1	$kgcm^2$	37,563	31,015	33,225	30,015	27,666	26,889	25,746	24,556	24,225	23,500	24,227	22,875	22,742	22,115	21,886
Ø d 32	J_1	$kgcm^2$	37,779	31,025	33,114	30,225	27,995	27,563	27,014	26,995	24,887	24,556	24,504	23,455	23,225	23,025	22,322

* measured with 2 % nominal torque on output shaft

MKSH

TECHNICAL DATA

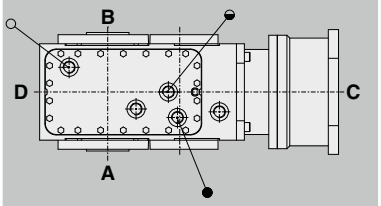
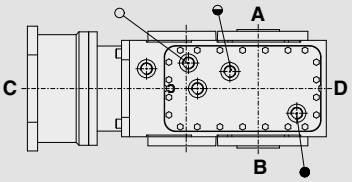
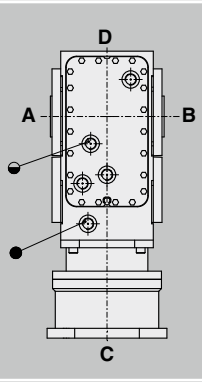
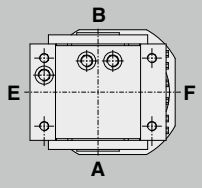
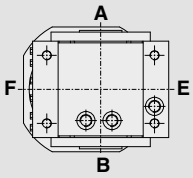
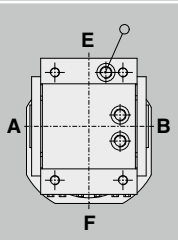
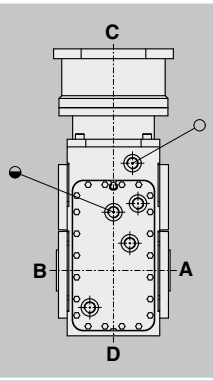
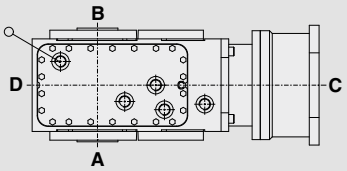
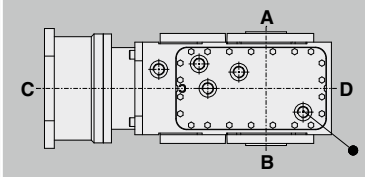
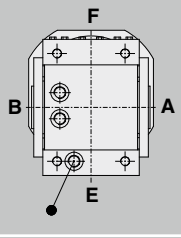
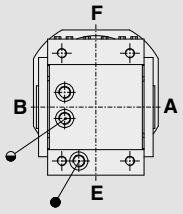
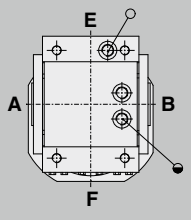
MKSH			16														
Axle offset	A		without											with			
Ratio	i		6,0	7,5	9,6	12,0	14,4	16,8	19,2	21,6	24,0	26,4	28,8	33,6	38,4	43,2	48,0
Combination	i		2x3	2,5x3	2x4,8	2,5x4,8	3x4,8	3,5x4,8	4x4,8	4,5x4,8	5x4,8	5,5x4,8	6x4,8	7x4,8	8x4,8	9x4,8	10x4,8
Max. permissible output torque	$T_{2maxzul}$	Nm	2916	2898	2970	2970	2925	2484	2232	2160	2070	2880	3150	2925	2772	2664	2808
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	1320	1330	1445	1425	1390	1160	1060	1020	950	1400	1490	1390	1300	1295	1290
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	3240	3220	3300	3300	3250	2760	2480	2400	2300	3200	3500	3250	3080	2960	3120
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	2000														
Max. input speed	$n_{1maxzul}$	min^{-1}	3000														
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 4														
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	13506	14451	15574	16663	17610	18452	19214	19912	20558	21161	21726	22765	23705	24566	25363
Max. permissible radial load output	$F_{2rmaxzul}$	N	26000														
Efficiency	η	-	0,96											0,935			
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	12,35											7,6			
Weight	m	kg	73														
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75														
Inertia (with reference to input) Ø d 19	J_1	$kgcm^2$	97,85	80,35	86,24	72,36	65,66	64,05	59,53	57,34	56,75	55,38	54,63	32,77	32,73	32,34	31,87
Ø d 24	J_1	$kgcm^2$	104,25	85,13	91,65	77,56	70,53	69,35	64,23	62,35	61,36	60,23	60,85	57,85	57,64	57,36	57,00
Ø d 28	J_1	$kgcm^2$	109,20	91,33	97,05	84,63	76,55	75,83	70,95	69,25	67,66	66,50	65,33	64,22	63,90	63,77	63,12
Ø d 32	J_1	$kgcm^2$	113,22	94,33	101,66	87,05	80,75	79,30	74,52	72,05	70,44	69,11	68,35	68,00	67,88	67,25	66,85
Ø d 38	J_1	$kgcm^2$	119,02	101,33	108,65	94,25	89,25	86,34	81,84	79,66	78,63	76,20	67,05	74,50	74,35	74,15	73,68
Ø d 42	J_1	$kgcm^2$	126,30	108,55	114,22	101,75	93,44	92,80	88,88	86,44	84,65	83,90	82,65	81,50	80,88	80,65	80,25
Ø d 48	J_1	$kgcm^2$	135,65	117,78	124,35	110,25	103,75	102,30	97,65	95,75	93,55	92,87	92,55	90,44	90,35	89,76	89,45

MKSH			32														
Axle offset	A		without											with			
Ratio	i		6,0	7,5	9,6	12,0	14,4	16,8	19,2	21,6	24,0	26,4	28,8	33,6	38,4	43,2	48,0
Combination	i		2x3	2,5x3	2x4,8	2,5x4,8	3x4,8	3,5x4,8	4x4,8	4,5x4,8	5x4,8	5,5x4,8	6x4,8	7x4,8	8x4,8	9x4,8	10x4,8
Max. permissible output torque	$T_{2maxzul}$	Nm	3780	3780	5760	5760	5760	5580	5238	4680	4374	5850	5760	5400	5310	5130	5220
Nominal torque on output (with n_{1mzul})	T_{2Nzul}	Nm	1732	1740	2698	2760	2720	2630	2480	2220	2060	2680	2715	2500	2450	2350	2200
Emergency stop torque (permissible 1000 times during gearbox life time)	$T_{2Notzul}$	Nm	4200	4200	6400	6400	6400	6200	5820	5200	4860	6500	6400	6000	5900	5700	5800
Permissible average input speed (with T_{2Nzul})	n_{1mzul}	min^{-1}	1700	1700	1700	1700	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Max. input speed	$n_{1maxzul}$	min^{-1}	3000														
Max. backlash*	j	arcmin	Standard ≤ 10 / Reduced ≤ 4														
Permissible radial load input (at permissible average input speed)	F_{1rmzul}	N	21874	23404	25222	26986	27149	28447	29622	30698	31694	32623	33494	35096	36545	37873	39102
Max. permissible radial load output	$F_{2rmaxzul}$	N	40000														
Efficiency	η	-	0,96											0,935			
Thermal limit power (Tu = 20° C ambient temperature indoor set-up, clean, S1 operation)	$P_{thGrenz}$	kW	17											10,5			
Weight	m	kg	120														
Running noise (with n_{1mzul})	L_{PA}	dB(A)	75														
Inertia (with reference to input) Ø d 28	J_1	$kgcm^2$	187,22	149,05	168,63	138,22	103,88	108,35	103,25	95,30	96,35	91,50	90,75	92,65	84,75	82,45	81,75
Ø d 32	J_1	$kgcm^2$	188,05	150,33	169,45	139,88	124,63	109,44	103,50	96,25	97,15	92,00	91,30	88,25	85,68	83,45	82,55
Ø d 38	J_1	$kgcm^2$	193,55	156,22	179,05	146,75	130,31	115,00	108,65	101,66	102,55	97,50	97,35	93,25	91,80	89,00	88,50
Ø d 42	J_1	$kgcm^2$	200,88	152,05	181,35	150,90	136,65	121,68	115,35	108,68	109,65	104,55	103,35	100,20	97,55	95,61	94,65
Ø d 48	J_1	$kgcm^2$	209,35	172,65	190,88	160,55	146,36	131,44	124,75	117,52	118,33	113,22	113,65	109,90	107,25	104,66	103,50
Ø d 55	J_1	$kgcm^2$	219,75	182,05	200,95	170,40	156,35	141,55	134,75	127,06	128,44	123,50	123,48	119,75	117,35	115,00	114,75

* measured with 2 % nominal torque on output shaft

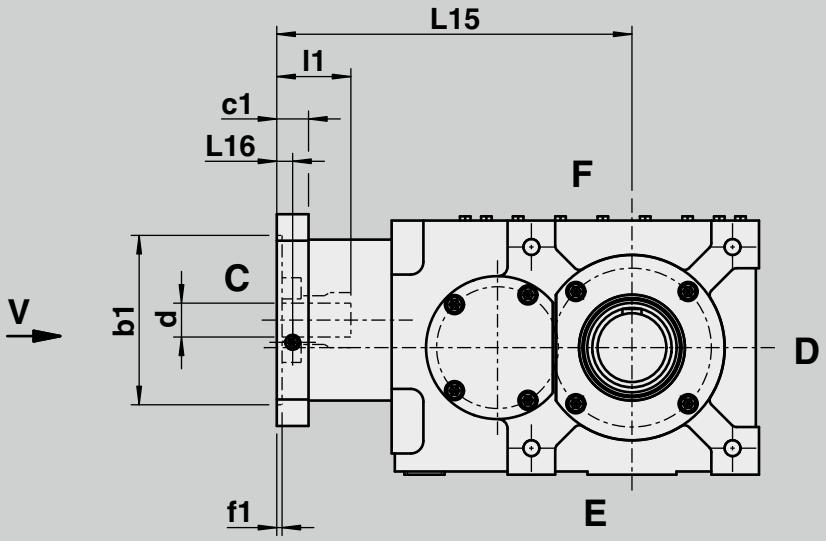
M K S H

M O U N T I N G P O S I T I O N A N D L U B R I C A T I O N

MKSH			
View side F			
View side D			
Mounting position (underside)	**A**	**B**	**C**
Side of oil fittings Breather - Sight glass - Drainage	**F - F - F**	**F - F - F**	**D - F - F**
View side F			
View side D			
Mounting position (underside)	**D**	**E**	**F**
Side of oil fittings Breather - Sight glass - Drainage	**F - F - D**	**F - D - D**	**D - D - F**

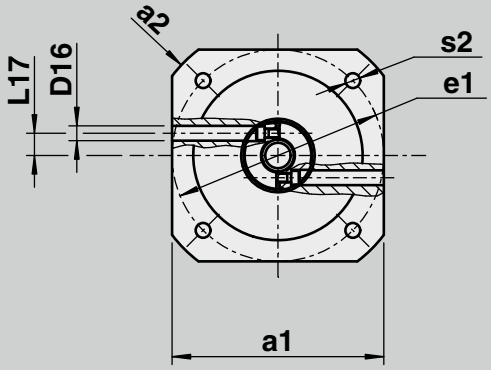
Breather Sight glass Drainage

The gearbox sizes 1 / 2 / 4 are delivered without vent



Gearbox dimensions										
d x l1	**Size**	**L15**	**L16**	**L17**	**c1**	**f1**	**D16**	**Screw type**	**MA**	**Version**
G7									Nm	
9 x 20 11 x 23 14 x 30 19 x 40	**1**	180	13	12,5	22	5	10	M6 / 12.9	18	C
9 x 20 11 x 23 14 x 30 19 x 40	**2**	190	13	12,5	22	5	10	M6 / 12.9	18	C
11 x 23 14 x 30 19 x 40 24 x 50 28 x 60 32 x 60	**4**	227	15	16,5	25	5	14	M6 / 12.9	18 39 43	C

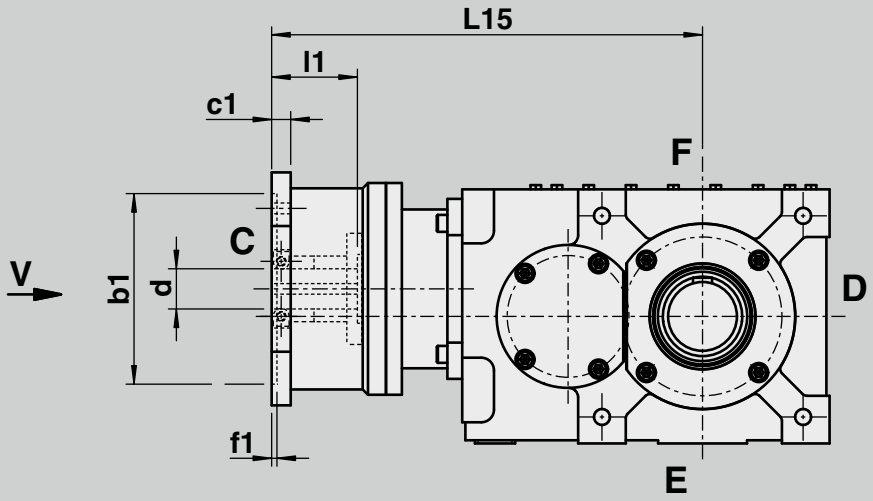
View V



		Motor dimensions						
a1		95	95	115	125	125	130	140
a2		105	120	140	140	140	160	190
b1	G8	70	80	95	80	95	110	130
e1		85	100	115	100	115	130	165
s2*		4x M6 / Ø7	4x M6 / Ø7	4x M8 / Ø9	4x M6 / Ø7	4x M8 / Ø9	4x M8 / Ø9	4x M10 / Ø11

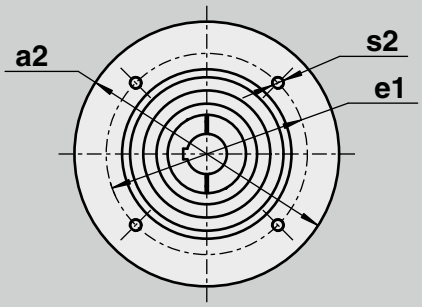
x	x	x			x	
x	x	x			x	
x	x	x			x	
x	x	x			x	
x	x	x			x	
x	x	x			x	
x	x	x			x	
x	x	x			x	
			x	x	x	x
			x	x	x	x
			x	x	x	x
			x	x	x	x
			x	x	x	x
			x	x	x	x

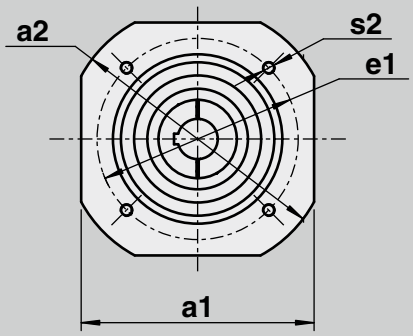
* Depth of thread: 2 x Ø or flange thickness



Gearbox dimensions				
d x l1	**Size**	**Ratio**	**L15**	**Version**
G7				
19 x 40 24 x 50 28 x 60 32 x 60	**8**	6,0 - 48,0	315	A
38 x 80			335	
28 x 60 32 x 60 38 x 80	**16**	6,0 - 48,0	407	A
42 x 110 48 x 110			437	
32 x 60 38 x 80	**32**	6,0 - 48,0	449	A
42 x 110 48 x 110 55 x 110			479	

View V

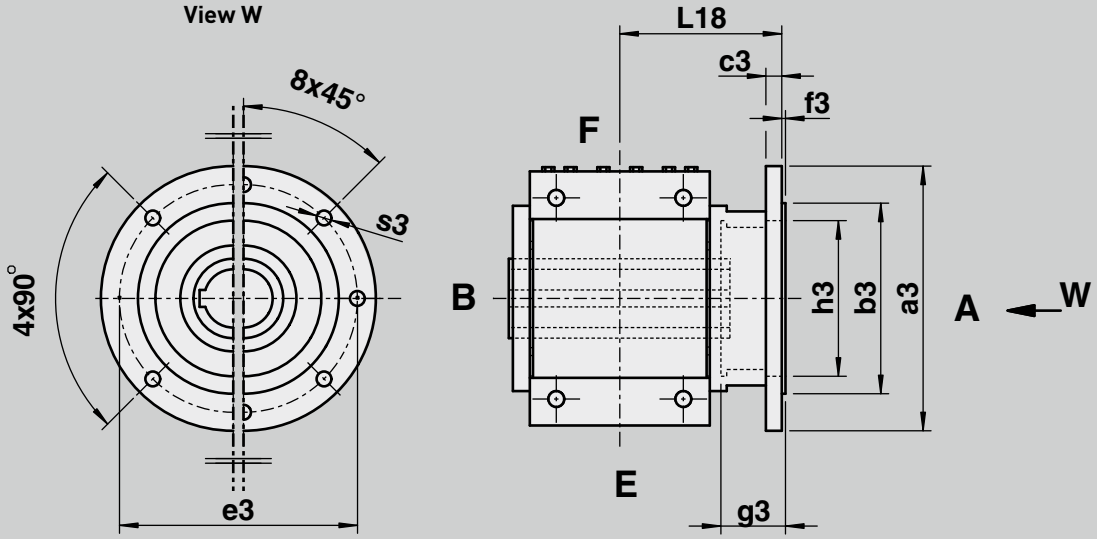




Motor dimensions														
a1			145		145		200		242		260		345	
a2		145	160	160	190	200	250	250	300	300	350	350	400	400
b1	H7	95	110	110	130	130	180	180	230	230	250	250	300	300
e1		115	130	130	165	165	215	215	265	265	300	300	350	350
s2*		4x M8 / Ø9	4x M8 / Ø9	4x M8 / Ø9	4x M10 / Ø11	4x M10 / Ø11	4x M12	4x M12	4x M12	4x M12	4x M16	4x M16	4x M16	4x M16
c1		12	12	12	15	15	18	18	18	18	24	24	24	24
f1		5	5	5	5	5	5	5	5	5	6	6	6	6

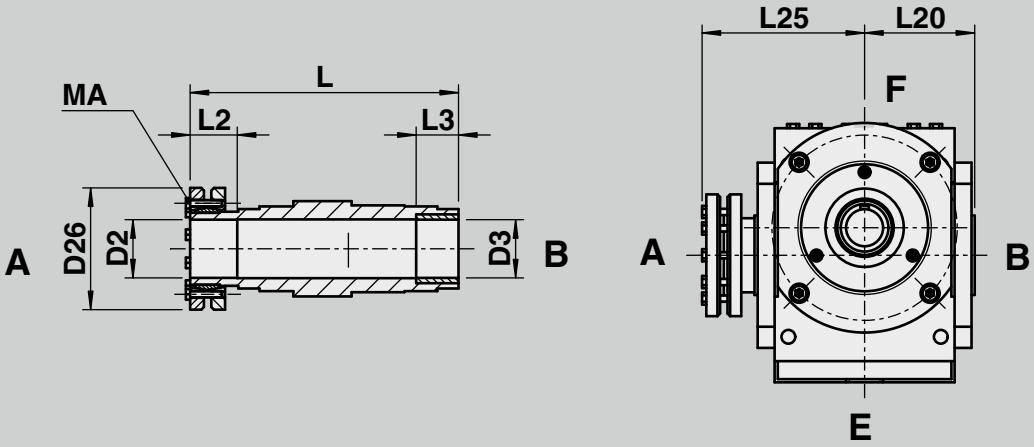
x	x	x	x	x	x	x	x	x	x	x	x	x	x
x	x	x	x	x	x	x	x	x	x	x	x	x	x
x	x	x	x	x	x	x	x	x	x	x	x	x	x
x	x	x	x	x	x	x	x	x	x	x	x	x	x
x	x	x	x	x	x	x	x	x	x	x	x	x	x
					x	x	x	x	x	x	x	x	x
					x	x	x	x	x	x	x	x	x
					x	x	x	x	x	x	x	x	x
					x	x	x	x	x	x	x	x	x
					x	x	x	x	x	x	x	x	x
							x	x	x	x	x	x	x
							x	x	x	x	x	x	x
							x	x	x	x	x	x	x
							x	x	x	x	x	x	x
							x	x	x	x	x	x	x

* Depth of thread: 2 x Ø or flange thickness



Order details: Output flange mounted on side A (or B).

Size	a3	b3	c3	e3	f3	g3	h3	s3	L18
		f7							
1	140	95	10	115	3,0	35,0	63	4 x Ø 9	83
2	160	110	10	130	3,0	47,0	75	4 x Ø 9	102
4	200	130	10	165	3,0	52,0	96	4 x Ø 11	120
8	250	180	12	215	3,5	55,5	104	4 x Ø 14	138
16	300	230	15	265	3,5	55,5	125	8 x Ø 14	153
32	350	250	12	300	4,0	51,0	148	8 x Ø 18	170



Order details: Side A (or B) with shrink disc.
Not suitable for cantilever load. A counter bearing or bearing of the shaft is required for radial load.

Size	D2/D3	D26	L	L20	L25	L2/L3	MA
	H7						Nm
1	25	60	133	53	86	20/21	The required clamping torques MA can be found on the shrink disc.
2	28	72	145	60	88	26/21	
4	38	90	170	70	102	32/31	
8	45	100	221	89	137	28/31	
16	55	115	252	104	154	42/41	
32	70	145	291	124	172	42/41	

Shaft material for the insert shaft: minimum yield strength approx. 360 N/mm².
Recommended shaft fit h6

Version A

Attention! To make sure to transfer the motor torque in case of an emergency stop, it is required to use a motor shaft with keyway.

It is essential that the motor shaft and the bore on the clamping sleeve are dirt and grease free. Take the clamping bush and fit it to the motor shaft back to the shaft shoulder. Then tighten the coupling screws to the recommended torque. Do this in 3 step eitherway with 20% / 50% and then 100%. The torque which can be found on a sticker on the coupling. Grease the tooth profile of the clamping bush. With the gearbox in the vertical position and the input flange facing upwards mount the motor onto the gearbox and tighten the motor flange/gearbox fixing bolts.

Version B

It is essential that the motor shaft and the bore on the profiled bush are dirt and grease free. Take the profiled bush together with the shrink disc and fit it to the motor shaft back to the shaft shoulder. Then tighten the coupling screws to the recommended torque, which can befound on a sticker on the coupling. Grease the tooth profile of the profiled bush. With the gearbox in the vertical position and the input flange facing upwards mount the motor onto the gearbox and tighten the motor flange/gearbox fixing bolts.

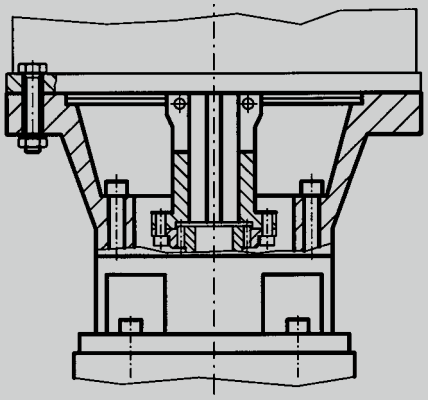
Version C

The connection between motor and gearbox is made using a shrink disc bush without a keyway. For maximum performance we recommend the use of motors with reduced shaft tolerance and concentricity according to DIN 42955 R standards.

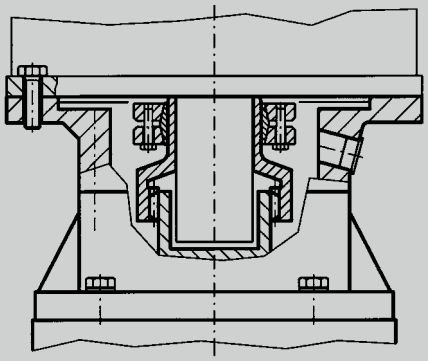
When fitting the motor, position the gearbox vertically with the motor flange upwards. Before assembly, degrease the motor shaft and the blind hole in the gearbox. Remove the lock screw or two plastic plugs from the motor flange of the gearbox, and insert a long Allen key to reach the tangential clamping screw in the coupling. The coupling must first be turned to the correct position for the screw to be accessible. Lower the motor vertically with the motor shaft in the blind hole. Ensure that the motor shaft has completely entered the bore, and that the flanges of motor and gearbox are in contact with each other over their full surface. The motor flange screws can now be inserted (do not tighten them completely). Then tighten the screws of the coupling with the required tightening torque. Do this in 3 steps alternately with 20%, 50% and then 100%.

The torque values for motor mounting can be accessed in our motor mounting manual, which is offered separately. Finish tightening the motor flange screws. After assembly, it is important to reinsert the lock screw or plastic plugs into their holes.

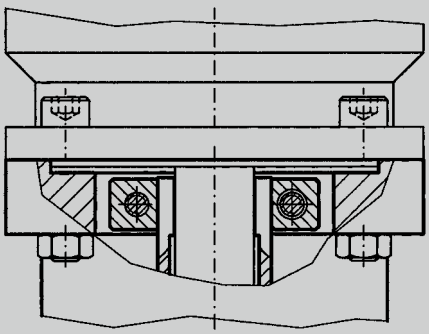
Version A

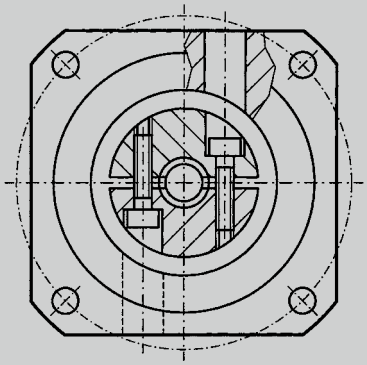


Version B



Version C





ENQUIRY AND ORDER FORM

Vogel-Project number
(to be filled out by VOGEL representative):

Customer / Company	Line
Customer no.	Note
Street	
Postal code / Place	
Country	Registered by (Name of contact at VOGEL)
Contact person	Date
Phone / Fax	Reply fax to ...
E-mail	Telefax: +49 7022 / 6001-
Date	Reply e-mail to ...

ENQUIRY AND ORDER FORM

Gearbox data	**Symbol**	**Unit**	
Quantity			
Gearbox type			
Gearbox size			
Ratio	i		
Construction type			
Backlash	j	arcmin	☐ Standard ☐ Reduced ☐ Value
Operating hours/year:			
Operating hours/day:			
Duty:	%	ED	
Lubrication	☐ Synthetic ☐ Mineral	☐ Oil ☐ Grease	☐ For use in the food industry
Side under:			
Breather side:			
Oil sight glass side:			
Drainage side:			

Gearbox performance data	**Symbol**	**Unit**	
Nominal input speed	n_{1N}	min^{-1}	
Max. input speed	$n_{1maxzul}$	min^{-1}	
Nominal output torque	T_{2Nzul}	Nm	
Max. output torque	T_{2max}	Nm	
Nominal power input	P_{1N}	kW	
Max. power input	P_{1max}	kW	

Gearbox shaft loads output	**Symbol**	**Unit**	
Radial load output	F_{2r}	N	
Distance radial	y2	mm	
Distance axial	x2	mm	
Axial load output	F_{2a}	N	
Distance radial	y2	mm	
Distance axial	x2	mm	
According to drawing			

E N Q U I R Y A N D O R D E R F O R M

Application			
Duty type			
No. of cycles	Z	1/h	
Ambient temperature		°C	
Ambient air	☐ Free of particles	☐ Dust	☐ Other:
	☐ Fibres	☐ Gas	
Customer drawing - Application - Number			

Motor data	**Symbol**	**Unit**	
Motor type			
Capacity		kW	
Speed		min^{-1}	
Outer dim. flange		mm	
Centring-Ø (b1)		mm	
Pitch circle-Ø (e1)		mm	
Motor mounting (s2)			
Motor shaft (Ø d x l1)		mm	
Direct connection			☐ Yes ☐ No
Connection through coupling:			

Additional data for ATEX versions	**Symbol**	**Unit**	
Category:			
Zone:			
Explosion group:			
Temperature class:			
Max. surface temperature:		°C	

Note!

Missing data will be clarified individually. Further information following design.

Further information/requirements: