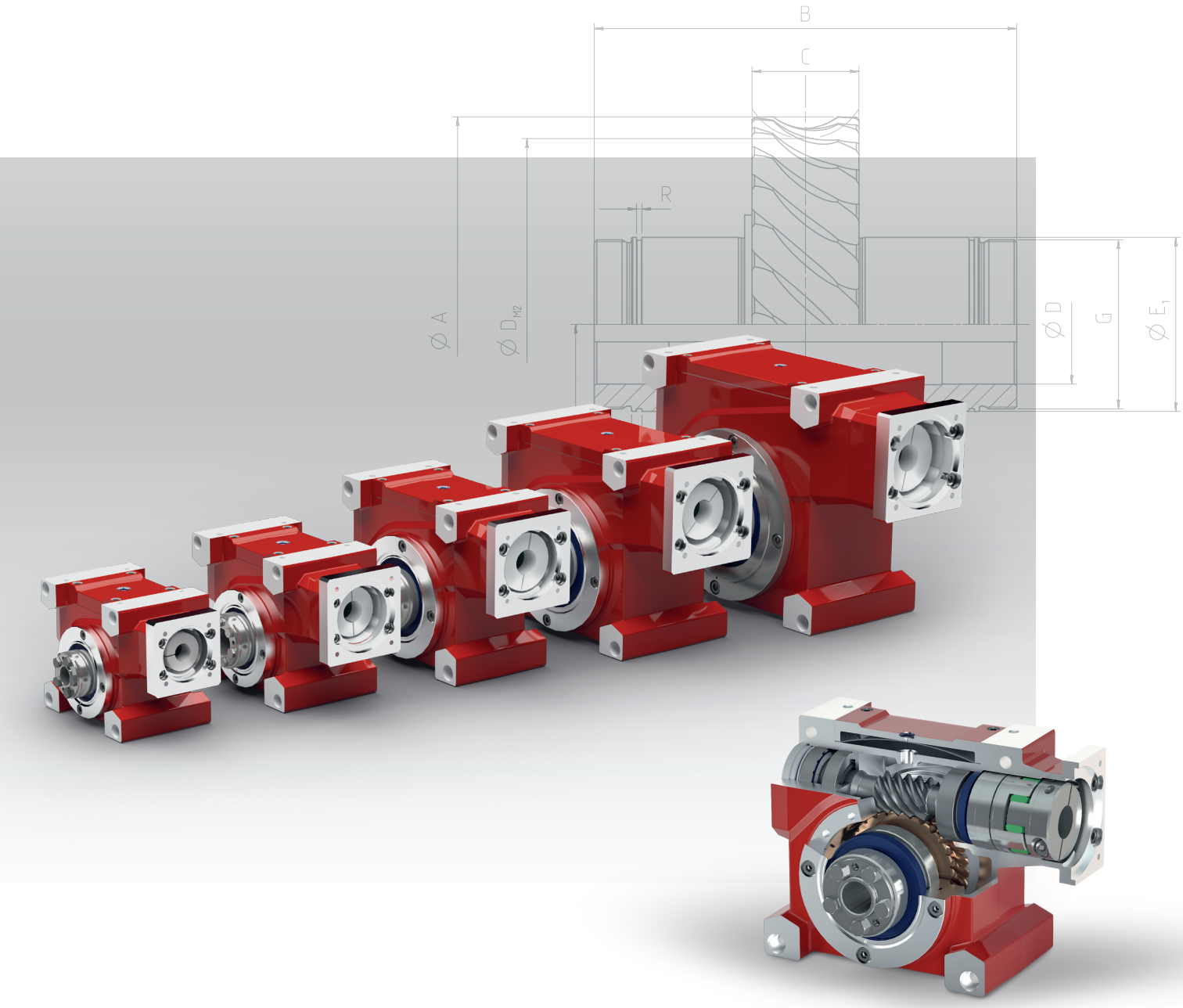
ANTRIEBSSYSTEME

ZAE SERVO-DRIVE

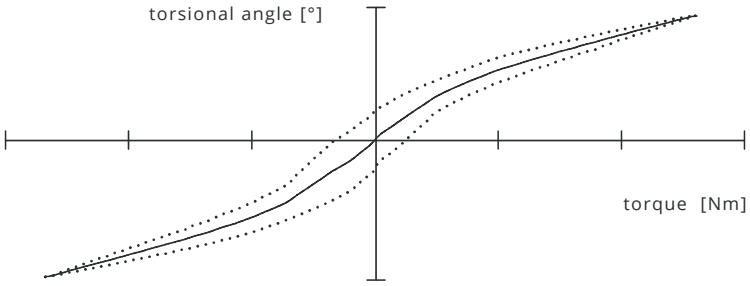
DEVELOPED FOR THE HIGHEST
DEMANDS IN SERVO TECHNOLOGY



ZAE SERVO-DRIVE

The new dimension **in drive technology**

ZAE sets new standards for servo drives with various application requirements. The proven ZAE quality in compact design and maximum torsional rigidity meets all requirements for highly dynamic servo applications.



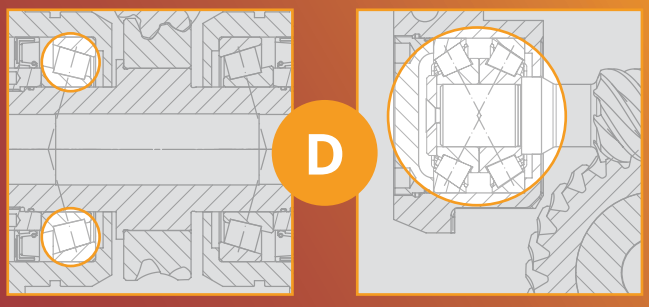
- highest stiffness
- very high positioning accuracy
- extreme overload capacity
- vibration and shock absorbing
- smooth run
- very compact
- eccentric cover for adjusting and readjusting the gear backlash

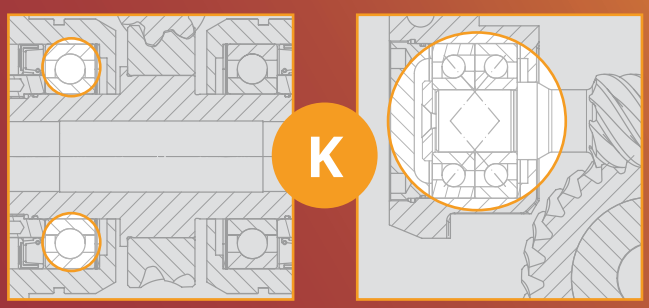
Optimally adjusted: The variable bearing concept

The new ZAE SERVO-DRIVE is equipped with tapered roller bearings or ball bearings to meet specific requirements.
This possibility of choice creates flexibility for your application.

D **High rigidity and high external forces**
for dynamic operation or precise positioning tasks

K **Energy-efficient operation**
for continuous operation modes

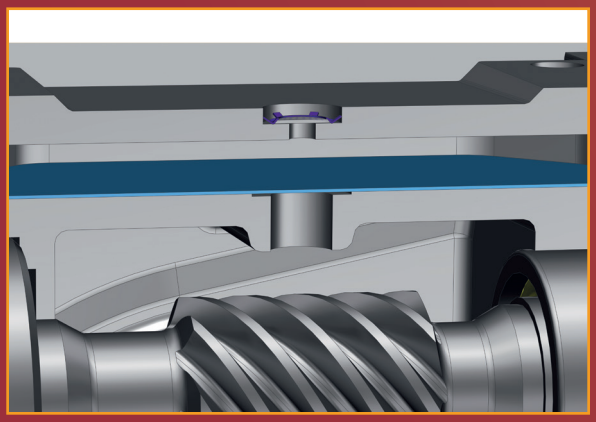


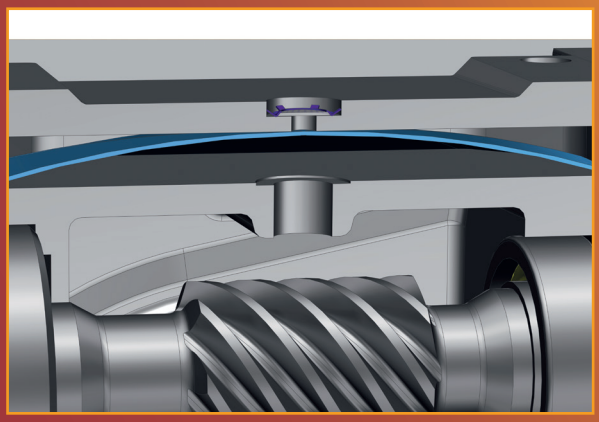


The ZAE-developed **hermetic pressure equalisation**

Integrated in the housing, the system offers maximum safety for sensitive processes, because here, nothing can leak out.
The concept of hermetic pressure compensation developed by ZAE works cleanly and reliably.

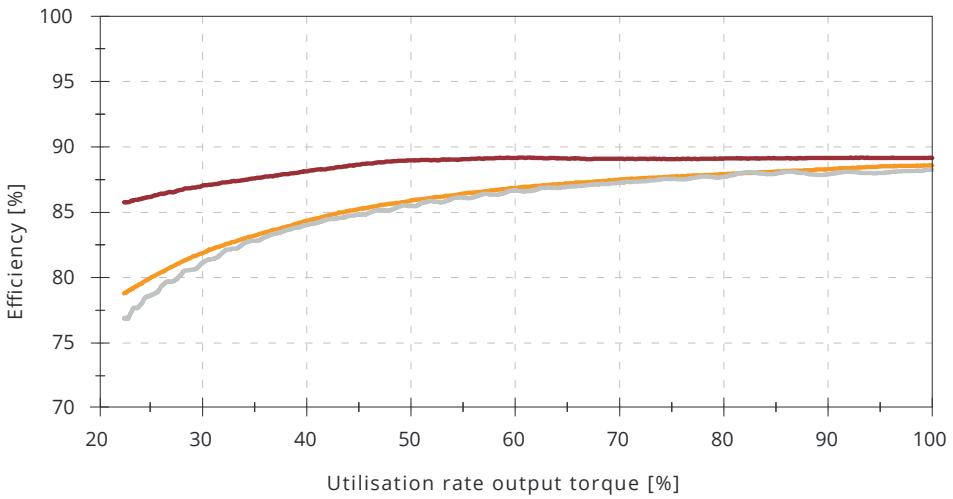
- **Membrane provides pressure compensation**
- **no gear venting necessary**
- **no oil leakage possible**
- **integrated in gear housing**





Efficiency ratio
Comparative measurement of different gear concepts

The diagram below shows examples of measured efficiencies as a function of output torque.
In this comparison, the ZAE worm gearbox performs best and achieves the highest efficiency.
This is particularly true for the partial load range, which is often encountered in dynamic applications.



Parameters:

n_1 = 1.500 rpm

ϑ_{Oil} = Steady state temperature

Worm gears
(i = 15,00:1)

Hypoid gears
(i = 15,00:1)

Spiroid gears
(i = 14,35:1)

The features **at a glance**

1. **Any servo motor can be mounted** by using adapter flanges

2. **Particularly rigid motor connection** due to the use of a rigid sprocket in the coupling

3. **Long service life and reliability** due to generously sized roller bearings, which provide particularly high rigidity in the case of bearing concept "D"

4. **Excellent synchronism** due to the precisely machined worm gearing

5. **Increased rigidity** due to a worm gear welded onto the hollow shaft

6. **High wear resistance** due to the worm gear being manufactured from high-perfomance bronze

7. **Optimum bearing concept** due to choice between a rigid heavy-duty tapered roller bearing or a smooth-running energy-efficient ball bearing, depending on the application

8. **Suitable for high external forces** (e.g. from sprocket, belt or spindle) due to the O arrangement of the output side bearing

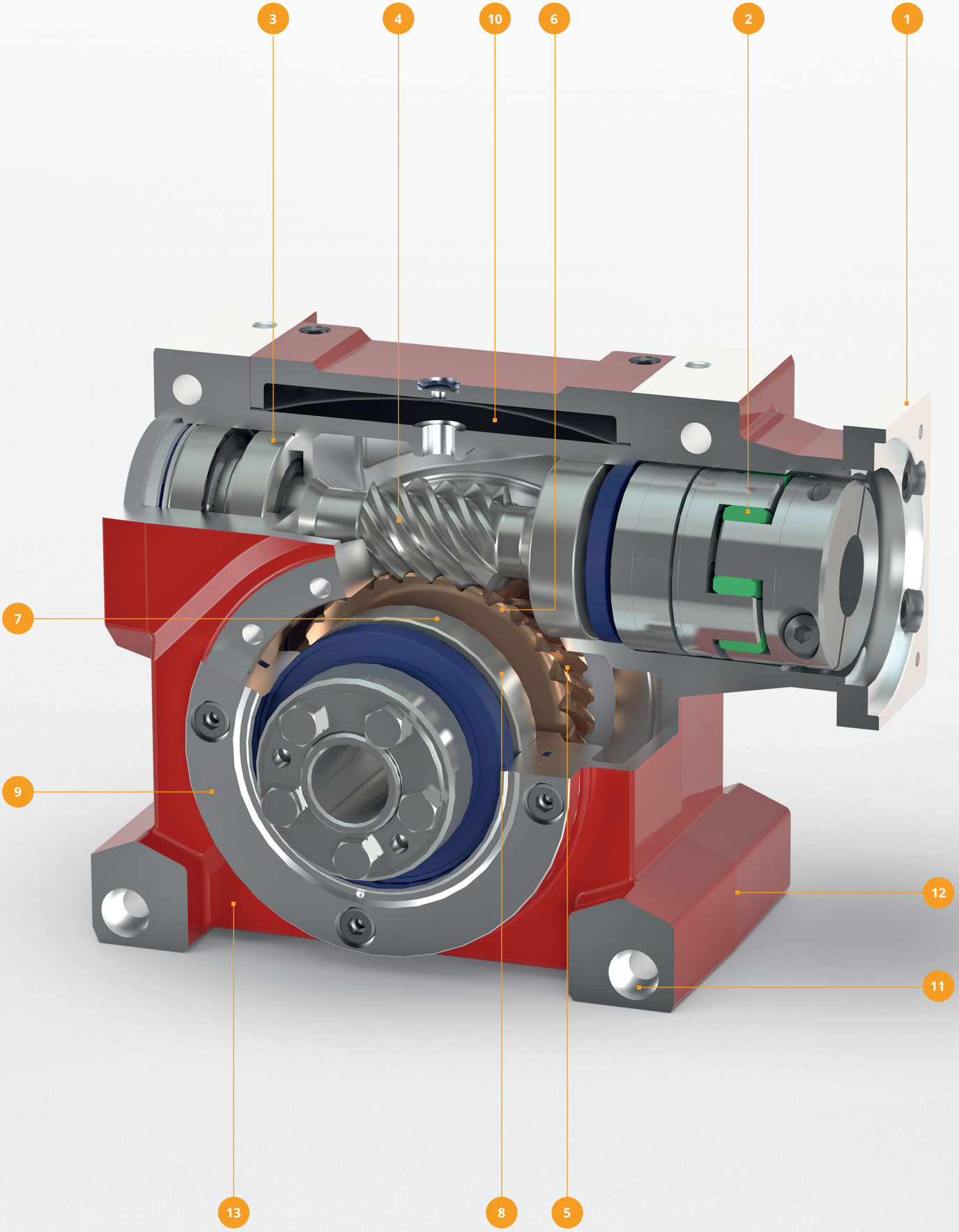
9. **Simple, precise backlash adjustment** by turning the output-side eccentric cover

10. **No oil leakage possible,** as the gear unit does not contain vent holes, but is equipped with hermetic pressure compensation

11. **Universal mounting options** through tapped holes and through holes for easy gear assembly

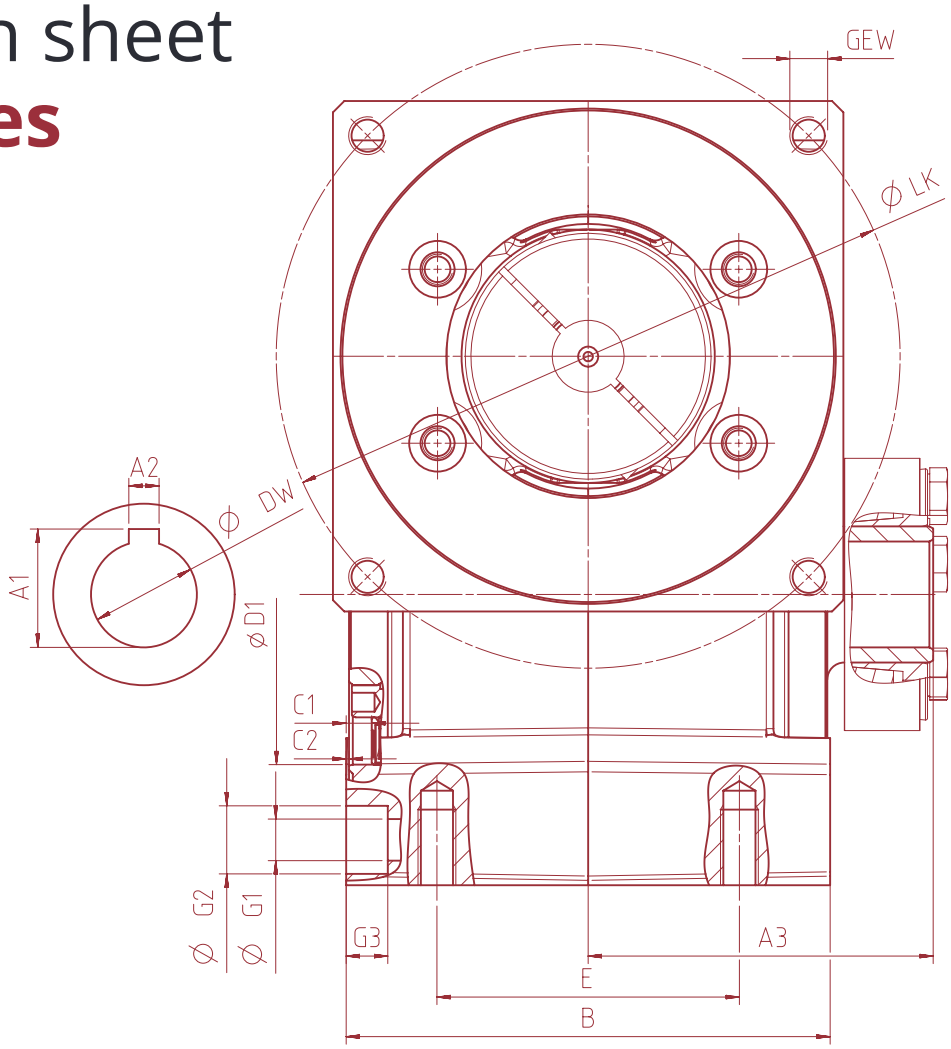
12. **Low weight** due to the use of aluminum as housing material

13. **Suitable for the food and packaging industry,** as lubricant with H1 approval is always used


3
4
10
6
2
1
7
9
12
11
13
8
5

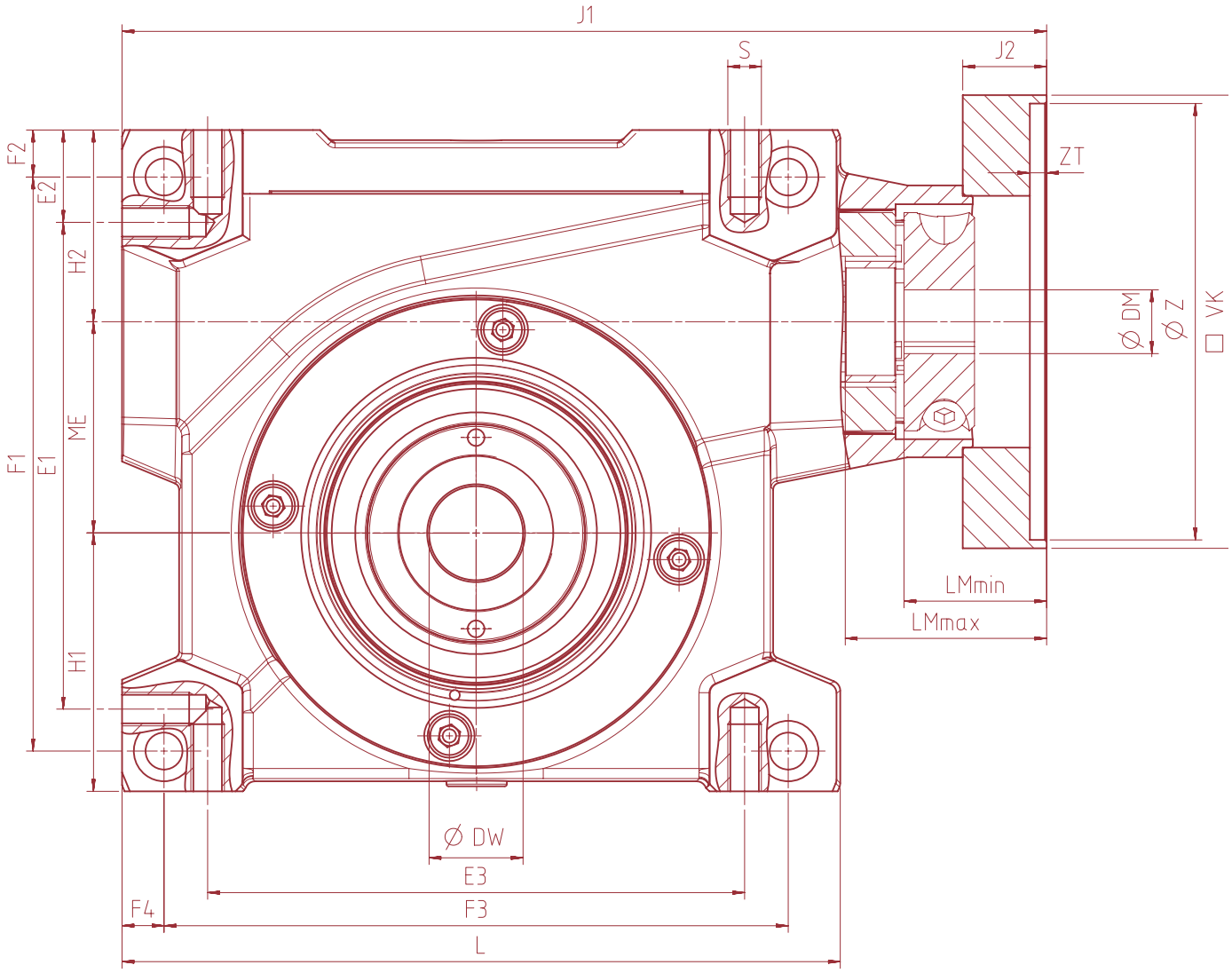
Dimension sheet **for all sizes**

In this table you will find an overview of all important dimensions.
You can download the corresponding STEP files from www.zae.de as well as request them from us.
Should you have any questions, we look forward to hearing from you at verkauf@zae.de
or Tel. +49 (0) 40 853 93-03.



Sizes	40	50	63	80	100
ME	40	50	63	80	100
L	157	177	214	252	309
B	110	122	128	160	172
H1	56	61	77	90	112
H2	45	51	57	62	75
DW H6 [1]	20	25	28	36	48
A1[2]	22.8	28.3	31.3	39.3	51.8
A2[2]	6	8	8	10	14
A3[3]	76.5	84.5	91.25	109	118
D1 H8	62	68	90	110	125
C1	6	6	5.75	6	6
C2	1	1	0.75	1	1
E	75	85	80	120	135[4]
E1	102	121	145	185	232
E2	19	20	27.5	23	28
E3	108	120	160	195	250
S	M6x12	M8x16	M10x20	M10x20	M12x24

1) Recommended fit for machine shaft h6
2) Only with model 00
3) Only with model 05 / 06
4) On the side opposite the motor: 120



Sizes	40	50	63	80	100
F1	122	142	171	209	262
F2	9.5	10	14	12	13
F3	135	152	186	226	280
F4	9.5	11	12.5	11.5	13
G1	9	9	11	11	14
G2	15	15	18	18	20
G3	10	10	11	11	13
VK	Depending on motor				
Z H8	Depending on motor				
ZT	Depending on motor				
LK	Depending on motor				
GEW	Depending on motor				
DM	Depending on motor				
LMmin	Depending on motor				
LMmax	Depending on motor				
J1	Depending on motor				
J2	Depending on motor				

ZAE SERVO-DRIVE

Technical Information

Z040								ZAE SERVO-DRIVE
Ratio	**i**	**[-]**	**4.0**	**6.4**	**10.0**	**16.0**	**27.0**	**39.0**
Max. acceleration torque	$M_{2;a}$	[Nm]	59	79	84	81	89	73
S1 nominal torque [1)2)]	$M_{2;S1}$	[Nm]	66	82	87	84	95	73
Backlash-constant torque	$M_{2;v}$	[Nm]	37	48	52	53	61	43
EMERGENCY STOP torque[3)]	$M_{2;NOT}$	[Nm]	179	195	212	203	238	164
Max. input speed	$n_{1;max}$	[rpm]	8000					
Backlash – standard		[arcmin]	< 6					
Backlash – reduced		[arcmin]	< 3					
Torsional stiffness	C_{t21}	[Nm/arcmin]	5					
Nominal efficiency (S1 operation)	η	[%]	95	94	91	86	80	72
Moment of inertia [4)5)]	J_{red}	[kgcm²]	0.8	0.6	0.5	0.5	0.5	0.4
Mass [6)]	m	[kg]	5.6-6.8)					

Z050								ZAE SERVO-DRIVE
Ratio	**i**	**[-]**	**4.0**	**6.4**	**10.0**	**16.0**	**27.0**	**39.0**
Max. acceleration torque	$M_{2;a}$	[Nm]	166	164	176	171	187	158
S1 nominal torque [1)2)]	$M_{2;S1}$	[Nm]	120	130	168	177	187	159
Backlash-constant torque	$M_{2;v}$	[Nm]	110	120	129	125	137	115
EMERGENCY STOP torque[3)]	$M_{2;NOT}$	[Nm]	357	374	420	399	471	315
Max. input speed	$n_{1;max}$	[rpm]	7000					
Backlash – standard		[arcmin]	< 6					
Backlash – reduced		[arcmin]	< 3					
Torsional stiffness	C_{t21}	[Nm/arcmin]	9					
Nominal efficiency (S1 operation)	η	[%]	96	95	92	88	81	76
Moment of inertia [4)5)]	J_{red}	[kgcm²]	2.5	2.0	1.8	1.7	1.7	1.6
Mass [6)]	m	[kg]	8.5-11.2)					

Z063								ZAE SERVO-DRIVE
Ratio	**i**	**[-]**	**4.0**	**6.4**	**10.0**	**16.0**	**27.0**	**39.0**
Max. acceleration torque	$M_{2;a}$	[Nm]	336	355	374	368	399	338
S1 nominal torque [1)2)]	$M_{2;S1}$	[Nm]	194	249	295	380	415	405
Backlash-constant torque	$M_{2;v}$	[Nm]	257	265	279	274	297	247
EMERGENCY STOP torque[3)]	$M_{2;NOT}$	[Nm]	951	999	1100	1073	1100	788
Max. input speed	$n_{1;max}$	[rpm]	5500					
Backlash – standard		[arcmin]	< 6					
Backlash – reduced		[arcmin]	< 2					
Torsional stiffness	C_{t21}	[Nm/arcmin]	31					
Nominal efficiency (S1 operation)	η	[%]	96	96	93	90	84	79
Moment of inertia [4)5)]	J_{red}	[kgcm²]	6.4	5.0	4.5	4.3	4.3	4.1
Mass [6)]	m	[kg]	14.9-18.3)					

Z080						ZAE SERVO-DRIVE		
Ratio	**i**	**[-]**	**4.0**	**6.4**	**10.0**	**16.0**	**27.0**	**39.0**
Max. acceleration torque	$M_{2;a}$	[Nm]	708	707	758	740	810	676
S1 nominal torque [1)2)]	$M_{2;S1}$	[Nm]	415	495	608	613	612	630
Backlash-constant torque	$M_{2;v}$	[Nm]	520	517	555	541	592	495
EMERGENCY STOP torque[3)]	$M_{2;NOT}$	[Nm]	1395	1464	1641	1567	1860	1305
Max. input speed	$n_{1;max}$	[rpm]	4500					
Backlash – standard		[arcmin]	< 6					
Backlash – reduced		[arcmin]	< 2					
Torsional stiffness	C_{t21}	[Nm/arcmin]	86					
Nominal efficiency (S1 operation)	η	[%]	97	96	95	92	87	82
Moment of inertia [4)5)]	J_{red}	[kgcm²]	12.4	8.4	6.8	6.2	6.0	5.6
Mass [6)]	m	[kg]	22.5-27.1)					

Z100						ZAE SERVO-DRIVE		
Ratio	**i**	**[-]**	**4.0**	**6.4**	**10.0**	**16.0**	**27.0**	**39.0**
Max. acceleration torque	$M_{2;a}$	[Nm]	1475	1480	1690	1545	1680	1410
S1 nominal torque [1)2)]	$M_{2;S1}$	[Nm]	700	870	1100	1250	1120	1150
Backlash-constant torque	$M_{2;v}$	[Nm]	1083	1085	1443	1130	1230	1030
EMERGENCY STOP torque[3)]	$M_{2;NOT}$	[Nm]	3000	3600	3800	4200	3800	3653
Max. input speed	$n_{1;max}$	[rpm]	3600					
Backlash – standard		[arcmin]	< 6					
Backlash – reduced		[arcmin]	< 2					
Torsional stiffness	C_{t21}	[Nm/arcmin]	168					
Nominal efficiency (S1 operation)	η	[%]	97	96	94	91	84	80
Moment of inertia [4)5)]	J_{red}	[kgcm²]	36.5	25.0	20.7	18.7	18.3	17.3
Mass [6)]	m	[kg]	36.7 - 47					

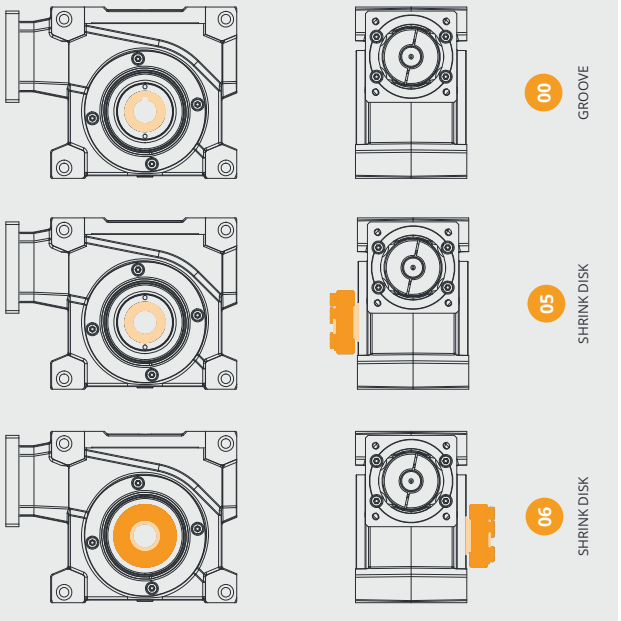
Specified data are indicative only. We will be pleased to advise you on an exact design.
1) S1 nominal torque without consideration of thermal limits
2) in continuous operation with 1,500 min^{-1}
3) EMERGENCY STOP torque without consideration of the permissible torque of the coupling and the output side shrink disk (for versions 05 and 06)
4) depending on the shaft diameter of the motor and the gear arrangement (output)
5) reduced to drive à reduced to input side
6) depending on motor adaptation and gear arrangement (output)

Output-side versions of the shaft

On the output side, three different shaft designs are available as standard (see illustration on the right).

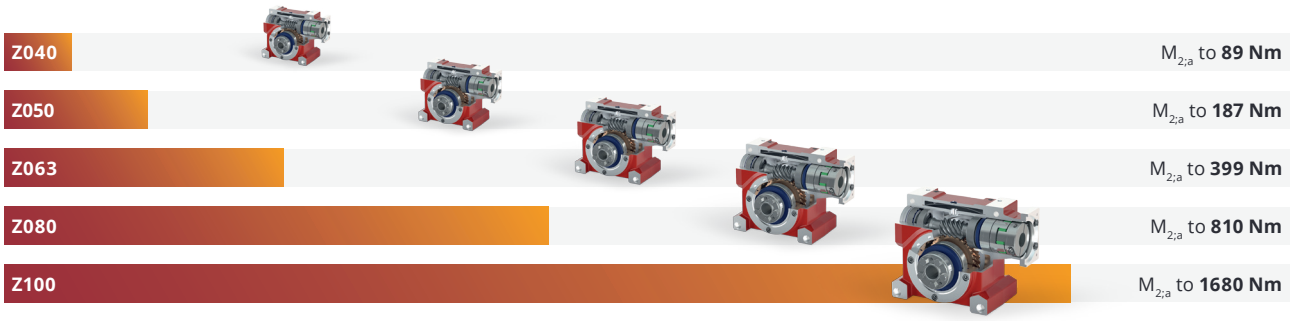
For a form-fit connection by means of a feather key connection, the grooved hollow shaft can be used (00).

For a more rigid, frictional connection, a smooth hollow shaft with shrink disc can be used, for which the mounting side can be selected (05+06).



Sizes
Quick selection

An initial estimation of which size is suitable for your application can be found in the figure below. The permissible acceleration torque is shown. For more detailed information, please refer to the respective performance table (see page 8–9 or under www.zae.de).



Our simplified
ordering code

Z063 - 05 - DOO - 16.0:1 – 130/165/M05/24x50-N
1 2 3 4 5 6 7 8

1 **Size**
040 | 050 | 063 | 080 | 100

2 **Gear arrangement (output)**
05: Hollow shaft without groove, with shrink disk
06: Hollow shaft without groove, with shrink disk
00: Hollow shaft with groove
(see page 8–9)

3 **Bearing concept**
D: optimised for dynamic operation
K: optimised for continuous operation

4 **Gearing backlash**
O: standard backlash
A: reduced backlash

5 **Model**
O: standard according to catalogue
X: in custom design

6 **Ratio**
04.0:1 | 06.4:1 | 10.0:1
16.0:1 | 27.0:1 | 39.0:1

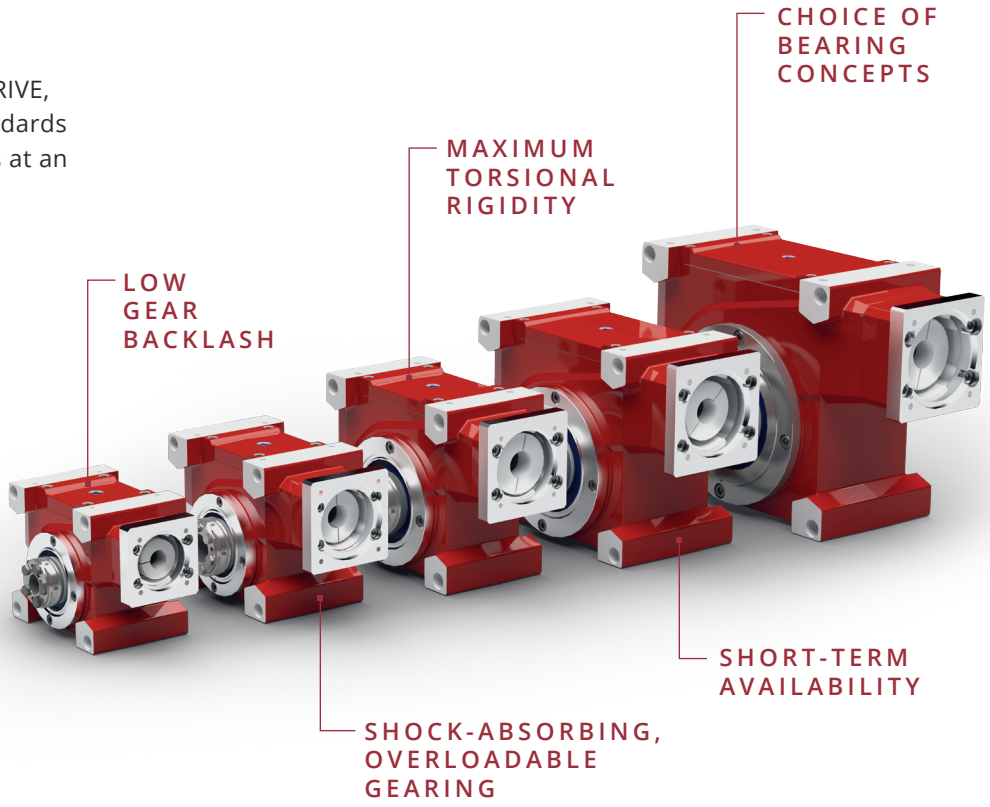
7 **Dimensions of the flange for motor mounting**
Ø centering diam. | Ø pitch diam.
thread | motor shaft ØDxL

8 **Coupling variant (for motor)**
G: for smooth motor shaft without keyway
N: for motor shaft with keyway

ZAE SERVO-DRIVE

For the highest demands **in servo technology**

With the ZAE SERVO-DRIVE, ZAE is setting new standards for reliable servo gears at an **attractive price.** The advantages of the ZAE SERVO-DRIVE series at a glance:

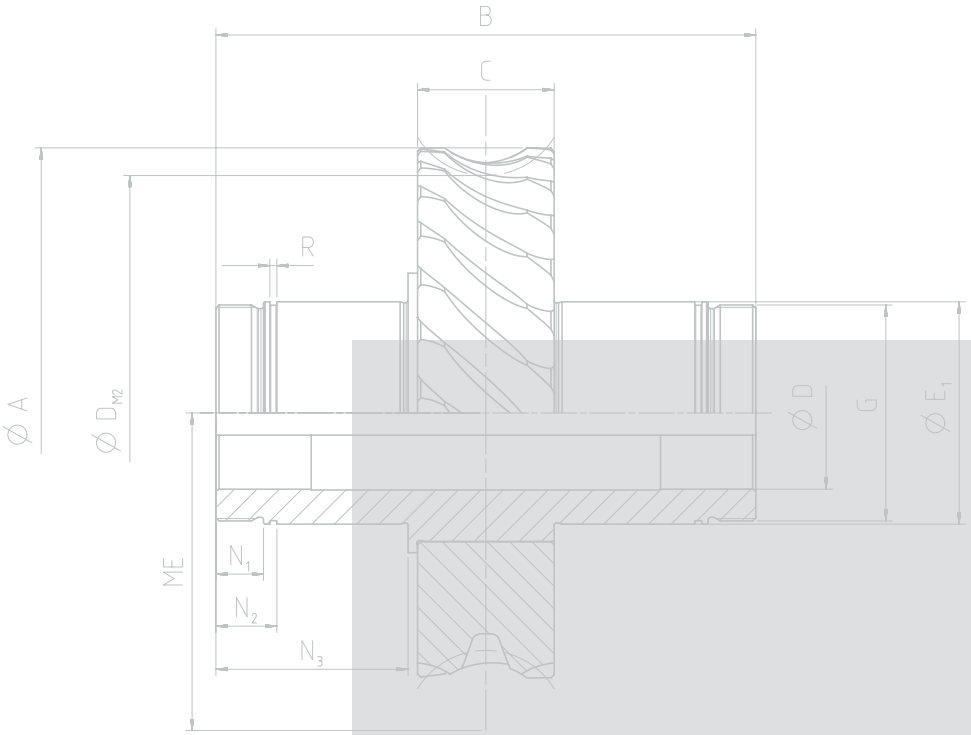


About **us**

ZAE-Antriebssysteme – perfectly matched drive solutions

We design, develop and manufacture high-performance gears for the entire machine and plant engineering industry. As a long-standing Hamburg company, we build on more than 100 years' experience.

Our angular gears have stood for the highest quality for many years. This applies both to our extensive catalogue programme and to tailor-made drive solutions, which we develop entirely according to the specifications of our customers.



ANTRIEBSSYSTEME

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