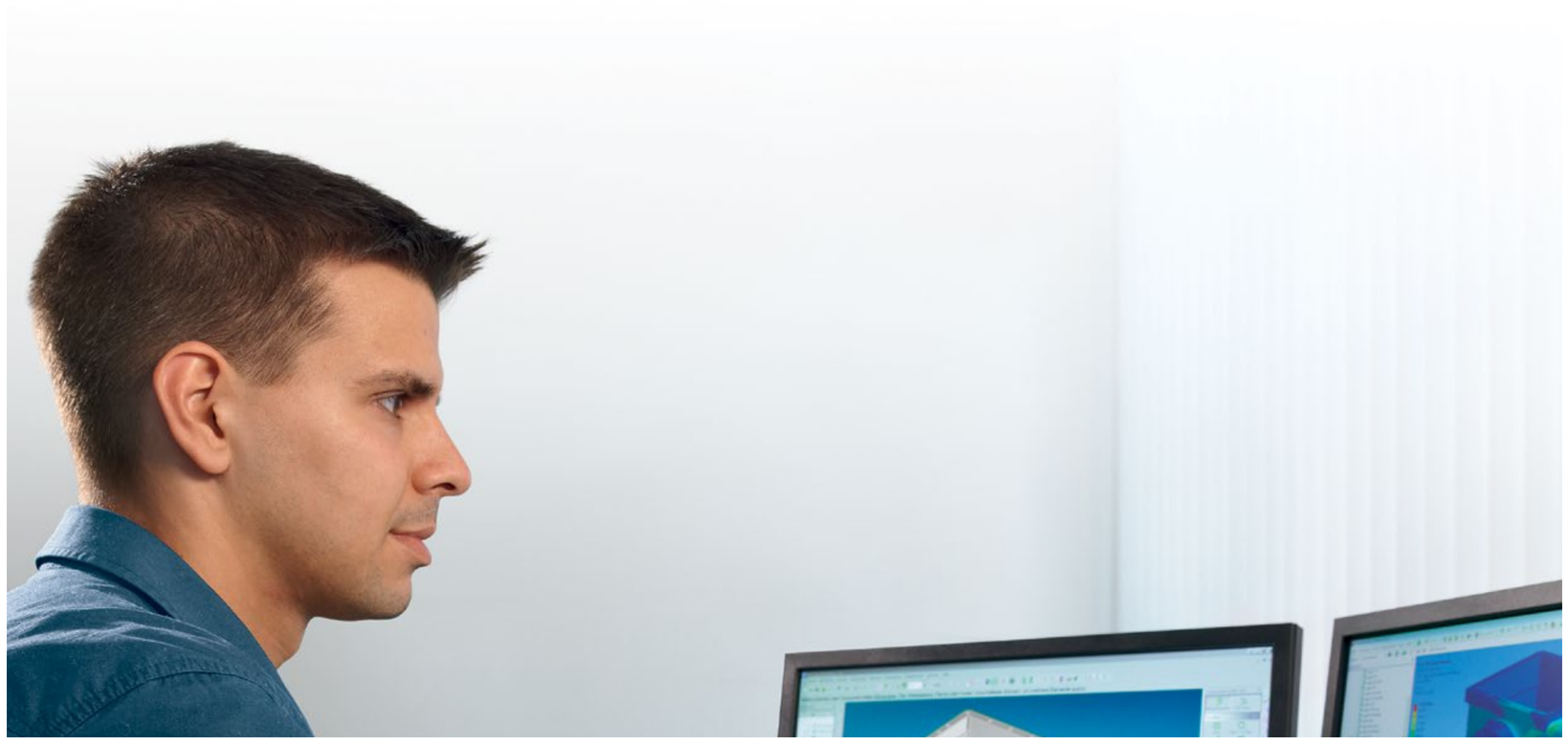
auma®
Solutions for a world in motion

PRODUCT CATALOGUE

Individual Actuator Solutions

Comprehensive technical information is available on the Internet:

www.auma-drives.com



The Core of our engineering: the crown

The quality of a drive concept mainly depends on the optimum fit of all system components. Consequently, the main issues are understanding and strategic thinking, developing and intelligent planning. And of course know-how, motivation and innovative ideas. Whenever you are looking for a suitable drive system solution, we can certainly provide the ideal implementation. Whether by intelligent configuration based on our modular system or by customized new developments which we will tailor to your exact requirements. We are your competent partner during all implementation phases due to our in-depth knowledge and experience. The result is top quality: Highly efficient products in terms of noise reduction, torque and performance. Their reliability and economic viability create a sustained competitive advantage for our customers.

Development processes for individual actuator systems are often preceded by rough sketches. As a matter of fact, these first outlines are the product of intensive communication and exchange between you, the customer, and ourselves. Your specific requirements are already intertwined with our expertise and many years of experience. At this phase, we already lay the headstone for a successful and straight forward project flow.

This is the reason for us to readily invest time in this initial phase to learn in detail about your requirements and demands, both from the technical as well as the economical point of view. Thanks to dedicating this time, we save costly erroneous developments caused due to incorrect and imprecise specifications.

If your requirements call for components not included in our product portfolio, e.g. specific electrical motors, we dispose of a network of providers for procuring competence in enhancing the development of your solution.

The output is a functional, reliable actuator system which will comply with your specified and economic general requirements.

DESIGN AND CALCULATION – USING THE LATEST TECHNOLOGY

The production facilities within the AUMA Group clearly highlight that production and assembly methods comply with the latest state-of-the-art methods with regard to safety and economic viability. This fact is always pointed out by the visitors to our local sites. This innovative spirit also applies to less evident areas. Our R & D departments and test laboratories always implement the latest methods, an absolute must for developing state-of-the-art products.

Our engineers are continually trained in these methods and enhance their development to meet AUMA Drives challenges. 3D CAD tools are used beyond the mere design of parts. At a very early stage, solid models can be used to check whether the space requirements offered at the place of installation is sufficient and that satisfactory access for operation and maintenance is granted.

Force loads are subject to extreme fluctuation for many customised applications. Sophisticated processes paired with our know-how allow determination of the load spectrum as key starting point for product design. With the aid of continuously refined finite element method, we manage to achieve the optimum ratio between minimum material input and maximum load – from the ball bearing via the worm wheel sets to the housing.

PUTTING TO THE ACID TEST

No calculation without double checking within the test environment. No market introduction without type testing. Modern calculation and design programs allow renouncement from some of the testing and considerably contribute to lean development processes. However, testing components and devices under close to realistic conditions still is a prerequisite.

As a consequence, AUMA test departments are perfectly equipped among others with test benches for torque measurement and vibration tests, pressure chambers and climatic chambers, motor test benches.

The test equipment provides the evidence if the theoretically determined data proves correct and allows for performing lifetime tests. Furthermore, we are capable of testing and confirming that AUMA Drives devices preserve their ability to fulfil their operational service even in harsh environmental conditions

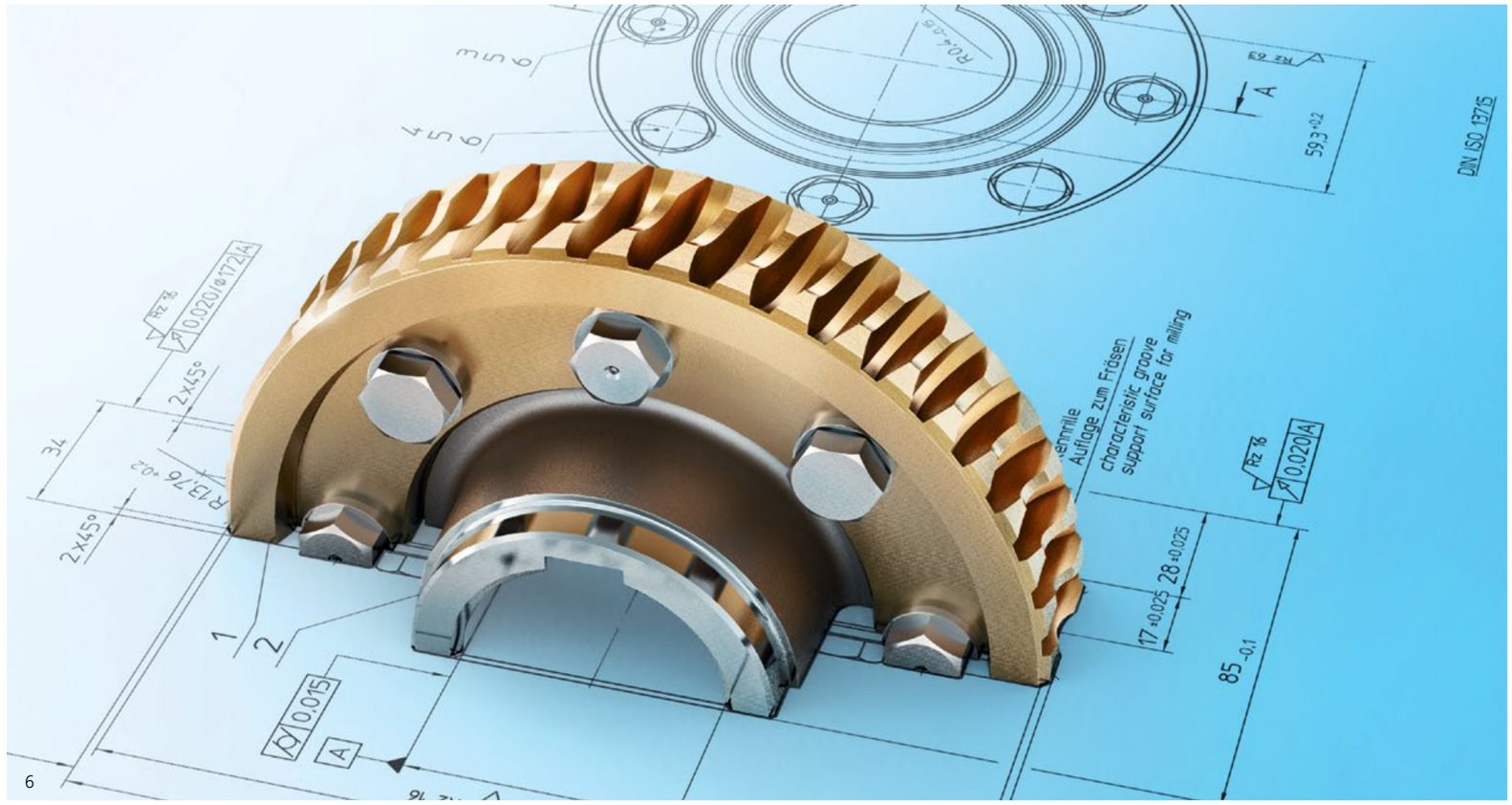
You will receive the expected reliability that every single AUMA Drives device supplied will to respond to the designated requirements.

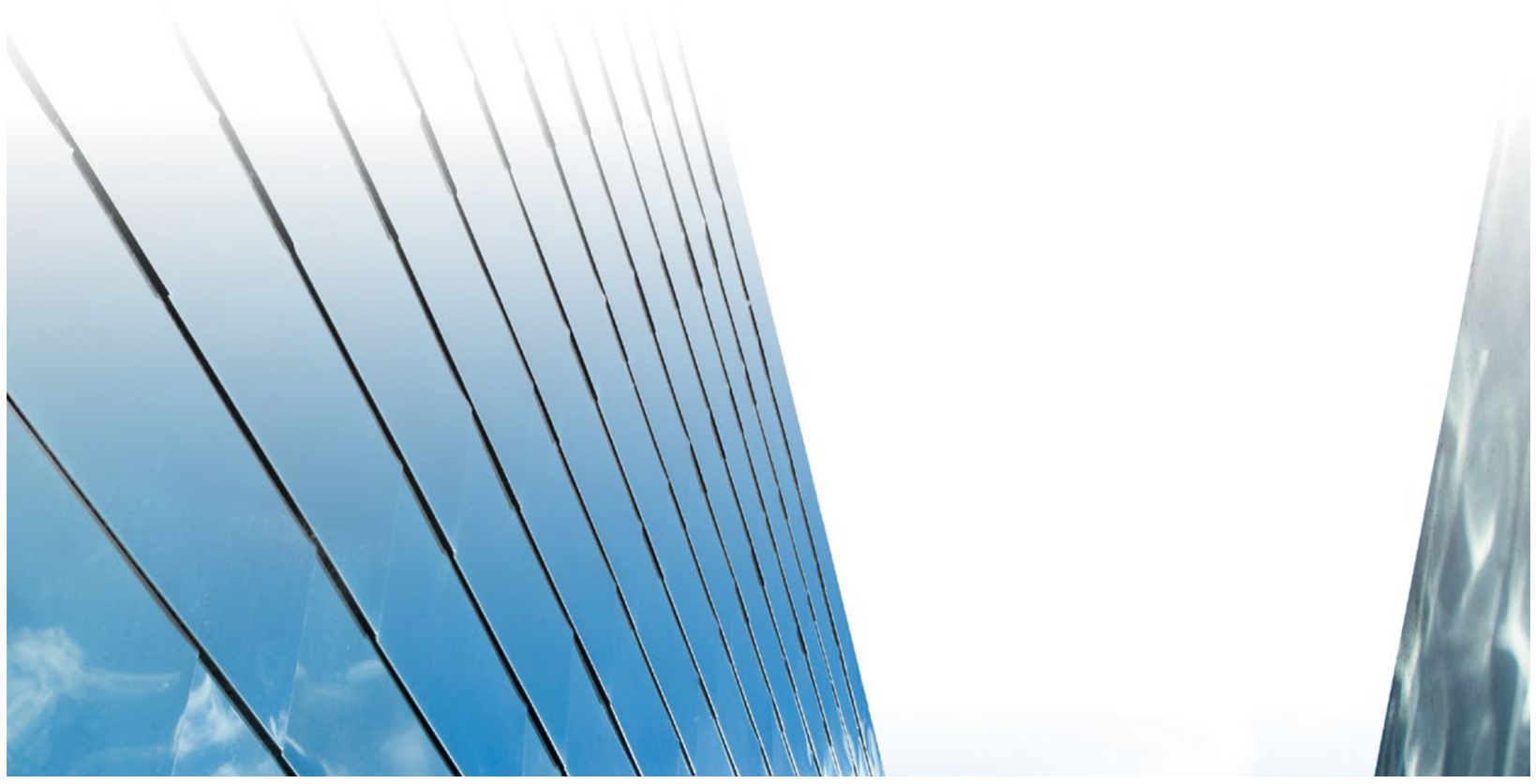
OUR PRODUCTION

We manufacture power drive components in our own AUMA Drives production plant in Coswig, Germany. All manufacturing steps are at close focus allowing us to safeguard that our quality standards are complied with at any time. At the very early stage of product development, the Industrial Engineering department opens up to aspects relating to the manufacturing process of components and draws the attention to the ease of product assembly thus considerably contributing to the cost efficiency in production and assembly departments.

Competitiveness paired with efficient quality management is based on modern production processes. For this reason, production and test equipment in AUMA production plants have a sound grasp of contemporary developments. Respecting specified component characteristics during decisive production phases as well as meeting the state-of-the-art quality standards in manufacturing processes are put to the acid test.

Hence you can be certain that you receive a product of highest quality, irrespective of the fact whether you require an individual part for a special solution or whether we are dealing with serial devices.





Customised actuator solutions

GUIDELINES FOR SELECTING GEAR UNITS

AUMA Drives offer long-lasting systems and reliable components in top material quality for machines and plants considering virtually any size. Gears from our modular system can be modified and completed with the option of low-noise brake motors, variable-speed gear units, electronic speed controls, or individual sub-assemblies. By machining tooth profiles while applying state-of-the-art technology, we achieve excellent antifriction qualities, low noise and a high level of efficiency. Our drives are maintained at the highest level due to the competence of our Development department paired with the ongoing training schemes for our staff. As a matter of fact, certifications in compliance with EN ISO 9001 and EN ISO 14001 as well as product certifications by DNV and ABS are significant quality parameters and are standard for AUMA Drives production. Our highly qualified field service and technical experts as well as their in-depth consulting knowledge make AUMA Drives your competent partner for creative solutions in drive technology.

We offer:

- Engineering
- Worm gear units / motors – centre distance a = 40 – 450
- Helical worm gear units / motors – centre distance a = 50 – 160
- Worm helical gear units / motors – centre distance a = 97 – 150
- Dual stage worm gear units / motors – centre distance a = 80 – 450
- Worm wheel sets – centre distance a = 40 – 500
  and in compliance with customer drawings
- Slewing gear units – centre distance a = 80 – 395
- Individual drive solutions

INFORMATION NEEDED FOR PROCESSING INQUIRIES

As the gear is to be precisely sized by AUMA Drives, we request the following information:

1. Intended use of gear unit
2. Type of drive motor
3. Drive performance P_1 in kW
4. Drive rotational speed n_1 in rpm
5. Gear output torque T_2 in Nm
6. Gear output speed n_2 in rpm
7. Desired total transmission ratio $i = n_1/n_2$
8. Is mathematically exact transmission ratio required?
9. Type of driven machine
10. Operation mode
    - > even
    - > uneven
    - > do jolts occur
11. Average daily operating time in hours
12. Starting frequency per hour
13. On time per hour **c.d.f.** in % (operating time under load)
14. Number of operating hours for which the gear is to be sized
15. Ambient temperature in °C
16. Special conditions for outdoor installation
    - > dust impact
    - > ambient temperature
    - > splash-proof
17. Power transmission from the drive motor to the gear
18. Do special operating conditions prevail?
    a) short-term high torques
    b) additional forces N and their direction to be accepted by the gear bearing, resulting from possible additional loads on the shaft ends through gear transmission with belts, V-belts and chains or toothed wheels of any kind
19. Design (series, service position) of the gear unit (see Design overview)
20. Are special characteristics required?
    - > details on required automatic self-locking (static, dynamic, mandatory self-locking out of idle state)
    - > close-fitting splines
    - > particularly low noise operation
    - > other special requirements
21. In the case of gear units with output mounting flange for motor unit
    a) motor size
    b) motor flange diameter (centering) in mm
    c) motor shaft end d × l in mm
22. Which coupling is to be used?

EFFICIENCY RATINGS AND SELF-LOCKING FOR WORM UNITS

Efficiency rating

The efficiency ratings given in performance tables for the cylindrical worm gears are average or reference values. They apply to well-run-in cylindrical worm gear units at operating temperature with anti-friction bearing, correct lubrication and driving worm shaft at the respective operating rotational speed under nominal load and continuous duty. The efficiency rating increases proportionally to the increase in running speed, on the splining (output speed and sizes influence), with increasing centre-increase angle gm (i.e. with a decreasing transmission ratio i) and with improvement in the surface quality of the tooth flanks for the worm shaft. We know from experience that the degree of efficiency in new gear units, depending on transmission ratio, is lower than that given in the performance tables. The values must be multiplied by the following factors:

S 40.1 – S 80.1 / SS 50.1 – SS 80.1

i (worm)	Factor
4.83 – 10	0.97
14.5 – 26.5	0.93
from 29	0.87

S 100.1 – S 450.1 / SS 100 – SS 160

i (worm)	Factor
4.83 – 10	0.97
11 – 27	0.93
from 30	0.87

SST 97 – SST 150

i (worm)	Factor
4.5 – 11	0.97
13.5 – 19.5	0.93
from 27	0.87

Please contact us for details relating to other gear unit types.

Self-locking

One differentiates between static and dynamic self-locking in worm gear units. Static automatic self-locking exists when the starting efficiency amounts to $\eta_A \leq 0.5$. A start of the worm shaft with a driving worm wheel is then impossible. Due to external initiation of oscillation, this self-locking effect can be (under certain circumstances) cancelled, which means that the worm shaft can be started when the worm wheel is driving. The dynamic self-locking effect (self-locking capacity when running) applies when the operating efficiency rating $\eta \leq 0.5$. For actuation applications, for which the self-locking effect is required, it should always be verified whether the installation of a return block or a brake is the more practical solution. An automatic self-locking gear unit cannot replace a brake. If self-locking is required, please contact AUMA Drives.

GUIDELINES FOR SELECTING GEAR UNITS

The outputs and torques indicated in the selection charts apply for well run-in, properly lubricated gears at operating temperature with rated load and driving worm shaft under the following conditions:

- > continuous operation (S1) at even load
- > ambient temperature 20° Celsius
- > synthetic oil
- > lubricant temperature 100° Celsius
- > Twice the driving torque can be transmitted during start-up, whereby five start-ups per hour are permissible. Allowance must be made for abnormal operating conditions by multiplying efficiency by factors. The factors given are guide values.

It is advisable to choose the gear units to suit the machine's driving torque. It is important to differentiate between mechanical and thermal load.

Torque T_a is calculated using the following equation

$T_a = (9{,}550 \times P_a) / n_a$
T_a = required torque on the driven machine [Nm]
P_a = required power on the driven machine [kW]
n_a = drive rotational speed [rpm] of the driven machine corresponds to gear motor output drive speed.

Selection according to mechanical load

$T_{mech.\ requ.} = f_B \times f_H \times T_a$
$T_{mech.\ requ.}$ = requ. mechanical gear unit output torque [Nm]
T_a = required torque on the driven machine [Nm]
f_B = load factor (table 1)
f_H = factor for starting frequency (table 2)

Selection according to thermal load

$T_{th.\ requ.} = f_E \times f_T \times f_L \times T_a$
$T_{th.\ requ.}$ = requ. thermal gear unit output torque [Nm]
T_a = required torque on the driven machine [Nm]
f_E = factor for operating time (table 3)
f_T = factor for ambient temperature (table 4)
f_L = factor for service position (table 5)

Selection of gear unit sizes

Selection of gear unit sizes depends on the higher value of the calculated values. Calculation is as follows:
$T_{mech.\ requ.} \leq T_2$ and $T_{th.\ requ.} \leq T_2$
T_2 = rated torque of gear unit at the slow motion shaft [Nm]

Starting efficiency rating

The lubricant film between the tooth flanks only appears after gearing starts at sliding motion. Therefore, the starting efficiency rating η_A is always lower than the operation efficiency rating η, whereby an increased input torque $T_{1A} = T_2 / (i \times \eta_A)$ is required at start-up under load. The starting efficiency values indicated in table 6 are reference values. They apply to run-in gears, lubricated with synthetic oil.

Table 1 Factor f_B

Type of load of driven machine	Daily service up to			
	3h/day	8h/day	16h/day	24h/day
I	0.8	1.00	1.15	1.25
II	1.0	1.25	1.40	1.50
III	1.5	1.75	1.90	2.00

Assignment of driven machine to the different load types is given in table 7 on page 10.

Table 2 Factor f_H

Starting frequency per hour	f_H
up to 5 starts	1.00
up to 10 starts	1.05
up to 60 starts	1.10
up to 120 starts	1.20
> 120 starts	1.25

Table 3 Factor f_E

On time per hour in %	10	20	40	60	80	100
f_E	0.5	0.65	0.7	0.8	0.9	1

$$\text{On time} = \frac{\text{Operat. time/h under load (min)}}{60} \times 100$$

Table 4 Factor f_T

Ambient temperature in degrees Celcius (°C)	10	20	30	40	50
f_T	0.9	1	1.2	1.5	1.9

Please contact us for ambient temperatures below –15 °C.

Table 5 Factor f_L

Service position	f_L
B3, V5, V5II	1.00
B8, B3I, B6	1.15

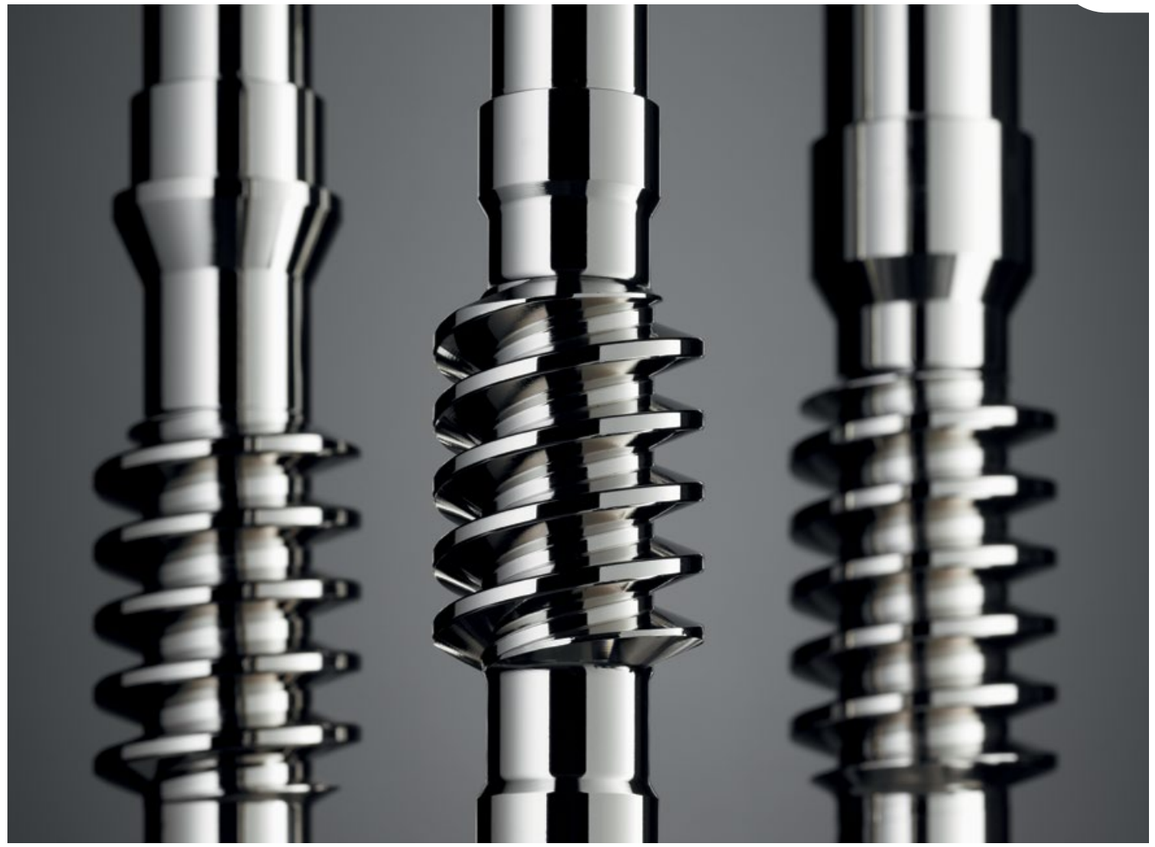
Table 6 Starting efficiency rating η_A

	S 40.1 – S 80.1 / SS 50.1 – SS 160	S 100.1 – S 160.1 / SS 100 – SS 160
i(worm)	η_A	η_A
4.83 – 13.5	0.66	0.68
14.5 – 26.5	0.52	0.56
29 – 54	0.38	0.40
> 54	0.28	0.28
SST 97 – SST 150		
4.5 – 11	0.66	
13.5 – 19.5	0.52	
from 27	0.38	

Table 7

Exemplary assignment of applications to the different load types			
Agitators	I	Kneaders	I
Auxiliary actuators for tool machines	III	Lifts	II
Blades, cutting machines	II	Main actuators for tool machines	II
Bottling machines	III	Mixing machines	III
Bucket excavators	III	Packaging machines	III
Calenders	III	Paper machines	II
Centrifugal compressors	I	Pressing devices	III
Centrifugal pumps	II	Road-building machines	II
Centrifuges	III	Rolling mill adjustment mechanisms	III
Clearing machines	III	Rolling mills	II
Conveyor installations coarse and non-homogeneous material	II	Rotating mechanisms for cranes	I
Conveyor installations homogeneous loads	I	Running gears	II
Conveyor installations with oscillating motion (vibrator installations)	III	Strainers	III
Crushers	II	Tape-winding machines	I
Die-cutters	II	Travelling-grate actuators for ovens	II
Extruder	II	Washing machines	I
Fans/blowers	II	Wire machinery	II
Hammer mills	II	Wood processing machines	II
Heavy duty lifts	III		

I even, no impacts, light weight to be accelerated
II uneven, medium impacts, heavier weight to be accelerated
III strongly uneven, strong impacts, heavy weight to be accelerated



Selecting example:

Driven machine — 4-pole electric motor S_1 with relative stall torque $M_K/M = 2$
Driven machine — even conveyor system

> required torque — T_a = 2,600 Nm
> type of load — even, almost jolt-free small weights to be accelerated
> required speed — n_a = 55 rpm
> starting frequency — 1 start per hour
> daily operating time — 16 hours
> running time per hour under load — 60 min
> ambient temperature — –10 °C to 30 °C
> service position — worm shaft on top (B8)

Calculating of required output torque:

> according to mechanical load

$T_{mech.\ requ.} = f_B \times f_H \times T_a$ with f_B = 1.15 (according to table 1)
f_H = 1.0 (according to table 2)
$T_{mech.\ requ.}$ = 1.15 × 1.0 × 2,600 Nm = 2,990 Nm

> according to thermal load

$T_{th.\ requ.} = f_E \times f_T \times f_L \times T_a$ with f_E = 1.0 (according to table 3)
f_T = 1.2 (according to table 4)
f_L = 1.15 (according to table 5)
$T_{th.\ requ.}$ = 1.0 × 1.2 × 1.15 × 2,600 = 3,588 Nm

Selected gear unit:

S200.1 with i = 30
n_2 = 50 rpm
T_2 = 4,030 Nm
η_A = 83 % for n_1 = 1,500 rpm
Conditions $T_{mech.\ requ.} \leq T_2$ and $T_{th.\ requ.} \leq T_2$ are fulfilled.

Effective motor power:

P_M = 2,600 Nm × 50 rpm / (9,550 × 0.83) = 16.4 kW
› 18.5 kW (size 180)

Worm wheel sets – matching splines

AUMA Drives worm wheel sets are used worldwide. They have been proven both in the heavy industry sector (mining, construction and steel industry) as well as in precision tasks such as indexing devices, rotary tables and positioning systems in machine tools. No matter whether standard or special solutions, small quantities or series production – AUMA Drives are your competent partner for high-quality wheel sets. We produce in compliance with the lean manufacturing principle. Our machine pool has been optimally adapted to the central production steps, i. e. turning, milling and grinding. Quality assurance is supported by state-of-the-art non-destructive test procedures. Some of the measuring equipment used has been specially designed for AUMA Drives.

Using high-precision gear cutting machines, AUMA Drives manufacture worm wheel sets with splines in accordance with DIN 3975 profile ZK right-handed-ascending (AUMA Drives worm gear units can be operated in both rotation directions. Left-hand-ed-ascending versions are available on request.). Compared to other profile shapes, their flank geometry makes ZK splines insensitive to wear which might be caused by misalignment such as bending of worm due to excessive torque loads or incorrect axes within the housing.

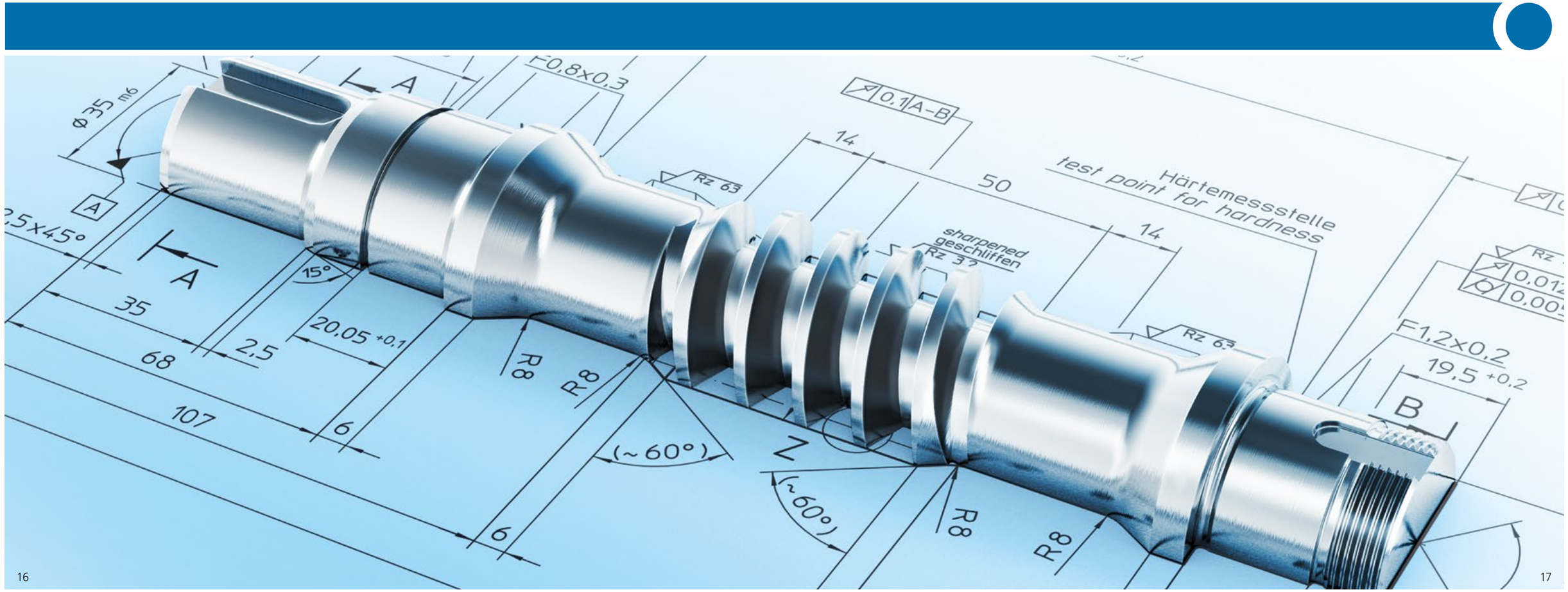
AUMA DRIVES PROVIDE

- Worm wheel sets with centre distance 40 to 500 mm with modules 1 to 30 and transmission ratios between 5 and > 110
- Integral worm wheel sets of standardised series from 40 to 315 mm (refer to dimension sheets on the following pages) AUMA Drives worm wheel sets consist of case-hardened and grinded worm shafts (16MnCrS5) combined with worm wheels made of high-quality, wear-resistant centrifugally cast or continuous cast bronze. Quality in accordance with DIN 3974 worm shaft 6, worm wheel 7, (other versions available on request)
- Worm wheel sets according to specifications / drawings of our customers
- Worm wheel sets with reduced circumferential / gear backlash
- Duplex worm wheel sets for backlash-free applications Compared to standard splines (also called simplex worm gears), the two flanks of so-called duplex worm gears are manufactured using different modules and consequently different pitch angles, so that circular thickness or transverse circular thickness continuously vary across the worm gear splines. Axial displacement of the worm ensures alignment of those sections of the worm splines where circular thickness matches the desired circumferential backlash.

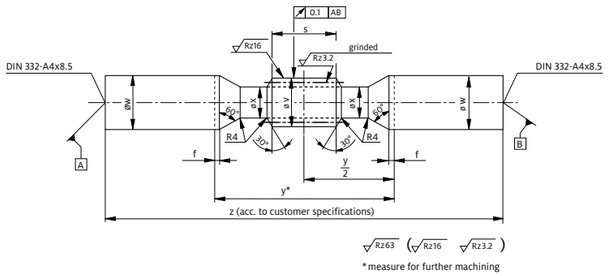
We guarantee that similar worm shafts and worm wheels can be replaced if they have not yet been run in. This does not apply to worm wheel sets with reduced gear backlash. Such wheel sets are adjusted to the actual dimension of the housing-centre-point distance and labeled in pairs.

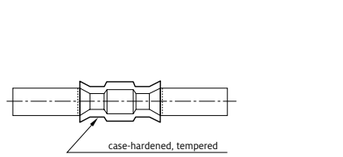
Requirements for fault-free operation of AUMA Drives worm wheel sets:

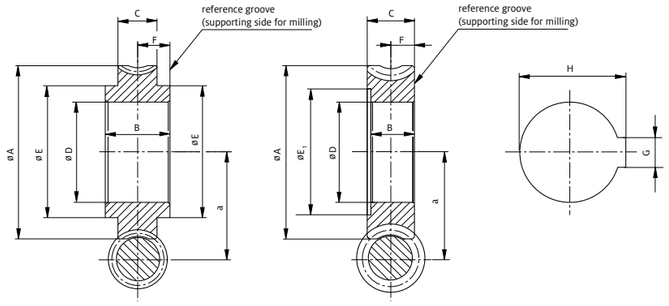
- correct gear contact pattern setting
- appropriate storage
- sufficient lubrication
- running-in procedure completed



CENTRE DISTANCE 40 – 80 MM



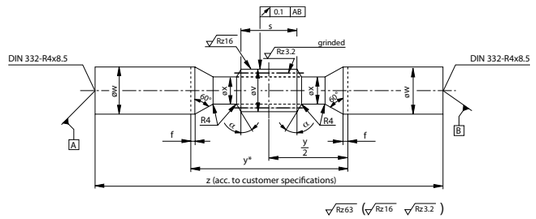


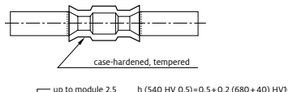


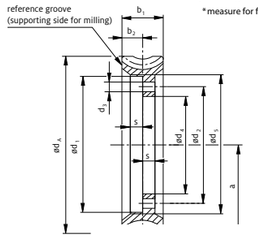
Centre distance	Precise transmission ratio	Worm shaft							Worm wheel								
a	i_{actual}	v	s	x	w	y	f	z Ref. value	A	B −0.05 −0.10	C	D H7	E	E_1	F ±0.025	G Js9	H +0.2
40	7.25–14.5–29	26.400	22	17.0	23	62	3	170	63.60	18.5	19.0	40	-	47	9.5	8	43.3
	9.75–19.5–39	21.120	21	13.5	23	62	3	170	66.80	18.5	19.0	40	-	47	9.5	8	43.3
	12.75–25.5–51	18.125	19	12.0	23	62	3	170	67.55	18.5	19.0	40	-	47	9.5	8	43.3
	60	22.000	16	17.0	23	62	3	170	63.00	18.5	19.0	40	-	47	9.5	8	43.3
	79	18.400	16	14.0	23	62	3	170	65.60	18.5	19.0	40	-	47	9.5	8	43.3
50	4.83–7.25–14.5–29	31.500	32	20.0	26	83	3	180	81.00	35.0	24.0	55	73	-	17.5	10	57.4
	9.5–19–38	26.400	29	17.0	26	83	3	180	83.60	35.0	21.0	55	73	-	17.5	10	57.4
	12.5–25–50*1	21.120	27	13.5	26	83	3	180	86.88	35.0	18.0	55	73	-	17.5	10	57.4
	62	24.900	20	19.0	26	83	3	180	81.35	35.0	18.0	55	73	-	17.5	10	57.4
	83	19.000	18	14.0	26	83	3	180	86.00	35.0	14.0	55	73	-	17.5	10	57.4
63	4.83–7.25–14.5–29	39.800	41	25.0	28	101	3	200	102.00	27.0	27.5	62	-	68	13.5	18	66.4
	9.75–19.5–39	31.500	37	20.0	28	101	3	200	107.00	27.0	27.5	62	-	68	13.5	18	66.4
	12.75–25.5–51	26.400	32	17.0	28	101	3	200	109.60	27.0	27.5	62	-	68	13.5	18	66.4
	61	31.200	25	23.5	28	101	3	200	102.80	27.0	27.5	62	-	68	13.5	18	66.4
	82	24.900	23	19.0	28	101	3	200	107.40	27.0	27.5	62	-	68	13.5	18	66.4
	106*1	22.000	23	17.0	28	101	3	200	109.00	27.0	27.5	62	-	68	13.5	18	66.4
	109	19.000	21	14.0	28	101	3	200	112.00	27.0	27.5	62	-	68	13.5	18	66.4
80	5–7.5–15–30	48.000	50	30.0	34	134	5	240	132.00	32.0	32.5	80	-	90	16.0	18	84.4
	10–20–40	39.800	45	25.0	34	134	5	240	136.00	32.0	32.5	80	-	90	16.0	18	84.4
	13.25–26.5–53	31.500	40	20.0	34	134	5	240	141.00	32.0	32.5	80	-	90	16.0	18	84.4
	62	39.500	32	30.0	34	134	5	240	130.50	32.0	32.5	80	-	90	16.0	18	84.4
	82	31.200	29	23.5	34	134	5	240	136.80	32.0	32.5	80	-	90	16.0	18	84.4
	110	24.900	26	19.0	34	134	5	240	141.40	32.0	32.5	80	-	90	16.0	18	84.4

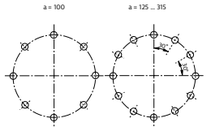
Dimensions in mm / Dimensions are subject to change

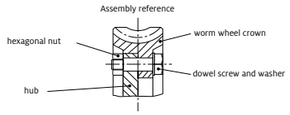
CENTRE DISTANCE 100 – 315 MM











The screw connection must be secured applying suitable glue.

Centre distance	Precise transmission ratio	Worm shaft								Worm wheel								
a	i_{actual}	v	s	x	w	y	f	z Ref. Value	α	d_1 H7	b_1 -0.1	b_2 ±0.025	d_2	d_3 *1	d_4	s	d_A	d_5
100	10–20–40	48.0	56	29	49	150	5	380	30°	135	32	16.0	115	10.8	90	8	172.0	139
	13–26–52	39.8	51	25	49	150	5	380	30°	145	27	13.5	125	10.8	100	8	176.0	149
	5–7.5–15–30	60.0	65	37	49	150	5	380	30°	120	40	20.0	105	10.8	80	12	165.0	130
	63	47.5	39	36	49	150	5	380	30°	135	32	16.0	115	10.8	90	8	165.0	139
	82	39.5	36	30	49	150	5	380	30°	145	27	13.5	125	10.8	100	8	170.5	149
	107	31.2	33	23	49	150	5	380	30°	145	27	13.5	125	10.8	100	8	176.8	149
125	10–20–40	60.0	65	37	54	185	5	420	30°	170	40	20.0	150	10.8	125	12	215.0	176
	13–26–52	48.0	63	29	54	185	5	420	30°	185	32	16.0	165	10.8	140	12	222.0	189
	7.25–14.5–29	75.6	80	47	54	185	5	420	30°	150	50	25.0	130	10.8	105	12	205.9	156
	62	59.3	49	44	54	185	5	420	30°	170	40	20.0	150	10.8	125	12	206.5	176
	83	47.5	45	35	54	185	5	420	30°	185	32	16.0	165	10.8	140	12	215.0	189
	107	39.5	42	30	54	185	5	420	30°	185	32	16.0	165	10.8	140	12	220.5	189
160	10–20–40	75.6	90	47	65	230	5	530	30°	220	50	25.0	195	12.8	165	16	275.9	225
	13.5–27–54	60.0	74	37	65	230	5	530	30°	240	40	20.0	215	12.8	185	14	285.0	245
	5–7.5–15–30	96.0	98	60	65	230	5	530	60°	195	64	32.0	170	12.8	140	16	264.0	200
	63	75.0	63	56	65	230	5	530	30°	220	50	25.0	195	12.8	165	16	265.0	225
	84	59.3	57	44	65	230	5	530	30°	240	40	20.0	215	12.8	185	14	276.4	245
	111	47.5	52	35	65	230	5	530	30°	240	40	20.0	215	12.8	185	14	285.0	245
200	10–20–40	96.0	112	60	77	280	5	630	60°	275	64	32.0	245	16.8	212	16	344.0	278
	13.25–26.5–53	75.6	102	47	77	280	5	630	30°	300	50	25.0	270	16.8	231	16	355.9	306
	7.5–15–30	115.0	122	70	77	280	5	630	60°	250	76	38.0	220	16.8	186	16	335.0	255
	63	95.0	82	72	77	280	5	630	30°	275	50	25.0	245	16.8	212	16	330.0	278
	83	75.0	82	56	77	280	5	630	30°	300	40	20.0	270	16.8	231	16	345.0	306
	110	59.3	82	44	77	280	5	630	30°	320	40	20.0	290	16.8	256	16	356.4	323
250	10–20–40	115.0	135	70	84	350	10	800	60°	350	76	38.0	320	16.8	286	20	435.0	353
	13–26–52	96.0	125	60	84	350	10	800	60°	375	64	32.0	345	16.8	310	20	444.0	378
	7.75–15.5–31	137.0	150	81	84	350	10	800	60°	320	90	45.0	290	16.8	256	20	425.5	323
	61	124.6	105	96	84	350	10	800	30°	350	76	38.0	320	16.8	286	20	406.9	353
	83	95.0	100	72	84	350	10	800	30°	375	60	30.0	345	16.8	310	20	430.0	378
	108	75.0	100	56	84	350	10	800	30°	390	60	30.0	360	16.8	327	20	444.0	393
315	10.25–20.5–41	137.0	185	81	100	420	10	960	60°	445	90	45.0	405	20.8	350	23	555.5	451
	13.25–26.5–53	115.0	165	70	100	420	10	960	60°	475	76	38.0	435	20.8	380	23	565.0	481
	15–30	172.0	210	101	100	420	10	960	60°	390	112	56.0	350	20.8	295	23	538.0	396
	60	156.0	160	120	100	420	10	960	60°	390	90	45.0	350	20.8	295	23	514.0	396
	82	124.6	125	96	100	420	10	960	30°	475	76	38.0	435	20.8	380	23	536.9	481
	109	95.0	125	72	100	420	10	960	30°	475	76	38.0	435	20.8	380	23	560.0	481

*1 pilot bore for dowel screw in accordance with DIN 610 / Dimensions in mm / Dimensions are subject to modification

Compact solution with persuasive power

Due to their exceptional characteristics, worm gear units are indispensable for a multitude of applications. Worm gear units rank top when implementing high transmission ratios (up to i = 100) within one gear stage. With reference to the transmitted power, worm gear units are the most compact gear type. Simultaneous alignment of several tooth pairs as well as the line-shaped contact of tooth flanks are the basis for uniform, vibration and shock damping force or torque transmission. Hardened and grinded tooth flanks of the worm shaft in combination with a worm wheel made of bronze guarantee low wear and warrant for highest lifetime. At the same time, these characteristics are the reason for the high overload capacity thus making the worm gear units lowest level noise gearing drives.

AUMA Drives worm gear units are provided for many connection and fastening options.

For example, they can be directly mounted as slip-on gears (type S_A) to the drive shaft of the driven machine and can be secured against turning by either using torque reaction levers (type S_AD), output flanges (type S_AF) or spigots and pitch circles at the housing. The basic variant type SVA (solid shaft at input, hollow shaft at output) can be extended by drive and motor flanges, covers and many Further options, such as slip-on output drive shafts. Slip-on gears within the gear hollow shaft can be axially secured both via end disc and circlip or via shrink disc. The following pictures provide an extract of the possible equipment variants. Please contact us for more information on solutions for special applications!

Sizes 200 to 450

Sizes 100 to 160

Sizes 40 to 80

- > Worm gear set according to DIN 3975, flank shape ZK, worm shaft made of 16MnCrS5, case-hardened and grinded Worm wheel made of highly wear resistant special bronze.
- > Lubrication: fully synthetic oil for highest efficiency and reduced maintenance.
- > Surface corrosion protection according to ISO 12944-2.
- > Quality roller bearings for highest lifetime and absorption of external forces.
- > Housing material: Cast iron with grey cast iron (GJL), spheroidal cast iron (GJS) for rough environments and mechanical impacts.
- > 10 standard transmission ratios are available per size. For further requests, please contact us.
- > As an option, radial seals with dust lips (form AS) made of Viton as spray water and dust protection made of Viton for use in severe environments and highest service temperatures.

SERVICE POSITION

AUMA Drives worm gear units are operable in a large variety of service positions. The lubricant quantities and the positions of air vent and oil draining plugs depend on the selected mounting position.

B3
Horizontal drive shaft bottom
Horizontal output drive

B8
Horizontal drive shaft top
Horizontal output drive

B6
Vertical drive shaft bottom
Horizontal output drive
(on request)

B3I
Vertical drive shaft top
Horizontal output drive

V5
Horizontal drive shaft
Vertical output drive
(top side B)

V5II
Horizontal drive shaft
Vertical output drive
(top side A)

WORM GEAR UNITS – OVERVIEW

AUMA Drives worm gear units are operable in both rotation directions. The shown rotational direction indications comply with right-handed rising version. Left-handed version is available on request.

Basic variant SVA

1 Torque reaction lever

2 Covers for protection against contamination and corrosion as well as against touching.

3 Coupling flanges for IEC motors. Option for sizes 100, 125, 160: Worm shafts with bores and flange for direct IEC motor connection – Ideal for confined spaces.

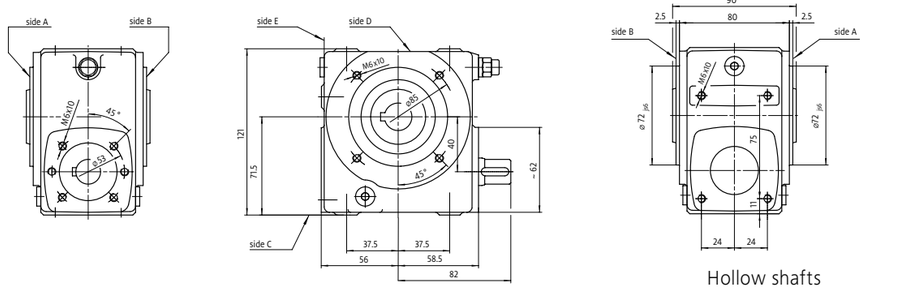
4 2nd worm shaft end. e. g. for assembly of speed and position sensors.

5 Output drive flange

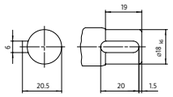
6 Output shafts (with free shaft ends on one or both sides), axially secured by circlip and washer or via shrink disc

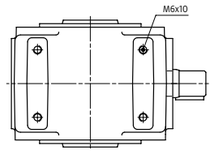
TYPE SVA

Solid input shaft, hollow shaft at output

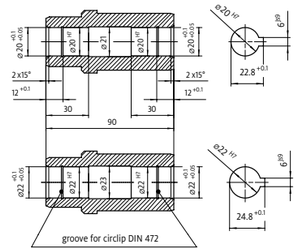


Drive shaft





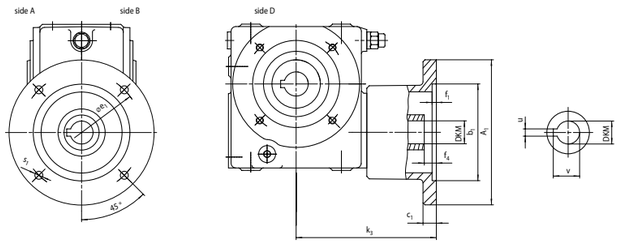
Hollow shafts



Further options: second free drive shaft end, hollow shaft with cover and shrink disc

TYPE SK

Coupling flanges for IEC motors



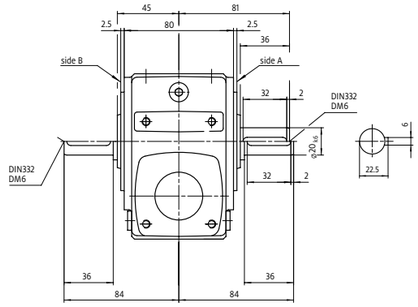
Motor					Flange 1				Flange 2			
Size	Shaft end	DKM	u	v	k_3 f_4	A_1 b_{1H7}	e_1 s_1	c_1 f_1	k_3 f_4	A_1 b_{1H7}	e_1 s_1	c_1 f_1
63	ø 11 x 23	ø 11	4	12.8	116	105	85.0	8	116			
71	ø 14 x 30	ø 14	5	16.3	0	70	6.6	3	0	120	120	11
80***	ø 19 x 40	ø 19	6	21.8					126	80	6.6	3.5
									10			

*** Only for service position B3I

Further options: direct motor connection (type SM_) for confined spaces – please contact us!

TYPE S_V

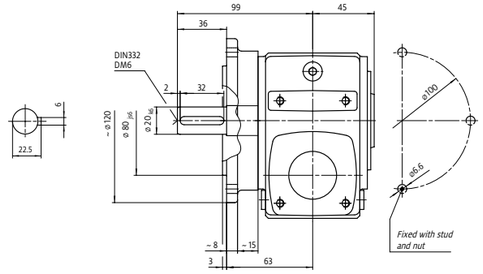
Solid shaft with free shaft ends on one or both sides



Further options: covers, torque reaction levers etc. on request

TYPE S_VF/S_AF

Output drive flange with solid shaft or hollow shaft (not illustrated)



i = transmission ratio; n_1 = drive speed; n_2 = output drive speed; P_1 = rated drive power;
T_2 = rated output torque; $T_{2\,max}$ = max. output torque

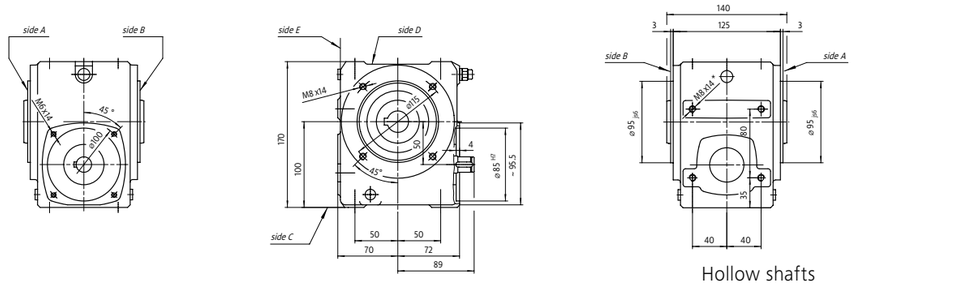
i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
7.25	2,800	386.2	1.60	36	91	70
	1,400	193.1	1.03	46	90	
	930	128.3	0.77	51	89	
	700	96.6	0.63	54	87	
	450	62.1	0.41	54	86	
	250	34.5	0.26	60	84	
9.75	2,800	287.2	1.24	37	90	70
	1,400	143.6	0.75	44	88	
	930	95.4	0.52	45	86	
	700	71.8	0.42	47	84	
	450	46.2	0.29	50	83	
	250	25.6	0.18	55	81	
12.75	2,800	219.6	0.81	30	85	60
	1,400	109.8	0.42	31	85	
	930	72.9	0.29	32	83	
	700	54.9	0.25	36	82	
	450	35.3	0.18	40	81	
	250	19.6	0.11	44	79	
14.50	2,800	193.1	0.91	38	84	95
	1,400	96.6	0.60	49	83	
	930	64.1	0.46	56	82	
	700	48.3	0.38	60	80	
	450	31.0	0.25	60	77	
	250	17.2	0.16	65	74	
19.50	2,800	143.6	0.79	43	82	85
	1,400	71.8	0.48	52	81	
	930	47.7	0.33	53	80	
	700	35.9	0.27	55	76	
	450	23.1	0.18	56	74	
	250	12.8	0.11	60	71	

i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
25.50	2,800	109.8	0.55	37	77	70
	1,400	54.9	0.28	37	77	
	930	36.5	0.20	39	74	
	700	27.5	0.16	40	72	
	450	17.6	0.12	45	70	
	250	9.8	0.08	50	68	
29.00	2,800	96.6	0.49	36	74	105
	1,400	48.3	0.36	51	72	
	930	32.1	0.29	60	70	
	700	24.1	0.23	62	67	
	450	15.5	0.17	65	62	
	250	8.6	0.11	73	60	
39.00	2,800	71.8	0.48	45	70	95
	1,400	35.9	0.32	58	68	
	930	23.8	0.24	63	66	
	700	17.9	0.19	65	63	
	450	11.5	0.13	68	61	
	250	6.4	0.08	72	58	
51.00	2,800	54.9	0.35	40	65	78
	1,400	27.5	0.19	41	63	
	930	18.2	0.14	46	61	
	700	13.7	0.11	48	60	
	450	8.8	0.08	52	58	
	250	4.9	0.05	60	56	
60.00	2,800	46.7	0.32	40	61	58
	1,400	23.3	0.19	44	58	
	930	15.5	0.14	48	55	
	700	11.7	0.12	50	53	
	450	7.5	0.08	50	50	
	250	4.2	0.05	50	48	

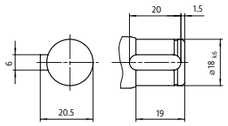
All indications for S1 operation at ambient temperature of 20 °C and use of synthetic oil.
The maximum output torques may be reached in momentary load peaks but never be exceeded

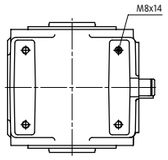
TYPE SVA

Solid input shaft, hollow shaft output

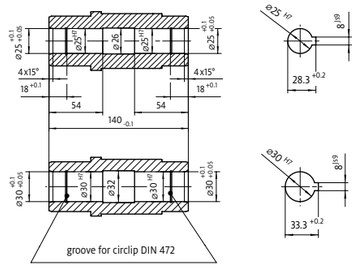


Drive shaft





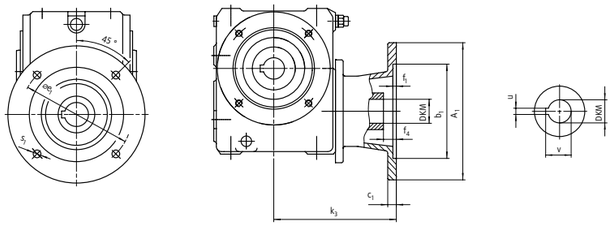
Hollow shafts



Further options: second free drive shaft end, hollow shaft with cover for shrink disc

TYPE SK

Coupling flanges for IEC motors



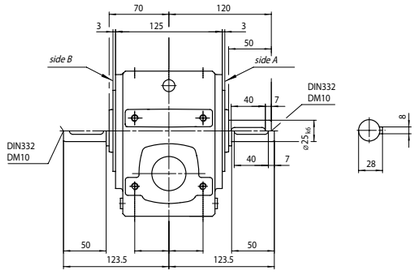
Motor					Flange 1				Flange 2			
Size	Shaft end	DKM	u	v	k_3 f_4	A_1 b_{1H7}	e_1 s_1	c_1 f_1	k_3 f_4	A_1 b_{1H7}	e_1 s_1	c_1 f_1
63	ø11x23	ø11	4	12.8	123 0	105 70	85 6.6	9 3	123 0	120 80	100 6.6	9 4
71	ø14x30	ø14	5	16.3						140 95	115 9	
80	ø19x40	ø19	6	21.8	133 10	120 80	100 6.6	9 4	143 5	160 110	130 9	10 4
90	ø24x50	ø24	8	27.3	143 20	140 95	115 9	10 4				
100***	ø28x60	ø28	8	31.3	153 15	160 110	130 9					

*** Only for service position B3I

Further options: direct motor connection (type SM_) for confined spaces – please contact us!

TYPE S_V

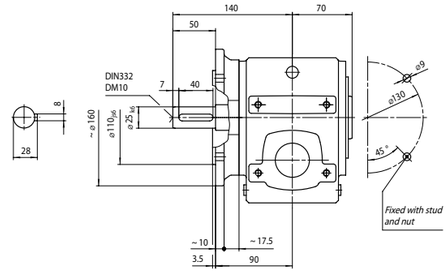
Solid shaft with free shaft ends on one or both sides



Further options: covers, torque reaction levers etc. on request

TYPE S_VF/S_AF

Output drive flange with solid shaft or hollow shaft (not illustrated)



i = transmission ratio; n_1 = drive speed; n_2 = output drive speed; P_1 = rated drive power; T_2 = rated output torque; $T_{2\,max}$ = max. output torque

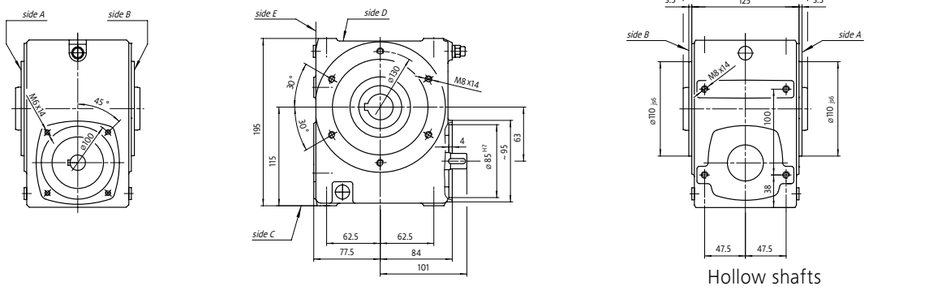
i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
4.83	2,800	579.7	4.79	75	95	140
	1,400	289.9	2.84	87	93	
	930	192.5	2.15	98	92	
	700	144.9	1.83	110	91	
	450	93.2	1.26	115	89	
	250	51.8	0.76	120	86	
7.25	2,800	386.2	3.04	70	93	160
	1,400	193.1	2.09	95	92	
	930	128.3	1.67	112	90	
	700	96.6	1.31	115	89	
	450	62.1	0.92	120	85	
	250	34.5	0.54	125	83	
9.50	2,800	294.7	2.54	75	91	150
	1,400	147.4	1.54	90	90	
	930	97.9	1.26	108	88	
	700	73.7	0.97	108	86	
	450	47.4	0.62	104	83	
	250	26.3	0.41	120	81	
12.75	2,800	219.6	1.37	52	87	105
	1,400	109.8	0.79	60	87	
	930	72.9	0.56	63	86	
	700	54.9	0.43	63	84	
	450	35.3	0.28	63	82	
	250	19.6	0.17	65	80	
14.50	2,800	193.1	1.65	70	86	190
	1,400	96.6	1.17	97	84	
	930	64.1	0.88	110	84	
	700	48.3	0.75	118	80	
	450	31.0	0.53	128	78	
	250	17.2	0.32	131	75	
19.00	2,800	147.4	1.38	75	84	170
	1,400	73.7	0.98	105	83	
	930	48.9	0.66	105	82	
	700	36.8	0.54	113	80	
	450	23.7	0.38	118	77	
	250	13.2	0.23	120	73	

i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
25.5	2,800	109.8	0.89	63	81	135
	1,400	54.9	0.53	74	80	
	930	36.5	0.40	81	77	
	700	27.5	0.31	81	74	
	450	17.6	0.22	85	73	
	250	9.8	0.13	90	71	
29.00	2,800	96.6	1.05	80	77	205
	1,400	48.3	0.74	110	75	
	930	32.1	0.56	120	72	
	700	24.1	0.47	127	69	
	450	15.5	0.32	132	66	
	250	8.6	0.21	145	62	
38.00	2,800	73.7	0.94	90	74	190
	1,400	36.8	0.62	115	72	
	930	24.5	0.46	125	69	
	700	18.4	0.37	128	67	
	450	11.8	0.26	131	62	
	250	6.6	0.16	135	58	
51.00	2,800	54.9	0.57	70	71	150
	1,400	27.5	0.32	75	68	
	930	18.2	0.24	82	65	
	700	13.7	0.21	90	63	
	450	8.8	0.15	95	58	
	250	4.9	0.09	100	55	
62.00	2,800	45.2	0.55	75	65	130
	1,400	22.6	0.37	95	61	
	930	15.0	0.27	102	59	
	700	11.3	0.23	110	56	
	450	7.3	0.16	110	52	
	250	4.0	0.10	110	47	
83.00	2,800	33.7	0.36	56	55	105
	1,400	16.9	0.20	60	54	
	930	11.2	0.14	63	52	
	700	8.4	0.11	65	50	
	450	5.4	0.08	70	49	
	250	3.0	0.05	70	45	

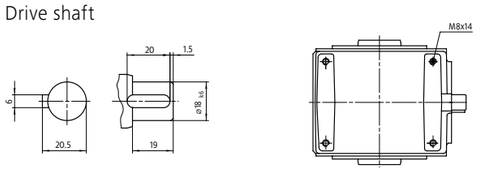
All indications for S1 operation at ambient temperature of 20 °C and use of synthetic oil.
The maximum output torques may be reached in momentary load peaks but never be exceeded.

TYPE SVA

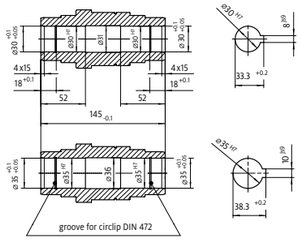
Solid input shaft, hollow shaft output



Drive shaft



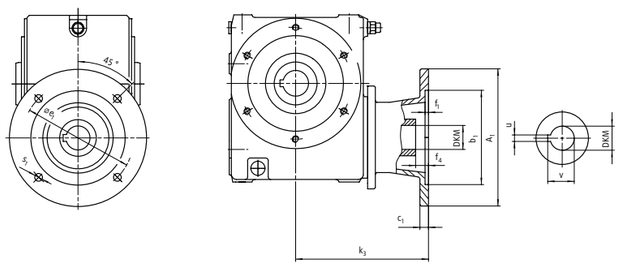
Hollow shafts



Further options: second free drive shaft end, hollow shaft with cover for shrink disc

TYPE SK

Coupling flanges for IEC motors



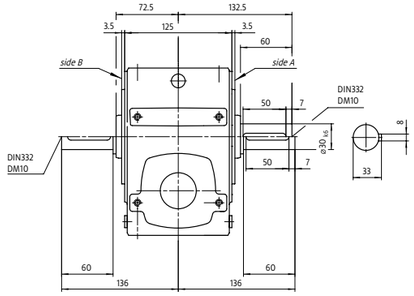
Motor					Flange 1				Flange 2			
Size	Shaft end	DKM	u	v	k_3 f_4	A_1 b_{1H7}	e_1 s_1	c_1 f_1	k_3 f_4	A_1 b_{1H7}	e_1 s_1	c_1 f_1
63	ø11 x 23	ø11	4	12.8	135 0	105 70	85 6.6	9 3	135 0	120 80	100 6.6	9 4
71	ø14 x 30	ø14	5	16.3						140 95	115 9	
80	ø19 x 40	ø19	6	21.8	145 10	120 80	100 6.6	9 4	155 5	160 110	130 9	10 4
90	ø24 x 50	ø24	8	27.3	155 20	140 95	115 9	10 4				
100*** 112***	ø28 x 60	ø28	8	31.3	165 15	160 110	130 9					

*** Only for service position B3I

Further options: direct motor connection (type SM_) for confined spaces – please contact us!

TYPE S_V

Solid shaft with free shaft ends on one or both sides



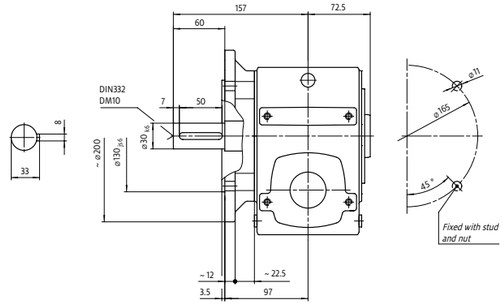
Further options: covers, torque reaction levers etc. on request

i = transmission ratio; n_1 = drive speed; n_2 = output drive speed; P_1 = rated drive power;
T_2 = rated output torque; $T_{2\,max}$ = max. output torque

i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
4.83	2,800	579.7	5.94	92	94	280
	1,400	289.9	4.62	143	94	
	930	192.5	3.47	160	93	
	700	144.9	2.80	170	92	
	450	93.2	2.06	190	90	
	250	51.8	1.22	200	89	
7.25	2,800	386.2	4.22	98	94	315
	1,400	193.1	3.12	145	94	
	930	128.3	2.60	180	93	
	700	96.6	2.17	195	91	
	450	62.1	1.57	215	89	
	250	34.5	0.98	235	87	
9.75	2,800	287.2	3.79	116	92	300
	1,400	143.6	2.78	168	91	
	930	95.4	2.33	210	90	
	700	71.8	1.79	210	88	
	450	46.2	1.17	210	87	
	250	25.6	0.74	230	84	
12.75	2,800	219.6	2.78	110	91	220
	1,400	109.8	1.69	132	90	
	930	72.9	1.16	137	90	
	700	54.9	0.93	140	87	
	450	35.3	0.63	145	85	
	250	19.6	0.38	155	83	
14.50	2,800	193.1	2.21	95	87	360
	1,400	96.6	2.12	180	86	
	930	64.1	1.42	180	85	
	700	48.3	1.17	195	84	
	450	31.0	0.86	215	81	
	250	17.2	0.59	252	77	
19.50	2,800	143.6	2.03	115	85	335
	1,400	71.8	1.61	180	84	
	930	47.7	1.26	210	83	
	700	35.9	0.99	215	82	
	450	23.1	0.76	250	80	
	250	12.8	0.47	260	75	

TYPE S_VF/S_AF

Output drive flange with solid shaft or hollow shaft (not illustrated)

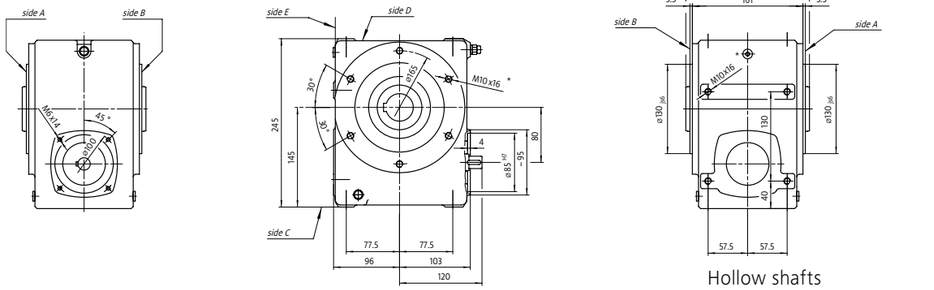


i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
25.50	2,800	109.8	1.78	130	84	290
	1,400	54.9	1.02	147	83	
	930	36.5	0.71	152	82	
	700	27.5	0.56	156	80	
	450	17.6	0.39	162	76	
	250	9.8	0.24	173	73	
29.00	2,800	96.6	1.20	94	79	400
	1,400	48.3	1.21	187	78	
	930	32.1	0.80	180	76	
	700	24.1	0.75	218	73	
	450	15.5	0.53	230	71	
	250	8.6	0.37	255	62	
39.00	2,800	71.8	1.14	115	76	390
	1,400	35.9	0.85	170	75	
	930	23.8	0.75	220	73	
	700	17.9	0.63	230	69	
	450	11.5	0.44	242	66	
	250	6.4	0.28	263	63	
51.00	2,800	54.9	1.01	130	74	330
	1,400	27.5	0.63	160	73	
	930	18.2	0.45	168	72	
	700	13.7	0.38	175	66	
	450	8.8	0.26	180	64	
	250	4.9	0.15	180	60	
61.00	2,800	45.9	0.76	106	67	175
	1,400	23.0	0.55	150	65	
	930	15.2	0.44	175	63	
	700	11.5	0.38	192	60	
	450	7.4	0.26	192	56	
	250	4.1	0.16	192	52	
82.00	2,800	34.1	0.72	128	64	240
	1,400	17.1	0.41	145	63	
	930	11.3	0.28	145	62	
	700	8.5	0.24	145	54	
	450	5.5	0.16	145	52	
	250	3.0	0.10	145	45	

All indications for S1 operation at ambient temperature of 20 °C and use of synthetic oil.
The maximum output torques may be reached in momentary load peaks but never be exceeded.

TYPE SVA

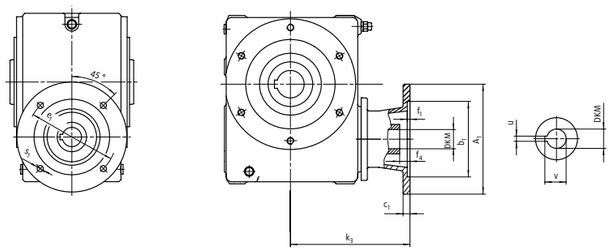
Solid input shaft, hollow shaft output



Further options: second free drive shaft end, hollow shaft with cover for shrink disc

TYPE SK

Coupling flanges for IEC motors



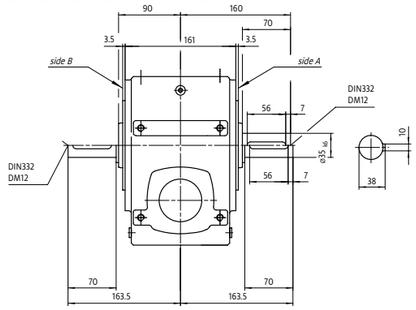
Further options: direct motor installation (type SM_) for confined spaces – please contact us!

Motor					Flange 1				Flange 2			
Size	Shaft end	DKM	u	v	k_3 f_4	A_1 b_{1H7}	e_1 s_1	c_1 f_1	k_3 f_4	A_1 b_{1H7}	e_1 s_1	c_1 f_1
71	ø14x30	ø14	5	16.3	154 0	105 70	85 6.6	9 3	154 0	140 95	115 9	9 4
80	ø19x40	ø19	6	21.8	164 10	120 80	100 6.6	9 4	174 5	160 110	130 9	10 4
90	ø24x50	ø24	8	27.3	174 20	140 95	115 9	10 4				
100 112	ø28x60	ø28	8	31.3	184 15	160 110	130 9					

*** Only for service position B3I

TYPE S_V

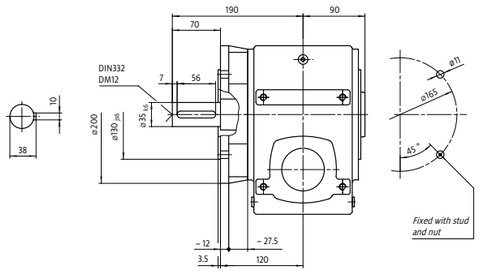
Solid shaft with free shaft ends on one or both sides



Further options: covers, torque reaction levers etc. on request

TYPE S_VF/S_AF

Output drive flange with solid shaft or hollow shaft (not illustrated)



i = transmission ratio; n_1 = drive speed; n_2 = output drive speed; P_1 = rated drive power; T_2 = rated output torque; $T_{2\,max}$ = max. output torque

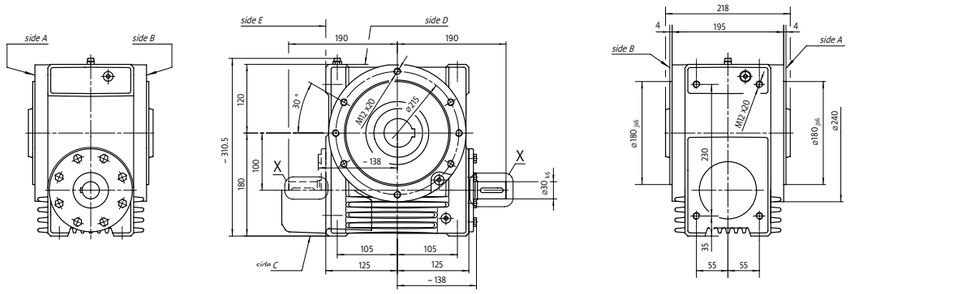
i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
5.00	2,800	560.0	8.02	130	95	590
	1,400	280.0	7.10	230	95	
	930	186.0	5.39	260	94	
	700	140.0	4.89	310	93	
	450	90.0	3.33	325	92	
	250	50.0	2.09	360	90	
7.50	2,800	373.3	6.17	150	95	680
	1,400	186.7	5.61	270	94	
	930	124.0	4.33	310	93	
	700	93.3	3.42	325	93	
	450	60.0	2.49	360	91	
	250	33.3	1.59	400	88	
10.00	2,800	280.0	6.86	220	94	610
	1,400	140.0	4.29	275	94	
	930	93.0	3.39	320	92	
	700	70.0	2.74	340	91	
	450	45.0	2.20	415	89	
	250	25.0	1.37	450	86	
13.25	2,800	211.3	4.09	170	92	320
	1,400	105.7	2.19	180	91	
	930	70.2	1.63	200	90	
	700	52.8	1.37	220	89	
	450	34.0	0.95	230	86	
	250	18.9	0.55	230	83	
15.00	2,800	186.7	3.65	170	91	800
	1,400	93.3	2.86	260	89	
	930	62.0	2.88	390	88	
	700	46.7	1.91	340	87	
	450	30.0	1.57	415	83	
	250	16.7	0.99	450	79	
20.00	2,800	140.0	3.33	200	88	720
	1,400	70.0	2.74	325	87	
	930	46.5	2.26	400	86	
	700	35.0	1.79	410	84	
	450	22.5	1.25	425	80	
	250	12.5	0.80	470	77	

i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
26.50	2,800	105.7	2.57	200	86	430
	1,400	52.8	1.63	250	85	
	930	35.1	1.17	265	83	
	700	26.4	0.93	270	80	
	450	17.0	0.63	275	78	
	250	9.4	0.38	285	75	
30.00	2,800	93.3	2.35	195	81	800
	1,400	46.7	2.38	395	81	
	930	31.0	1.71	415	79	
	700	23.3	1.33	420	77	
	450	15.0	0.97	450	73	
	250	8.3	0.64	490	67	
40.00	2,800	70.0	1.60	170	78	800
	1,400	35.0	1.60	340	78	
	930	23.3	1.27	390	75	
	700	17.5	1.04	415	73	
	450	11.3	0.74	435	69	
	250	6.3	0.48	470	64	
53.00	2,800	52.8	1.49	205	76	490
	1,400	26.4	1.07	285	74	
	930	17.5	0.75	295	72	
	700	13.2	0.64	305	66	
	450	8.5	0.43	310	64	
	250	4.7	0.27	325	60	
62.00	2,800	45.2	1.11	160	68	560
	1,400	22.6	0.93	270	69	
	930	15.0	0.77	325	66	
	700	11.3	0.66	350	63	
	450	7.3	0.47	364	59	
	250	4.0	0.28	364	54	
82.00	2,800	34.1	1.01	190	67	500
	1,400	17.1	0.72	265	66	
	930	11.3	0.51	270	63	
	700	8.5	0.42	270	58	
	450	5.5	0.28	270	56	
	250	3.0	0.18	270	49	

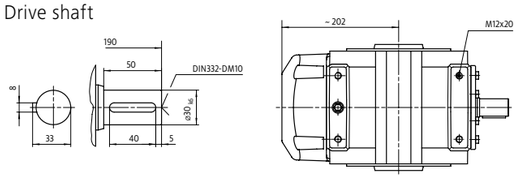
All indications for S1 operation at ambient temperature of 20 °C and use of synthetic oil.
The maximum output torques may be reached in momentary load peaks but never be exceeded.

TYPE SVA

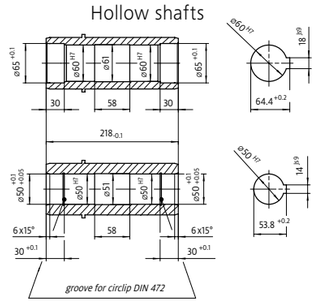
Solid input shaft, hollow shaft at output



Drive shaft



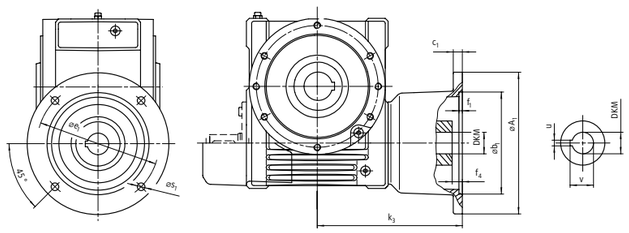
Hollow shafts



Further options: second free drive shaft end, hollow shaft with cover for shrink disc

TYPE SK

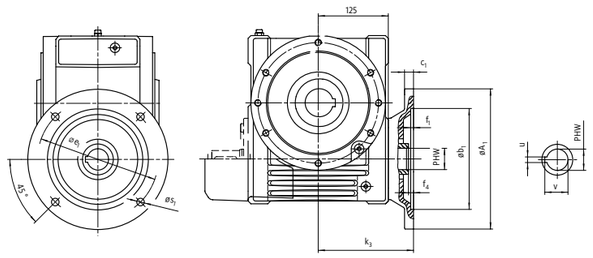
Coupling flanges for IEC motors



Motor					Flange			
Size	Shaft end	DKM	u	v	k_3 f_4	A_1 b_{1H7}	e_1 s_1	c_1 f_1
90	ø24x50	ø24	8	27.3	256 2	200 130	165 ø11	13 5
100 112	ø28x60	ø28	8	31.3				
100 112	ø28x60	ø28	8	31.3	256 2	250	215 ø13.5	16 6
132	ø38x80	ø38	10	41.3	276 10	180		36 5
132	ø38x80	ø38	10	41.3	281 14	300 230	265 M12	15 5

TYPE SP

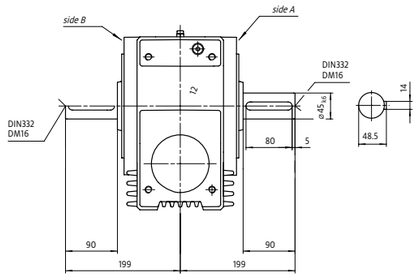
Primary hollow shaft and flange for IEC motors



Motor					Flange			
Size	Shaft end	PHW	u	v	k_3 f_4	A_1 b_{1H7}	e_1 s_1	c_1 f_1
90	ø24x50	ø24	8	27.3	162 1	200 130	165 ø11	14 6
100 112	ø28x60	ø28	8	31.3				
100 112	ø28x60	ø28	8	31.3	170 9	250 180	215 ø13.5	16 5
132	ø38x80	ø38	10	41.3				
132	ø38x80	ø38	10	41.3	187 26	300 230	265 M12	15 5

TYPE S_V

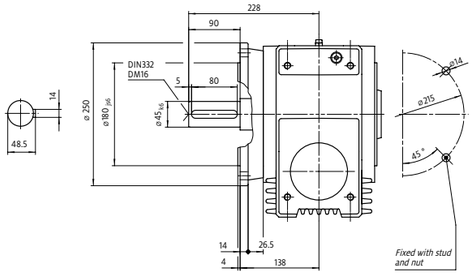
Solid shaft with free shaft ends on one or both sides



Further options: covers, torque reaction levers etc. on request

TYPE S_VF/S_AF

Output drive flange with solid shaft or hollow shaft (not illustrated)



i = transmission ratio; n_1 = drive speed; n_2 = output drive speed; P_1 = rated drive power; T_2 = rated output torque; $T_{2\,max}$ = max. output torque

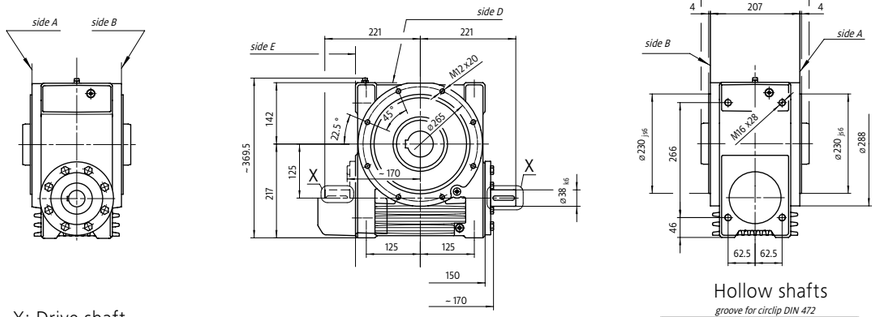
i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
5.0	2,800	560.0	28.70	460	94	1,250
	1,400	280.0	19.03	610	94	
	930	186.0	14.40	695	94	
	700	140.0	11.98	760	93	
	450	90.0	8.82	870	93	
	250	50.0	5.46	960	92	
7.5	2,800	373.3	21.44	510	93	1,280
	1,400	186.7	12.32	580	92	
	930	124.0	10.44	740	92	
	700	93.3	8.70	810	91	
	450	60.0	6.35	910	90	
	250	33.3	4.21	1,050	87	
10.0	2,800	280.0	14.19	450	93	1,000
	1,400	140.0	10.84	680	92	
	930	93.0	8.45	790	91	
	700	70.0	6.68	820	90	
	450	45.0	5.09	950	88	
	250	25.0	3.08	1,000	85	
13.0	2,800	215.4	10.90	430	89	710
	1,400	107.7	6.02	470	88	
	930	71.5	4.22	490	87	
	700	53.8	3.31	510	87	
	450	34.6	2.19	520	86	
	250	19.2	1.31	545	84	
15.0	2,800	186.7	11.53	525	89	1,500
	1,400	93.3	8.00	720	88	
	930	62.0	6.27	850	88	
	700	46.7	5.17	910	86	
	450	30.0	3.97	1,050	83	
	250	16.7	2.55	1,170	80	
20.0	2,800	140.0	9.16	550	88	1,380
	1,400	70.0	6.07	720	87	
	930	46.5	4.81	840	85	
	700	35.0	3.93	900	84	
	450	22.5	3.11	1,070	81	
	250	12.5	2.01	1,200	78	

i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
26.0	2,800	107.7	6.66	490	83	900
	1,400	53.8	3.61	525	82	
	930	35.8	2.76	590	80	
	700	26.9	2.25	630	79	
	450	17.3	1.46	630	78	
	250	9.6	0.93	700	76	
30.0	2,800	93.3	6.60	540	80	1,700
	1,400	46.7	4.70	750	78	
	930	31.0	3.72	870	76	
	700	23.3	3.10	940	74	
	450	15.0	2.18	1,000	72	
	250	8.3	1.37	1,100	70	
40.0	2,800	70.0	5.83	620	78	1,400
	1,400	35.0	3.96	810	75	
	930	23.3	2.99	910	74	
	700	17.5	2.51	1,000	73	
	450	11.3	1.88	1,100	69	
	250	6.3	1.26	1,250	65	
52.0	2,800	53.8	4.19	550	74	950
	1,400	26.9	2.31	590	72	
	930	17.9	1.66	620	70	
	700	13.5	1.35	650	68	
	450	8.7	0.96	700	66	
	250	4.8	0.62	750	61	
63.0	2,800	44.4	4.29	645	70	1,125
	1,400	22.2	2.76	817	69	
	930	14.8	2.04	886	67	
	700	11.1	1.59	886	65	
	450	7.1	1.09	886	61	
	250	4.0	0.67	886	55	
82.0	2,800	34.1	3.20	591	66	1,002
	1,400	17.1	1.70	599	63	
	930	11.3	1.17	599	61	
	700	8.5	0.91	599	59	
	450	5.5	0.61	599	56	
	250	3.0	0.37	599	51	

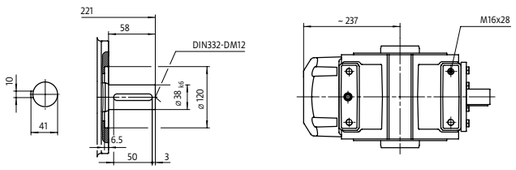
All indications for S1 operation at ambient temperature of 20 °C and use of synthetic oil.
The maximum output torques may be reached in momentary load peaks but never be exceeded.

TYPE SVA

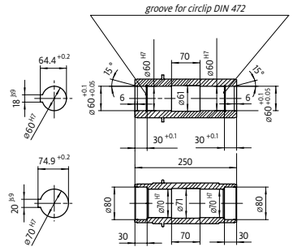
Solid input shaft, hollow shaft at output



X: Drive shaft



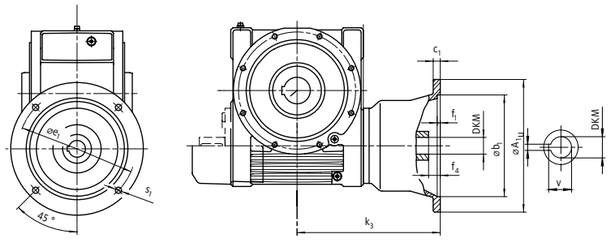
Hollow shafts



Further options: second free drive shaft end, hollow shaft with cover for shrink disc

TYPE SK

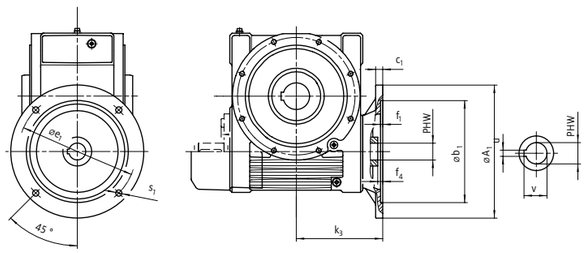
Coupling flanges for IEC motors



Motor					Flange			
Size	Shaft end	DKM	u	v	k_3 f_4	A_1 b_{1H7}	e_1 s_1	c_1 f_1
100	ø28x60	ø28	8	31.3	299 13	250 180	215 ø13.5	16 7
112								
132	ø38x80	ø38	10	41.3	309 20 324 27.5	250 180 300 230	215 ø13.5 265 M12	26 5 16 7
160	ø42x110	ø42	12	45.3	351 40.5	350 250	300 M16	20 7

TYPE SP

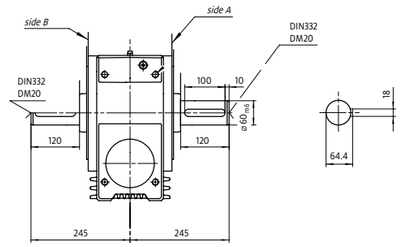
Primary hollow shaft and flange for IEC motors



Motor					Flange			
Size	Shaft end	PHW	u	v	k_3 f_4	A_1 b_{1H7}	e_1 s_1	c_1 f_1
100	ø28x60	ø28	8	31.3	195 5	250 180	215 ø13.5	16 5
112								
132	ø38x80	ø38	10	41.3	195 5	300 230	265 M12	16 5
160	ø42x110	ø42	12	45.3	229 35	350 250	300 M16	22 7

TYPE S_V

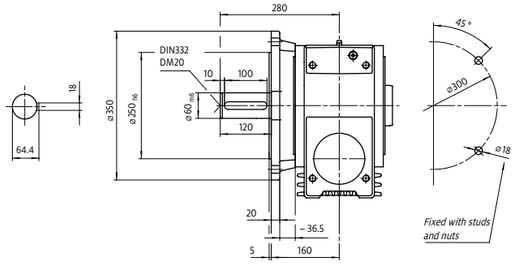
Solid shaft with free shaft ends on one or both sides



Further options: covers, torque reaction levers etc. on request

TYPE S_VF/S_AF

Output drive flange with solid shaft or hollow shaft (not illustrated)



i = transmission ratio; n_1 = drive speed; n_2 = output drive speed; P_1 = rated drive power; T_2 = rated output torque; $T_{2\,max}$ = max. output torque

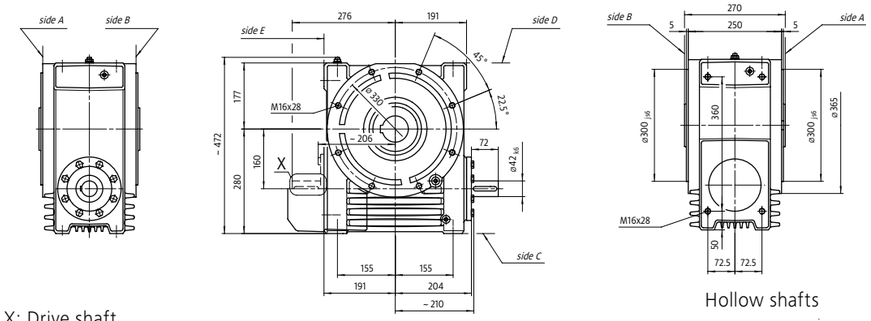
i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
4.83	2,800	579.7	45.37	710	95	2,100
	1,400	289.9	27.80	870	95	
	930	192.5	23.27	1,085	94	
	700	144.9	18.73	1,160	94	
	450	93.2	14.27	1,360	93	
	250	51.8	9.90	1,680	92	
7.25	2,800	386.2	27.83	640	93	2,190
	1,400	193.1	19.57	900	93	
	930	128.3	15.45	1,058	92	
	700	96.6	13.64	1,228	91	
	450	62.1	10.11	1,400	90	
	250	34.5	6.53	1,610	89	
10.00	2,800	280.0	23.96	760	93	2,200
	1,400	140.0	15.76	1,000	93	
	930	93.0	11.75	1,110	92	
	700	70.0	10.39	1,290	91	
	450	45.0	7.78	1,470	89	
	250	25.0	5.27	1,750	87	
13.00	2,800	215.4	18.09	730	91	1,200
	1,400	107.7	9.42	760	91	
	930	71.5	6.66	800	90	
	700	53.8	5.26	830	89	
	450	34.6	3.58	860	87	
	250	19.2	2.11	890	85	
14.50	2,800	193.1	19.10	850	90	2,300
	1,400	96.6	12.24	1,090	90	
	930	64.1	9.51	1,260	89	
	700	48.3	7.87	1,370	88	
	450	31.0	5.96	1,560	85	
	250	17.2	4.05	1,840	82	
20.00	2,800	140.0	15.15	920	89	2,250
	1,400	70.0	9.58	1,150	88	
	930	46.5	7.56	1,350	87	
	700	35.0	6.39	1,500	86	
	450	22.5	4.83	1,700	83	
	250	12.5	3.11	1,900	80	

i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
26.00	2,800	107.7	9.83	750	86	1,550
	1,400	53.8	5.90	890	85	
	930	35.8	4.33	970	84	
	700	26.9	3.40	1,000	83	
	450	17.3	2.38	1,050	80	
	250	9.6	1.42	1,100	78	
29.00	2,800	96.6	10.85	880	82	2,300
	1,400	48.3	7.11	1,140	81	
	930	32.1	5.50	1,310	80	
	700	24.1	4.61	1,440	79	
	450	15.5	3.57	1,650	75	
	250	8.6	2.41	1,870	70	
40.00	2,800	70.0	8.43	920	80	2,250
	1,400	35.0	5.80	1,250	79	
	930	23.3	4.46	1,430	78	
	700	17.5	3.79	1,570	76	
	450	11.3	2.95	1,780	71	
	250	6.3	2.03	2,080	67	
52.00	2,800	53.8	7.10	970	77	1,780
	1,400	26.9	3.89	1,050	76	
	930	17.9	2.73	1,080	74	
	700	13.5	2.25	1,150	72	
	450	8.7	1.56	1,170	68	
	250	4.8	0.98	1,250	64	
62.00	2,800	45.2	6.40	988	73	2,211
	1,400	22.6	4.08	1,243	72	
	930	15.0	3.14	1,421	71	
	700	11.3	2.68	1,562	69	
	450	7.3	2.02	1,731	65	
	250	4.0	1.24	1,731	59	
83.00	2,800	33.7	5.34	1,043	69	1,953
	1,400	16.9	3.08	1,167	67	
	930	11.2	2.07	1,167	66	
	700	8.4	1.61	1,167	64	
	450	5.4	1.10	1,167	60	
	250	3.0	0.67	1,167	55	

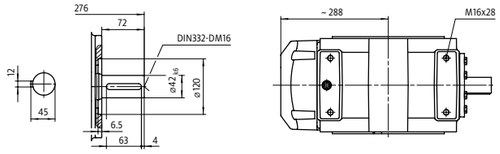
All indications for S1 operation at ambient temperature of 20 °C and use of synthetic oil.
The maximum output torques may be reached in momentary load peaks but never be exceeded.

TYPE SVA

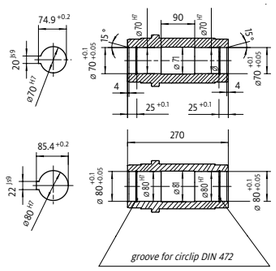
Solid input shaft, hollow shaft at output



X: Drive shaft



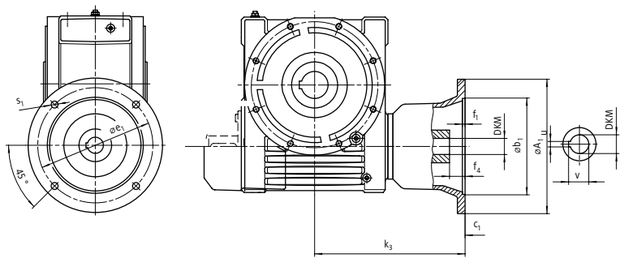
Hollow shafts



Further options: second free drive shaft end, hollow shaft with cover for shrink disc

TYPE SK

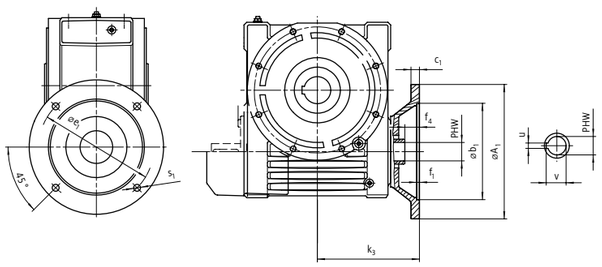
Coupling flanges for IEC motors



Motor					Flange			
Size	Shaft end	DKM	u	v	k_3 f_4	A_1 b_{1H7}	e_1 s_1	c_1 f_1
100	ø28x60	ø28	8	31.3	340 0	250 180	265 ø13.5	16 7
112								
132	ø38x80	ø38	10	41.3	360 20	250 180	265 ø13.5	36 7
					365 29	300 230	265 M12	16 7
160	ø42x110	ø42	12	45.3	392 40.5	350 250	300 M16	20 7
180	ø42x110	ø42	12	45.3	351 40.5	350 250		

TYPE SP

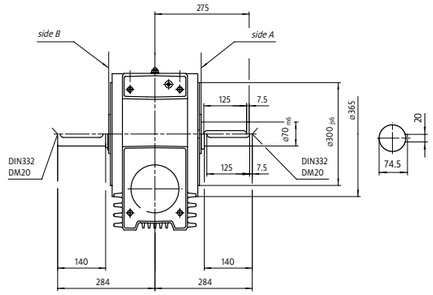
Primary hollow shaft and flange for IEC motors



Motor					Flange			
Size	Shaft end	PHW	u	v	k_3 f_4	A_1 b_{1H7}	e_1 s_1	c_1 f_1
100	ø28x60	ø28	8	31.3	236 8	250 180	215 ø13.5	16 5
112								
132	ø38x80	ø38	10	41.3	236 8	300 230	265 M12	16 5
132	ø42x110	ø42	10	41.3				
160	ø42x110	ø42	12	45.3	266 38	350 250	300 M16	22 7
180	ø48x110	ø48	14	51.8		350 250		

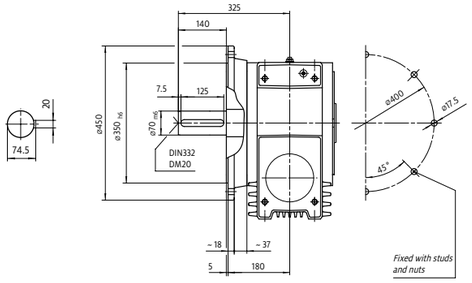
TYPE S_V

Solid shaft with free shaft ends on one or both sides



TYPE S_VF/S_AF

Output drive flange with solid shaft or hollow shaft (not illustrated)



Further options: covers, torque reaction levers etc. on request

i = transmission ratio; n_1 = drive speed; n_2 = output drive speed; P_1 = rated drive power;
T_2 = rated output torque; $T_{2\,max}$ = max. output torque

i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
5.0	2,800	560.0	*	*	*	4,350
	1,400	280.0	52.16	1,690	95	
	930	186.0	41.62	2,030	95	
	700	140.0	33.18	2,150	95	
	450	90.0	25.13	2,480	93	
	250	50.0	15.65	2,750	92	
7.5	2,800	373.3	*	*	*	4,350
	1,400	186.7	37.43	1,800	94	
	930	124.0	28.73	2,080	94	
	700	93.3	23.43	2,230	93	
	450	60.0	17.71	2,565	91	
	250	33.3	11.67	3,010	90	
10.0	2,800	280.0	42.11	1,350	94	4,250
	1,400	140.0	29.63	1,900	94	
	930	93.0	23.04	2,200	93	
	700	70.0	19.52	2,450	92	
	450	45.0	14.37	2,775	91	
	250	25.0	9.31	3,200	90	
13.5	2,800	207.4	32.11	1,375	93	2,400
	1,400	103.7	17.63	1,510	93	
	930	68.9	12.15	1,550	92	
	700	51.9	9.79	1,640	91	
	450	33.3	6.86	1,750	89	
	250	18.5	3.97	1,800	88	
15.0	2,800	186.7	*	*	*	4,350
	1,400	93.3	21.25	2,000	92	
	930	62.0	16.27	2,280	91	
	700	46.7	13.57	2,500	90	
	450	30.0	10.52	2,880	86	
	250	16.7	6.88	3,350	85	
20.0	2,800	140.0	27.04	1,660	90	4,250
	1,400	70.0	17.49	2,100	88	
	930	46.5	13.56	2,450	88	
	700	35.0	11.37	2,700	87	
	450	22.5	8.50	3,030	84	
	250	12.5	5.76	3,610	82	

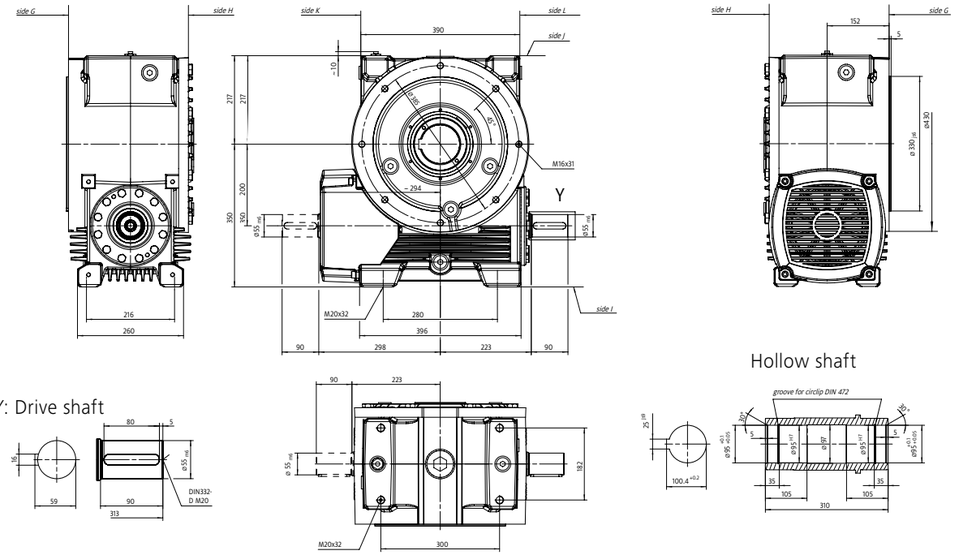
i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
26.0	2,800	103.7	21.22	1,700	87	3,300
	1,400	51.9	12.31	1,950	86	
	930	34.4	8.49	2,000	85	
	700	25.9	6.79	2,100	84	
	450	16.7	4.52	2,150	83	
	250	9.3	2.64	2,150	79	
29.0	2,800	93.3	*	*	*	4,350
	1,400	46.7	12.22	2,100	84	
	930	31.0	9.27	2,400	84	
	700	23.3	7.65	2,600	83	
	450	15.0	6.08	2,980	77	
	250	8.3	4.13	3,500	74	
40.0	2,800	70.0	15.64	1,750	82	4,250
	1,400	35.0	10.15	2,270	82	
	930	23.3	7.81	2,600	81	
	700	17.5	6.61	2,850	79	
	450	11.3	5.08	3,275	76	
	250	6.3	3.47	3,765	71	
52.0	2,800	51.9	12.65	1,840	79	3,400
	1,400	25.9	7.43	2,135	78	
	930	17.2	5.19	2,215	77	
	700	13.0	4.14	2,320	76	
	450	8.3	3.25	2,680	72	
	250	4.6	1.99	2,795	68	
62.0	2,800	44.4	11.17	1,800	75	4,390
	1,400	22.2	7.03	2,266	75	
	930	14.8	5.41	2,591	74	
	700	11.1	4.54	2,848	73	
	450	7.1	3.45	3,225	70	
	250	4.0	2.31	3,552	64	
83.0	2,800	33.3	9.11	1,906	73	4,062
	1,400	16.7	5.69	2,347	72	
	930	11.1	3.89	2,347	70	
	700	8.3	2.97	2,347	69	
	450	5.4	2.03	2,347	65	
	250	3.0	1.24	2,347	59	

All indications for S1 operation at ambient temperature of 20 °C and use of synthetic oil.
The maximum output torques may be reached in momentary load peaks but never be exceeded.

* Please consult us

TYPE SVA

Solid input shaft, hollow shaft at output



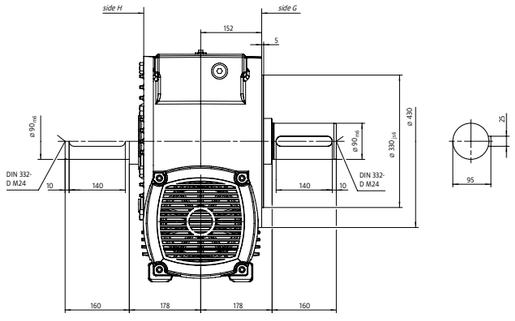
Y: Drive shaft

Hollow shaft

Further options: second free drive shaft end, hollow shaft with cover for shrink disc

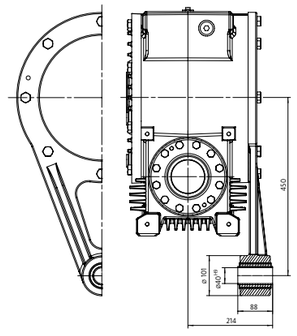
TYPE SVV

Solid shaft with free shaft ends on one or both sides



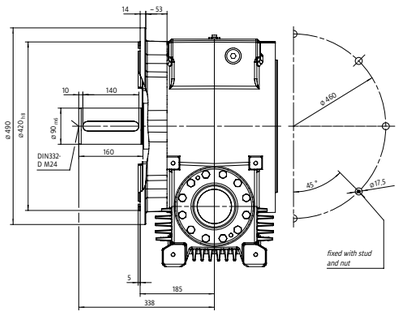
TYPE SV_D

Torque reaction lever at output drive



TYPE SVVF/SVAF

Output drive flange with solid shaft or hollow shaft (not illustrated)



Dimensions in mm / featherkey ways according to DIN 6885 / strength class for screws 10.9

i = transmission ratio; n_1 = drive speed; n_2 = output drive speed; P_1 = rated drive power;
T_2 = rated output torque; $T_{2\,max}$ = max. output torque

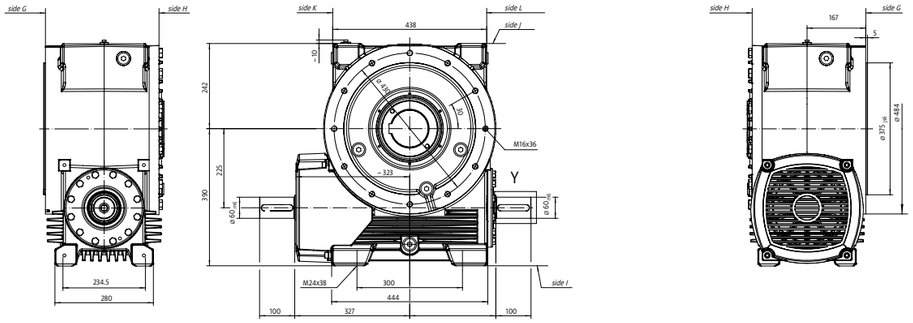
i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
7.50	2,400	320.0	76.4	2,190	96	8,570
	1,800	240.0	71.4	2,700	95	
	1,500	200.0	67.7	3,070	95	
	1,200	160.0	62.3	3,530	95	
	1,000	133.3	57.6	3,920	95	
	750	100.0	50.8	4,610	95	
	500	66.7	41.1	5,470	93	
	300	40.0	29.5	6,540	93	
	150	20.0	17.1	7,610	93	
	60	8.0	7.7	8,490	92	
	10	1.3	1.4	8,570	88	
10.00	2,400	240.0	64.0	2,420	95	8,640
	1,800	180.0	60.5	3,050	95	
	1,500	150.0	57.3	3,430	94	
	1,200	120.0	54.1	4,050	94	
	1,000	100.0	49.8	4,470	94	
	750	75.0	43.1	5,160	94	
	500	50.0	34.3	6,100	93	
	300	30.0	24.3	7,120	92	
	150	15.0	13.8	8,090	92	
	60	6.0	5.9	8,530	91	
	10	1.0	1.0	8,640	87	
13.25	2,400	181.1	51.9	2,570	94	4,270
	1,800	135.8	48.5	3,170	93	
	1,500	113.2	42.8	3,360	93	
	1,200	90.6	36.1	3,540	93	
	1,000	75.5	32.3	3,800	93	
	750	56.6	25.1	3,900	92	
	500	37.7	17.3	3,980	91	
	300	22.6	10.8	4,160	91	
	150	11.3	5.6	4,270	90	
	60	4.5	2.3	4,270	89	
	10	0.8	0.4	4,270	83	
15.00	2,400	160.0	49.5	2,690	91	9,050
	1,800	120.0	46.4	3,320	90	
	1,500	100.0	43.6	3,750	90	
	1,200	80.0	40.2	4,320	90	
	1,000	66.7	37.2	4,800	90	
	750	50.0	32.8	5,580	89	
	500	33.3	25.3	6,450	89	
	300	20.0	17.4	7,390	89	
	150	10.0	9.9	8,290	88	
	60	4.0	4.2	8,710	87	
	10	0.7	0.8	9,050	81	
20.00	2,400	120.0	41.0	3,000	92	8,940
	1,800	90.0	37.9	3,660	91	
	1,500	75.0	36.0	4,120	90	
	1,200	60.0	32.7	4,690	90	
	1,000	50.0	30.1	5,180	90	
	750	37.5	25.4	5,750	89	
	500	25.0	19.4	6,510	88	
	300	15.0	13.3	7,370	87	
	150	7.5	7.4	8,180	87	
	60	3.0	3.2	8,630	85	
	10	0.5	0.6	8,940	77	
26.50	2,400	90.6	31.3	2,970	90	5,670
	1,800	67.9	28.3	3,580	90	
	1,500	56.6	25.8	3,870	89	
	1,200	45.3	23.2	4,360	89	
	1,000	37.7	20.4	4,590	89	
	750	28.3	17.1	5,080	88	
	500	18.9	12.3	5,420	87	
	300	11.3	7.8	5,670	86	
	150	5.7	4.0	5,670	85	
	60	2.3	1.6	5,670	83	
	10	0.4	0.3	5,670	75	

i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
30.00	2,400	80.0	28.9	2,900	84	9,520
	1,800	60.0	26.7	3,570	84	
	1,500	50.0	25.4	4,030	83	
	1,200	40.0	23.5	4,650	83	
	1,000	33.3	21.7	5,160	83	
	750	25.0	18.4	5,770	82	
	500	16.7	14.2	6,670	82	
	300	10.0	10.1	7,830	81	
	150	5.0	5.5	8,580	81	
	60	2.0	2.5	9,150	76	
	10	0.3	0.5	9,520	65	
34.00	2,400	70.6	27.8	3,230	86	11,430
	1,800	52.9	26.3	4,080	86	
	1,500	44.1	24.6	4,580	86	
	1,200	35.3	22.7	5,210	85	
	1,000	29.4	20.8	5,750	85	
	750	22.1	18.1	6,590	84	
	500	14.7	13.8	7,450	83	
	300	8.8	10.2	9,050	82	
	150	4.4	5.5	9,700	81	
	60	1.8	2.6	10,860	78	
	10	0.3	0.5	11,430	68	
40.00	2,400	60.0	23.6	3,150	84	9,330
	1,800	45.0	21.6	3,850	84	
	1,500	37.5	20.4	4,320	83	
	1,200	30.0	18.7	4,930	83	
	1,000	25.0	17.2	5,440	83	
	750	18.8	14.4	6,020	82	
	500	12.5	11.1	6,840	81	
	300	7.5	7.5	7,590	80	
	150	3.8	4.2	8,400	78	
	60	1.5	1.8	8,860	76	
	10	0.3	0.4	9,330	65	
53.00	2,400	45.3	18.6	3,250	83	7,000
	1,800	34.0	16.6	3,870	83	
	1,500	28.3	15.7	4,340	82	
	1,200	22.6	13.7	4,670	81	
	1,000	18.9	12.2	5,010	81	
	750	14.2	9.9	5,350	80	
	500	9.4	7.3	5,830	79	
	300	5.7	4.8	6,380	78	
	150	2.8	2.7	7,000	76	
	60	1.1	1.1	7,000	73	
	10	0.2	0.2	7,000	62	
63.00	2,400	38.1	12.4	2,430	78	5,340
	1,800	28.6	11.5	2,970	77	
	1,500	23.8	11.0	3,350	76	
	1,200	19.0	10.2	3,840	75	
	1,000	15.9	9.4	4,250	75	
	750	11.9	8.2	4,890	74	
	500	7.9	5.7	5,040	74	
	300	4.8	3.5	5,120	73	
	150	2.4	1.9	5,160	67	
	60	1.0	0.8	5,230	64	
	10	0.2	0.2	5,340	53	

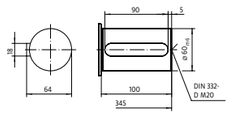
All indications for S1 operation at ambient temperature of 20 °C and use of synthetic oil. The maximum output torques may be reached in momentary load peaks but never be exceeded.

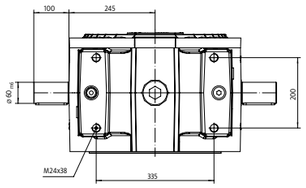
TYPE SVA

Solid input shaft, hollow shaft at output

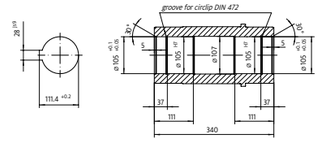


Y: Drive shaft





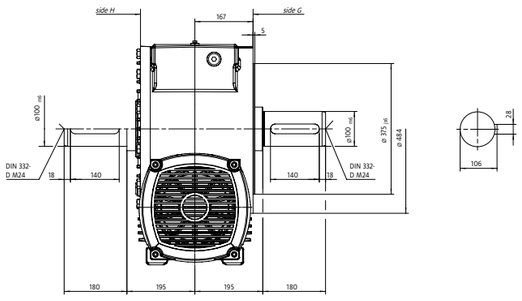
Hollow shaft



Further options: second free drive shaft end, hollow shaft with cover for shrink disc

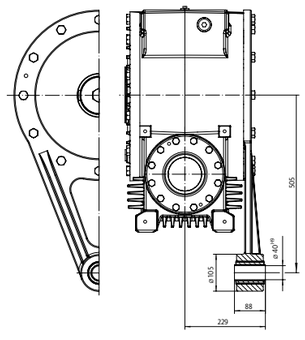
TYPE SVV

Solid shaft with free shaft ends on one or both sides



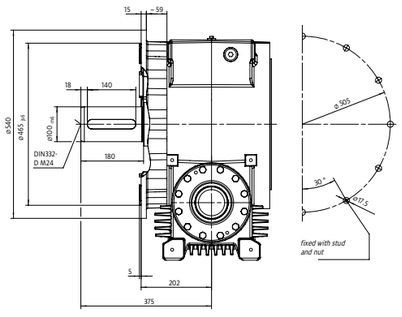
TYPE SV_D

Torque reaction lever at output drive



TYPE SVVF/SVAF

Output drive flange with solid shaft or hollow shaft (not illustrated)



i = transmission ratio; n_1 = drive speed; n_2 = output drive speed; P_1 = rated drive power;
T_2 = rated output torque; $T_{2\,max}$ = max. output torque

i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
6.75	2,400	355.6	105.5	2,720	96	12,270
	1,800	266.7	99.6	3,390	95	
	1,500	222.2	96.5	3,940	95	
	1,200	177.8	90.9	4,640	95	
	1,000	148.1	85.1	5,210	95	
	750	111.1	75.4	6,160	95	
	500	74.1	62.1	7,530	94	
	300	44.4	44.6	8,910	93	
	150	22.2	25.9	10,340	93	
	60	8.9	11.7	11,670	93	
	10	1.5	2.1	12,270	89	
8.75	2,400	274.3	89.2	2,950	95	12,180
	1,800	205.7	85.0	3,750	95	
	1,500	171.4	82.6	4,370	95	
	1,200	137.1	77.1	5,050	94	
	1,000	114.3	71.7	5,630	94	
	750	85.7	62.7	6,570	94	
	500	57.1	50.8	7,900	93	
	300	34.3	36.3	9,400	93	
	150	17.1	21.5	11,000	92	
	60	6.9	9.4	11,920	91	
	10	1.1	1.7	12,180	87	
13.50	2,400	177.8	70.1	3,500	93	12,610
	1,800	133.3	65.5	4,360	93	
	1,500	111.1	62.7	4,960	92	
	1,200	88.9	56.6	5,590	92	
	1,000	74.1	52.7	6,250	92	
	750	55.6	45.1	7,140	92	
	500	37.0	36.2	8,390	90	
	300	22.2	25.3	9,780	90	
	150	11.1	14.6	11,190	89	
	60	4.4	6.4	12,110	88	
	10	0.7	1.2	12,610	83	
17.50	2,400	137.1	60.7	3,890	92	12,920
	1,800	102.9	56.3	4,810	92	
	1,500	85.7	53.1	5,440	92	
	1,200	68.6	49.4	6,260	91	
	1,000	57.1	45.8	6,970	91	
	750	42.9	39.6	8,020	91	
	500	28.6	30.8	9,280	90	
	300	17.1	21.5	10,650	89	
	150	8.6	12.2	12,100	89	
	60	3.4	5.3	12,920	87	
	10	0.6	1.0	12,920	81	

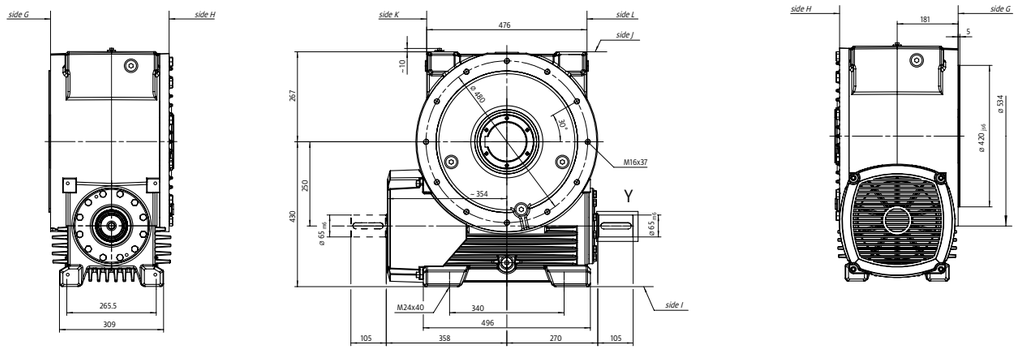
i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
23.00	2,400	104.3	46.4	3,910	92	12,350
	1,800	78.3	43.0	4,770	91	
	1,500	65.2	40.1	5,350	91	
	1,200	52.2	37.1	6,110	90	
	1,000	43.5	34.1	6,740	90	
	750	32.6	29.3	7,730	90	
	500	21.7	23.0	8,990	89	
	300	13.0	15.6	10,060	88	
	150	6.5	9.0	11,410	87	
	60	2.6	3.9	12,350	86	
	10	0.4	0.7	12,350	79	
27.00	2,400	88.9	40.0	3,700	86	12,920
	1,800	66.7	37.7	4,590	85	
	1,500	55.6	36.9	5,390	85	
	1,200	44.4	36.3	6,630	85	
	1,000	37.0	33.9	7,420	85	
	750	27.8	29.4	8,480	84	
	500	18.5	23.0	9,970	84	
	300	11.1	16.1	11,640	84	
	150	5.6	9.2	12,920	82	
	60	2.2	3.9	12,920	77	
	10	0.4	0.7	12,920	68	
35.00	2,400	68.6	32.9	4,030	88	13,300
	1,800	51.4	31.7	5,120	87	
	1,500	42.9	30.1	5,770	86	
	1,200	34.3	27.9	6,610	85	
	1,000	28.6	25.8	7,340	85	
	750	21.4	22.4	8,480	85	
	500	14.3	16.8	9,450	84	
	300	8.6	11.6	10,730	83	
	150	4.3	6.6	12,120	82	
	60	1.7	3.0	12,880	78	
	10	0.3	0.6	13,300	67	
46.00	2,400	52.2	25.2	3,960	86	12,900
	1,800	39.1	24.8	5,140	85	
	1,500	32.6	23.5	5,780	84	
	1,200	26.1	21.5	6,600	84	
	1,000	21.7	19.9	7,260	83	
	750	16.3	17.2	8,340	83	
	500	10.9	13.1	9,430	82	
	300	6.5	8.7	10,340	81	
	150	3.3	4.9	11,570	80	
	60	1.3	2.2	12,410	77	
	10	0.2	0.4	12,900	66	

All indications for S1 operation at ambient temperature of 20 °C and use of synthetic oil.
The maximum output torques may be reached in momentary load peaks but never be exceeded.

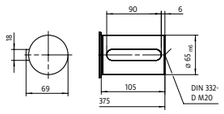
Dimensions in mm / featherkey ways according to DIN 6885 / strength class for screws 10.9

TYPE SVA

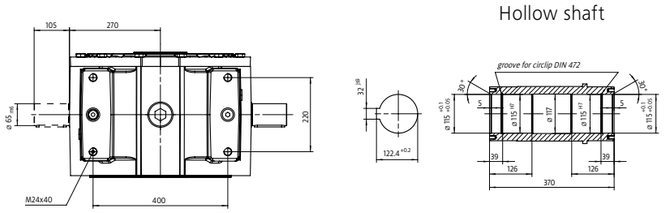
Solid input shaft, hollow shaft at output



Y: Drive shaft



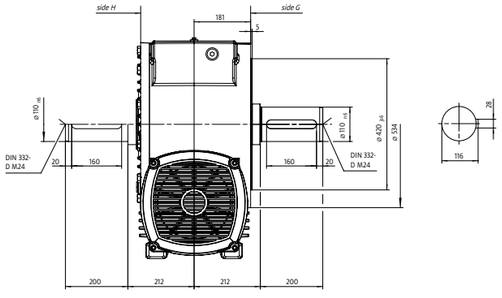
Hollow shaft



Further options: second free drive shaft end, hollow shaft with cover for shrink disc

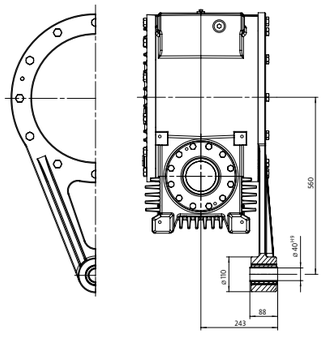
TYPE SVV

Solid shaft with free shaft ends on one or both sides



TYPE SV_D

Torque reaction lever at output drive



Dimensions in mm / featherkey ways according to DIN 6885 / strength class for screws 10.9

i = transmission ratio; n_1 = drive speed; n_2 = output drive speed; P_1 = rated drive power;
T_2 = rated output torque; $T_{2\,max}$ = max. output torque

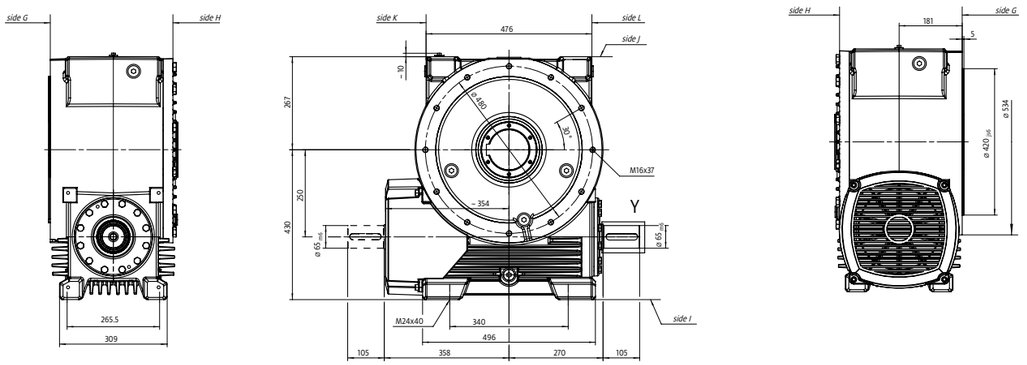
i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
7.75	2,200	283.9	113.6	3,670	96	14,630
	1,800	232.3	115.3	4,550	96	
	1,500	193.5	110.7	5,190	95	
	1,200	154.8	103.3	6,050	95	
	1,000	129.0	98.7	6,940	95	
	750	96.8	88.1	8,260	95	
	500	64.5	71.9	10,010	94	
	300	38.7	52.6	12,190	94	
	150	19.4	30.5	14,130	94	
	60	7.7	12.8	14,630	93	
	10	1.3	2.2	14,630	89	
10.00	2,200	220.0	102.1	4,210	95	14,000
	1,800	180.0	102.6	5,170	95	
	1,500	150.0	97.1	5,870	95	
	1,200	120.0	90.4	6,760	94	
	1,000	100.0	84.0	7,540	94	
	750	75.0	73.9	8,850	94	
	500	50.0	58.6	10,530	94	
	300	30.0	42.3	12,520	93	
	150	15.0	23.2	13,730	93	
	60	6.0	9.6	14,000	92	
	10	1.0	1.6	14,000	89	
13.00	2,200	169.2	88.4	4,690	94	9,180
	1,800	138.5	83.4	5,410	94	
	1,500	115.4	80.2	6,170	93	
	1,200	92.3	74.3	7,150	93	
	1,000	76.9	68.9	7,950	93	
	750	57.7	55.9	8,600	93	
	500	38.5	38.7	8,840	92	
	300	23.1	23.9	9,000	91	
	150	11.5	11.9	9,000	91	
	60	4.6	4.8	9,000	90	
	10	0.8	0.8	9,180	87	
15.50	2,200	141.9	75.8	4,640	91	14,890
	1,800	116.1	72.0	5,390	91	
	1,500	96.8	68.3	6,130	91	
	1,200	77.4	64.1	7,120	90	
	1,000	64.5	61.8	8,230	90	
	750	48.4	52.9	9,390	90	
	500	32.3	41.4	11,040	90	
	300	19.4	28.5	12,510	89	
	150	9.7	16.2	14,210	89	
	60	3.9	7.0	14,890	86	
	10	0.6	1.2	14,890	82	
20.00	2,200	110.0	65.5	5,230	92	14,600
	1,800	90.0	62.4	6,030	91	
	1,500	75.0	58.9	6,820	91	
	1,200	60.0	54.9	7,860	90	
	1,000	50.0	52.4	9,010	90	
	750	37.5	45.2	10,470	91	
	500	25.0	35.3	12,010	89	
	300	15.0	23.2	13,170	89	
	150	7.5	12.8	14,380	88	
	60	3.0	5.2	14,460	87	
	10	0.5	0.9	14,600	81	
26.00	2,200	84.6	50.2	5,160	91	12,060
	1,800	69.2	47.7	5,920	90	
	1,500	57.7	45.1	6,720	90	
	1,200	46.2	40.8	7,590	90	
	1,000	38.5	38.3	8,460	89	
	750	28.8	32.3	9,530	89	
	500	19.2	24.5	10,710	88	
	300	11.5	15.8	11,540	88	
	150	5.8	8.3	11,940	87	
	60	2.3	3.4	11,940	86	
	10	0.4	0.6	12,060	79	

i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
31.00	2,200	71.0	43.3	5,010	86	15,230
	1,800	58.1	41.2	5,830	86	
	1,500	48.4	39.5	6,630	85	
	1,200	38.7	36.7	7,690	85	
	1,000	32.3	33.5	8,320	84	
	750	24.2	28.2	9,460	85	
	500	16.1	22.0	11,080	85	
	300	9.7	15.5	12,860	84	
	150	4.8	8.9	14,330	82	
	60	1.9	3.8	14,760	79	
	10	0.3	0.8	15,230	68	
35.00	2,200	62.9	38.8	5,130	87	19,740
	1,800	51.4	41.4	6,610	86	
	1,500	42.9	40.1	7,680	86	
	1,200	34.3	38.3	9,060	85	
	1,000	28.6	35.5	10,080	85	
	750	21.4	30.5	11,400	84	
	500	14.3	24.2	13,580	84	
	300	8.6	16.5	15,470	84	
	150	4.3	9.4	17,320	83	
	60	1.7	4.1	18,650	81	
	10	0.3	0.8	19,740	71	
40.00	2,200	55.0	33.8	5,050	86	14,900
	1,800	45.0	35.6	6,420	85	
	1,500	37.5	34.6	7,490	85	
	1,200	30.0	32.2	8,610	84	
	1,000	25.0	29.7	9,540	84	
	750	18.8	25.9	11,100	84	
	500	12.5	20.0	12,680	83	
	300	7.5	13.4	13,980	82	
	150	3.8	7.2	14,900	81	
	60	1.5	3.0	14,900	77	
	10	0.3	0.6	14,900	67	
52.00	2,200	42.3	29.7	5,630	84	12,490
	1,800	34.6	28.1	6,440	83	
	1,500	28.8	26.3	7,240	83	
	1,200	23.1	23.6	8,010	82	
	1,000	19.2	21.4	8,730	82	
	750	14.4	17.9	9,700	82	
	500	9.6	13.7	11,050	81	
	300	5.8	9.1	12,020	80	
	150	2.9	4.8	12,490	79	
	60	1.2	2.0	12,490	76	
	10	0.2	0.4	12,490	65	
61.00	2,200	36.1	21.0	4,400	79	11,680
	1,800	29.5	20.2	5,110	78	
	1,500	24.6	19.2	5,830	78	
	1,200	19.7	18.5	6,920	77	
	1,000	16.4	17.3	7,780	77	
	750	12.3	15.2	9,110	77	
	500	8.2	11.8	10,450	76	
	300	4.9	7.9	11,680	76	
	150	2.5	4.2	11,680	71	
	60	1.0	1.8	11,680	66	
	10	0.2	0.4	11,680	56	

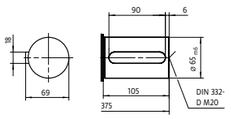
All indications for S1 operation at ambient temperature of 20 °C and use of synthetic oil. The maximum output torques may be reached in momentary load peaks but never be exceeded.

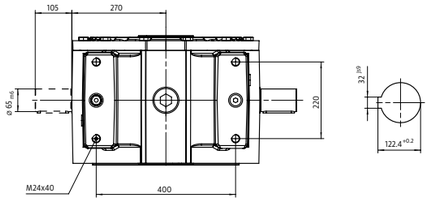
TYPE SVA

Solid input shaft, hollow shaft at output

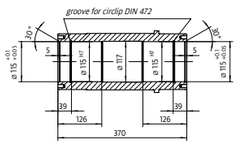


Y: Drive shaft





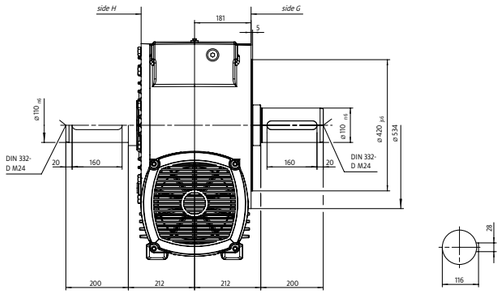
Hollow shaft



Further options: second free drive shaft end, hollow shaft with cover for shrink disc

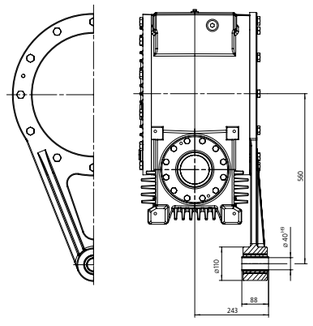
TYPE SVV

Solid shaft with free shaft ends on one or both sides



TYPE SV_D

Torque reaction lever at output drive



i = transmission ratio; n_1 = drive speed; n_2 = output drive speed; P_1 = rated drive power; T_2 = rated output torque; $T_{2\,max}$ = max. output torque

i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
6.50	2,000	307.7	152.0	4,530	96	22,570
	1,800	276.9	149.2	4,940	96	
	1,500	230.8	142.4	5,600	95	
	1,200	184.6	143.1	6,960	94	
	1,000	153.8	135.6	7,910	94	
	750	115.4	122.0	9,490	94	
	500	76.9	101.2	11,810	94	
	300	46.2	76.6	14,900	94	
	150	23.1	47.1	18,320	94	
	60	9.2	22.1	21,220	93	
	10	1.5	4.0	22,570	90	
8.75	2,000	228.6	144.6	5,740	95	20,680
	1,800	205.7	140.4	6,190	95	
	1,500	171.4	133.8	7,080	95	
	1,200	137.1	128.3	8,490	95	
	1,000	114.3	119.9	9,520	95	
	750	85.7	107.1	11,340	95	
	500	57.1	88.9	13,810	93	
	300	34.3	62.8	16,280	93	
	150	17.1	36.5	18,930	93	
	60	6.9	16.1	20,680	92	
	10	1.1	2.8	20,680	89	
11.50	2,000	173.9	119.3	6,160	94	14,250
	1,800	156.5	115.8	6,640	94	
	1,500	130.4	112.1	7,800	95	
	1,200	104.3	108.1	9,300	94	
	1,000	87.0	98.9	10,210	94	
	750	65.2	88.4	12,170	94	
	500	43.5	69.8	14,250	93	
	300	26.1	41.9	14,250	93	
	150	13.0	21.2	14,250	92	
	60	5.2	8.6	14,250	91	
	10	0.9	1.5	14,250	87	
13.00	2,000	153.8	110.5	6,240	91	23,750
	1,800	138.5	107.4	6,740	91	
	1,500	115.4	102.9	7,750	91	
	1,200	92.3	97.9	9,120	90	
	1,000	76.9	92.5	10,340	90	
	750	57.7	83.0	12,370	90	
	500	38.5	68.7	15,350	90	
	300	23.1	47.4	17,460	89	
	150	11.5	27.2	20,000	89	
	60	4.6	12.4	22,260	87	
	10	0.8	2.3	23,750	83	
17.50	2,000	114.3	93.5	7,190	92	23,620
	1,800	102.9	91.0	7,770	92	
	1,500	85.7	87.5	8,870	91	
	1,200	68.6	80.4	10,300	92	
	1,000	57.1	75.7	11,510	91	
	750	42.9	66.5	13,490	91	
	500	28.6	51.5	15,490	90	
	300	17.1	36.1	18,090	90	
	150	8.6	20.8	20,430	88	
	60	3.4	9.1	22.170	87	
	10	0.6	1.7	23.620	82	

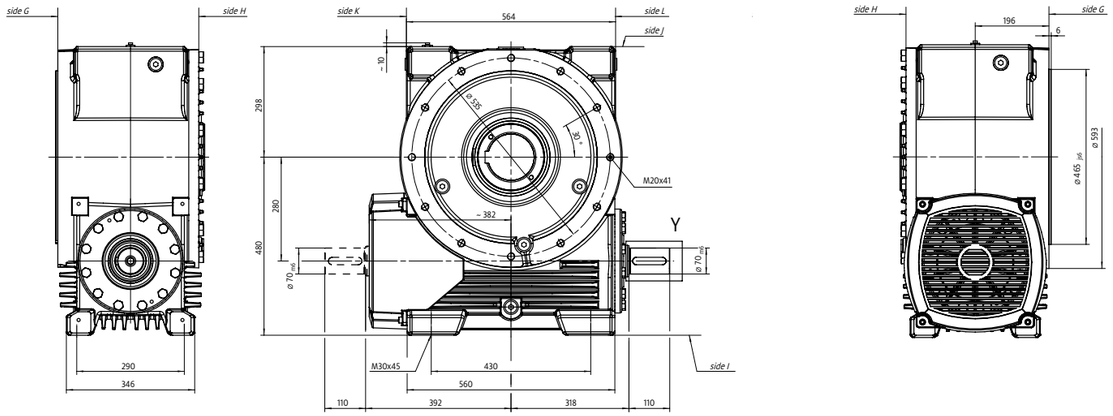
i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
23.00	2,000	87.0	66.8	6,750	92	19,220
	1,800	78.3	67.2	7,540	92	
	1,500	65.2	66.3	8,840	91	
	1,200	52.2	62.6	10,320	90	
	1,000	43.5	56.7	11,200	90	
	750	32.6	49.2	12,980	90	
	500	21.7	39.2	15,330	89	
	300	13.0	27.0	17,610	89	
	150	6.5	15.0	19,320	88	
	60	2.6	6.0	19,220	87	
	10	0.4	1.1	19,220	81	
26.00	2,000	76.9	62.4	6,820	88	24,640
	1,800	69.2	62.7	7,610	88	
	1,500	57.7	60.8	8,750	87	
	1,200	46.2	55.6	9,900	86	
	1,000	38.5	50.5	10,910	87	
	750	28.8	43.8	12,610	87	
	500	19.2	35.5	15,180	86	
	300	11.5	26.3	18,730	86	
	150	5.8	15.4	21,380	84	
	60	2.3	7.1	23,510	80	
	10	0.4	1.4	24,640	70	
35.00	2,000	57.1	46.9	6,900	88	25,270
	1,800	51.4	45.7	7,460	88	
	1,500	42.9	48.3	9,360	87	
	1,200	34.3	45.3	10,850	86	
	1,000	28.6	42.7	12,130	85	
	750	21.4	36.3	13,740	85	
	500	14.3	28.6	16,070	84	
	300	8.6	20.3	18,960	84	
	150	4.3	11.8	21,870	83	
	60	1.7	5.4	23,730	79	
	10	0.3	1.1	25,270	71	
46.00	2,000	43.5	37.7	7.130	86	19,800
	1,800	39.1	36.5	7.670	86	
	1,500	32.6	36.8	9.160	85	
	1,200	26.1	35.8	11,000	84	
	1,000	21.7	33.4	12,320	84	
	750	16.3	28.4	13,970	84	
	500	10.9	21.9	15,990	83	
	300	6.5	14.9	17,930	82	
	150	3.3	8.1	19,290	81	
	60	1.3	3.5	19,800	78	
	10	0.2	0.7	19,800	69	

All indications for S1 operation at ambient temperature of 20 °C and use of synthetic oil. The maximum output torques may be reached in momentary load peaks but never be exceeded.

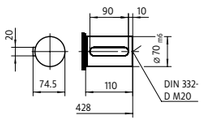
Dimensions in mm / featherkey ways according to DIN 6885 / strength class for screws 10.9

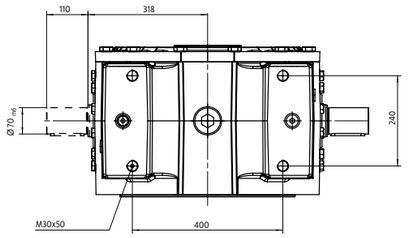
TYPE SVA

Solid input shaft, hollow shaft at output

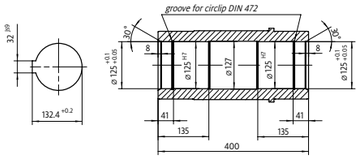


Y: Drive shaft





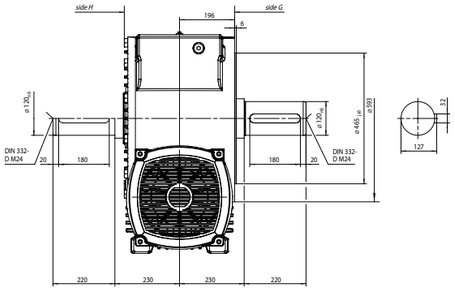
Hollow shaft



Further options: second free drive shaft end, hollow shaft with cover for shrink disc

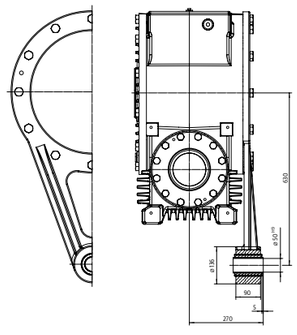
TYPE SVV

Solid shaft with free shaft ends on one or both sides



TYPE SV_D

Torque reaction lever at output drive



i = transmission ratio; n_1 = drive speed; n_2 = output drive speed; P_1 = rated drive power; T_2 = rated output torque; $T_{2\,max}$ = max. output torque

i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
7.50	1,800	240.0	189.5	7,240	96	30,180
	1,500	200.0	186.7	8,560	96	
	1,200	160.0	177.2	10,050	95	
	1,000	133.3	167.7	11,410	95	
	750	100.0	154.4	14,010	95	
	500	66.7	122.9	16,550	94	
	300	40.0	94.0	21,090	94	
	150	20.0	57.2	25,420	93	
	60	8.0	25.7	28,490	93	
	10	1.3	4.7	30,180	90	
10.25	1,800	175.6	156.4	8,080	95	26,250
	1,500	146.3	157.8	9,780	95	
	1,200	117.1	147.4	11,420	95	
	1,000	97.6	141.6	13,170	95	
	750	73.2	123.9	15,360	95	
	500	48.8	99.4	18,100	93	
	300	29.3	71.6	21,720	93	
	150	14.6	40.4	24,490	93	
	60	5.9	17.2	25,790	92	
	10	1.0	3.0	26,250	89	
13.25	1,800	135.8	117.5	7,850	95	13,340
	1,500	113.2	119.0	9,440	94	
	1,200	90.6	118.9	11,790	94	
	1,000	75.5	103.6	12,190	93	
	750	56.6	81.8	12,980	94	
	500	37.7	56.7	13,340	93	
	300	22.6	34.0	13,340	93	
	150	11.3	17.0	13,340	93	
	60	4.5	6.9	13,340	92	
	10	0.8	1.2	13,340	88	
15.00	1,800	120.0	121.7	8,810	91	32,210
	1,500	100.0	116.1	10,090	91	
	1,200	80.0	110.1	11,830	90	
	1,000	66.7	104.1	13,420	90	
	750	50.0	95.6	16,440	90	
	500	33.3	79.7	20,540	90	
	300	20.0	59.3	25,470	90	
	150	10.0	35.4	30,120	89	
	60	4.0	15.3	32,210	88	
	10	0.7	2.7	32,210	84	
20.50	1,800	87.8	99.9	10,000	92	29,150
	1,500	73.2	91.7	11,010	92	
	1,200	58.5	85.3	12,800	92	
	1,000	48.8	83.0	14,780	91	
	750	36.6	74.5	17,690	91	
	500	24.4	61.0	21,510	90	
	300	14.6	42.6	25,010	90	
	150	7.3	24.1	27,940	89	
	60	2.9	9.9	28,760	89	
	10	0.5	1.8	29,150	84	
26.50	1,800	67.9	82.6	10,680	92	17,850
	1,500	56.6	73.0	11,210	91	
	1,200	45.3	61.1	11,730	91	
	1,000	37.7	54.5	12,540	91	
	750	28.3	45.2	13,870	91	
	500	18.9	34.1	15,520	90	
	300	11.3	23.5	17,850	90	
	150	5.7	11.9	17,850	89	
	60	2.3	4.8	17,850	88	
	10	0.4	0.9	17,850	82	

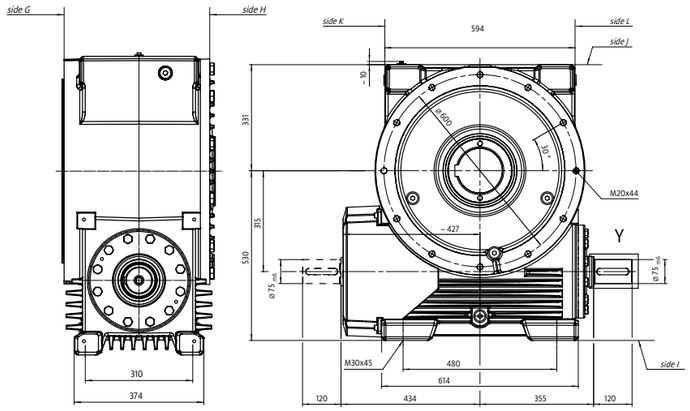
i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
30.00	1,800	60.0	69.2	9,690	88	32,730
	1,500	50.0	66.0	11,090	88	
	1,200	40.0	62.7	13,030	87	
	1,000	33.3	61.0	15,200	87	
	750	25.0	54.6	18,140	87	
	500	16.7	44.2	21,780	86	
	300	10.0	31.7	26,070	86	
	150	5.0	18.4	30,260	86	
	60	2.0	8.4	32,730	82	
	10	0.3	1.6	32,730	72	
36.00	1,800	50.0	67.4	11,200	87	32,590
	1,500	41.7	64.0	12,760	87	
	1,200	33.3	59.4	14,810	87	
	1,000	27.8	56.2	16,630	86	
	750	20.8	50.2	19,570	85	
	500	13.9	41.0	23,690	84	
	300	8.3	29.0	27,920	84	
	150	4.2	16.8	32,020	83	
	60	1.7	6.9	32,590	82	
	10	0.3	1.3	32,590	74	
41.00	1,800	43.9	56.1	10,610	87	29,660
	1,500	36.6	55.5	12,450	86	
	1,200	29.3	52.1	14,450	85	
	1,000	24.4	49.1	16,150	84	
	750	18.3	42.2	18,510	84	
	500	12.2	32.6	21,190	83	
	300	7.3	22.1	23,990	83	
	150	3.7	12.5	26,780	82	
	60	1.5	5.6	28,980	80	
	10	0.2	1.1	29,660	71	
53.00	1,800	34.0	43.4	10,250	84	20,880
	1,500	28.3	40.4	11,460	84	
	1,200	22.6	37.8	13,250	83	
	1,000	18.9	34.1	14,170	82	
	750	14.2	28.3	15,650	82	
	500	9.4	21.8	17,850	81	
	300	5.7	14.6	19,700	80	
	150	2.8	7.7	20,890	80	
	60	1.1	3.2	20,880	77	
	10	0.2	0.6	20,880	67	
60.00	1,800	40.0	47.6	8,980	79	26,470
	1,500	30.0	39.8	10,020	79	
	1,200	25.0	40.6	12,090	78	
	1,000	20.0	37.0	13,620	77	
	750	16.7	36.8	16,250	77	
	500	12.5	33.4	19,640	77	
	300	8.3	25.7	22,350	76	
	150	5.0	17.6	24,850	74	
	60	2.5	10.0	26,000	68	
	10	1.0	4.8	26,470	58	

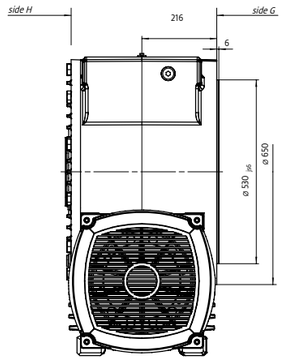
All indications for S1 operation at ambient temperature of 20 °C and use of synthetic oil. The maximum output torques may be reached in momentary load peaks but never be exceeded.

Dimensions in mm / featherkey ways according to DIN 6885 / strength class for screws 10.9

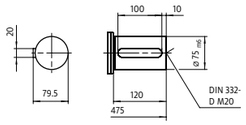
TYPE SVA

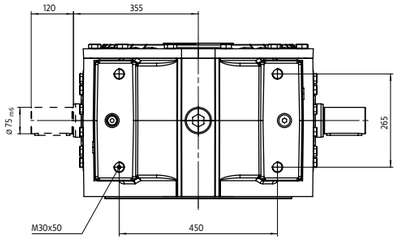
Solid input shaft, hollow shaft at output



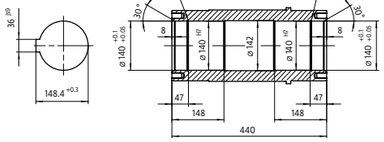


Y: Drive shaft





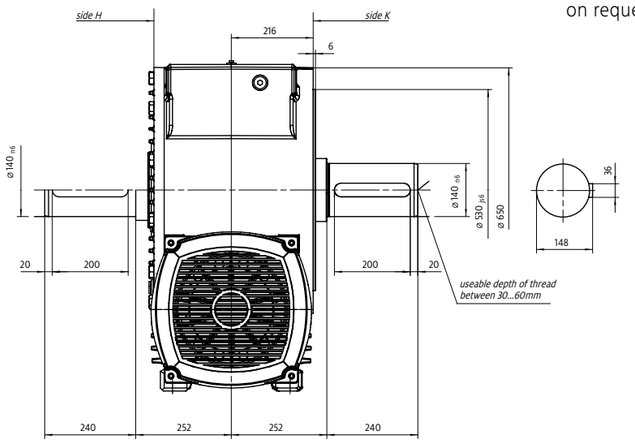
Hollow shaft



Further options: second free drive shaft end, hollow shaft with cover for shrink disc

TYPE SVV

Solid shaft with free shaft ends on one or both sides



TYPE SV_D

Torque reaction lever at output drive

on request

i = transmission ratio; n_1 = drive speed; n_2 = output drive speed; P_1 = rated drive power;
T_2 = rated output torque; $T_{2\,max}$ = max. output torque

i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
6.75	1,500	222.2	258.6	10,670	96	44,970
	1,200	177.8	245.9	12,550	95	
	1,000	148.1	232.9	14,260	95	
	750	111.1	213.2	17,410	95	
	500	74.1	184.9	22,410	94	
	300	44.4	141.8	28,330	93	
	150	22.2	90.8	36,270	93	
	60	8.9	42.2	41,720	92	
	10	1.5	7.8	44,970	90	
8.75	1,500	171.4	214.8	11,370	95	40,840
	1,200	137.1	200.7	13,420	96	
	1,000	114.3	196.3	15,580	95	
	750	85.7	176.6	18,690	95	
	500	57.1	151.5	23,800	94	
	300	34.3	112.4	29,420	94	
	150	17.1	67.4	35,300	94	
	60	6.9	30.5	39,540	93	
	10	1.1	5.4	40,840	90	
11.75	1,500	127.7	187.0	13,290	95	38,090
	1,200	102.1	175.4	15,420	94	
	1,000	85.1	161.9	17,080	94	
	750	63.8	146.8	20,640	94	
	500	42.6	119.3	24,910	93	
	300	25.5	85.6	29,780	93	
	150	12.8	50.7	35,280	93	
	60	5.1	22.1	38,100	92	
	10	0.9	3.8	38,090	89	
13.50	1,500	111.1	163.9	13,100	93	45,700
	1,200	88.9	161.0	15,910	92	
	1,000	74.1	149.0	17,670	92	
	750	55.6	135.3	21,390	92	
	500	37.0	111.5	26,440	92	
	300	22.2	83.8	32,420	90	
	150	11.1	50.0	38,650	90	
	60	4.4	23.2	44,290	89	
	10	0.7	4.2	45,700	84	
17.50	1,500	85.7	138.2	14,320	93	46,150
	1,200	68.6	130.9	16,770	92	
	1,000	57.1	122.3	18,800	92	
	750	42.9	110.7	22,440	91	
	500	28.6	92.7	28,190	91	
	300	17.1	68.7	34,450	90	
	150	8.6	40.0	40,090	90	
	60	3.4	18.0	44,660	89	
	10	0.6	3.3	46,150	84	

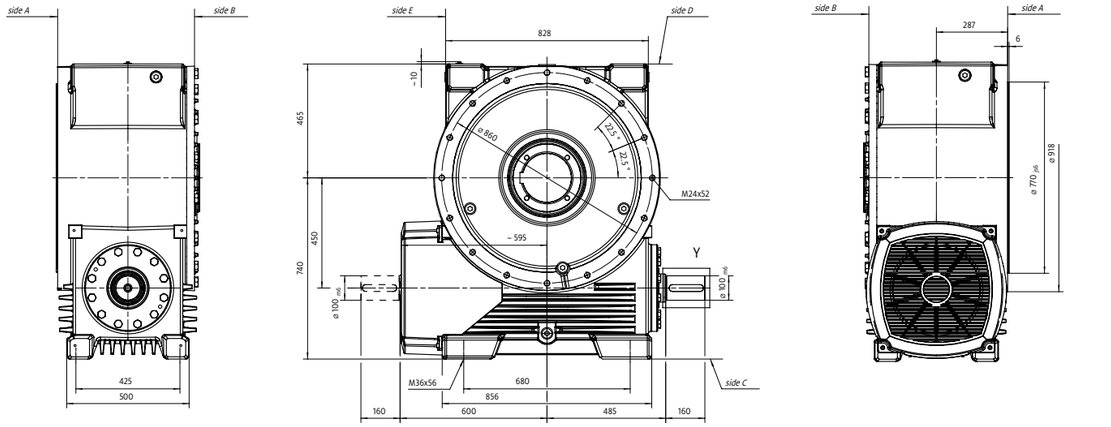
i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
23.50	1,500	63.8	99.7	13,580	91	40,480
	1,200	51.1	100.8	17,150	91	
	1,000	42.6	94.0	19,190	91	
	750	31.9	86.2	23,220	90	
	500	21.3	67.5	27,250	90	
	300	12.8	49.3	32,850	89	
	150	6.4	28.7	38,250	89	
	60	2.6	12.3	40,490	88	
	10	0.4	2.2	40,480	82	
27.00	1,500	55.6	89.9	13,760	89	43,610
	1,200	44.4	88.5	16,730	88	
	1,000	37.0	84.9	19,050	87	
	750	27.8	77.1	23,060	87	
	500	18.5	65.1	29,220	87	
	300	11.1	50.0	37,420	87	
	150	5.6	28.2	41,730	86	
	60	2.2	12.6	45,500	84	
	10	0.4	2.3	43,610	75	
37.00	1,500	40.5	67.0	13,880	88	52,680
	1,200	32.4	69.1	17,710	87	
	1,000	27.0	69.8	21,210	86	
	750	20.3	62.5	25,010	85	
	500	13.5	51.4	30,870	85	
	300	8.1	38.1	37,670	84	
	150	4.1	22.5	44,060	83	
	60	1.6	10.1	48,870	82	
	10	0.3	2.0	52,680	74	
47.00	1,500	31.9	54.9	14,140	86	43,840
	1,200	25.5	57.6	18,320	85	
	1,000	21.3	55.8	21,050	84	
	750	16.0	48.4	24,340	84	
	500	10.6	38.8	29,260	84	
	300	6.4	27.8	34,540	83	
	150	3.2	16.5	39,910	81	
	60	1.3	7.3	43,840	80	
	10	0.2	1.4	43,840	71	

All indications for S1 operation at ambient temperature of 20 °C and use of synthetic oil. The maximum output torques may be reached in momentary load peaks but never be exceeded.

Dimensions in mm / featherkey ways according to DIN 6885 / strength class for screws 10.9

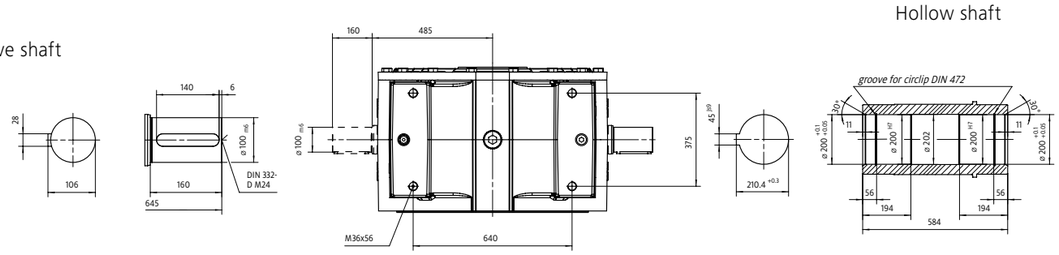
TYPE SVA

Solid input shaft, hollow shaft at output



Hollow shaft

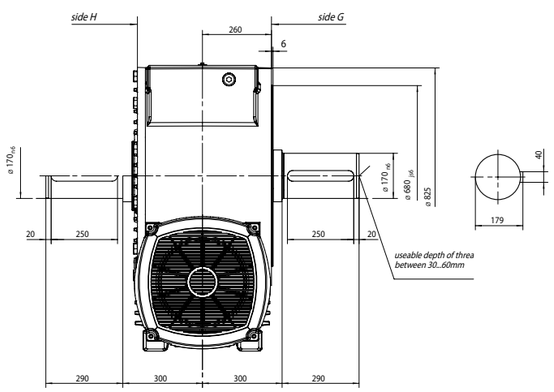
Y: Drive shaft



Further options: second free drive shaft end, hollow shaft with cover for shrink disc

TYPE SVV

solid shaft free shaft ends on one or both sides



TYPE SV_D

Torque reaction lever at output drive

on request

i = transmission ratio; n_1 = drive speed; n_2 = output drive speed; P_1 = rated drive power;
T_2 = rated output torque; $T_{2\,max}$ = max. output torque

i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
7.75	1,500	193.5	312.1	14,630	95	57,790
	1,200	154.8	305.5	17,900	95	
	1,000	129.0	292.8	20,370	94	
	750	96.8	267.3	24,800	94	
	500	64.5	227.6	31,670	94	
	300	38.7	175.2	40,190	93	
	150	19.4	108.5	49,780	93	
	60	7.7	50.9	57,790	92	
	10	1.3	8.7	57,790	90	
10.25	1,500	146.3	262.4	16,440	96	56,280
	1,200	117.1	250.2	19,390	95	
	1,000	97.6	235.9	21,940	95	
	750	73.2	218.6	27,100	95	
	500	48.8	182.5	33,950	95	
	300	29.3	132.9	40,340	93	
	150	14.6	78.7	47,750	93	
	60	5.9	34.9	53,000	93	
	10	1.0	6.4	56,280	90	
13.75	1,500	109.1	186.6	15,520	95	25,730
	1,200	87.3	172.1	17,890	95	
	1,000	72.7	169.6	20,930	94	
	750	54.5	138.2	22,740	94	
	500	36.4	96.9	23,920	94	
	300	21.8	61.7	24,840	92	
	150	10.9	31.9	25,730	92	
	60	4.4	12.9	25,730	91	
	10	0.7	2.2	25,730	88	
15.50	1,500	96.8	181.1	16,620	93	69,420
	1,200	77.4	179.1	20,320	92	
	1,000	64.5	171.1	23,050	91	
	750	48.4	155.8	27,990	91	
	500	32.3	135.8	36,590	91	
	300	19.4	103.9	46,650	91	
	150	9.7	65.2	58,590	91	
	60	3.9	30.0	66,690	90	
	10	0.6	5.5	69,420	86	
20.50	1,500	73.2	141.6	17,000	92	66,900
	1,200	58.5	144.2	21,410	91	
	1,000	48.8	141.0	25,120	91	
	750	36.6	126.1	29,950	91	
	500	24.4	106.3	37,460	90	
	300	14.6	79.7	46,800	90	
	150	7.3	47.8	56,120	90	
	60	2.9	21.2	61,680	89	
	10	0.5	4.1	66,900	84	
27.50	1,500	54.5	102.1	16,450	92	35,910
	1,200	43.6	103.8	20,670	91	
	1,000	36.4	100.4	23,990	91	
	750	27.3	88.2	28,090	91	
	500	18.2	66.5	31,420	90	
	300	10.9	43.0	33,870	90	
	150	5.5	23.0	35,910	89	
	60	2.2	9.3	35,910	88	
	10	0.4	1.6	35,910	83	

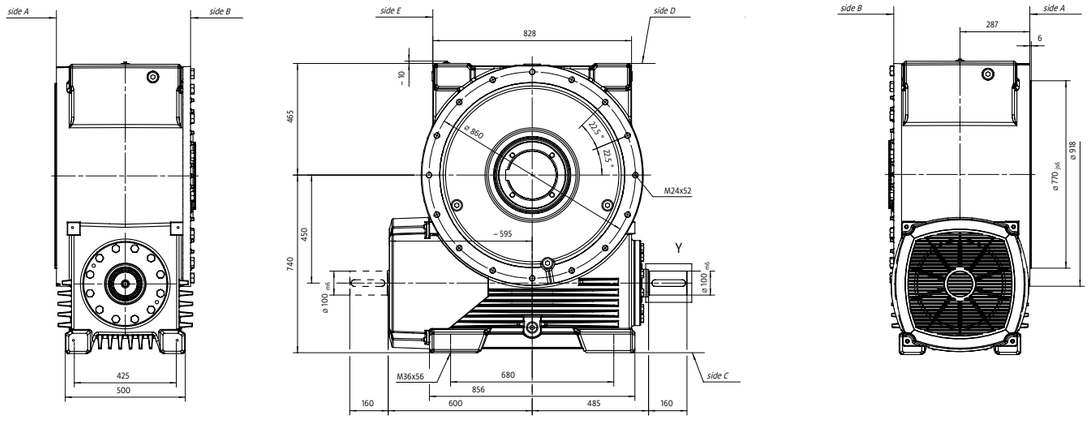
i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
31.00	1,500	48.4	97.1	17,060	89	68,800
	1,200	38.7	95.4	20,940	89	
	1,000	32.3	95.7	24,920	88	
	750	24.2	91.6	31,810	88	
	500	16.1	77.9	40,140	87	
	300	9.7	56.7	48,670	87	
	150	4.8	33.6	57,720	87	
	60	1.9	15.5	64,360	84	
	10	0.3	3.1	68,800	76	
37.00	1,500	40.5	84.8	17,580	88	74,280
	1,200	32.4	88.2	22,850	88	
	1,000	27.0	86.3	26,850	88	
	750	20.3	84.6	34,270	86	
	500	13.5	68.1	41,390	86	
	300	8.1	48.9	49,570	86	
	150	4.1	30.4	60,800	85	
	60	1.6	13.7	67,760	84	
	10	0.3	2.7	74,280	77	
41.00	1,500	36.6	74.7	17,170	88	66,470
	1,200	29.3	75.6	21,700	88	
	1,000	24.4	74.4	25,360	87	
	750	18.3	71.2	31,950	86	
	500	12.2	61.0	41,060	86	
	300	7.3	44.7	48,960	84	
	150	3.7	26.4	57,260	83	
	60	1.5	11.8	63,010	82	
	10	0.2	2.3	66,470	75	
55.00	1,500	27.3	57.2	17,020	85	39,180
	1,200	21.8	57.9	21,270	84	
	1,000	18.2	56.4	24,580	83	
	750	13.6	52.6	30,210	82	
	500	9.1	39.4	33,960	82	
	300	5.5	26.0	36,860	81	
	150	2.7	14.0	39,180	80	
	60	1.1	5.7	39,180	78	
	10	0.2	1.1	39,180	69	
63.00	1,500	25.0	49.7	16,150	85	53,380
	1,200	20.0	47.5	19,070	84	
	1,000	16.7	45.7	21,720	83	
	750	12.5	41.8	26,180	82	
	500	8.3	35.3	33,170	82	
	300	5.0	26.8	41,500	81	
	150	2.5	16.1	49,280	80	
	60	1.0	7.2	53,380	78	
	10	0.2	1.4	53,380	69	

All indications for S1 operation at ambient temperature of 20 °C and use of synthetic oil. The maximum output torques may be reached in momentary load peaks but never be exceeded.

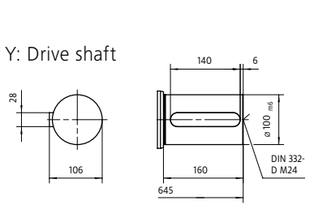
Dimensions in mm / featherkey ways according to DIN 6885 / strength class for screws 10.9

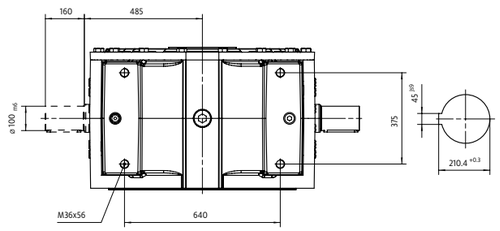
TYPE SVA

Solid input shaft, hollow shaft at output

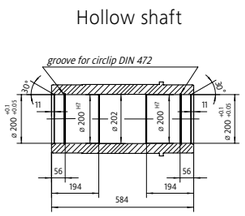


Y: Drive shaft





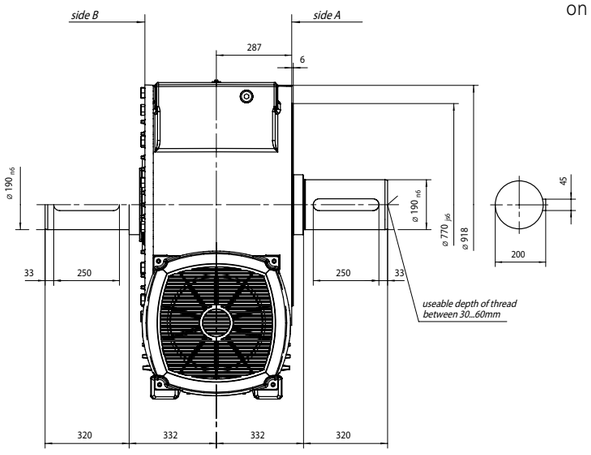
Hollow shaft



Further options: second free drive shaft end, hollow shaft with cover for shrink disc

TYPE SVV

Solid shaft with free shaft ends on one or both sides



TYPE SV_D

Torque reaction lever at output drive

on request

i = transmission ratio; n_1 = drive speed; n_2 = output drive speed; P_1 = rated drive power;
T_2 = rated output torque; $T_{2\,max}$ = max. output torque

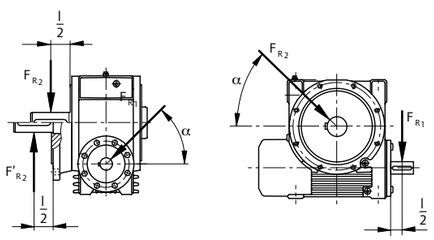
i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
9.00	1,350	150.0	343.4	20,770	95	78,260
	1,200	133.3	340.3	22,910	94	
	1,000	111.1	330.2	26,960	95	
	750	83.3	304.7	32,820	94	
	500	55.6	258.5	41,770	94	
	300	33.3	189.7	51,090	94	
	150	16.7	117.9	62,840	93	
	60	6.7	53.6	71,470	93	
	10	1.1	10.0	78,260	91	
11.75	1,350	114.9	294.8	23,280	95	58,920
	1,200	102.1	288.5	25,630	95	
	1,000	85.1	274.0	29,210	95	
	750	63.8	243.2	34,200	94	
	500	42.6	198.2	41,370	93	
	300	25.5	144.4	50,780	94	
	150	12.8	84.7	58,920	93	
	60	5.1	34.2	58,920	92	
	10	0.9	5.9	58,920	89	
18.00	1,350	75.0	196.2	23,230	93	91,220
	1,200	66.7	199.3	26,260	92	
	1,000	55.6	198.3	31,360	92	
	750	41.7	191.7	40,420	92	
	500	27.8	168.2	52,620	91	
	300	16.7	123.7	64,480	91	
	150	8.3	75.1	77,450	90	
	60	3.3	33.8	86,110	89	
	10	0.6	6.2	91,220	85	

i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
23.50	1,350	57.4	152.5	23,320	92	74,380
	1,200	51.1	151.0	25,980	92	
	1,000	42.6	152.5	31,150	91	
	750	31.9	145.0	39,480	91	
	500	21.3	116.8	47,710	91	
	300	12.8	86.7	57,740	89	
	150	6.4	52.4	69,780	89	
	60	2.6	22.6	74,380	88	
	10	0.4	4.0	74,380	83	
38.00	1,350	35.5	97.6	23,080	88	99,620
	1,200	31.6	98.4	26,180	88	
	1,000	26.3	101.2	31,950	87	
	750	19.7	96.1	39,990	86	
	500	13.2	89.9	55,470	85	
	300	7.9	65.6	67,430	85	
	150	3.9	39.5	81,280	85	
	60	1.6	18.5	92,790	83	
	10	0.3	3.6	99,620	76	
47.00	1,350	28.7	80.9	23,140	86	81,880
	1,200	25.5	83.0	26,400	85	
	1,000	21.3	82.2	31,380	85	
	750	16.0	79.0	39,700	84	
	500	10.6	70.1	52,890	84	
	300	6.4	51.1	63,470	83	
	150	3.2	30.3	74,390	82	
	60	1.3	13.7	81,880	80	
	10	0.2	2.5	81,880	73	

All indications for S1 operation at ambient temperature of 20 °C and use of synthetic oil.
The maximum output torques may be reached in momentary load peaks but never be exceeded.

Dimensions in mm / featherkey ways according to DIN 6885 / strength class for screws 10.9

PERMISSIBLE SHAFT LOADS



F_{R1} Radial force drive shaft
F_{R2} Radial force output shaft
F'_{R2} Radial force output shaft with output drive flange
$F'_{R2} = 0.7 \times F_{R2}$

Our units can withstand additional forces at both the output shaft and hollow shaft. The following data on permissible loads were determined on the basis of the most unfavourable angle of force application α and application of force in the middle of the shaft end, as well as at drive rotational speed n_1 = 1.400 rpm. The gear units are capable of withstanding axial forces up to a level of 50 % of the permissible radial force. All data given applies to one-way loads, i. e. simultaneous application of axial and radial forces is not permissible.

Individual recalculation is required for higher loads or occurrence of combined loads (both axial and radial). In this case, please state direction of rotation, forces as wells as indications on the point of application of force or the angle of application α as well as the desired output speed.

Permissible radial forces for drive rotational speed n_1 = 1400 rpm depending on the transmission ratio i:

S40.1		
i	F_{R1} [N]	F_{R2} [N]
7.25	300	870
9.75	300	950
12.75	*	1,030
14.50	300	1,000
19.50	300	1,250
25.50	300	1,250
29.00	300	1,000
39.00	*	1,030
51.00	300	950
60.00	300	870
-	-	-
-	-	-

S50.1		
i	F_{R1} [N]	F_{R2} [N]
4.83	500	2,250
7.25	500	2,400
9.50	500	2,900
12.75	*	3,300
14.50	500	3,500
19.00	500	3,800
25.50	*	4,300
29.00	500	4,800
38.00	500	5,000
51.00	*	5,000
62.00	500	5,000
83.00	500	5,000

S63.1		
i	F_{R1} [N]	F_{R2} [N]
4.83	800	2,800
7.25	800	2,900
9.75	800	3,000
12.75	*	3,850
14.50	800	4,300
19.50	800	4,750
25.50	*	5,000
29.00	800	5,700
39.00	800	5,950
51.00	*	6,000
61.00	800	6,100
82.00	800	6,300

S80.1		
i	F_{R1} [N]	F_{R2} [N]
5.00	1,000	3,250
7.50	1,000	3,600
10.00	1,000	3,900
13.25	*	4,200
15.00	1,000	4,500
20.00	1,000	5,800
26.50	*	6,000
30.00	1,000	6,100
40.00	1,000	7,500
53.00	*	7,600
62.00	1,000	7,700
82.00	1,000	7,800

S100.1		
i	F_{R1} [N]	F_{R2} [N]
5.0	*	*
7.5	*	5,000
10.0	*	5,400
13.0	*	7,100
15.0	*	6,700
20.0	*	7,900
26.0	*	9,900
30.0	*	9,500
40.0	*	10,000
52.0	*	10,000
63.0	*	10,000
82.0	*	10,000

S125.1		
i	F_{R1} [N]	F_{R2} [N]
4.83	*	*
7.25	*	5,500
10.00	*	6,300
13.00	*	8,200
14.50	*	7,800
20.00	*	8,900
26.00	*	11,200
29.00	*	10,800
40.00	*	12,300
52.00	*	14,000
62.00	*	14,000
83.00	*	14,000

S160.1		
i	F_{R1} [N]	F_{R2} [N]
5.0	*	*
7.5	*	7,400
10.0	*	8,500
13.5	*	11,700
15.0	*	11,000
20.0	*	12,400
27.0	*	15,200
30.0	*	15,500
40.0	*	17,500
54.0	*	18,000
63.0	*	18,000
84.0	*	18,000

Data relating to sizes 200 to 450 on request

*on request

OIL QUANTITIES/WEIGHTS

As standard, AUMA Drives worm gear units are delivered including oil filling. Fully synthetic high performance oils with low-wear additives for premium efficiency and reduced maintenance are used. Lubricant quantities depend on the service position of the gear unit. For more detailed information, please refer to page 21. Permissible lubricants are indicated in the operation instructions or on the name plate.

Oil quantities (litre)

Size	Service position					
	B3	B8	B3I	B6	V5	V5II
40	0.18	0.28	0.30	0.30	0.20	0.20
50	0.45	0.75	0.65	0.65	0.55	0.55
63	0.63	1.10	1.00	1.00	0.75	0.75
80	1.30	2.50	2.00	2.00	1.50	1.50
100	1.70	3.80	3.00	3.00	3.00	3.00
125	2.00	6.50	4.00	4.00	4.00	4.00
160	4.20	12.00	8.50	8.50	7.70	7.70
200	8.00	22.00	15.00	15.00	13.00	13.00
225	11.00	26.00	19.00	19.00	19.50	19.50
250	14.00	42.00	29.00	29.00	29.00	29.00
280	18.50	58.00	41.00	41.00	39.50	39.50
315	27.00	75.00	53.00	53.00	53.00	53.00
355	36.00	110.00	75.00	75.00	75.00	75.00
400	44.00	148.00	98.00	98.00	98.00	98.00
450	68.00	219.00	141.00	141.00	144.00	144.00

Weights (kg) sizes 40.1 to 80.1

Basic version		Mounting parts										
Size	Typ SVA	Flanges for mounting IEC motor Type SK_				Coupling		Solid output shaft		Output drive flange	Torque reaction lever	Cover
		A1 = 105	A1 = 120	A1 = 140	A1 = 160	24	28	1 shaft end	2 shaft ends			
40	5.2	1.0	1.2	1.5	-	0.25	0.6	0.35	0.5	1.1	1.0	0.5
50	11.0	1.0	1.2	1.5	2.0	0.25	0.6	0.80	1.0	1.6	1.4	0.5
63	14.5	1.0	1.2	1.5	2.0	0.25	0.6	1.40	1.6	3.6	1.7	1.0
80	26.5	1.0	1.2	1.5	2.0	0.25	0.6	2.20	2.5	4.9	2.6	1.6

Weights (kg) sizes 100.1 to 160.1

Basic version		Mounting parts												
Size	Type SVA[2]	Flanges for mounting IEC motor								Solid output shaft		Output drive flange	Torque reaction lever	Cover
		Type SK_[1]				Type SP_								
		A1 = 200	A1 = 250	A1 = 300	A1 = 350	A1 = 200	A1 = 250	A1 = 300	A1 = 350	1 shaft end	2 shaft ends			
100	46.0	9.0	12.0	19.0	-	4.0	6.0	14.0	-	4.8	6.0	6.0	7.5	4.2
125	84.0	-	12.0	16.0	22.0	-	4.0	7.0	12.0	9.8	12.6	11.7	6.6	5.1
160	157.0	-	12.0	16.0	23.0	-	4.0	7.0	12.0	14.0	20.0	18.0	12.0	11.0

[1] including coupling; [2] including fan

Weights (kg) sizes 200.1 to 450.1

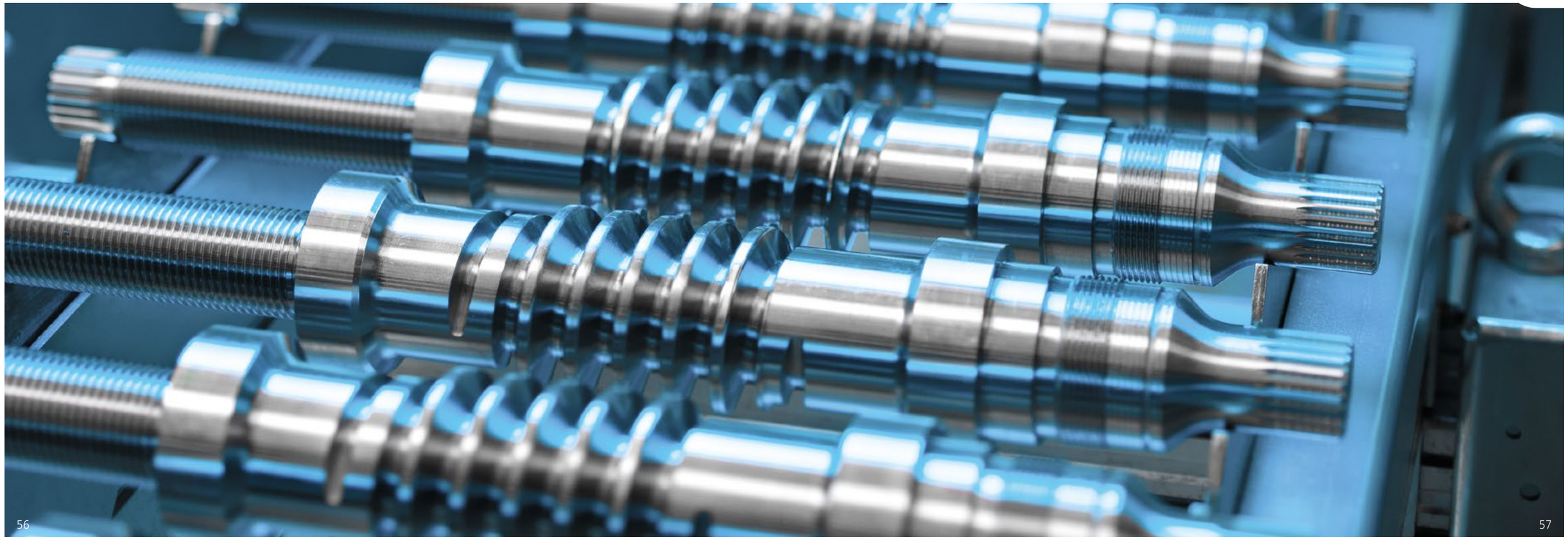
Basic version		Mounting parts				
Size	Type SVA[2]	Solid output shaft		Output drive flange	Torque reaction lever	Cover
		1 shaft end	2 shaft ends			
200	210.0	*	*	*	*	*
225	336.0	*	*	*	*	*
250	380.0	*	*	*	*	*
280	525.0	*	*	*	*	*
315	700.0	*	*	*	*	*
355	960.0	*	*	*	*	*
400	1,300.0	*	*	*	*	*
450	1,710.0	*	*	*	*	*

*on request; [2] including fan

OVERVIEW

By combining two single-stage worm gear units, significant speed reduction can be achieved in spite of the smaller and compact design. Due to the high transmission ratios, the relatively low drive performance is converted into high torques, particularly paying off for strong intermittent duty such as positioning duties. AUMA Drives supply dual stage double worm gear units and double worm gear motors in different sizes and versions with highest transmission ratios. Helical worm gear units can be implemented as primary reduction gearings (refer to chapter 4), thus achieving a total transmission of i > 10.000 – please contact us!

Size	Total transmission ratio i
DS 200.1	up to 5,166
DS 225.1	up to 3,818
DS 250.1	up to 5,063
DS 280.1	up to 3,864
DS 315.1	up to 5,040
DS 355.1	up to 2,898
DS 400.1	up to 3,780
DS 450.1	up to 2,162



Optimised solutions for complex motion cycles

HELICAL WORM GEAR UNITS

The combination of a worm gearing with an upstream helical gear stage provide the advantages of both gearing types. On the one hand, the two stages allow for large transmission ratio ranges, on the other hand, it combines high efficiency levels and torques with highest lifetime and reliability within a compact drive. This is extremely efficient in terms of space, cost and reduced maintenance efforts. Helical worm gear units are used to safely lift and lower loads and are ideally suited for applications in continuous duty, such as conveyor belt systems. To ensure optimum sizing for the machines and systems of our customers, AUMA Drives gear units are available in different sizes and versions.

AUMA Drives helical worm gear units are provided for many connection and fastening options.

For example, they can be directly mounted as slip-on gears (type SS_A) to the drive shaft of the driven machine and can be secured against turning by either using torque reaction levers (type SS_AD), output flanges (type SS_AF) or spigots and pitch circles at the housing. The basic variant type SSVA (solid shaft at input, hollow shaft at output) can be extended by drive and motor flanges, covers and many further options, such as slip-on output drive shafts. Slip-on gears within the gear hollow shaft can be axially secured both via end disc and circlip or via shrink disc. The following pictures provide an extract of the possible equipment variants. Please contact us for more information on bespoke solutions for different industries and applications.

- Worm wheel set according to DIN 3975 flank shape ZK, worm shaft made of 16MnCrS5, case-hardened and grinded. Worm wheel made of highly wear resistant special bronze.
- Lubrication: fully synthetic oil for highest efficiency and reduced maintenance.
- Surface corrosion protection in accordance with ISO 12944-2.
- Housing material: Cast iron with lamellar graphite (GJL), spheroidal cast iron (GJS) upon request.
- More than 20 standard transmission ratios per size. As an option, radial seals with dust lips (form AS) made of Viton as spray water and dust protection made of Viton for use in severe environments and highest service temperatures.

SERVICE POSITIONS

AUMA Drives helical worm gear units are operable in a large variety of service positions. The lubricant quantities and the positions of air vent and oil draining plugs depend on the selected mounting position.

B3
Horizontal drive shaft bottom
Horizontal output drive

B8
Horizontal drive shaft top
Horizontal output drive

B6
Vertical drive shaft bottom
Horizontal output drive

B3I
Vertical drive shaft top
Horizontal output drive

V5
Horizontal drive shaft
Vertical output drive
(top side B)

V5II
Horizontal drive shaft
Vertical output drive
(top side A)

HELICAL WORM GEAR UNITS – OVERVIEW

AUMA Drives helical worm gear units are operable in both rotation directions. The shown rotational direction indications comply with right-handed rising version. Left-handed version is available on request.

Basic variant type SSVA
(solid input shaft,
hollow shaft at output)

1 Torque reaction lever (type SS__D)

2 Covers for protection against contamination and corrosion as well as protection against touching.

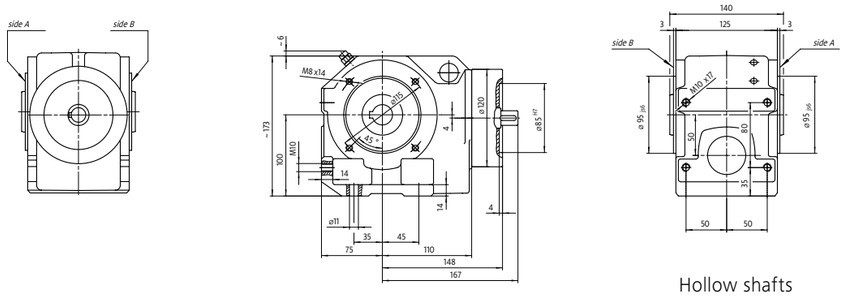
3 Coupling flanges for IEC motors (type SSK__) Option: Direct motor installation (Type SSM__ – with drive pinion on motor shaft) for confined spaces.

4 Output flange (type SS__F)

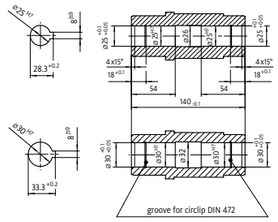
5 Output shafts (type SS_V) with free shaft ends on one or both sides), axially secured by retaining ring and washer or via shrink disc (type SS__S)

TYPE SSVA

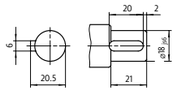
Solid input shaft, hollow shaft output

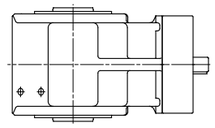


Hollow shafts



Drive shaft

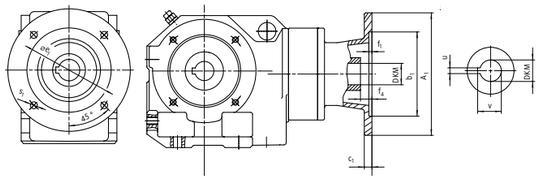




Further options: hollow shaft for shrink disc,
torque reaction levers (refer to page 74)

TYPE SSK

Coupling flanges for IEC motors



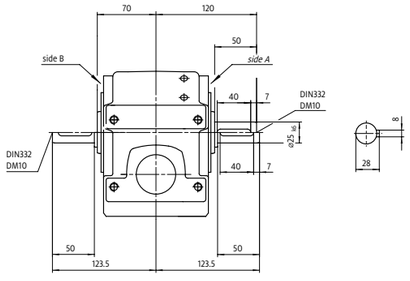
Motor					Flange 1				Flange 2			
Size	Shaft end	DKM	u	v	k_3 f_4	A_1 b_{1H7}	e_1 s_1	c_1 f_1	k_3 f_4	A_1 b_{1H7}	e_1 s_1	c_1 f_1
63	ø11x23	ø11	4	12.8	199 0	105 70	85 6.6	9 3	199 0	120 80 140 95	100 6.6 115 9	9 4
71	ø14x30	ø14	5	16.3								
80	ø19x40	ø19	6	21.8	209 10	120 80	100 6.6	9 4	219 5	160 110	130 9	10 4
90	ø24x50	ø24	8	27.3	219 20	140 95	115 9	10				
100***	ø28x60	ø28	8	31.3	229 15	160 110	130 9	4				

*** Only for service position B3I

Further options: direct motor installation (type SSM_)
for confined spaces – please contact us!

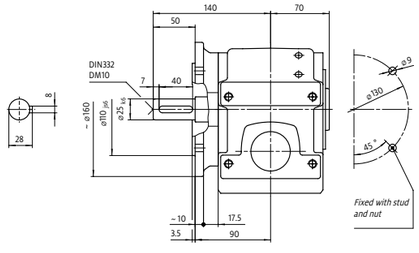
TYPE SS_V

Solid shaft with free shaft ends on one or both sides



TYPE SS_VF/SS_AF

Output drive flange with solid shaft or hollow shaft
(not illustrated)



Dimensions in mm / featherkey ways according to DIN 6,885 / strength class for screws 10.9

i = transmission ratio; n_1 = drive speed; n_2 = output drive speed; P_1 = rated drive power;
T_2 = rated output torque; $T_{2\,max}$ = max. output torque

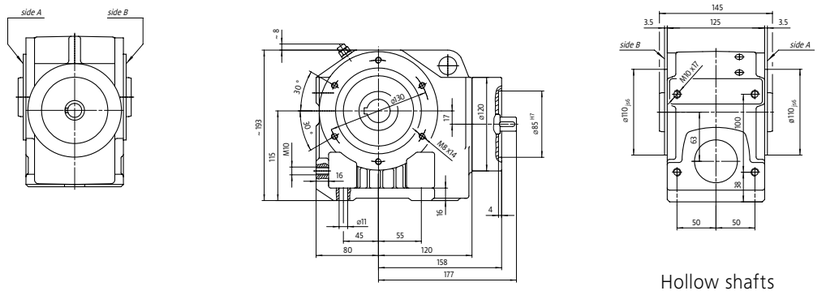
i (i_{worm})	n_1 [rpm]	n_2 [rpm]	P_1 [kW]	T_2 [Nm]	η [%]	$T_{2\,max}$ [Nm]
7.55 (4.83)	2,800	370.9	3.38	81	93	140
	1,400	185.4	2.11	100	92	
	930	123.2	1.45	100	89	
	700	92.7	1.27	115	88	
	450	59.6	0.83	115	86	
	250	33.1	0.47	115	84	
8.82 (4.83)	2,800	317.5	3.07	86	93	140
	1,400	158.7	1.92	105	91	
	930	105.4	1.36	108	88	
	700	79.4	1.05	110	87	
	450	51.0	0.72	115	85	
	250	28.3	0.42	120	84	
9.58 (7.25)	2,800	292.3	2.83	85	92	160
	1,400	146.1	1.82	107	90	
	930	97.1	1.36	115	86	
	700	73.1	0.99	113	87	
	450	47.0	0.70	120	84	
	250	26.1	0.41	123	81	
11.33 (7.25)	2,800	247.1	2.47	87	91	160
	1,400	123.6	1.63	112	89	
	930	82.1	1.13	112	85	
	700	61.8	0.88	115	85	
	450	39.7	0.63	125	83	
	250	22.1	0.36	125	80	
12.55 (9.5)	2,800	223.1	2.18	85	91	150
	1,400	111.6	1.41	106	88	
	930	74.1	0.97	108	86	
	700	55.8	0.71	103	85	
	450	35.9	0.50	110	82	
	250	19.9	0.33	125	80	
14.84 (9.5)	2,800	188.7	1.89	86	90	150
	1,400	94.3	1.25	110	87	
	930	62.7	0.84	110	86	
	700	47.2	0.62	104	83	
	450	30.3	0.45	115	82	
	250	16.8	0.28	126	79	
17.35 (9.5)	2,800	161.4	1.63	87	90	150
	1,400	80.7	1.07	110	87	
	930	53.6	0.76	113	84	
	700	40.3	0.53	105	83	
	450	25.9	0.40	120	81	
	250	14.4	0.25	128	78	
19.16 (14.5)	2,800	146.1	1.49	84	86	190
	1,400	73.1	1.01	110	83	
	930	48.5	0.76	118	79	
	700	36.5	0.58	120	79	
	450	23.5	0.42	129	75	
	250	13.0	0.26	139	74	
22.66 (14.5)	2,800	123.6	1.35	90	86	190
	1,400	61.8	0.89	112	81	
	930	41.0	0.66	120	78	
	700	30.9	0.54	128	77	
	450	19.9	0.36	130	75	
	250	11.0	0.23	141	72	
26.48 (14.5)	2,800	105.7	1.24	95	85	190
	1,400	52.9	0.80	115	80	
	930	35.1	0.58	122	77	
	700	26.4	0.47	129	76	
	450	17.0	0.32	131	74	
	250	9.4	0.20	145	71	
32.63 (14.5)	2,800	85.8	1.07	100	84	190
	1,400	42.9	0.68	120	79	
	930	28.5	0.51	129	76	
	700	21.5	0.39	130	74	
	450	13.8	0.27	139	73	
	250	7.7	0.17	147	68	

i (i_{worm})	n_1 [rpm]	n_2 [rpm]	P_1 [kW]	T_2 [Nm]	η [%]	$T_{2\,max}$ [Nm]
38.32 (29)	2,800	73.1	1.01	102	77	190
	1,400	36.5	0.64	120	72	
	930	24.3	0.47	127	68	
	700	18.3	0.38	130	66	
	450	11.7	0.27	140	63	
	250	6.5	0.21	148	48	
45.31 (29)	2,800	61.8	0.92	108	76	190
	1,400	30.9	0.56	123	71	
	930	20.5	0.42	130	67	
	700	15.4	0.33	132	65	
	450	9.9	0.24	142	62	
	250	5.5	0.15	150	57	
52.96 (29)	2,800	52.9	0.81	110	75	190
	1,400	26.4	0.49	125	70	
	930	17.6	0.37	130	65	
	700	13.2	0.29	135	64	
	450	8.5	0.21	145	61	
	250	4.7	0.13	152	56	
59.38 (38)	2,800	47.2	0.73	108	73	190
	1,400	23.6	0.46	126	67	
	930	15.7	0.34	130	63	
	700	11.8	0.26	131	62	
	450	7.6	0.19	134	57	
	250	4.2	0.11	137	54	
69.39 (38)	2,800	40.4	0.66	112	72	190
	1,400	20.2	0.41	128	66	
	930	13.4	0.29	130	63	
	700	10.1	0.23	132	60	
	450	6.5	0.16	135	56	
	250	3.6	0.10	138	53	
85.50 (38)	2,800	32.7	0.57	118	71	190
	1,400	16.4	0.34	129	65	
	930	10.9	0.24	132	62	
	700	8.2	0.20	133	58	
	450	5.3	0.14	136	55	
	250	2.9	0.08	140	53	
107.29 (38)	2,800	26.1	0.50	125	68	190
	1,400	13.0	0.28	130	63	
	930	8.7	0.20	133	59	
	700	6.5	0.16	135	56	
	450	4.2	0.11	137	54	
	250	2.3	0.07	141	52	
126.67 (38)	2,800	22.1	0.44	126	67	190
	1,400	11.1	0.25	131	61	
	930	7.3	0.18	135	58	
	700	5.5	0.14	136	55	
	450	3.6	0.10	138	53	
	250	2.0	0.06	143	51	
138.43 (38)	2,800	20.2	0.41	128	66	190
	1,400	10.1	0.23	132	60	
	930	6.7	0.17	135	57	
	700	5.1	0.13	137	54	
	450	3.3	0.09	139	53	
	250	1.8	0.05	145	51	
145.29 (38)	2,800	19.3	0.40	130	65	190
	1,400	9.6	0.23	132	59	
	930	6.4	0.16	135	57	
	700	4.8	0.13	137	54	
	450	3.1	0.09	140	52	
	250	1.7	0.05	145	51	

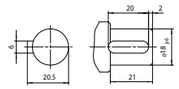
All indications for S1 operation at ambient temperature of 20 °C and use of synthetic oil. The maximum output torques may be reached in momentary load peaks but never be exceeded.

TYPE SSVA

Solid input shaft, hollow shaft output



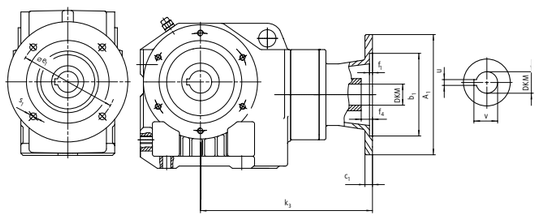
Drive shaft



Further options: hollow shaft for shrink disc, torque reaction levers (refer to page 74)

TYPE SSK

Coupling flanges for IEC motors



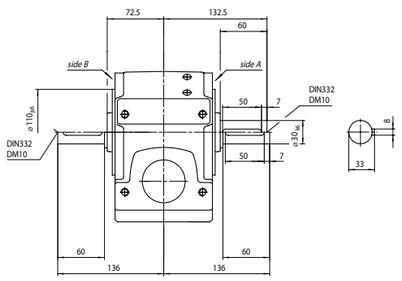
Motor					Flange 1				Flange 2			
Size	Shaft end	DKM	u	v	k_3 f_4	A_1 b_{1H7}	e_1 s_1	c_1 f_1	k_3 f_4	A_1 b_{1H7}	e_1 s_1	c_1 f_1
63	ø11x23	ø11	4	12.8	209 0	105 70	85 6.6	9 3	209 0	120 80	100 6.6	9 4
71	ø14x30	ø14	5	16.3						140 95	115 9	
80	ø19x40	ø19	6	21.8	219 10	120 80	100 6.6	9 4	229 5	160 110	130 9	10 4
90	ø24x50	ø24	8	27.3	229 20	140 95	115 9	10 4				
100***	ø28x60	ø28	8	31.3	239 15	160 110	130 9					

*** Only for service position B3I

Further options: direct motor installation (type SSM_) for confined spaces – please contact us!

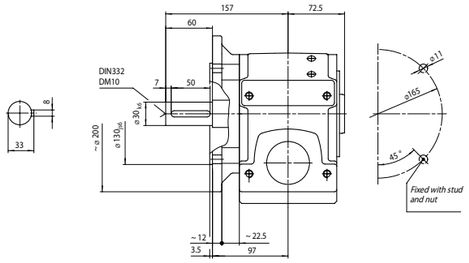
TYPE SS_V

Solid shaft with free shaft ends on one or both sides



TYPE SS_VF/SS_AF

Output drive flange with solid shaft or hollow shaft (not illustrated)



Dimensions in mm / featherkey ways according to DIN 6,885 / strength class for screws 10.9

i = transmission ratio; n_1 = drive speed; n_2 = output drive speed; P_1 = rated drive power; T_2 = rated output torque; $T_{2\,max}$ = max. output torque

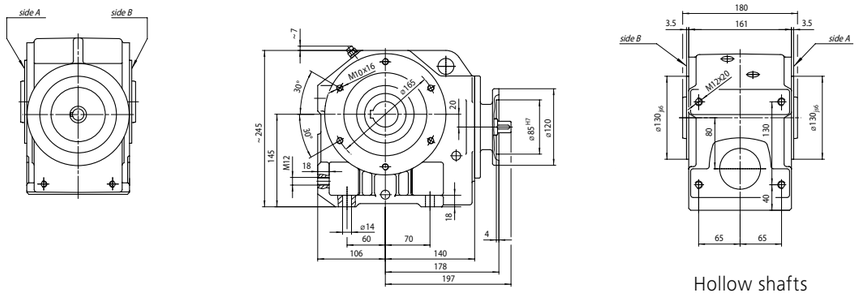
i (i_{worm})	n_1 [rpm]	n_2 [rpm]	P_1 [kW]	T_2 [Nm]	η [%]	$T_{2\,max}$ [Nm]
7.55 (4.83)	2,800	370.9	4.30	103	93	200
	1,400	185.4	2.83	134	92	
	930	123.2	1.87	132	91	
	700	92.7	1.65	150	88	
	450	59.6	0.95	132	87	
	250	33.1	0.51	126	85	
8.82 (4.83)	2,800	317.5	4.07	114	93	225
	1,400	158.7	2.65	145	91	
	930	105.4	1.75	143	90	
	700	79.4	1.48	159	89	
	450	51.0	0.87	140	86	
	250	28.3	0.45	130	85	
9.58 (7.25)	2,800	292.3	3.83	115	92	250
	1,400	146.1	2.86	170	91	
	930	97.1	2.00	175	89	
	700	73.1	1.60	180	86	
	450	47.0	1.10	190	85	
	250	26.1	0.70	210	82	
11.33 (7.25)	2,800	247.1	3.38	120	92	250
	1,400	123.6	2.52	175	90	
	930	82.1	1.78	180	87	
	700	61.8	1.43	190	86	
	450	39.7	0.97	195	84	
	250	22.1	0.59	208	81	
12.88 (9.75)	2,800	217.4	3.46	140	92	280
	1,400	108.7	2.28	180	90	
	930	72.2	1.66	193	88	
	700	54.3	1.26	190	86	
	450	34.9	0.87	203	85	
	250	19.4	0.52	208	81	
15.23 (9.75)	2,800	183.8	3.03	143	91	280
	1,400	91.9	2.00	185	89	
	930	61.1	1.44	196	87	
	700	46.0	1.16	205	85	
	450	29.5	0.76	205	83	
	250	16.4	0.44	205	80	
17.80 (9.75)	2,800	157.3	2.65	145	90	280
	1,400	78.7	1.76	190	89	
	930	52.2	1.27	200	86	
	700	39.3	0.99	200	83	
	450	25.3	0.68	210	82	
	250	14.0	0.39	210	80	
19.16 (14.5)	2,800	146.1	2.43	138	87	360
	1,400	73.1	1.53	170	85	
	930	48.5	1.18	193	83	
	700	36.5	0.88	185	80	
	450	23.5	0.63	198	77	
	250	13.0	0.42	227	74	
22.66 (14.5)	2,800	123.6	2.01	135	87	360
	1,400	61.8	1.42	185	84	
	930	41.0	1.03	195	81	
	700	30.9	0.85	208	79	
	450	19.9	0.60	220	76	
	250	11.0	0.39	248	73	
26.48 (14.5)	2,800	105.7	1.76	138	87	360
	1,400	52.9	1.25	190	84	
	930	35.1	0.92	200	80	
	700	26.4	0.76	212	77	
	450	17.0	0.56	235	75	
	250	9.4	0.34	250	72	
32.63 (14.5)	2,800	85.8	1.53	145	85	360
	1,400	42.9	1.07	195	82	
	930	28.5	0.80	210	78	
	700	21.5	0.65	220	76	
	450	13.8	0.46	238	74	
	250	7.7	0.30	258	69	

i (i_{worm})	n_1 [rpm]	n_2 [rpm]	P_1 [kW]	T_2 [Nm]	η [%]	$T_{2\,max}$ [Nm]
38.32 (29)	2,800	73.1	1.69	175	79	390
	1,400	36.5	1.05	205	75	
	930	24.3	0.76	215	72	
	700	18.3	0.62	225	69	
	450	11.7	0.46	242	64	
	250	6.5	0.30	260	60	
45.31 (29)	2,800	61.8	1.53	185	78	390
	1,400	30.9	0.92	210	74	
	930	20.5	0.69	225	70	
	700	15.4	0.55	230	68	
	450	9.9	0.41	247	63	
	250	5.5	0.26	262	59	
52.96 (29)	2,800	52.9	1.37	190	77	390
	1,400	26.4	0.80	215	74	
	930	17.6	0.63	235	69	
	700	13.2	0.50	240	66	
	450	8.5	0.36	255	63	
	250	4.7	0.23	267	58	
60.94 (39)	2,800	45.9	0.99	155	75	390
	1,400	23.0	0.76	222	70	
	930	15.3	0.57	237	67	
	700	11.5	0.46	242	63	
	450	7.4	0.34	260	60	
	250	4.1	0.21	278	56	
71.22 (39)	2,800	39.3	0.89	160	74	390
	1,400	19.7	0.67	225	69	
	930	13.1	0.50	240	65	
	700	9.8	0.42	246	61	
	450	6.3	0.29	263	60	
	250	3.5	0.19	280	54	
87.75 (39)	2,800	31.9	0.85	184	72	390
	1,400	16.0	0.59	235	67	
	930	10.6	0.44	244	62	
	700	8.0	0.36	258	60	
	450	5.1	0.25	274	58	
	250	2.8	0.16	285	53	
110.12 (39)	2,800	25.4	0.82	220	71	390
	1,400	12.7	0.49	240	65	
	930	8.4	0.38	255	60	
	700	6.4	0.30	263	59	
	450	4.1	0.21	278	56	
	250	2.3	0.13	288	52	
130.00 (39)	2,800	21.5	0.72	225	70	390
	1,400	10.8	0.44	244	62	
	930	7.2	0.32	258	60	
	700	5.4	0.26	270	59	
	450	3.5	0.19	280	54	
	250	1.9	0.11	288	51	
142.07 (39)	2,800	19.7	0.67	225	69	390
	1,400	9.9	0.42	248	61	
	930	6.5	0.30	260	59	
	700	4.9	0.24	272	58	
	450	3.2	0.18	282	53	
	250	1.8	0.10	290	51	
149.12 (39)	2,800	18.8	0.67	230	68	390
	1,400	9.4	0.41	250	60	
	930	6.2	0.29	260	59	
	700	4.7	0.23	275	58	
	450	3.0	0.17	285	53	
	250	1.7	0.10	290	51	

All indications for S1 operation at ambient temperature of 20 °C and use of synthetic oil. The maximum output torques may be reached in momentary load peaks but never be exceeded.

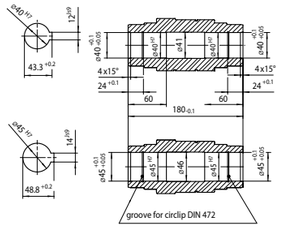
TYPE SSVA

Solid input shaft, hollow shaft output



Drive shaft

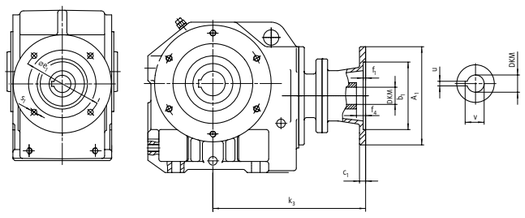
Hollow shafts



Further options: hollow shaft for shrink disc, torque reaction levers (refer to page 74)

TYPE SSK

Coupling flanges for IEC motors

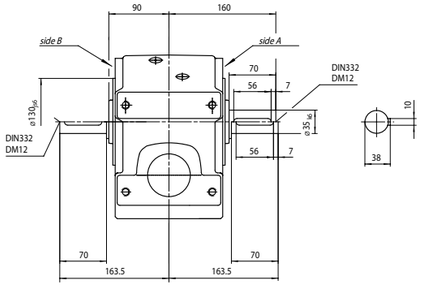


Motor					Flange 1				Flange 2			
Size	Shaft end	DKM	u	v	k_3 f_4	A_1 b_{1H7}	e_1 s_1	c_1 f_1	k_3 f_4	A_1 b_{1H7}	e_1 s_1	c_1 f_1
71	ø14x30	ø14	5	16.3	229 0	105 70	85 6.6	93	299 0	140 95	115 9	94
80	ø19x40	ø19	6	21.8	239 10	120 80	100 6.6	94	249 5	160 110	130 9	104
90	ø24x50	ø24	8	27.3	249 20	140 95	115 9	104	249 0			
100 112	ø28x60	ø28	8	31.3	259 15	160 110	130 9					

Further options: direct motor installation (type SSM_) for confined spaces – please contact us!

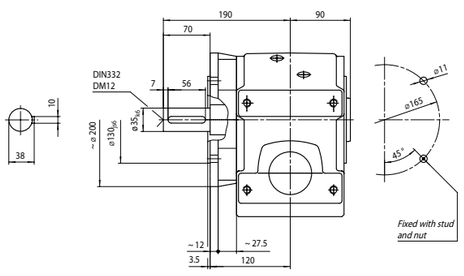
TYPE SS_V

Solid shaft with free shaft ends on one or both sides



TYPE SS_VF/SS_AF

Output drive flange with solid shaft or hollow shaft (not illustrated)



i = transmission ratio; n_1 = drive speed; n_2 = output drive speed; P_1 = rated drive power; T_2 = rated output torque; $T_{2\,max}$ = max. output torque

i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
(i_{worm})	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
7.68	2,800	364.6	5.69	140	94	460
(5)	1,400	182.3	4.77	230	92	
	930	121.1	4.07	295	92	
	700	91.1	3.08	290	90	
	450	58.6	2.00	283	87	
	250	32.6	1.15	283	84	
9.20	2,800	304.3	5.59	165	94	510
(5)	1,400	152.2	4.76	275	92	
	930	101.1	3.55	305	91	
	700	76.1	2.83	320	90	
	450	48.9	2.00	340	87	
	250	27.2	1.08	320	84	
10.25	2,800	273.2	5.54	180	93	560
(7.5)	1,400	136.6	4.69	305	93	
	930	90.7	3.29	315	91	
	700	68.3	2.61	325	89	
	450	43.9	1.85	350	87	
	250	24.4	1.03	340	84	
11.52	2,800	243.1	5.47	200	93	560
(7.5)	1,400	121.5	4.34	310	91	
	930	80.7	2.97	320	91	
	700	60.8	2.39	330	88	
	450	39.1	1.71	360	86	
	250	21.7	1.00	365	83	
13.67	2,800	204.8	5.13	220	92	580
(10)	1,400	102.4	3.71	315	91	
	930	68.0	2.61	330	90	
	700	51.2	2.07	340	88	
	450	32.9	1.50	370	85	
	250	18.3	0.89	380	82	
15.36	2,800	182.3	5.03	245	93	580
(10)	1,400	91.1	3.36	320	91	
	930	60.5	2.39	335	89	
	700	45.6	1.92	350	87	
	450	29.3	1.39	380	84	
	250	16.3	0.84	400	81	
18.40	2,800	152.2	4.76	275	92	580
(10)	1,400	76.1	2.92	330	90	
	930	50.5	2.02	340	89	
	700	38.0	1.67	360	86	
	450	24.5	1.20	390	83	
	250	13.6	0.72	405	80	
20.5	2,800	136.6	3.78	235	89	800
(15)	1,400	68.3	2.55	310	87	
	930	45.4	1.90	340	85	
	700	34.1	1.61	370	82	
	450	22.0	1.16	400	79	
	250	12.2	0.76	450	76	
23.04	2,800	121.5	3.26	228	89	800
(15)	1,400	60.8	2.89	390	86	
	930	40.4	2.08	408	83	
	700	30.4	1.63	415	81	
	450	19.5	1.16	442	78	
	250	10.9	0.74	480	74	
27.60	2,800	101.4	3.10	260	89	800
(15)	1,400	50.7	2.50	400	85	
	930	33.7	1.77	412	82	
	700	25.4	1.39	425	81	
	450	16.3	1.00	450	77	
	250	9.1	0.64	495	73	
30.71	2,800	91.2	3.07	280	87	720
(20)	1,400	45.6	2.27	400	84	
	930	30.3	1.64	420	81	
	700	22.8	1.30	425	78	
	450	14.7	0.94	465	76	
	250	8.1	0.61	510	71	
36.80	2,800	76.1	3.01	325	86	720
(20)	1,400	38.0	1.97	410	83	
	930	25.3	1.41	425	80	
	700	19.0	1.10	430	78	
	450	12.2	0.80	470	75	
	250	6.8	0.52	510	70	
41.00	2,800	68.3	3.18	360	81	800
(30)	1,400	34.1	1.86	410	79	
	930	22.7	1.33	430	77	
	700	17.1	1.09	445	73	
	450	11.0	0.82	480	67	
	250	6.1	0.52	515	63	

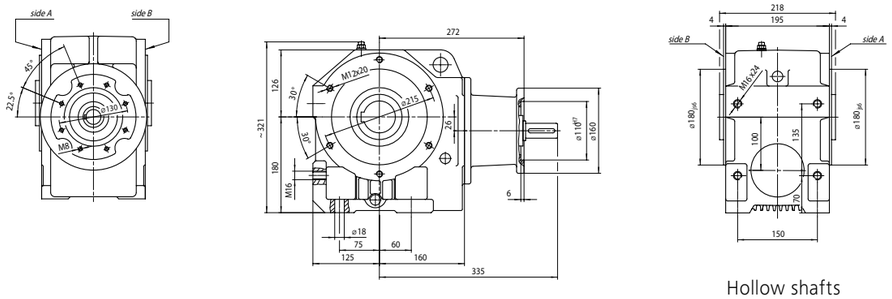
i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
(i_{worm})	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
46.07	2,800	60.8	3.06	390	81	800
(30)	1,400	30.4	1.69	415	78	
	930	20.2	1.26	440	74	
	700	15.2	1.01	450	71	
	450	9.8	0.76	490	66	
	250	5.4	0.48	520	61	
55.20	2,800	50.7	2.59	395	81	800
(30)	1,400	25.4	1.49	425	76	
	930	16.8	1.09	450	73	
	700	12.7	0.87	460	70	
	450	8.2	0.65	490	64	
	250	4.5	0.42	520	59	
61.43	2,800	45.6	2.51	410	78	800
(40)	1,400	22.8	1.36	410	72	
	930	15.1	1.01	460	72	
	700	11.4	0.75	440	70	
	450	7.3	0.57	470	63	
	250	4.1	0.38	520	59	
73.60	2,800	38.0	1.74	340	78	800
(40)	1,400	19.0	1.15	410	71	
	930	12.6	0.83	425	68	
	700	9.5	0.69	450	65	
	450	6.1	0.48	475	63	
	250	3.4	0.31	520	59	
88.33	2,800	31.7	1.49	345	77	800
(30)	1,400	15.8	0.98	415	70	
	930	10.5	0.71	425	66	
	700	7.9	0.59	460	65	
	450	5.1	0.43	485	60	
	250	2.8	0.28	520	56	
95.29	2,800	29.4	1.56	385	76	800
(30)	1,400	14.7	0.89	420	73	
	930	9.8	0.67	430	66	
	700	7.3	0.54	460	65	
	450	4.7	0.40	490	60	
	250	2.6	0.26	528	56	
117.78	2,800	23.8	1.31	390	74	800
(40)	1,400	11.9	0.80	430	67	
	930	7.9	0.59	460	64	
	700	5.9	0.47	475	63	
	450	3.8	0.36	515	58	
	250	2.1	0.22	535	54	
127.06	2,800	22.0	1.28	405	73	800
(40)	1,400	11.0	0.75	435	67	
	930	7.3	0.55	462	64	
	700	5.5	0.45	480	62	
	450	3.5	0.34	520	57	
	250	2.0	0.20	535	54	
149.33	2,800	18.8	1.13	410	71	800
(40)	1,400	9.4	0.67	450	66	
	930	6.2	0.49	470	62	
	700	4.7	0.39	490	61	
	450	3.0	0.30	528	56	
	250	1.7	0.18	540	53	
162.86	2,800	17.2	1.07	415	70	800
(40)	1,400	8.6	0.63	455	65	
	930	5.7	0.46	475	62	
	700	4.3	0.38	500	59	
	450	2.8	0.27	525	56	
	250	1.5	0.17	545	52	
178.46	2,800	15.7	1.00	420	69	800
(40)	1,400	7.8	0.59	460	64	
	930	5.2	0.43	485	61	
	700	3.9	0.36	515	58	
	450	2.5	0.25	530	55	
	250	1.4	0.16	545	51	
211.76	2,800	13.2	0.87	425	68	800
(40)	1,400	6.6	0.51	465	63	
	930	4.4	0.38	495	60	
	700	3.3	0.32	520	57	
	450	2.1	0.22	535	54	
	250	1.2	0.13	550	51	

All indications for S1 operation at ambient temperature of 20 °C and use of synthetic oil. The maximum output torques may be reached in momentary load peaks but never be exceeded.

Dimensions in mm / featherkey ways according to DIN 6,885 / strength class for screws 10.9

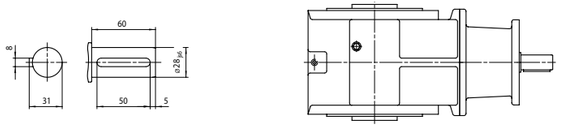
TYPE SSVA

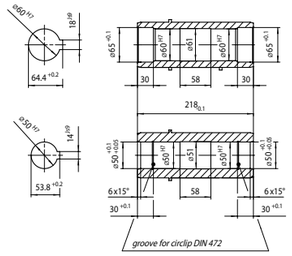
Solid input shaft, hollow shaft output



Hollow shafts

Drive shaft

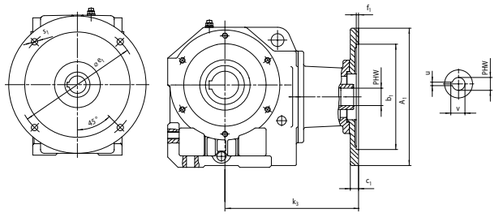




Further options: hollow shaft for shrink disc,
torque reaction levers (refer to page 74)

TYPE SSK

Coupling flanges for IEC motors

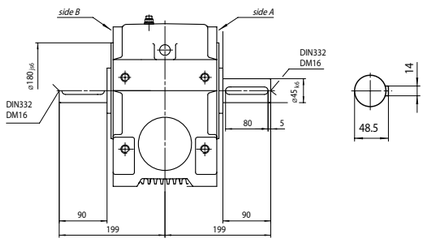


Motor					Flange 1				Flange 2			
Size	Shaft end	PHW	u	v	k_3 f_4	A_1 b_1H7	e_1 s_1	c_1 f_1	k_3 f_4	A_1 b_1H7	e_1 s_1	c_1 f_1
63	ø11x23	ø11	4	12.8	272	160	130	-	-	-	-	-
71	ø14x30	ø14	5	16.3		110	M8x16	4	290	200	165	16
80	ø19x40	ø19	6	21.8						130	11	5
90	ø24x50	ø24	8	27.3								
100	ø28x60	ø28	8	31.3	290	250	215	16				
112	ø28x60	ø28	8	31.3		180	14	5				
132	ø38x80	ø38	10	41.3	290	300	265	18	-	-	-	-
						230	14	5				

Further options: direct motor installation (type SSM_)
for confined spaces – please contact us!

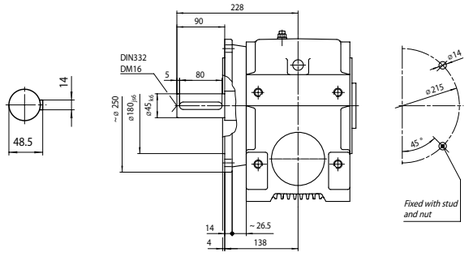
TYPE SS_V

Solid shaft with free shaft ends on one or both sides



TYPE SS_VF/SS_AF

Output drive flange with solid shaft or hollow shaft
(not illustrated)



Dimensions in mm / featherkey ways according to DIN 6,885 / strength class for screws 10.9

i = transmission ratio; n_1 = drive speed; n_2 = output drive speed; P_1 = rated drive power;
T_2 = rated output torque; $T_{2\,max}$ = max. output torque

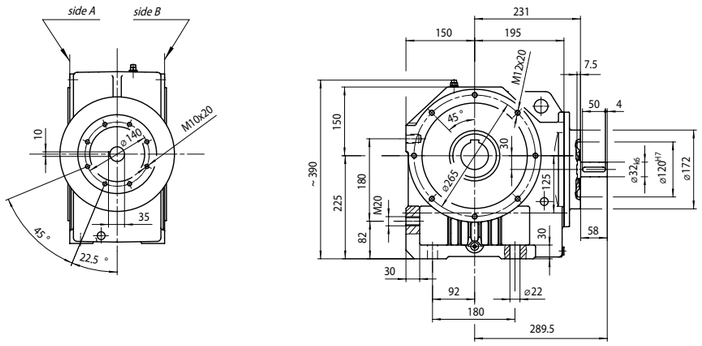
i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
(i_{worm})	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
7.94	2,800	352.6	11.36	280	91	950
(5)	1,400	176.3	8.12	400	91	
	930	117.1	6.49	476	90	
	700	88.2	6.22	600	89	
	450	56.7	4.95	725	87	
	250	31.5	2.00	510	84	
9.67	2,800	289.6	10.58	314	90	1,050
(5)	1,400	144.8	7.93	471	90	
	930	96.2	5.94	525	89	
	700	72.4	5.77	670	88	
	450	46.5	4.19	740	86	
	250	25.9	1.98	614	84	
11.30	2,800	247.8	11.08	380	89	1,100
(5)	1,400	123.9	7.93	550	90	
	930	82.3	6.29	650	89	
	700	61.9	5.16	700	88	
	450	39.8	3.55	733	86	
	250	22.1	1.95	698	83	
12.60	2,800	222.2	10.58	400	88	1,140
(5)	1,400	111.1	7.58	580	89	
	930	73.8	5.53	630	88	
	700	55.6	4.85	725	87	
	450	35.7	3.40	773	85	
	250	19.8	1.90	759	83	
14.13	2,800	198.2	9.76	414	88	1,140
(5)	1,400	99.1	6.99	600	89	
	930	65.8	5.25	670	88	
	700	49.5	4.38	735	87	
	450	31.8	3.13	789	84	
	250	17.7	1.70	752	82	
17.00	2,800	164.7	8.78	443	87	1,140
(5)	1,400	82.4	6.30	650	89	
	930	54.7	4.46	678	87	
	700	41.2	3.76	750	86	
	450	26.5	2.79	847	84	
	250	14.7	1.50	799	82	
20.68	2,800	135.4	8.15	500	87	1,500
(15)	1,400	67.7	6.38	765	85	
	930	45.0	4.65	820	83	
	700	33.8	4.11	950	82	
	450	21.8	2.79	980	80	
	250	12.1	1.78	1,040	74	
23.82	2,800	117.5	7.30	510	86	1,500
(15)	1,400	58.8	6.08	820	83	
	930	39.0	4.44	880	81	
	700	29.4	3.71	965	80	
	450	18.9	2.54	1,000	78	
	250	10.5	1.60	1,060	73	
29.00	2,800	96.6	6.94	590	86	1,500
(15)	1,400	48.3	5.12	840	83	
	930	32.1	3.99	950	80	
	700	24.1	3.15	985	79	
	450	15.5	2.18	1,020	76	
	250	8.6	1.32	1,070	73	
33.89	2,800	82.6	6.31	620	85	1.500
(15)	1,400	41.3	4.59	870	82	
	930	27.4	3.50	975	80	
	700	20.7	2.77	1,000	78	
	450	13.3	1.91	1,030	75	
	250	7.4	1.17	1,090	72	
37.80	2,800	74.1	5.91	640	84	1,500
(15)	1,400	37.0	4.26	890	81	
	930	24.6	3.21	985	79	
	700	18.5	2.51	1,010	78	
	450	11.9	1.78	1,055	74	
	250	6.6	1.07	1,100	71	
42.39	2,800	66.1	6.42	780	84	1.500
(15)	1,400	33.0	4.11	950	80	
	930	21.9	2.95	1,000	78	
	700	16.5	2.28	1,015	77	
	450	10.6	1.61	1,060	73	
	250	5.9	0.97	1,120	71	

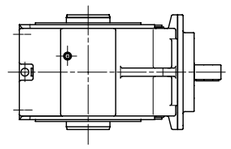
i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
(i_{worm})	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
51.00	2,800	54.9	5.71	825	83	1,500
(15)	1,400	27.5	3.50	975	80	
	930	18.2	2.47	1,010	78	
	700	13.7	1.98	1,035	75	
	450	8.8	1.35	1,070	73	
	250	4.9	0.84	1,150	70	
58.33	2,800	48.0	5.09	840	83	1,500
(15)	1,400	24.0	3.13	985	79	
	930	15.9	2.21	1,020	77	
	700	12.0	1.78	1,050	74	
	450	7.7	1.21	1,080	72	
	250	4.3	0.76	1,180	70	
63.53	2,800	44.1	3.99	640	74	1,400
(40)	1,400	22.0	3.01	925	71	
	930	14.6	1.98	893	69	
	700	11.0	1.75	1,000	66	
	450	7.1	1.18	1,000	63	
	250	3.9	0.80	1,140	59	
77.33	2,800	36.2	3.42	650	72	1,400
(40)	1,400	18.1	2.55	940	70	
	930	12.0	1.84	980	67	
	700	9.1	1.51	1,020	64	
	450	5.8	1.12	1,100	60	
	250	3.2	0.69	1,165	57	
90.37	2,800	31.0	3.11	680	71	1,400
(40)	1,400	15.5	2.27	950	68	
	930	10.3	1.63	1,000	66	
	700	7.7	1.35	1,050	63	
	450	5.0	0.98	1,110	59	
	250	2.8	0.62	1,190	56	
100.80	2,800	27.8	3.07	740	70	1,400
(40)	1,400	13.9	2.08	960	67	
	930	9.2	1.54	1,020	64	
	700	6.9	1.24	1,060	62	
	450	4.5	0.91	1,130	58	
	250	2.5	0.57	1,190	54	
113.04	2,800	24.8	3.26	880	70	1,400
(40)	1,400	12.4	1.93	980	66	
	930	8.2	1.42	1,040	63	
	700	6.2	1.15	1,080	61	
	450	4.0	0.83	1,140	57	
	250	2.2	0.52	1.200	53	
136.00	2,800	20.6	2.95	945	69	1,400
(40)	1,400	10.3	1.66	1,000	65	
	930	6.8	1.22	1,060	62	
	700	5.1	1.01	1,110	59	
	450	3.3	0.73	1,160	55	
	250	1.8	0.44	1,200	52	
155.56	2,800	18.0	2.61	940	68	1,400
(40)	1,400	9.0	1.50	1,020	64	
	930	6.0	1.11	1,080	61	
	700	4.5	0.92	1,130	58	
	450	2.9	0.67	1,180	53	
	250	1.6	0.40	1,220	51	
167.06	2,800	16.8	2.49	950	67	1,400
(40)	1,400	8.4	1.45	1,040	63	
	930	5.6	0.10	100	61	
	700	4.2	0.88	1,140	57	
	450	2.7	0.63	1,190	53	
	250	1.5	0.39	1,230	50	
209.41	2,800	13.4	2.06	970	66	1,400
(40)	1,400	6.7	1.20	1,060	62	
	930	4.4	0.91	1,130	58	
	700	3.3	0.74	1,160	55	
	450	2.1	0.52	1,200	52	
	250	1.2	0.32	1,240	49	
242.67	2,800	11.5	1.84	990	65	1,400
(40)	1,400	5.8	1.09	1,100	61	
	930	3.8	0.81	1,150	57	
	700	2.9	0.67	1,180	53	
	450	1.9	0.46	1,200	51	
	250	1.0	0.28	1,250	49	

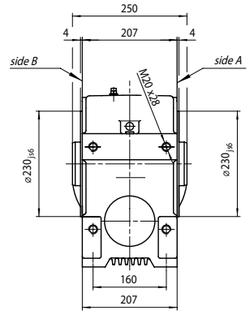
All indications for S1 operation at ambient temperature of 20 °C and use of synthetic oil.
The maximum output torques may be reached in momentary load peaks but never be exceeded.

TYPE SSVA

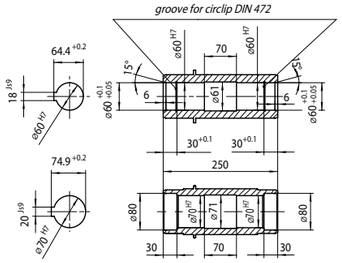
Solid input shaft, hollow shaft output







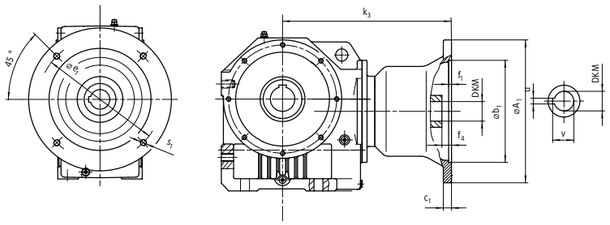
Hollow shafts



Further options: hollow shaft for shrink disc, torque reaction levers (refer to page 74)

TYPE SSK

Coupling flanges for IEC motors

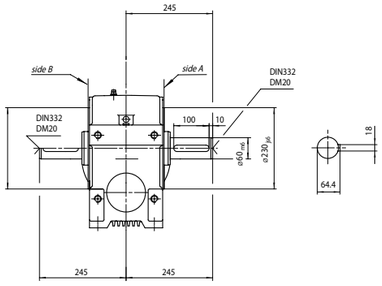


Motor					Flange			
Size	Shaft end	DKM	u	v	k_3 f_4	A_1 b_{1H7}	e_1 s_1	c_1 f_1
90	ø24x50	ø24	8	27.3		200	on request	
100	ø28x60	ø28	8	31.3	367 11	250 180	215 M12	16 7
112								
132	ø38x80	ø38	10	41.3	392 25	300 230	265 M12	
160	ø42x110	ø42	12	45.3	419 42.5	350 250	300 M16	20 7

Further options: direct motor installation (type SSM_) for confined spaces – please contact us!

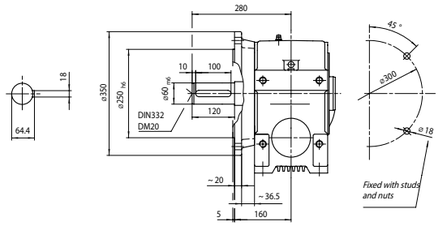
TYPE SS_V

Solid shaft with free shaft ends on one or both sides



TYPE SS_VF/SS_AF

Output drive flange with solid shaft or hollow shaft (not illustrated)



Dimensions in mm / featherkey ways according to DIN 6,885 / strength class for screws 10.9

i = transmission ratio; n_1 = drive speed; n_2 = output drive speed; P_1 = rated drive power; T_2 = rated output torque; $T_{2\,max}$ = max. output torque

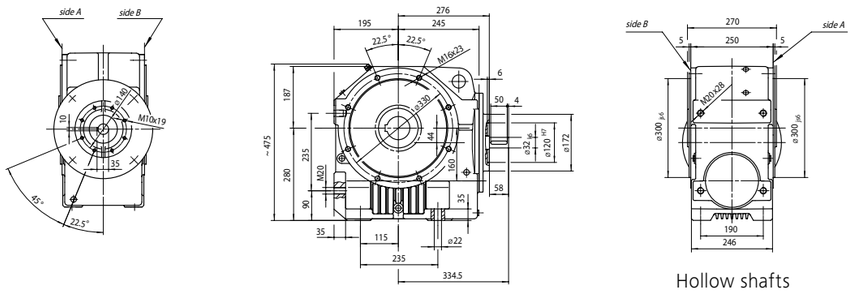
i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
(i_{worm})	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
8.21	2,800	341.0	15.87	400	90	2,200
(7.25)	1,400	170.5	14.59	760	93	
	930	113.3	12.52	950	90	
	700	85.3	10.50	1,070	91	
	450	54.8	6.74	1,034	88	
	250	30.5	3.75	1,000	85	
10.18	2,800	275.0	16.32	510	90	2,200
(7.25)	1,400	137.5	13.93	890	92	
	930	91.4	11.29	1,050	89	
	700	68.8	8.72	1,090	90	
	450	44.2	6.05	1,150	88	
	250	24.6	3.66	1,210	85	
11.37	2,800	246.3	16.33	570	90	2,200
(7.25)	1,400	123.1	13.18	930	91	
	930	81.8	10.35	1,075	89	
	700	61.6	8.11	1,120	89	
	450	39.6	5.64	1,170	86	
	250	22.0	3.51	1,280	84	
13.76	2,800	203.5	15.15	640	90	2,200
(7.25)	1,400	101.7	12.06	1,030	91	
	930	67.6	8.85	1,100	88	
	700	50.9	6.90	1,140	88	
	450	32.7	4.78	1,200	86	
	250	18.2	3.00	1,308	83	
16.85	2,800	166.2	13.92	720	90	2,200
(7.25)	1,400	83.1	10.30	1,065	90	
	930	55.2	7.51	1,130	87	
	700	41.5	5.80	1,160	87	
	450	26.7	4.11	1,250	85	
	250	14.8	2.58	1,362	82	
18.35	2,800	152.6	14.00	780	89	2,200
(7.25)	1,400	76.3	9.99	1,125	90	
	930	50.7	7.01	1,150	87	
	700	38.1	5.48	1,180	86	
	450	24.5	3.87	1,280	85	
	250	13.6	2.50	1,418	81	
20.36	2,800	137.5	11.75	710	87	2.300
(14.5)	1,400	68.8	9.52	1,150	87	
	930	45.7	6.98	1,240	85	
	700	34.4	6.30	1,470	84	
	450	22.1	4.52	1,600	82	
	250	12.3	2.93	1,800	79	
22.74	2,800	123.1	10.67	720	87	2,300
(14.5)	1,400	61.6	9.15	1,220	86	
	930	40.9	6.30	1,250	85	
	700	30.8	5.83	1,500	83	
	450	19.8	4.35	1,700	81	
	250	11.0	2.69	1,820	78	
27.51	2,800	101.8	10.66	870	87	2,300
(14.5)	1,400	50.9	7.71	1,230	85	
	930	33.8	6.24	1,480	84	
	700	25.4	5.13	1,580	82	
	450	16.4	3.81	1,780	80	
	250	9.1	2.27	1,840	77	
33.69	2,800	83.1	10.10	1,010	87	2,300
(14.5)	1,400	41.6	6.40	1,250	85	
	930	27.6	5.40	1,550	83	
	700	20.8	4.57	1,700	81	
	450	13.4	3.26	1,840	79	
	250	7.4	1.88	1,860	77	
36.70	2,800	76.3	10.40	1,120	86	2,300
(14.5)	1,400	38.1	6.32	1,330	84	
	930	25.3	5.05	1,580	83	
	700	19.1	4.29	1,720	80	
	450	12.3	3.02	1,860	79	
	250	6.8	1.76	1,880	76	
44.02	2,800	63.6	9.37	1,210	86	2,300
(14.5)	1,400	31.8	5.95	1,500	84	
	930	21.1	4.53	1,680	82	
	700	15.9	3.75	1,800	80	
	450	10.2	2.60	1,895	78	
	250	5.7	1.50	1,891	75	

i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
(i_{worm})	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
51.04	2,800	54.9	8.45	1,250	85	2,300
(14.5)	1,400	27.4	5.36	1,550	83	
	930	18.2	4.17	1,750	80	
	700	13.7	3.34	1,840	79	
	450	8.8	2.26	1,910	78	
	250	4.9	1.33	1,918	74	
56.74	2,800	49.3	7.57	1,230	84	2,300
(14.5)	1,400	24.7	5.04	1,600	82	
	930	16.4	3.87	1,780	79	
	700	12.3	3.04	1,860	79	
	450	7.9	2.08	1,930	77	
	250	4.4	1.25	1,976	73	
62.73	2,800	44.6	5.34	880	77	2,300
(40)	1,400	22.3	4.36	1,380	74	
	930	14.8	3.66	1,650	70	
	700	11.2	3.10	1,780	67	
	450	7.2	2.29	1,955	64	
	250	4.0	1.45	2,080	60	
75.90	2,800	36.9	4.98	980	76	2,300
(40)	1,400	18.4	4.23	1,600	73	
	930	12.3	3.22	1,730	69	
	700	9.2	2.65	1,810	66	
	450	5.9	1.96	1,985	63	
	250	3.3	1.23	2,100	59	
92.94	2,800	30.1	4.80	1,140	75	2,300
(40)	1,400	15.1	3.78	1,700	71	
	930	10.0	2.81	1,800	67	
	700	7.5	2.37	1,950	65	
	450	4.8	1.68	2,060	62	
	250	2.7	1.03	2,120	58	
101.25	2,800	27.7	5.17	1,320	74	2,300
(40)	1,400	13.8	3.61	1,720	69	
	930	9.2	2.64	1,810	66	
	700	6.9	2.22	1,960	64	
	450	4.4	1.58	2,070	61	
	250	2.5	0.97	2,140	57	
121.43	2,800	23.1	4.50	1,360	73	2,300
(40)	1,400	11.5	3.09	1,740	68	
	930	7.7	2.41	1,950	65	
	700	5.8	1.91	1,990	63	
	450	3.7	1.35	2,090	60	
	250	2.1	0.83	2,150	56	
156.52	2,800	17.9	4.43	1,680	71	2,300
(40)	1,400	8.9	2.74	1,900	65	
	930	5.9	1.97	1,990	63	
	700	4.5	1.59	2,070	61	
	450	2.9	1.11	2,130	58	
	250	1.6	0.67	2,160	54	
197.89	2,800	14.1	3.62	1,710	70	2,300
(40)	1,400	7.1	2.27	1,960	64	
	930	4.7	1.64	2,070	62	
	700	3.5	1.30	2,100	60	
	450	2.3	0.90	2,150	57	
	250	1.3	0.55	2,190	53	
242.50	2,800	11.5	3.30	1,810	66	2,300
(40)	1,400	5.8	1.93	2,010	63	
	930	3.8	1.41	2,100	60	
	700	2.9	1.08	2,150	60	
	450	1.9	0.75	2,160	56	
	250	1.0	0.46	2,200	52	
282.86	2,800	9.9	2.84	1,810	66	2,300
(40)	1,400	4.9	1.71	2,050	62	
	930	3.3	1.24	2,120	59	
	700	2.5	0.94	2,150	59	
	450	1.6	0.66	2,170	55	
	250	0.9	0.39	2,200	52	

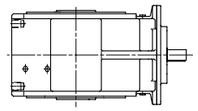
All indications for S1 operation at ambient temperature of 20 °C and use of synthetic oil. The maximum output torques may be reached in momentary load peaks but never be exceeded.

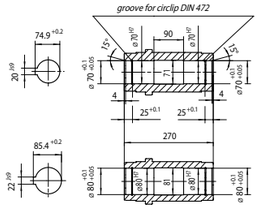
TYPE SSVA

Solid input shaft, hollow shaft output



Hollow shafts

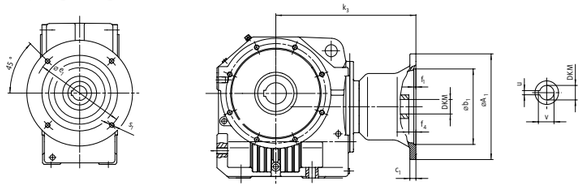




Further options: hollow shaft for shrink disc, torque reaction levers (refer to page 74)

TYPE SSK

Coupling flanges for IEC motors

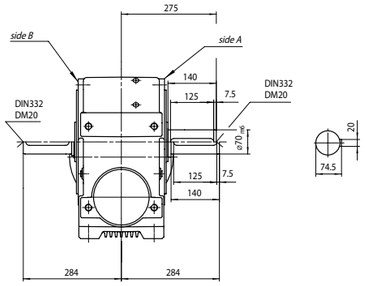


Further options: direct motor installation (type SSM_) for confined spaces – please contact us!

Motor					Flange			
Size	Shaft end	DKM	u	v	k_3 f_4	A_1 b_{1H7}	e_1 s_1	c_1 f_1
100	ø28x60	ø28	8	31.3	412	250	215	16
112					11	180	M12	
132	ø38x80	ø38	10	41.3	437 25	300 230	265 M12	7
160	ø42x110	ø42	12	45.3	464	350	300	20
180	ø48x110	ø48	14	51.8	43	250	M16	7

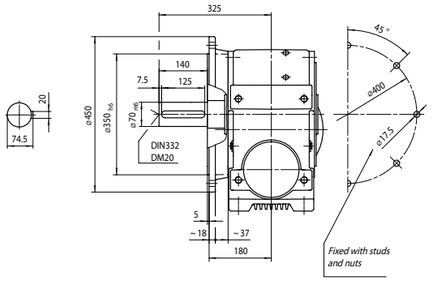
TYPE SS_V

Solid shaft with free shaft ends on one or both sides



TYPE SS_VF/SS_AF

Output drive flange with solid shaft or hollow shaft (not illustrated)



Dimensions in mm / featherkey ways according to DIN 6,885 / strength class for screws 10.9

i = transmission ratio; n_1 = drive speed; n_2 = output drive speed; P_1 = rated drive power; T_2 = rated output torque; $T_{2\,max}$ = max. output torque

i (i_{worm})	n_1 [rpm]	n_2 [rpm]	P_1 [kW]	T_2 [Nm]	η [%]	$T_{2\,max}$ [Nm]
10.23 (7.5)	2,800	273.7	37.38	1,200	92	4,300
	1,400	136.9	23.62	1,500	91	
	930	90.9	19.88	1,900	91	
	700	68.4	16.72	2,100	90	
	450	44.0	14.13	2,700	88	
	250	24.4	10.29	3,500	87	
13.64 (10)	2,800	205.3	30.37	1,300	92	4,300
	1,400	102.6	20.08	1,700	91	
	930	68.2	16.48	2,100	91	
	700	51.3	13.73	2,300	90	
	450	33.0	10.99	2,800	88	
	250	18.3	7.90	3,500	85	
14.79 (7.5)	2,800	189.3	29.09	1,350	92	4,300
	1,400	94.7	19.06	1,750	91	
	930	62.9	16.10	2,200	90	
	700	47.3	13.36	2,400	89	
	450	30.4	10.99	3,000	87	
	250	16.9	7.29	3,500	85	
16.36 (12)	2,800	171.1	27.27	1,400	92	4,300
	1,400	85.6	18.92	1,900	90	
	930	56.8	15.21	2,300	90	
	700	42.8	13.24	2,600	88	
	450	27.5	9.93	3,000	87	
	250	15.3	7.24	3,800	84	
19.71 (10)	2,800	142.1	25.34	1,550	91	4,300
	1,400	71.0	15.70	1,900	90	
	930	47.2	13.18	2,400	90	
	700	35.5	11.41	2,700	88	
	450	22.8	9.31	3,350	86	
	250	12.7	6.08	3,800	83	
23.66 (12)	2,800	118.3	23.15	1,700	91	4,300
	1,400	59.2	14.80	2,150	90	
	930	39.3	12.16	2,600	88	
	700	29.6	10.21	2,900	88	
	450	19.0	7.41	3,200	86	
	250	10.6	5.13	3,800	82	
25.86 (10)	2,800	108.3	22.43	1,800	91	4,300
	1,400	54.1	14.55	2,310	90	
	930	36.0	11.42	2,700	89	
	700	27.1	9.66	3,000	88	
	450	17.4	7.29	3,400	85	
	250	9.7	4.75	3,800	81	
29.57 (15)	2,800	94.7	17.83	1,600	89	4,300
	1,400	47.3	12.96	2,300	88	
	930	31.5	10.22	2,700	87	
	700	23.7	8.85	3,000	84	
	450	15.2	6.69	3,400	81	
	250	8.5	4.43	3,800	76	
31.60 (10)	2,800	88.6	19.07	1,850	90	4,300
	1,400	44.3	14.20	2,725	89	
	930	29.4	10.51	3,000	88	
	700	22.2	10.22	3,350	76	
	450	14.2	6.21	3,500	84	
	250	7.9	3.98	3,800	79	
37.27 (10)	2,800	75.1	18.36	2,100	90	4.300
	1,400	37.6	12.20	2,760	89	
	930	25.0	9.31	3,100	87	
	700	18.8	8.28	3,200	76	
	450	12.1	5.33	3,500	83	
	250	6.7	3.42	3,800	78	
38.38 (7.5)	2,800	73.0	14.43	1,700	90	4,300
	1,400	36.5	7.21	1,660	88	
	930	24.2	4.67	1,600	87	
	700	18.2	3.55	1,600	86	
	450	11.7	2.32	1,550	82	
	250	6.5	1.31	1,500	78	
44.73 (12)	2,800	62.6	14.57	2,000	90	4,300
	1,400	31.3	10.43	2,800	88	
	930	20.8	8.01	3,200	87	
	700	15.6	6.46	3,350	85	
	450	10.1	4.50	3,500	82	
	250	5.6	2.82	3,800	79	

i (i_{worm})	n_1 [rpm]	n_2 [rpm]	P_1 [kW]	T_2 [Nm]	η [%]	$T_{2\,max}$ [Nm]
47.40 (15)	2,800	59.1	12.86	1,850	89	4,300
	1,400	29.5	9.35	2,600	86	
	930	19.6	7.70	3,150	84	
	700	14.8	6.06	3,250	83	
	450	9.5	4.40	3,500	79	
	250	5.3	2.96	3,800	71	
51.18 (10)	2,800	54.7	14.00	2,200	90	4,300
	1,400	27.4	7.24	2,250	89	
	930	18.2	4.76	2,100	84	
	700	13.7	3.50	2,050	84	
	450	8.8	2.27	2,000	81	
	250	4.9	1.31	2,000	78	
51.72 (20)	2,800	54.1	13.18	2,000	86	4,300
	1,400	27.1	8.67	2,600	85	
	930	18.0	6.81	3,000	83	
	700	13.5	5.69	3,250	81	
	450	8.7	3.50	3,000	78	
	250	4.8	2.88	4,100	72	
55.91 (15)	2,800	50.1	12.51	2,100	88	4,300
	1,400	25.0	8.90	2,920	86	
	930	16.6	7.01	3,300	82	
	700	12.5	5.81	3,500	79	
	450	8.0	3.33	3,000	76	
	250	4.5	2.57	3,900	71	
61.41 (12)	2,800	45.6	12.34	2,300	89	4,300
	1,400	22.8	7.19	2,620	87	
	930	15.1	4.72	2,500	84	
	700	11.4	3.54	2,400	81	
	450	7.3	2.30	2,400	80	
	250	4.1	1.31	2,400	78	
63.20 (20)	2,800	44.3	11.06	2,050	86	4,300
	1,400	22.2	8.20	2,900	82	
	930	14.7	6.01	3,200	82	
	700	11.1	4.73	3,300	81	
	450	7.1	3.63	3,700	76	
	250	4.0	2.39	4,100	71	
74.55 (20)	2,800	37.6	10.06	2,200	86	4.300
	1,400	18.8	7.43	3,100	82	
	930	12.5	5.39	3,300	80	
	700	9.4	4.18	3,400	80	
	450	6.0	3.20	3,800	75	
	250	3.4	2.03	4,100	71	
76.76 (15)	2,800	36.5	10.22	2,300	86	4,300
	1,400	18.2	7.13	3,100	83	
	930	12.1	4.82	3,000	79	
	700	9.1	3.61	2,950	78	
	450	5.9	2.30	2,700	72	
	250	3.3	1.32	2,700	70	
89.25 (15)	2,800	31.4	9.17	2,400	86	4,300
	1,400	15.7	6.29	3,100	81	
	930	10.4	4.20	3,000	78	
	700	7.8	3.15	2,950	77	
	450	5.0	2.23	3,000	71	
	250	2.8	1.28	3,000	69	
102.35 (20)	2,800	27.4	8.70	2,550	84	4,300
	1,400	13.7	5.48	3,100	81	
	930	9.1	4.16	3,500	80	
	700	6.8	3.44	3,700	77	
	450	4.4	2.27	3,500	71	
	250	2.4	1.30	3,450	68	
111.82 (30)	2,800	25.0	7.12	2,200	81	4,300
	1,400	12.5	5.00	2,900	76	
	930	8.3	3.88	3,300	74	
	700	6.3	3.28	3,500	70	
	450	4.0	2.61	3,900	63	
	250	2.2	1.65	4,100	58	
119.00 (20)	2,800	23.5	7.72	2,600	83	4,300
	1,400	11.8	4.83	3,100	79	
	930	7.8	3.72	3,500	77	
	700	5.9	3.00	3,650	75	
	450	3.8	2.26	4,000	70	
	250	2.1	1.29	4,000	68	

All indications for S1 operation at ambient temperature of 20 °C and use of synthetic oil.
The maximum output torques may be reached in momentary load peaks but never be exceeded.

i = transmission ratio; n_1 = drive speed; n_2 = output drive speed; P_1 = rated drive power;
T_2 = rated output torque; $T_{2\,max}$ = max. output torque

i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
(i_{worm})	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
149.09	2,800	18.8	6.05	2,400	78	4.300
(40)	(40)	9.4	4.71	3,500	73	
	930	6.2	3.45	3,700	70	
	700	4.7	2.86	3,900	67	
	450	3.0	2.09	4,100	62	
	250	1.7	1.26	4,100	57	
153.53	2,800	18.2	6.20	2,500	77	4.300
(30)	1,400	9.1	4.58	3,500	73	
	930	6.1	3.64	3,900	68	
	700	4.6	2.97	4,100	66	
	450	2.9	2.10	4,100	60	
	250	1.6	1.27	4,100	55	
178.50	2,800	15.7	5.62	2,600	76	4.300
(30)	1,400	7.8	3.94	3,500	73	
	930	5.2	3.18	3,900	67	
	700	3.9	2.59	4,100	65	
	450	2.5	1.83	4,100	59	
	250	1.4	1.09	4,100	55	
204.71	2,800	13.7	5.16	2,700	75	4,300
(40)	1,400	6.8	3.63	3,600	71	
	930	4.5	2.70	3,800	67	
	700	3.4	2.15	3,900	65	
	450	2.2	1.63	4,100	58	
	250	1.2	0.95	4,100	55	
238.00	2,800	11.8	4.71	2,750	72	4,300
(40)	1,400	5.9	3.17	3,600	70	
	930	3.9	2.39	3,800	65	
	700	2.9	1.88	3,900	64	
	450	1.9	1.40	4,100	58	
	250	1.1	0.84	4,100	54	
276.35	2,800	10.1	3.39	2,300	72	3,800
(54)	1,400	5.1	2.30	2,900	67	
	930	3.4	1.68	3,000	63	
	700	2.5	1.33	3,100	62	
	450	1.6	1.02	3,400	57	
	250	0.9	0.64	3,600	53	

All indications for S1 operation at ambient temperature of 20 °C and use of synthetic oil.
The maximum output torques may be reached in momentary load peaks but never be exceeded.

TORQUE REACTION LEVERS

When slip-on gear motors / gear units with torque reaction levers are used, external forces act on the driven machine shaft. The application point and impact direction of external force depend on the position of the torque reaction lever and on the direction of rotation. The torque reaction lever must be provided on the driven machine side of the gear motor / gear unit. This minimizes the bending wear on the motor shaft due to external forces. The reaction torque equals the output torque – however, in opposite direction. The fastening screw for the torque reaction lever must be positioned on both sides.

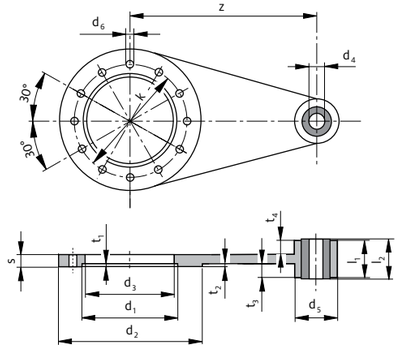


Fig. 1

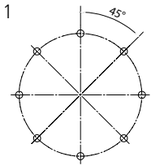
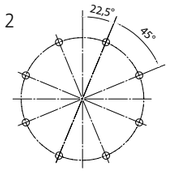
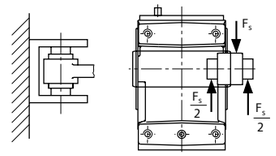


Fig. 2



Arrangement of torque reaction lever

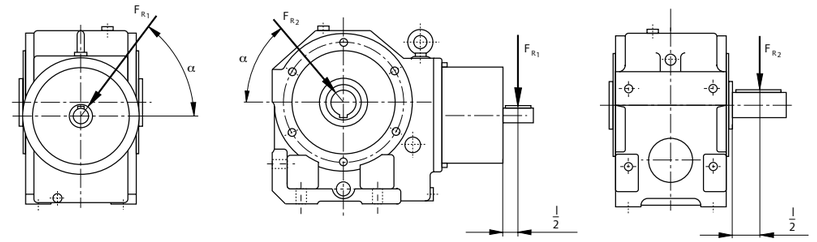


Size	z ±0.2	$d_{1\,H11}$	d_2	d_3	$d_{4\,F8}$	d_5	d_6 ±0.2	k	l_1	l_2	s	t_1	t_2	t_3	t_4	Hex. socket screw*	Pitch circle at gear unit
SS50.1	130	95	136	85	10	40	9.0	115	32	36	14	4	2	11.5	9.5	4 x M8 x 25	1
SS63.1	160	110	153	100	10	40	9.0	130	32	36	14	4	3	11.5	9.5	6 x M8 x 25	1
SS80.1	200	130	193	120	10	50	11.0	165	32	36	14	4	3	11.5	9.5	6 x M10 x 25	1
SS100	250	180	243	170	20	70	13.5	215	56	70	16	5	3	21.0	22.0	6 x M12 x 35	2
SS125	310	230	294	220	20	70	13.5	265	56	70	18	5	3	19.0	22.0	8 x M12 x 35	2
SS160	380	300	374	290	24	80	18.0	330	90	115	20	6	-	44.5	28.5	8 x M16 x 40	2

*Strength class for screws 10.9; dimensions in mm

PERMISSIBLE SHAFT LOADS

F_{R1} Radial force drive shaft
F_{R2} Radial force output shaft
F'_{R2} Radial force output shaft with output drive flange (not illustrated $F'_{R2} = 0{,}7 \times F_{R2}$)



AUMA Drives gear units can withstand additional forces at both the output shaft and hollow shaft. The following data on permissible loads were determined on the basis of the most unfavourable angle of force application α and application of force in the middle of the shaft end, as well as at drive rotational speed n_1 = 1,400 rpm. The gear units are capable of withstanding axial forces up to a level of 50 % of the permissible radial force. All data given applies to one-way loads, i.e. simultaneous application of axial and radial forces is not permissible. Individual recalculation is required for higher loads or occurrence of combined loads (both axial and radial). In this case, please state direction of rotation, forces, as well as indications on the point of application of force or the angle of application a, as well as the desired output speed.

Permissible radial forces for drive rotational speed n_1 = 1,400 rpm depending on the transmission ratio i:

SS50.1		
i	F_{R1} [N]	F_{R2} [N]
7.55	600	2,250
8.82	600	2,300
9.58	600	2,400
11.33	600	2,600
12.55	600	2,850
14.84	600	2,950
17.35	600	3,350
19.16	600	3,500
22.66	600	3,700
26.48	600	4,100
32.63	600	4,500
38.32	600	4,800
45.31	600	4,800
52.96	600	4,900
59.38	600	5,000
69.39	600	5,200
85.50	600	5,800
107.29	600	5,800
126.67	600	5,800
138.43	600	5,800
145.29	600	5,800
-	-	-
-	-	-
-	-	-
-	-	-

SS63.1		
i	F_{R1} [N]	F_{R2} [N]
7.55	700	2,860
8.82	700	3,010
9.58	700	3,110
11.33	700	3,230
12.88	700	3,420
15.23	700	3,690
17.80	700	4,100
19.16	700	4,490
22.66	700	4,570
26.48	700	5,200
32.63	700	5,580
38.32	700	5,700
45.31	700	5,900
52.96	700	6,100
60.94	700	6,280
71.22	700	7,110
87.75	700	7,400
110.12	700	8,300
130.00	700	8,500
142.07	700	8,350
149.12	700	8,350
-	-	-
-	-	-
-	-	-
-	-	-

SS80.1		
i	F_{R1} [N]	F_{R2} [N]
7.68	800	3,250
9.20	800	3,270
10.25	800	3,620
11.52	800	3,630
13.67	800	3,990
15.36	800	4,270
18.40	800	4,370
20.50	800	4,750
23.04	800	5,050
27.60	800	5,360
30.71	800	5,800
36.80	800	6,190
41.00	800	6,020
46.07	800	6,930
55.20	800	7,330
61.43	800	7,570
73.60	800	7,990
88.33	800	8,100
95.29	800	9,150
117.78	800	9,850
127.06	800	9,850
149.33	800	9,700
162.86	800	9,700
178.46	800	9,600
211.76	800	9,600

Permissible radial forces for drive rotational speed n_1 = 1,400 rpm depending on the transmission ratio i:

SS100		
i	F_{R1} [N]	F_{R2} [N]
7.94	1,900	3,620
9.67	1,770	3,240
11.30	1,700	2,730
12.60	1,760	2,800
14.13	1,780	2,850
17.00	1,840	2,910
20.68	1,860	4,260
23.82	2,080	4,950
29.00	2,210	5,430
33.89	2,240	5,680
37.80	2,250	6,210
42.39	2,280	6,570
51.00	2,290	7,010
58.33	2,340	7,530
63.53	2,400	7,990
77.33	2,430	8,780
90.37	2,470	9,890
100.80	2,510	10,340
113.04	2,560	11,010
136.00	2,580	11,460
155.56	2,600	11,770
167.06	2,620	11,800
209.41	2,630	11,830
242.67	2,650	11,860
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

SS125		
i	F_{R1} [N]	F_{R2} [N]
8.21	2,700	8,000
10.18	2,650	8,300
11.37	2,660	6,800
13.76	2,680	9,400
16.85	2,690	10,000
18.35	2,680	9,900
20.36	2,690	10,000
22.74	2,700	11,500
27.51	3,050	12,400
33.69	3,180	13,700
36.70	3,210	13,850
44.02	3,250	14,500
51.04	3,270	15,700
56.74	3,300	16,000
62.73	3,260	17,300
75.90	3,280	18,000
92.94	3,310	19,400
101.25	3,360	20,800
121.43	3,380	21,700
156.52	3,400	23,000
197.89	3,440	26,000
242.50	3,450	26,200
282.86	3,470	26,500
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

SS160		
i	F_{R1} [N]	F_{R2} [N]
10.23	3,700	15,500
13.64	3,780	15,400
14.79	3,700	15,300
16.36	3,850	15,500
19.71	3,850	15,800
23.66	3,930	15,800
25.86	3,800	15,300
29.57	4,030	16,400
31.60	3,740	15,000
37.27	3,800	15,500
38.38	*	15,500
44.73	3,930	16,700
47.40	4,090	18,100
51.18	*	18,200
51.72	4,240	19,500
55.92	4,060	18,700
61.41	*	19,000
63.20	4,200	20,000
74.55	4,190	20,500
76.76	*	20,300
89.25	*	21,100
102.35	*	23,000
111.82	4,370	24,600
119.00	*	24,600
149.09	4,400	25,900
153.53	*	25,700
178.50	*	27,200
204.71	*	28,000
238.00	*	30,100
276.35	*	33,000

OIL QUANTITIES / WEIGHTS

As standard, AUMA Drives helical gear units are delivered including oil filling. Fully synthetic high performance oils with low-wear additives for premium efficiency and reduced maintenance are used. Lubricant quantities depend on the service position of the gear unit. For more detailed information, please refer to page 59. Permissible lubricants are indicated in the operation instructions or on the name plate.

Oil quantities [litres]

Size	Service position					
	B3	B8	B3I	B6	V5	V5II
SS50.1	0.55	0.95	1.15	1.10	1.05	1.05
SS63.1	0.60	1.00	1.25	1.10	1.25	1.25
SS80.1	1.50	2.90	3.10	3.25	2.20	2.20
SS100	1.70	4.30	5.40	5.00	3.80	3.80
SS125	4.00	7.70	10.20	8.60	6.50	6.50
SS160	6.00	15.00	21.00	15.00	10.00	10.00

Weights [kg] sizes SS 50.1 to SS 80.1

Basic version		Mounting parts										
Size	Type SSVA	Flanges for mounting IEC motor Type SSK_				Coupling		Solid output shaft		Output drive flange	Torque reaction lever	Cover
		A1 = 105	A1 = 120	A1 = 140	A1 = 160	24	28	1 Shaft end	2 Shaft ends			
SS50.1	17.5	1.0	1.2	1.5	2.0	0.25	0.6	0.80	1.0	1.6	1.4	0.5
SS63.1	22.0	1.0	1.2	1.5	2.0	0.25	0.6	1.40	1.6	3.6	1.7	1.0
SS80.1	30.5	1.0	1.2	1.5	2.0	0.25	0.6	2.20	2.5	4.9	2.6	1.6

Data for direct motor installation (type SSM with helical gear pinion on motor shaft) available on request.

Weights [kg] sizes SS 100 to SS 160

Basic version		Mounting parts										
Size	Type SSVA	Flanges for mounting IEC motor Type SSK_					Coupling	Solid output shaft		Output drive flange	Torque reaction lever	Cover
		A1 = 160	A1 = 200	A1 = 250	A1 = 300	A1 = 350		1 Shaft end	2 Shaft ends			
SS100	64.0	*	*	*	9.0	-	*	4.80	6.0	7.5	4.2	4.2
SS125	90.0	-	0.0	1.0	4.0	10.00	*	9.80	12.6	11.7	6.6	5.1
SS160	150.0	-	-	12.0	17.0	23.00	*	14.00	20.0	18.0	12.0	11.0

Data for direct motor installation (type SSM with helical gear pinion on motor shaft) available on request.

* on request

Elevator gear units – a safe bet

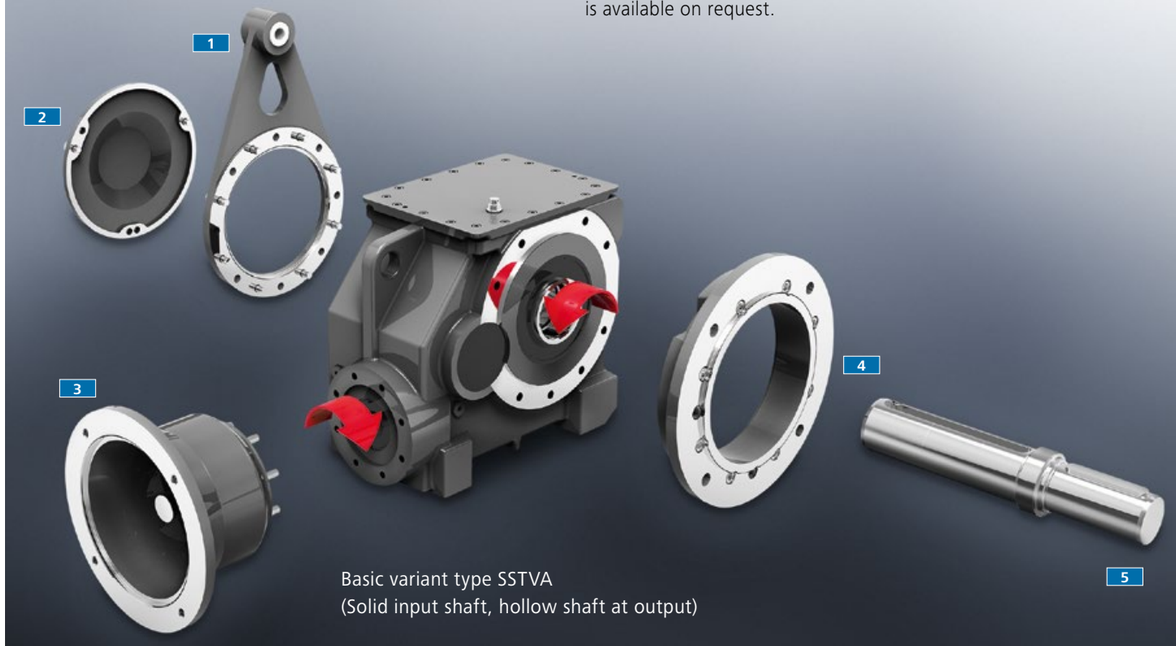
WORM HELICAL GEAR UNITS

AUMA Drives worm helical gear units are the perfect choice with regard to low and reduced noise – whether used in elevators or as stage drives in theatres. The first high-speed gear stage is implemented as worm gear stage ensuring homogeneous and low-noise torque transmission due to the outstanding noise absorbing properties and protecting the subsequent transmission elements from load peaks. The second stage consists of two helical, low-noise precision spur gears combining premium efficiency and soft start-up behaviour. Explorer bearings – running three times longer during long-term tests than conventional cylinder roller bearings – are of main focus for the gear unit concept relating to long service life and low maintenance expenditures. On request, we implement the complete drive package and look after smooth combination of gear unit, electric motor, double brake and incremental encoder.

WORM HELICAL GEAR UNITS – OVERVIEW

AUMA Drives worm helical gear units are provided for many connection and fastening options. For example, they can be directly mounted as slip-on gears (type SST_A) to the drive shaft of the driven machine and can be secured against turning by either using torque reaction levers (type SST_AD), output flanges (type SST_AF) or spigots and pitch circles at the housing. The basic variant type SSVA (solid shaft at input, hollow shaft at output) can be extended by drive and motor flanges, covers and many further options, such as slip-on output drive shafts. Slip-on gears within the gear hollow shaft can be axially secured both via end disc and circlip or via shrink disc.
The following pictures provide an extract of the possible equipment variants. Please contact us for more information on bespoke solutions for different industries and applications.

AUMA Drives worm helical gear units are operable in both rotation directions. The shown rotational direction indications comply with right-handed rising version. Left-handed version is available on request.



Basic variant type SSTVA
(Solid input shaft, hollow shaft at output)

- Worm gear set according to DIN 3975, flank shape ZK, worm shaft made of 16MnCrS5, case-hardened and grinded Worm wheel made of highly wear resistant special bronze. Low-noise inclined spur gears.
- Lubrication: fully synthetic oil for highest efficiency and reduced maintenance.
- Housing material: Grey cast iron (GJL)
- More than 20 standard transmission ratios per size
- As an option, radial seals with dust lips (form AS) made of Viton as spray water and dust protection made of Viton for use in severe environments and highest service temperatures.

SERVICE POSITIONS

AUMA Drives worm helical gear units are operable in a large variety of service positions. The lubricant quantities and the positions of air vent and oil draining plugs depend on the selected mounting position.

B3
Horizontal drive shaft bottom
Horizontal output drive

B8
Horizontal drive shaft top
Horizontal output drive

B6
Vertical drive shaft bottom
Horizontal output drive

B3I
Vertical drive shaft top
Horizontal output drive

V5
Horizontal drive shaft
Vertical output drive
(top side B)

V5II
Horizontal drive shaft
Vertical output drive
(top side A)

1 Torque reaction lever (type SST__D)

2 Covers for protection against contamination and corrosion as well as against direct touching.

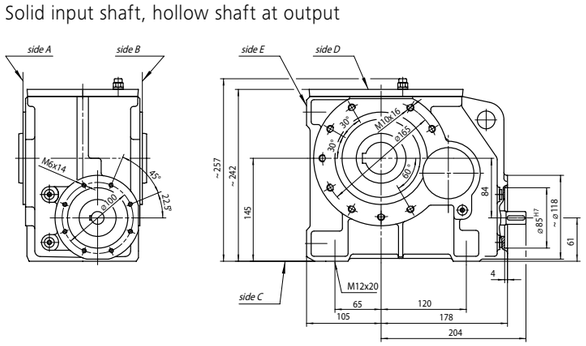
3 Coupling flanges for IEC motors (Type SSTK__) Option: Direct motor installation (Type SSTM__ – with drive pinion on motor shaft) for confined spaces.

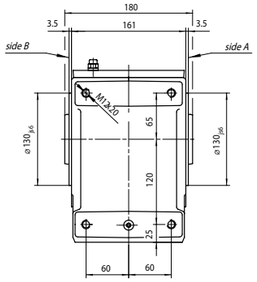
4 Output drive flange (type SST__F)

5 Output shafts (type SST_V) with free shaft ends on one or both sides), axially secured by circlip and washer or via shrink disc (type SST__S).

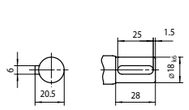
TYPE SSTVA

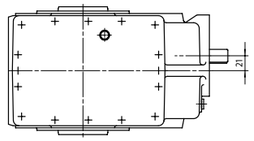
Solid input shaft, hollow shaft at output



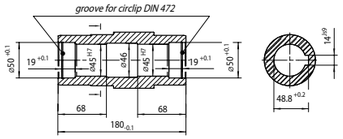


Drive shaft





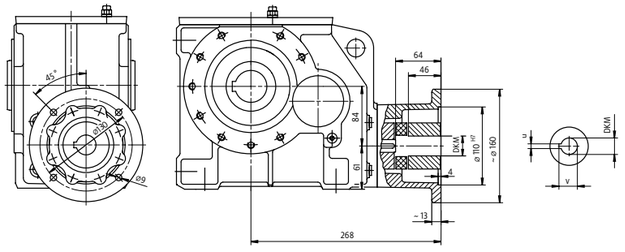
Hollow shaft



Further options: hollow shaft for shrink disc

TYPE SSTK

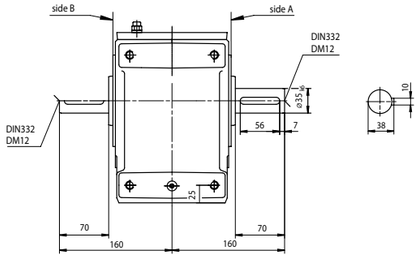
Coupling flanges for IEC motors



Motor				
Size	Shaft end	DKM	u	v
80	ø 19 x 40	ø 19	6	21.8
90	ø 24 x 50	ø 24	8	27.3
100 112	ø 28 x 60	ø 28	8	31.3

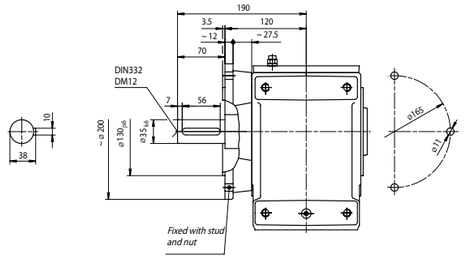
TYPE SST_V

Solid shaft with free shaft ends on one or both sides



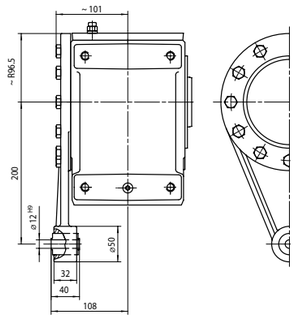
TYPE SST_VF/SST_AF

Output drive flange with solid shaft or hollow shaft (not illustrated)



TYPE SST_AD

Slip-on model with torque reaction lever



i = transmission ratio; n_1 = drive speed; n_2 = output drive speed; P_1 = rated drive power;
T_2 = rated output torque; $T_{2\,max}$ = max. output torque

i (i_{worm})	n_1 [rpm]	n_2 [rpm]	P_1 [kW]	T_2 [Nm]	η [%]	$T_{2\,max}$ [Nm]
7.90	2,800	354.4	6.19	150	90	600
(4.83)	1,400	177.2	5.15	250	90	
	930	117.7	4.09	295	89	
	700	88.6	3.11	295	88	
10.18	2,800	275.0	5.76	180	90	700
(4.83)	1,400	137.5	4.67	292	90	
	930	91.4	3.55	330	89	
	700	68.8	2.74	335	88	
11.98	2,800	233.7	5.71	210	90	900
(4.83)	1,400	116.9	4.69	345	90	
	930	77.6	3.56	390	89	
	700	58.4	2.82	405	88	
15.18	2,800	184.5	6.01	280	90	900
(4.83)	1,400	92.2	4.67	435	90	
	930	61.3	3.46	480	89	
	700	46.1	2.77	505	88	
17.98	2,800	155.7	3.99	220	90	900
(7.25)	1,400	77.9	3.15	348	90	
	930	51.7	2.62	430	89	
	700	38.9	2.18	470	88	
20.54	2,800	136.3	3.69	230	89	900
(9.75)	1,400	68.2	2.77	342	88	
	930	45.3	2.23	410	87	
	700	34.1	1.85	440	85	
24.18	2,800	115.8	3.81	280	89	1,050
(9.75)	1,400	57.9	2.78	404	88	
	930	38.5	2.22	480	87	
	700	28.9	1.85	520	85	
30.64	2,800	91.4	3.17	295	89	1,050
(9.75)	1,400	45.7	2.61	480	88	
	930	30.4	1.97	540	87	
	700	22.8	1.63	580	85	
37.37	2,800	74.9	2.87	325	89	1,050
(9.75)	1,400	37.5	2.23	500	88	
	930	24.9	1.68	560	87	
	700	18.7	1.38	600	85	
41.09	2,800	68.1	2.26	260	82	1,050
(19.50)	1,400	34.1	1.67	380	81	
	930	22.6	1.24	420	80	
	700	17.0	0.99	440	79	
45.57	2,800	61.4	2.45	320	84	1,050
(14.50)	1,400	30.7	2.02	520	83	
	930	20.4	1.41	540	82	
	700	15.4	1.19	600	81	

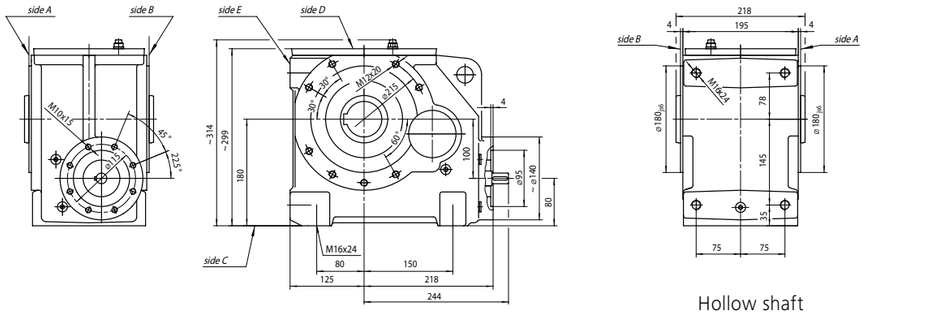
i (i_{worm})	n_1 [rpm]	n_2 [rpm]	P_1 [kW]	T_2 [Nm]	η [%]	$T_{2\,max}$ [Nm]
48.36	2,800	57.9	2.11	285	82	1,050
(19.50)	1,400	28.9	1.62	433	81	
	930	19.2	1.26	500	80	
	700	14.5	1.00	520	79	
55.58	2,800	50.4	2.51	400	84	1,050
(14.50)	1,400	25.2	1.62	510	83	
	930	16.7	1.22	570	82	
	700	12.6	0.99	610	81	
61.29	2,800	45.7	2.39	410	82	1,050
(19.50)	1,400	22.8	1.57	530	81	
	930	15.2	1.17	590	80	
	700	11.4	0.92	610	79	
71.92	2,800	38.9	1.61	300	76	1,050
(29.00)	1,400	19.5	1.13	415	75	
	930	12.9	0.81	435	73	
	700	9.7	0.73	510	71	
74.75	2,800	37.5	1.63	340	82	1,050
(19.50)	1,400	18.7	1.26	520	81	
	930	12.4	0.96	590	80	
	700	9.4	0.77	620	79	
82.18	2,800	34.1	1.47	300	73	1,050
(39.00)	1,400	17.0	0.99	400	72	
	930	11.3	0.70	420	71	
	700	8.5	0.67	500	67	
91.14	2,800	30.7	1.63	385	76	1,050
(29.00)	1,400	15.4	1.12	520	75	
	930	10.2	0.72	495	73	
	700	7.7	0.66	580	71	
96.72	2,800	28.9	1.45	350	73	1,050
(39.00)	1,400	14.5	0.86	410	72	
	930	9.6	0.65	460	71	
	700	7.2	0.58	510	67	
111.17	2,800	25.2	1.34	385	76	1,050
(29.00)	1,400	12.6	0.90	510	75	
	930	8.4	0.68	570	73	
	700	6.3	0.55	590	71	
122.57	2,800	22.8	1.33	405	73	1,050
(39.00)	1,400	11.4	0.86	520	72	
	930	7.6	0.66	590	71	
	700	5.7	0.55	620	67	
149.5	2,800	18.7	1.10	410	73	1,050
(39.00)	1,400	9.4	0.72	530	72	
	930	6.2	0.55	600	71	
	700	4.7	0.46	630	67	

All indications for S1 operation at ambient temperature of 20 °C and use of synthetic oil.
The maximum output torques may be reached in momentary load peaks but never be exceeded.

Dimensions in mm / featherkey ways according to DIN 6,885 / strength class for screws 10.9

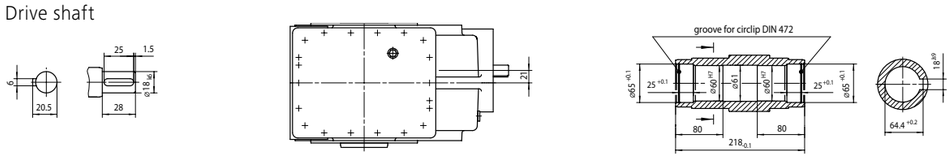
TYPE SSTVA

Solid input shaft, hollow shaft at output



Hollow shaft

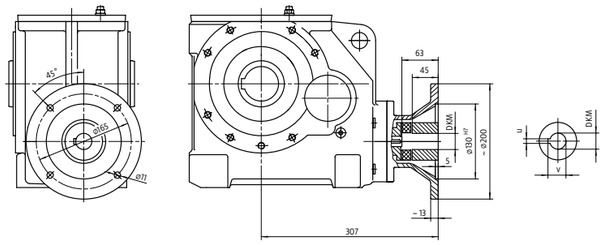
Drive shaft



Further options: hollow shaft for shrink disc

TYPE SSTK

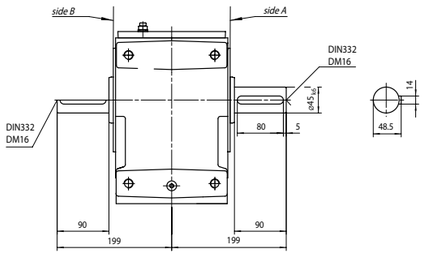
Coupling flanges for IEC motors



Motor				
Size	Shaft end	DKM	u	v
90	ø 24 x 50	ø 24	8	27.0
100	ø 28 x 60	ø 28	8	31.3
112				
132	ø 28 x 60 (special version)			

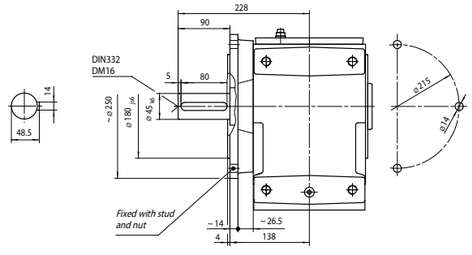
TYPE SST_V

Solid shaft with free shaft ends on one or both sides



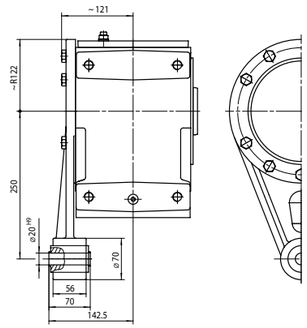
TYPE SST_VF / SST_AF

Output drive flange with solid shaft or hollow shaft (not illustrated)



TYPE SST_AD

Slip-on model with torque reaction lever



i = transmission ratio; n_1 = drive speed; n_2 = output drive speed; P_1 = rated drive power; T_2 = rated output torque; $T_{2\,max}$ = max. output torque

i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
(i_{worm})	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
8.05	2,800	347.8	10.97	280	93	1,000
(4.50)	1,400	173.9	7.83	400	93	
	930	115.5	5.98	455	92	
	700	87.0	5.10	510	91	
9.82	2,800	285.1	10.11	315	93	1,200
(4.50)	1,400	142.6	7.62	475	93	
	930	94.7	5.71	530	92	
	700	71.3	4.92	600	91	
12.08	2,800	231.8	10.82	410	92	1,200
(6.75)	1,400	115.9	6.60	500	92	
	930	77.0	5.05	570	91	
	700	57.9	4.65	690	90	
16.65	2,800	168.2	8.71	460	93	1,600
(4.50)	1,400	84.1	7.38	780	93	
	930	55.9	5.59	880	92	
	700	42.0	4.60	950	91	
19.00	2,800	147.4	8.63	520	93	1,600
(4.50)	1,400	73.7	7.05	850	93	
	930	48.9	5.24	940	92	
	700	36.8	4.28	1,010	91	
24.98	2,800	112.1	6.76	530	92	1,700
(6.75)	1,400	56.0	5.52	865	92	
	930	37.2	4.16	970	91	
	700	28.0	3.36	1,030	90	
28.50	2,800	98.2	6.71	600	92	1,700
(6.75)	1,400	49.1	5.51	985	92	
	930	32.6	3.94	1,050	91	
	700	24.6	3.29	1,150	90	
34.23	2,800	81.8	6.02	640	91	1,800
(9.25)	1,400	40.9	4.66	990	91	
	930	27.2	3.38	1,070	90	
	700	20.4	2.72	1,130	89	
39.06	2,800	71.7	5.94	720	91	1,800
(9.25)	1,400	35.8	4.37	1,060	91	
	930	23.8	3.10	1,120	90	
	700	17.9	2.51	1,190	89	

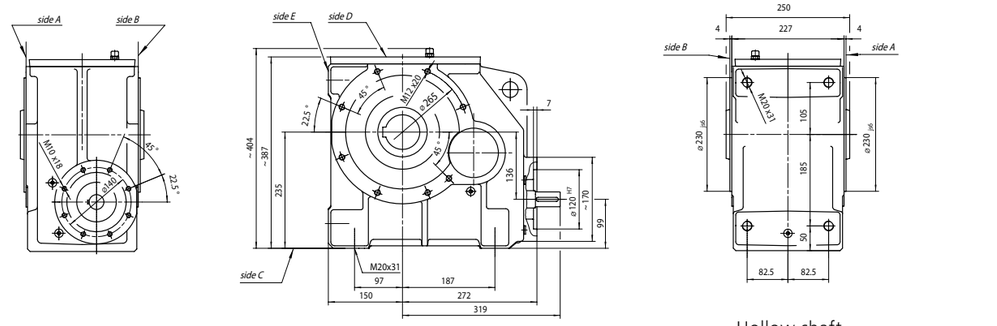
i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
(i_{worm})	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
46.44	2,800	60.3	5.11	720	89	1,800
(11.00)	1,400	30.1	3.55	1,000	89	
	930	20.0	2.62	1,100	88	
	700	15.1	2.15	1,170	86	
49.95	2,800	56.1	4.54	680	88	1,800
(13.50)	1,400	28.0	3.27	970	87	
	930	18.6	2.36	1,030	85	
	700	14.0	1.92	1,100	84	
57.00	2,800	49.1	4.53	775	88	1,800
(13.50)	1,400	24.6	3.04	1,030	87	
	930	16.3	2.21	1,100	85	
	700	12.3	1.82	1,190	84	
68.45	2,800	40.9	3.68	730	85	1,800
(18.50)	1,400	20.5	2.52	1,000	85	
	930	13.6	1.83	1,080	84	
	700	10.2	1.45	1,110	82	
78.11	2,800	35.8	3.49	790	85	1,800
(18.50)	1,400	17.9	2.43	1,100	85	
	930	11.9	1.69	1,140	84	
	700	9.0	1.38	1,210	82	
99.90	2,800	28.0	2.57	700	80	1,800
(27.00)	1,400	14.0	1.78	960	79	
	930	9.3	1.29	1,020	77	
	700	7.0	1.08	1,100	75	
114.00	2,800	24.6	2.41	750	80	1,800
(27.00)	1,400	12.3	1.71	1,050	79	
	930	8.2	1.28	1,150	77	
	700	6.1	1.07	1,250	75	
136.90	2,800	20.5	2.17	770	76	1,800
(37.00)	1,400	10.2	1.49	1,060	76	
	930	6.8	1.07	1,110	74	
	700	5.1	0.89	1,180	71	
156.22	2,800	17.9	2.16	875	76	1,800
(37.00)	1,400	9.0	1.47	1,190	76	
	930	6.0	1.04	1,230	74	
	700	4.5	0.86	1,300	71	

All indications for S1 operation at ambient temperature of 20 °C and use of synthetic oil.
The maximum output torques may be reached in momentary load peaks but never be exceeded.

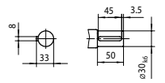
Dimensions in mm / featherkey ways according to DIN 6,885 / strength class for screws 10.9

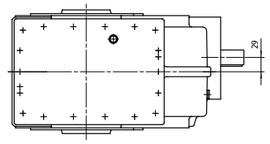
TYPE SSTVA

Solid input shaft, hollow shaft at output

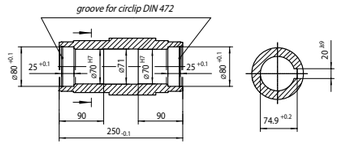


Drive shaft





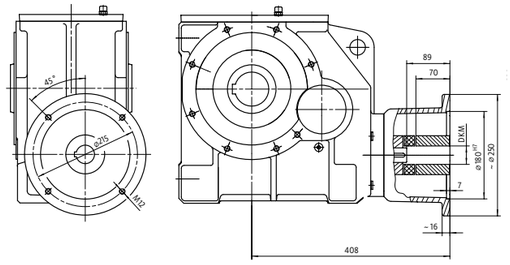
Hollow shaft



Further options: hollow shaft for shrink disc

TYPE SSTK

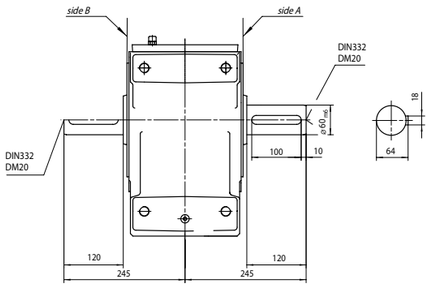
Coupling flanges for IEC motors



Motor				
Size	Shaft end	DKM	u	v
100 112	ø28x60	ø28	8	31.3
132 160	ø38x80 ø38x80 (special version)	ø38	10	41.3

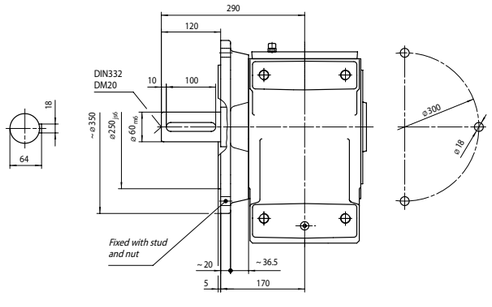
TYPE SST_V

Solid shaft with free shaft ends on one or both sides



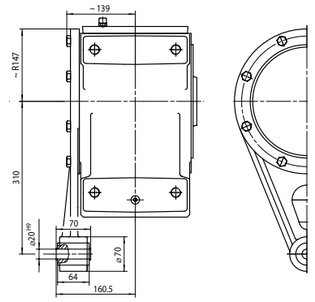
TYPE SST_VF/SST_AF

Output drive flange with solid shaft or hollow shaft (not illustrated)



TYPE SST_AD

Slip-on model with torque reaction lever



i = transmission ratio; n_1 = drive speed; n_2 = output drive speed; P_1 = rated drive power; T_2 = rated output torque; $T_{2\,max}$ = max. output torque

i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
(i_{worm})	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
7.54	2,800	371.4	19.02	450	92	2,700
(4.50)	1,400	185.7	16.06	760	92	
	930	123.3	12.21	860	91	
	700	92.8	9.61	900	91	
10.09	2,800	277.5	18.32	580	92	2,700
(4.50)	1,400	138.8	14.06	890	92	
	930	92.2	11.02	1,050	92	
	700	69.4	8.78	1,100	91	
11.31	2,800	247.6	16.52	580	91	2,700
(6.75)	1,400	123.8	12.11	850	91	
	930	82.2	9.85	1,030	90	
	700	61.9	7.92	1,100	90	
14.76	2,800	189.7	15.11	700	92	2,700
(4.50)	1,400	94.9	11.88	1,100	92	
	930	63.0	8.34	1,150	91	
	700	47.4	7.09	1,300	91	
16.43	2,800	170.4	15.32	790	92	2,700
(4.50)	1,400	85.2	11.64	1,200	92	
	930	56.6	8.14	1,250	91	
	700	42.6	6.86	1,400	91	
18.43	2,800	151.9	15.39	890	92	2,700
(4.50)	1,400	76.0	11.36	1,300	91	
	930	50.5	7.93	1,350	90	
	700	38.0	6.63	1,500	90	
22.14	2,800	126.5	12.37	850	91	2,700
(6.75)	1,400	63.2	9.68	1,330	91	
	930	42.0	6.84	1,400	90	
	700	31.6	5.70	1,550	90	
24.65	2,800	113.6	13.07	1,000	91	2,700
(6.75)	1,400	56.8	9.74	1,490	91	
	930	37.7	6.92	1,560	89	
	700	28.4	5.68	1,700	89	
27.64	2,800	101.3	12.96	1,100	90	2,700
(6.75)	1,400	50.7	9.43	1,600	90	
	930	33.6	6.61	1,670	89	
	700	25.3	5.36	1,800	89	
30.34	2,800	92.3	10.74	1,000	90	2,700
(9.25)	1,400	46.1	8.05	1,500	90	
	930	30.7	5.77	1,600	89	
	700	23.1	4.61	1,700	89	
33.78	2,800	82.9	10.73	1,100	89	2,700
(9.25)	1,400	41.4	7.80	1,600	89	
	930	27.5	5.57	1,700	88	
	700	20.7	4.44	1,800	88	

i	n_1	n_2	P_1	T_2	η	$T_{2\,max}$
(i_{worm})	[rpm]	[rpm]	[kW]	[Nm]	[%]	[Nm]
37.88	2,800	73.9	10.55	1,200	88	2,700
(9.25)	1,400	37.0	7.48	1,700	88	
	930	24.6	5.32	1,800	87	
	700	18.5	4.23	1,900	87	
44.28	2,800	63.2	7.70	1,000	86	2,700
(13.50)	1,400	31.6	5.84	1,500	85	
	930	21.0	4.19	1,600	84	
	700	15.8	3.59	1,800	83	
49.30	2,800	56.8	7.70	1,100	85	2,700
(13.50)	1,400	28.4	5.66	1,600	84	
	930	18.9	4.05	1,700	83	
	700	14.2	3.44	1,900	82	
55.29	2,800	50.6	7.58	1,200	84	2,700
(13.50)	1,400	25.3	5.43	1,700	83	
	930	16.8	3.87	1,800	82	
	700	12.7	3.27	2,000	81	
67.57	2,800	41.4	5.75	1,100	83	2,700
(18.50)	1,400	20.7	4.23	1,600	82	
	930	13.8	3.02	1,700	81	
	700	10.4	2.44	1,800	80	
75.76	2,800	37.0	5.66	1,200	82	2,700
(18.50)	1,400	18.5	4.06	1,700	81	
	930	12.3	2.89	1,800	80	
	700	9.2	2.33	1,900	79	
88.56	2,800	31.6	4.58	1,080	78	2,700
(27.00)	1,400	15.8	3.44	1,600	77	
	930	10.5	2.46	1,700	76	
	700	7.9	2.01	1,800	74	
98.61	2,800	28.4	4.57	1,200	78	2,700
(27.00)	1,400	14.2	3.29	1,680	76	
	930	9.4	2.34	1,780	75	
	700	7.1	1.93	1,900	73	
110.57	2,800	25.3	4.42	1,300	78	2,700
(27.00)	1,400	12.7	3.18	1,800	75	
	930	8.4	2.26	1,900	74	
	700	6.3	1.84	2,000	72	
135.13	2,800	20.7	4.34	1,500	75	2,700
(37.00)	1,400	10.4	2.64	1,800	74	
	930	6.9	1.88	1,900	73	
	700	5.2	1.60	2,100	71	
151.52	2,800	18.5	4.33	1,680	75	2,700
(37.00)	1,400	9.2	2.61	2,000	74	
	930	6.1	1.85	2,100	73	
	700	4.6	1.57	2,300	71	

All indications for S1 operation at ambient temperature of 20 °C and use of synthetic oil.
The maximum output torques may be reached in momentary load peaks but never be exceeded.

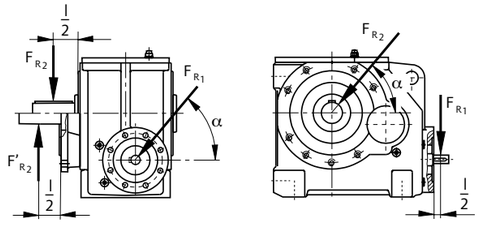
Dimensions in mm / featherkey ways according to DIN 6,885 / strength class for screws 10.9

PERMISSIBLE SHAFT LOADS

AUMA Drives gear units can withstand additional forces at both the output shaft and hollow shaft. The following data on permissible loads were determined on the basis of the most unfavourable angle of force application and application of force in the middle of the shaft end, as well as at drive rotational speed n_1 = 1,400 rpm. The gear units are capable of withstanding axial forces up to a level of 50 % of the permissible radial force.

All data given applies to one-way loads, i. e. simultaneous application of axial and radial forces is not permissible. Individual recalculation is required for higher loads or occurrence of combined loads (both axial and radial). In this case, please state direction of rotation, forces, as well as indications on the point of application of force or the angle of application, as well as the desired output speed.

F_{R1} Radial force drive shaft
F_{R2} Radial force output shaft
F'_{R2} Radial force output shaft with Output drive flange $F'_{R2} = 0.7 \times F_{R2}$



When determining the resultant radial forces, the type of transmission element mounted on the shaft end must be considered by applying appropriate factors.

F_R Equivalent radial load $F_R = T \times 2000 \times f_z / d_0$
T [Nm] Torque at output drive shaft
d_0 [mm] Mean diameter of the transmission element
f_z Factor of transmission element

Transmission element	Remark	f_z
Geared wheel	< 17 teeth	1.1
Chain wheels	< 13 teeth	1.4
Chain wheels	< 20 teeth	1.2
V-belt pulleys	Pre-tensioning influence	1.7
Flat belt pulleys	Pre-tensioning influence	2.5

Permissible radial forces for drive rotational speed n_1 = 1,400 rpm depending on the transmission ratio i:

SST97	
i	F_{R2} [N]
7.90	3,500
10.18	4,000
11.98	4,000
15.18	4,300
17.98	4,400
20.54	4,800
24.18	5,000
30.64	5,500
37.37	6,100
41.09	6,300
45.57	6,500
48.36	6,900
55.58	7,200
61.29	7,500
71.92	8,000
74.75	8,100
82.18	8,500
91.14	9,000
96.72	9,000
111.17	9,000
122.57	9,000
149.50	9,000

SST118	
i	F_{R2} [N]
8.05	3,500
9.82	4,000
12.08	4,000
16.65	4,300
19.00	4,400
24.98	4,800
28.50	5,000
34.23	5,500
39.06	6,100
46.44	6,300
49.95	6,500
57.00	6,900
68.45	7,200
78.11	7,500
99.90	8,000
114.00	8,100
136.90	8,500
156.22	9,000
-	-
-	-
-	-
-	-

SST150	
i	F_{R2} [N]
7.54	8,000
10.09	8,000
11.31	8,500
14.76	9,000
16.43	9,000
18.43	10,000
22.14	11,500
24.65	11,500
27.64	12,000
30.34	13,000
33.78	13,500
37.89	13,500
44.28	14,000
49.30	15,000
55.29	15,000
67.57	16,000
75.76	17,000
88.56	18,000
98.61	20,000
110.57	20,000
135.13	20,000
151.52	20,000

OIL QUANTITIES & WEIGHTS

As standard, AUMA Drives worm helical gear units are delivered including oil filling. Fully synthetic high performance oils with low-wear additives for premium efficiency and reduced maintenance are used. Lubricant quantities depend on the service position of the gear unit. For more detailed information, please refer to page 78. Permissible lubricants are indicated in the operation instructions or on the name plate.

Oil quantities [litres]

Size	Service positions					
	B3	B8	B3I	B6	V5	V5II
SST97	1.75	3.0	3.7	1.9	3.0	3.0
SST118	3.70	6.1	6.3	3.0	7.4	7.4
SST150	5.70	11.0	12.0	7.0	11.0	11.0

Weights [kg]

Basic version		Mounting parts										
Size	Type SSTVA	Flanges for mounting IEC motor Type SSTK_			Coupling diameter			Solid output shaft		Output drive flange	Torque reaction lever	Cover
		A1 = 160	A1 = 200	A1 = 250	24	28	38	1 shaft end	2 shaft ends			
SST97	32.0	3.5	-	-	1.3	1.3	2.6	2.80	3.3	4.2	3.0	1.6
SST118	56.0	-	4.0	-	1.3	1.3	2.6	6.00	7.1	6.5	5.1	2.2
SST150	101.0	-	-	9.5	1.3	1.3	2.6	10.00	13.0	16.0	7.4	4.0

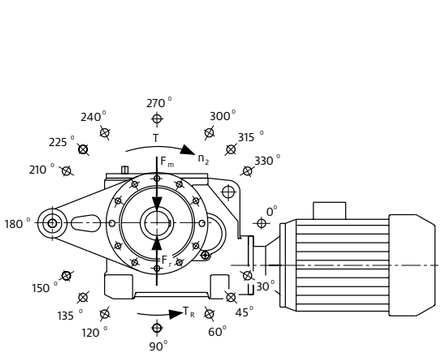
APPLICATION GUIDELINE FOR MOUNTING TORQUE REACTION LEVERS

When slip-on gear motors / gear units with torque reaction levers are used, external forces act on the driven machine shaft. The application point and impact direction of external force depend on the position of the torque reaction lever and on the direction of rotation. The torque reaction lever must be provided on the driven machine side of the gear motor / gear unit. This minimizes the bending wear on the motor shaft due to external forces. The fastening bolt for the torque reaction lever must be positioned on both sides.

The output drive torque equals the reaction torque; however, into the opposite direction. Suitable selection of application point and impact direction of external force in combination with the force derived from the gear unit weight can result in a reduction of the external force acting upon the drive machine.

Active forces:

F_m Force from the mass
F_s Force acting on the fastening bolts of torque reaction lever
F_r External force acting on the motor shaft
z Lever length for the torque reaction lever
n_2 Output speed of hollow shaft
T Output drive torques
T_R Reaction torque at gear unit housing



Possible mounting positions of the torque reaction lever															
Size	0°	30°	45°	60°	90°	120°	135°	150°	180°	210°	225°	240°	270°	300°	315°	330°
97	×			×	×	×		×	×	×		×	×	×		×
118	×			×	×	×		×	×	×		×	×	×		×
150	×				×		×		×		×		×		×	

Escalator gear units without compromise

No matter whether you go to airports, underground stations or department stores – It is impossible to imagine everyday life without escalators. The core of all systems is the drive technology, imperatively meeting highest demands: a matter of course for GFC. We guarantee high resilience and functional safety, long service performance, reliability and economic viability.

Our worm gear units keep the noise level constantly below 55 dB (A). They are lubricated for life and subject to continuous quality control – from incoming goods to final inspection at the acoustic measurement room. GCF products fulfil all requirements of standards DIN 3990, DIN 3996:2012, EN 115 and APTA according to the customer's product specifications

Our name means highest precision, engineering art and customised solutions in manufacturing gear units and drive systems. Safety-relevant applications such as the transport of people have always been a core automation competence for our gear units. We have complemented the elevator drive range by GFC escalator gear units for more than a decade. More than 19,000 GFC escalator gear units are reliably automating escalators in airpoirts, underground stations and department stores worldwide. With the FTS.1 and FTSST.1 series – and going beyond with the so-called twin drives – we cover motor power between 5 kW and 90 kW. The major assets of GFC escalator gear units are their capability to withstand high loads and their functional safety, long running times, reliability and efficiency. We offer 100 % traceability for all components within the power drive.

DESIGN AND CHARACTERISTICS

Various outstanding features have established our gear units as first class escalator gear units. Vibration and shock-absorbing torque transmission, one of the main assets of worm gear units, means low-noise transport and therefore convenience for the passengers. Worm gearings with ZK type tooth profile optimised for this purpose have high overload capabilities and are therefore ideally suited for frequent load changes in daily operation. This is achieved by implementing grinded worm shafts made of case-hardened steel and worm wheels made of highly wear-resistant special bronze. Worm gearings correspond to DIN 3996:2012, the newest method for calculation of load capacity. The load capacity for the spur gear stages of our FTSST.1 heavy duty range have been calculated according to DIN 3990. All machine elements within GFC escalator gear units meet the safety factor ≥ 5 according to EN 115:2010. FEM optimised housings warrant for maximum stiffness and consequently reduced vibration within the powertrain.

NOISE EMISSION, EFFICIENCY AND LIFETIME

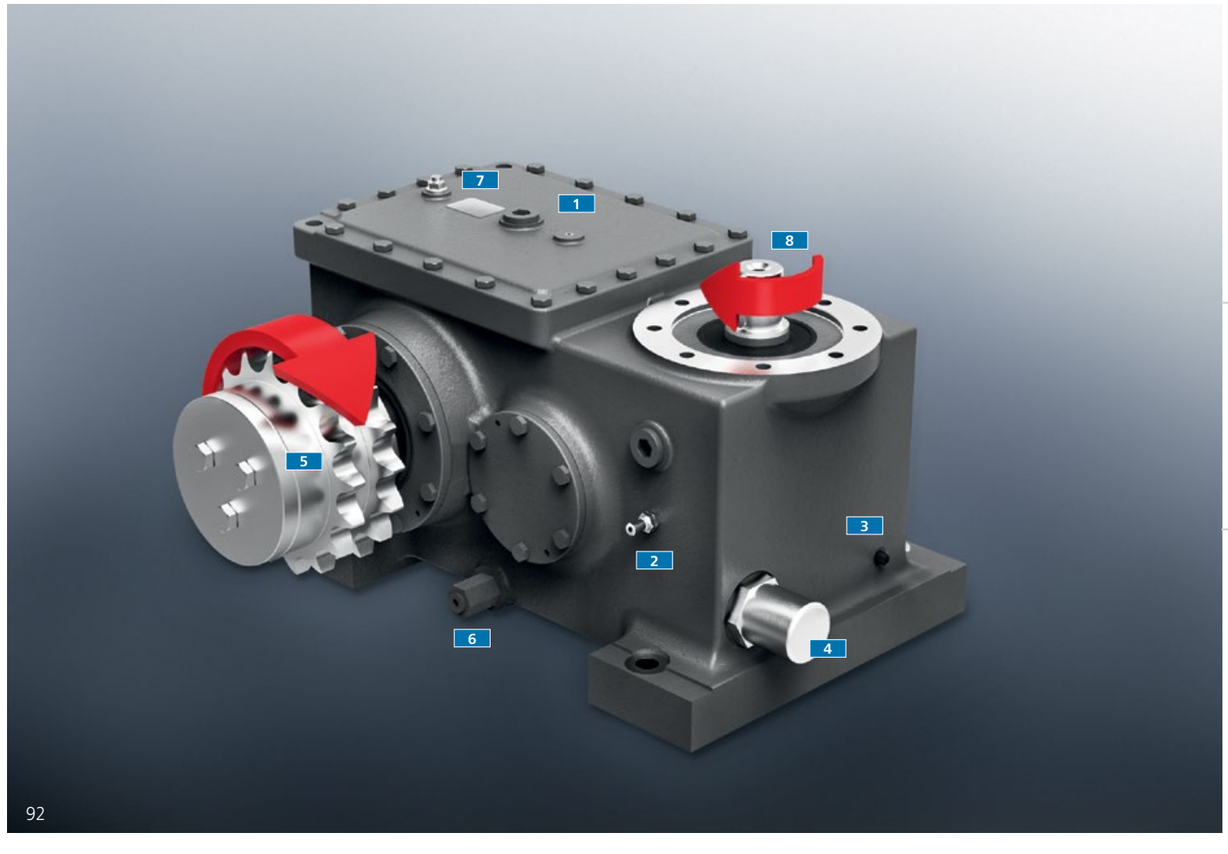
With regard to low-noise applications and noise emissions, worm gear units will always be the measure of all things. In our in-house acoustic measurement room complying with DIN standards, the acoustic pressure level of our escalator gear units is measured and recorded as part of final inspection.

Machining of worm wheel sets on state-of-the-art equipment as well as unique measuring technology, partially in special development projects in close cooperation with our partners, ensure optimum gear quality. When using synthetic polyglycol lubricants, typical heavy industry worm gearings achieve an efficiency rating of up to 96 % thanks to our gearing optimisation technology. Paired with the implementation of top grade materials, selected standard parts and high precision housing machining, maximum service life and highest reliability are achieved. The evidence of these results were confirmed by internal verifications and tests on customers' test benches.

OPTIONS AND MOUNTING PARTS

If specifically desired, GFC escalator gear units can be provided with integrated sensor technology for monitoring oil level, oil sump temperature and system vibration. When implemented in extremely low temperature environments, we offer an optional oil heater to ensure optimum lubrication as early as during the start-up phase.

ESCALATOR GEAR UNITS: DESIGN AND OPTIONS



1 Vibration sensor

2 Option: Oil level sensor

3 Oil temperature probe

4 Lubricant heater

5 Pinion

6 Oil drain

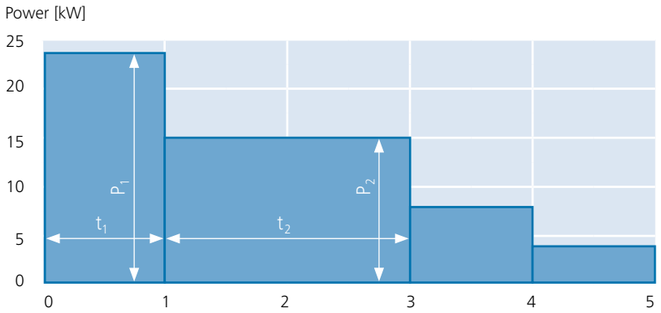
7 Air vent valve

8 Drive shaft

FTS125.1 FTS160.1 FTS180.1 FTSST158.1 FTSST180.1 FTSST212.1

Our comprehensive product portfolio and the large number of possible transmission ratios offer many selection criteria for finding the optimum gear unit for your application and hence a cost-efficient drive solution. Rated motor power and speed and the desired speed at the pinion are decisive for the gear unit type, size and transmission ratio. Determination of computed lifetime of the selected motor-gear unit combination is based on the load spectrum of the escalator to be automated. The load spectrum is the variable for the varying loads due to fluctuating number of people to be transported during the day. By means of the computed equivalent power P_{eq} lifetime and permissible radial force are determined on the basis of graphs. The course of action is demonstrated by means of the following example:

1. LOAD SPECTRUM (EXAMPLE)



Load event 1 = 24 kW across 1/5 of time

Load event 2 = 15 kW across 2/5 of time

Load event 3 = 8 kW across 1/5 of time

Load event 4 = 4 kW across 1/5 of time

2. CYCLE TIME

$$t_{tot} = t_1 + t_2 + t_3 + \cdots t_i$$

3. AVERAGE DRIVE POWER P_{AV}

$$P_{avg} = P_1 \times \frac{t_1}{t_{tot}} + P_2 \times \frac{t_2}{t_{tot}} + P_3 \times \frac{t_3}{t_{tot}} + \ldots + P_i \times \frac{t_i}{t_{tot}}$$

4. EQUIVALENT POWER P_{EQ}

$$P_{eq} = \sqrt[3]{P_1^3 \times \frac{P_1}{P_{avg}} \times \frac{t_1}{t_{tot}} + P_2^3 \times \frac{P_2}{P_{avg}} \times \frac{t_2}{t_{tot}} + P_3^3 \times \frac{P_3}{P_{avg}} \times \frac{t_3}{t_{tot}} + \ldots + P_i^3 \times \frac{P_i}{P_{avg}} \times \frac{t_i}{t_{tot}}}$$

EXAMPLE

$t_{tot} = 5$ h

$P_{avg} = 13.2$ kW

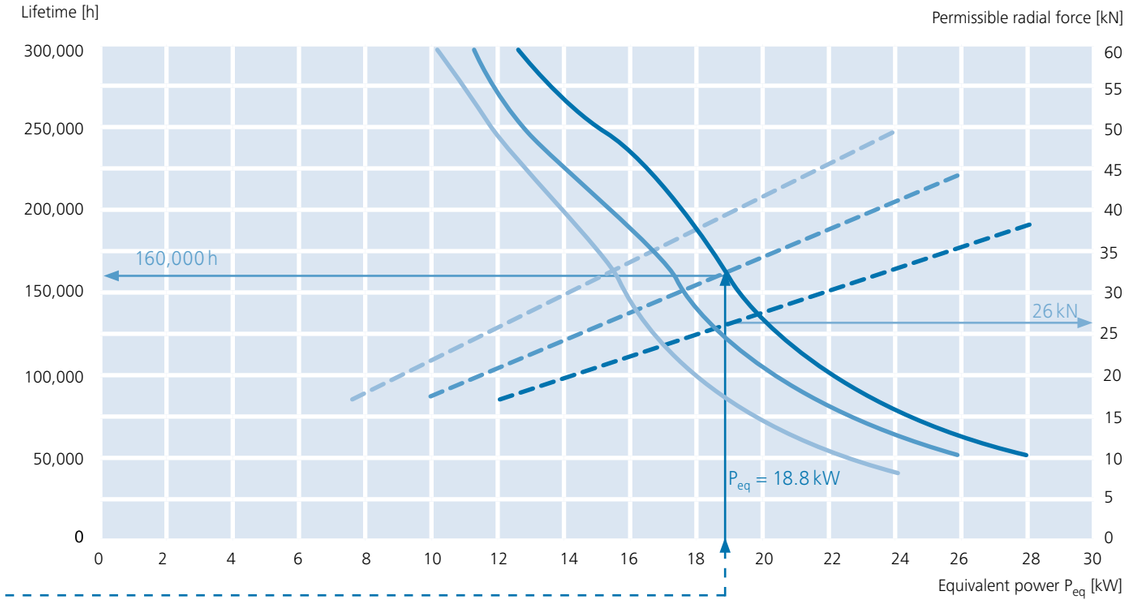
$P_{eq} = 18.8$ kW

5. GRAPHIC DETERMINATION OF RESULTING LIFETIME AND PERMISSIBLE RADIAL FORCE AT OUTPUT SHAFT

Gear unit selected as example: FTSST180.1 with transmission ratio i = 20.4 and motor speed of 1,480 rpm.

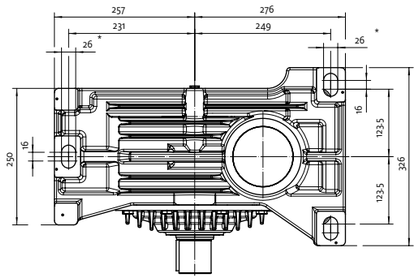
Lubrication	Polyglycol
Ambient temperature	40 °C
Efficiency	≥ 94 %
Max. output torque	6.5 kNm (according to EN 115 » safety factor = 5)
Max. radial force	71 kN (according to EN 115 » safety factor = 5)

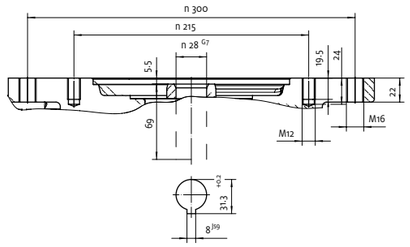
α = 60°
x = 300 mm

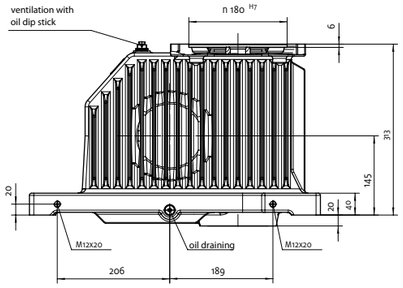


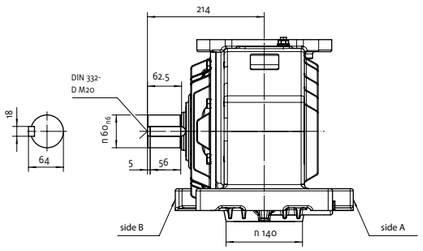
Life-time	radial force	Input speed [rpm]	Max. rated motor power [kW]	Max. rated radial force [kN]
		980	27	54
		1,180	30	51
		1,480	30	41

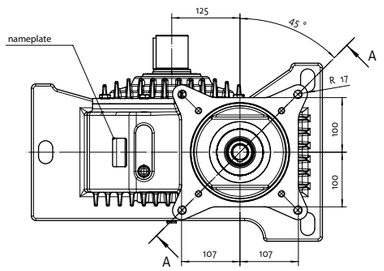
The selected gear unit FTSST180.1 with reduction ratio i = 20.4 achieves a computed lifetime of 160,000 hours.

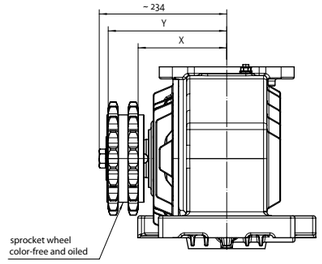












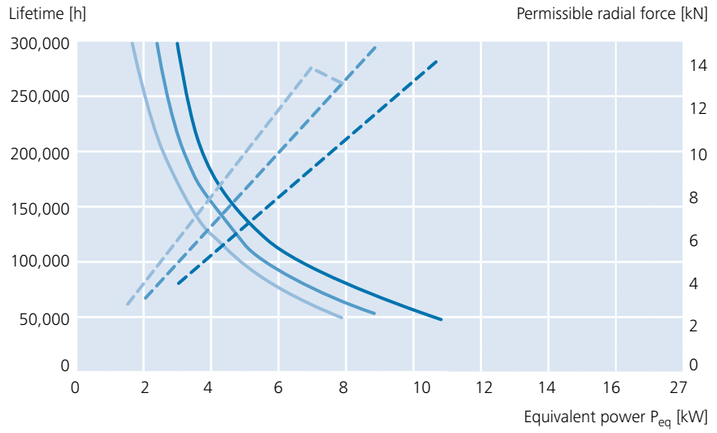
Pinion		
Type of pinion	X [mm]	Y [mm]
Duplex-1 1/4'' (double) for chains acc. to DIN 8187	162.3	217.1
Duplex-1 1/4'' (double) for chains acc. to DIN 8188	163.7	217.1

*Strength class of screws 10.9

Lubrication	Polyglycol
Ambient temperature	40 °C
Efficiency	≥ 91 %
Max. output torque	2.0 kNm (according to EN 115 » safety factor = 5)
Max. radial force	17 kN (according to EN 115 » safety factor = 5)

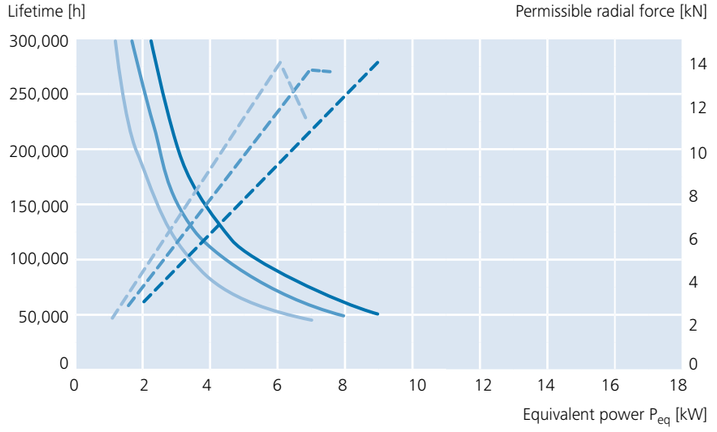
α = 60°
x = 183 mm

TRANSMISSION RATIO 20.5



Life-time	Radial force	Input speed [rpm]	Max. rated motor power [kW]	Max. rated radial force [kN]
———	- - -	980	9.0	17
———	- - -	1,180	9.5	15
———	- - -	1,480	10.5	14

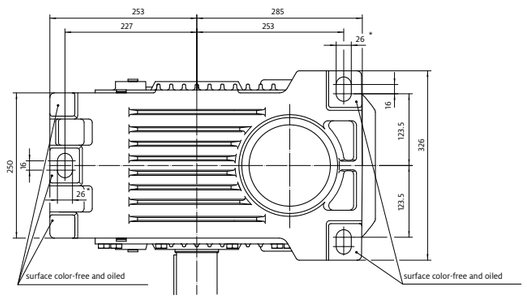
TRANSMISSION RATIO 24.5

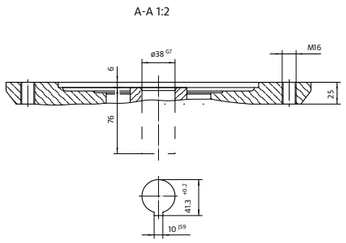


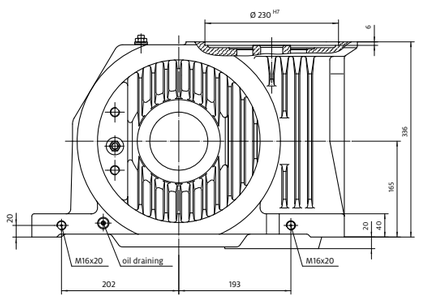
Life-time	Radial force	Input speed [rpm]	Max. rated motor power [kW]	Max. rated radial force [kN]
———	- - -	980	7.5	17
———	- - -	1,180	8.0	15
———	- - -	1,480	9.0	14

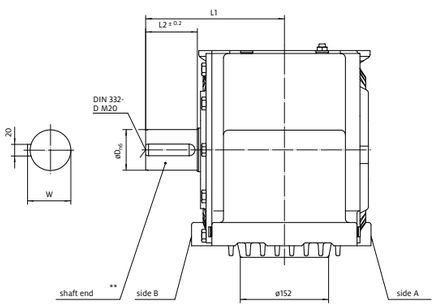
The calculations of machine elements are based on the standards and guidelines reflecting the current state-of-the-art.
Tooth profiles comply with the latest revision of DIN 3996:2012.

TECHNICAL DATA – SIZE FTS 160.1



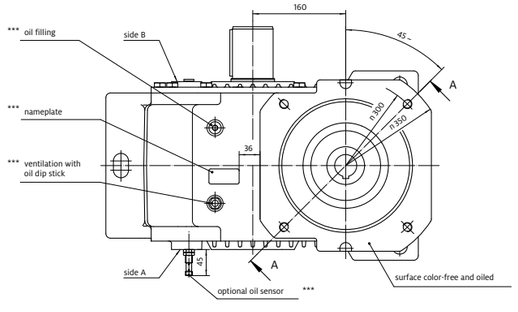


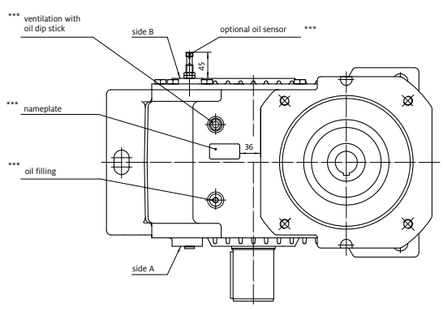




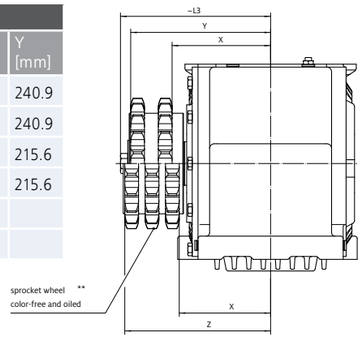
Output side A

Output side B





Pinion							
Type of pinion	D [mm]	L1 [mm]	L2 [mm]	L3 [mm]	W [mm]	X [mm]	Y [mm]
Duplex-1 1/2'' (double)	70	239	89.0	258.5	74.5	168.9	240.9
Duplex-1 1/2'' (double) for chains DIN 8188	70	239	89.0	258.5	74.5	172.0	240.9
Duplex-1 1/4'' (double) for chains DIN 8187	60	214	62.5	232.0	64.0	160.8	215.6
Duplex-1 1/4'' (double) for chains DIN 8188	60	214	62.5	232.0	64.0	162.2	215.6
Triple-1 1/4'' (triple) for chains DIN 8187	70	239	89.0	258.5	74.5	162.3	
Triple-1 1/4'' (triple) for chains DIN 8188	70	239	89.0	258.5	74.5	164.5	

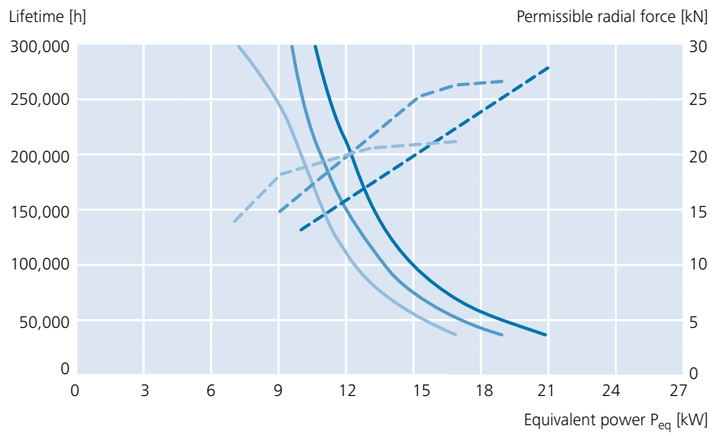


* Strength class of screws 10.9
** Specify mounting side of pinion or shaft end on order
*** Position of oil inlet, air vent valve, oil sensor and machine plate depend on output drive sides A and B
Parallel keys and parallel key grooves according to DIN 6885

Lubrication	Polyglycol
Ambient temperature	40 °C
Efficiency	≥ 91 %
Max. output torque	4 kNm (according to EN 115 » safety factor = 5)
Max. radial force	32 kN (according to EN 115 » safety factor = 5)

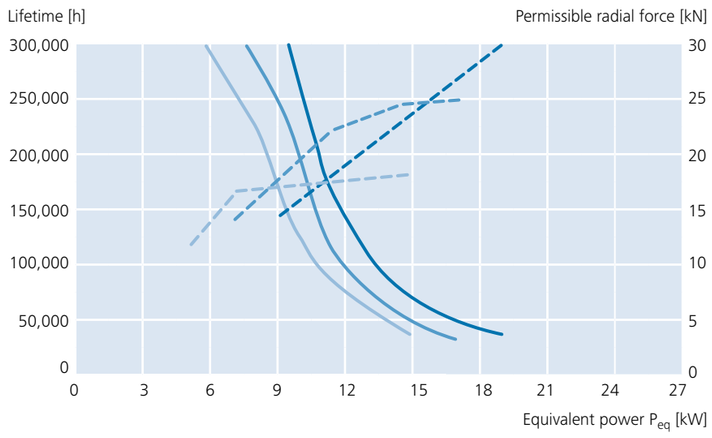
α = 60°
x = 194.5 mm

TRANSMISSION RATIO 20.5



Life-time	Radial force	Input speed [rpm]	Max. rated motor power [kW]	Max. rated radial force [kN]
———	- - -	980	19	32
———	- - -	1,180	22	32
———	- - -	1,480	22	29

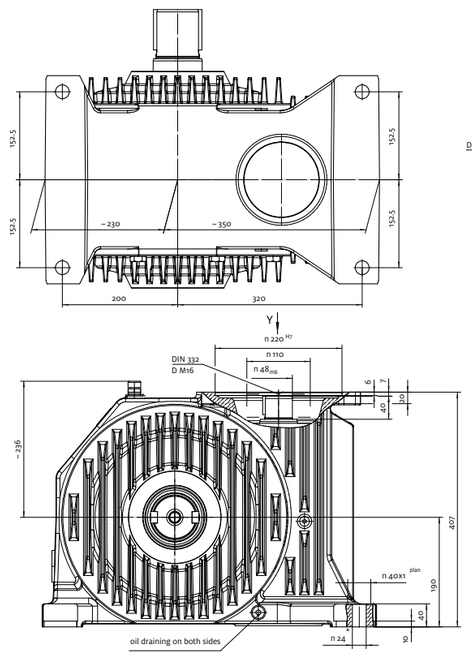
TRANSMISSION RATIO 24.5



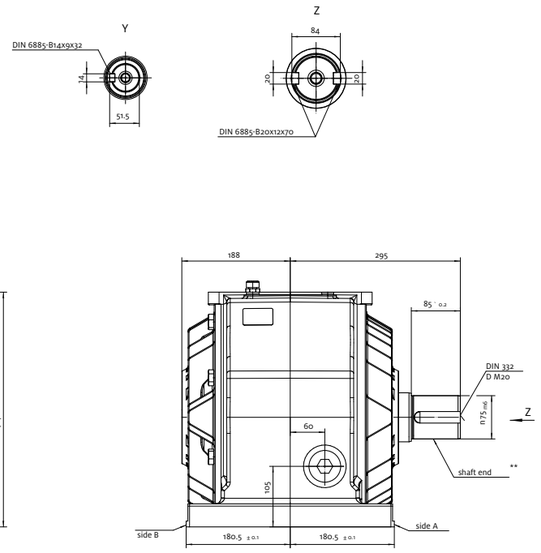
Life-time	Radial force	Input speed [rpm]	Max. rated motor power [kW]	Max. rated radial force [kN]
———	- - -	980	17	32
———	- - -	1,180	19	32
———	- - -	1,480	19	30

The calculations of machine elements are based on the standards and guidelines reflecting the current state-of-the-art.
Tooth profiles comply with the latest revision of DIN 3996:2012.

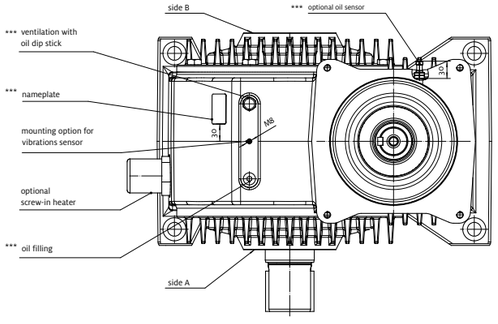
TECHNICAL DATA – SIZE FTS 180.1

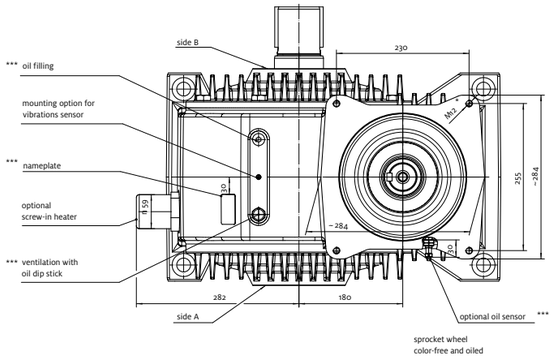


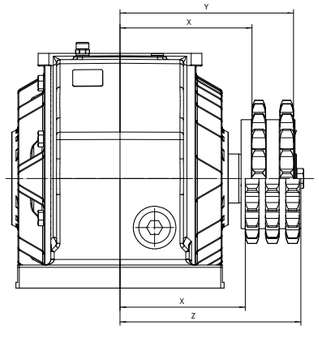
Output side A



Output side B







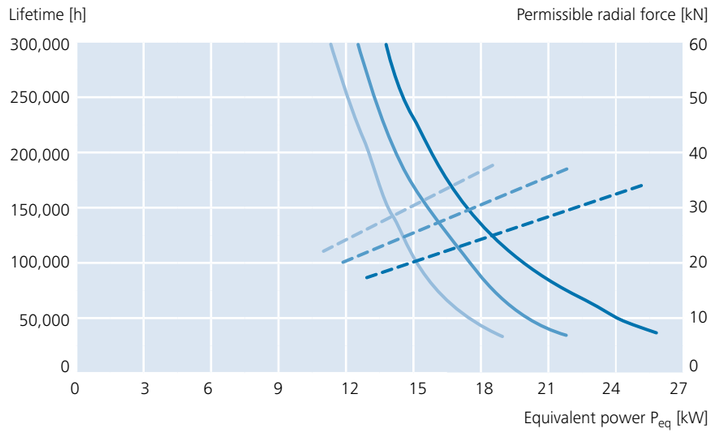
Pinion			
Type of pinion	X [mm]	Y [mm]	Z [mm]
Duplex-1 1/2'' (double) for chains DIN 8187	228.9	300.9	
Duplex-1 1/2'' (double) for chains DIN 8188	232.0	300.9	
Triple-1 1/4'' (triple) for chains DIN 8187	222.3		313.7
Triple-1 1/4'' (triple) for chains DIN 8188	224.5		313.7

* Strength class of screws 10.9
** Specify mounting side of pinion or shaft end on order
*** Position of oil inlet, air vent valve, oil sensor and machine plate depend on output drive sides A and B
Parallel keys and parallel key grooves according to DIN 6885

Lubrication	Polyglycol
Ambient temperature	40 °C
Efficiency	≥ 91 %
Max. output torque	4.4 kNm (according to EN 115 » safety factor = 5)
Max. radial force	44 kN (according to EN 115 » safety factor = 5)

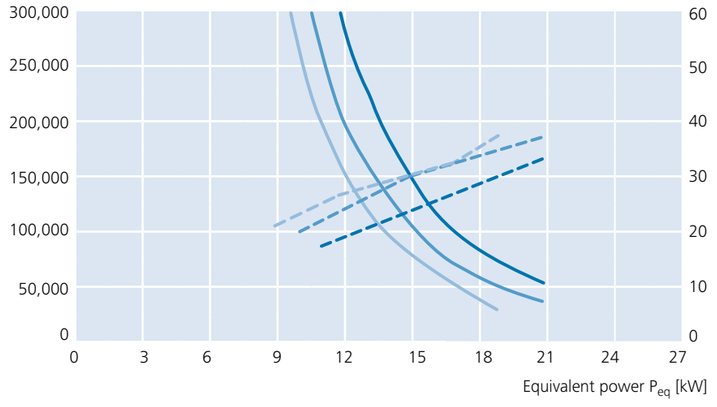
α = 60°
x = 252.5 mm

TRANSMISSION RATIO 20.5



Life-time	Radial force	Input speed [rpm]	Max. rated motor power [kW]	Max. rated radial force [kN]
———	– – –	980	23	44
———	– – –	1,180	25	44
———	– – –	1,480	25	44

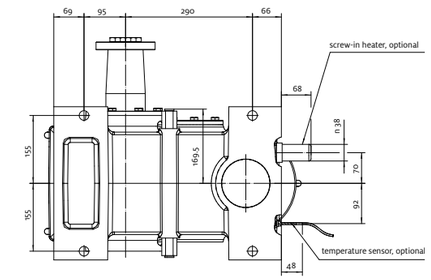
TRANSMISSION RATIO 24.5

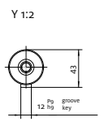


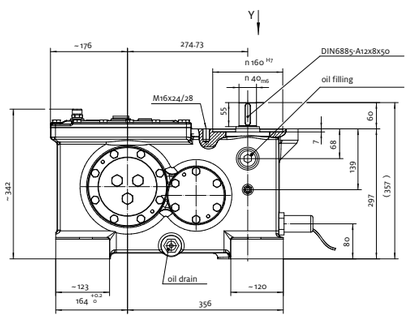
Life-time	Radial force	Input speed [rpm]	Max. rated motor power [kW]	Max. rated radial force [kN]
———	– – –	980	20	44
———	– – –	1,180	22	44
———	– – –	1,480	22	44

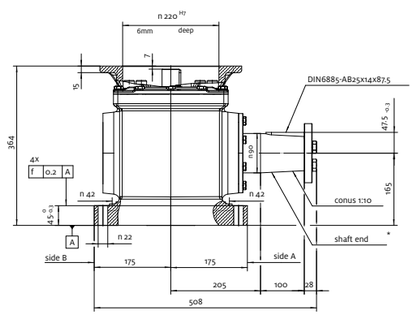
The calculations of machine elements are based on the standards and guidelines reflecting the current state-of-the-art.
Tooth profiles comply with the latest revision of DIN 3996:2012.

TECHNICAL DATA – SIZE FTS 158.1

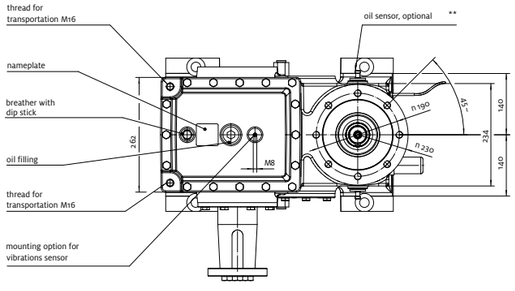




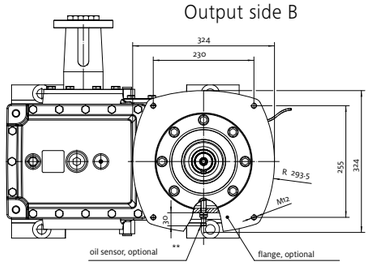




Output side A



Output side B

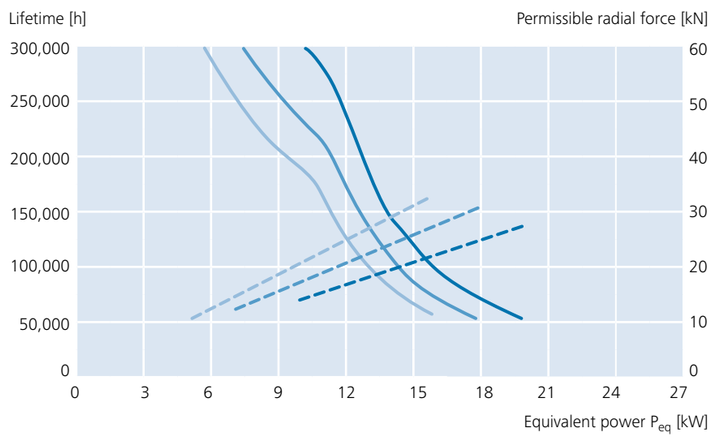


* Specify mounting side of shaft end on order
** Position of oil sensor depends on output drive sides A and B
Strength class of screws 10.9
Parallel keys and parallel key grooves according to DIN 6885

Lubrication	Polyglycol
Ambient temperature	40 °C
Efficiency	≥ 94 %
Max. output torque	4.6 kNm (according to EN 115 » safety factor = 5)
Max. radial force	50 kN (according to EN 115 » safety factor = 5)

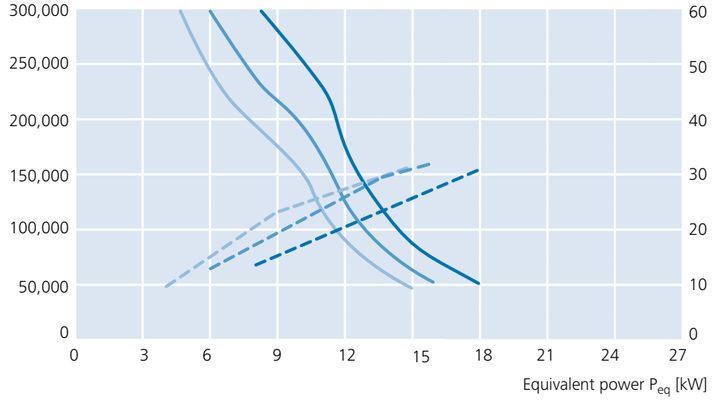
α = 60°
x = 255 mm

TRANSMISSION RATIO 20.4



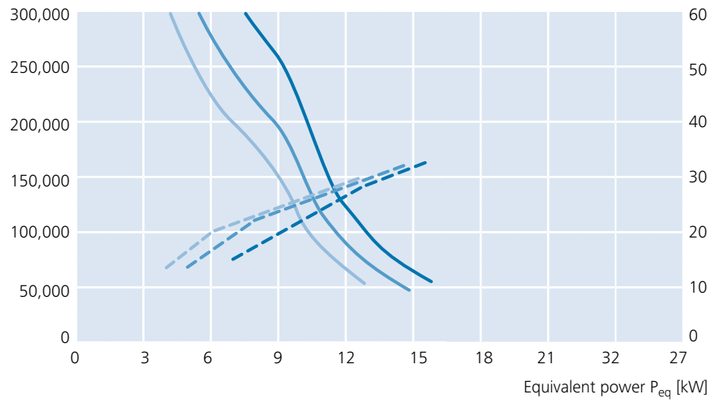
Life-time	Radial force	Input speed [rpm]	Max. rated motor power [kW]	Max. rated radial force [kN]
		980	18	37
		1,180	20	34
		1,480	22	30

TRANSMISSION RATIO 26.0



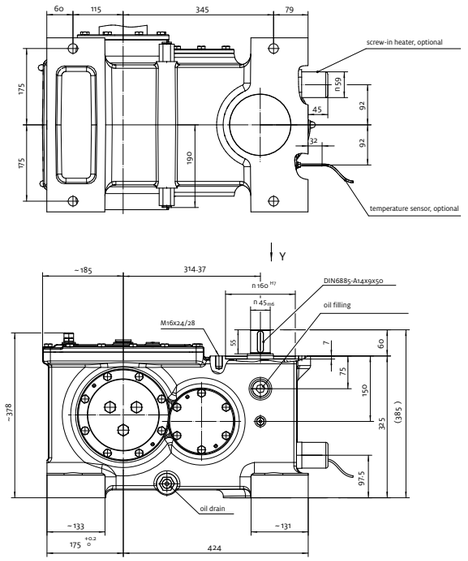
Life-time	Radial force	Input speed [rpm]	Max. rated motor power [kW]	Max. rated radial force [kN]
		980	16	40
		1,180	18	39
		1,480	20	35

TRANSMISSION RATIO 32.5

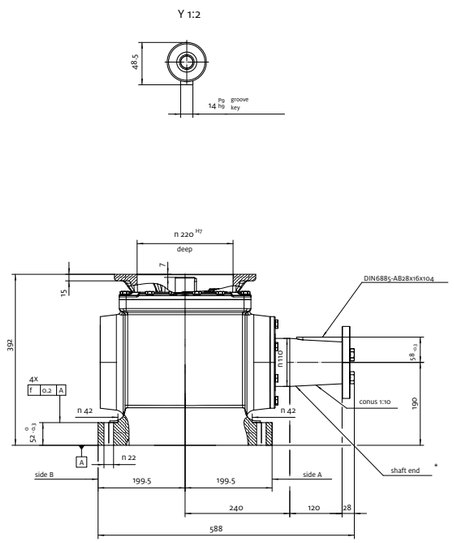


Life-time	Radial force	Input speed [rpm]	Max. rated motor power [kW]	Max. rated radial force [kN]
		980	14	37
		1,180	16	40
		1,480	18	39

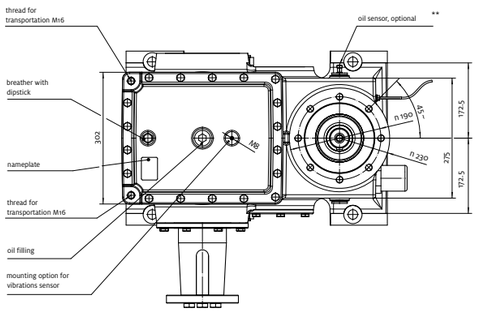
The calculations of machine elements are based on the standards and guidelines reflecting the current state-of-the-art.
Tooth profiles comply with the latest revision of DIN 3996:2012.

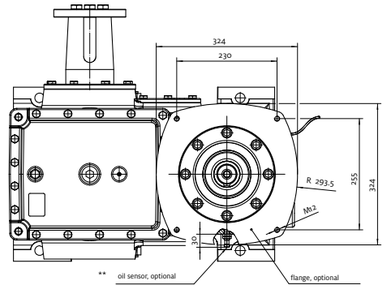


Output side A



Output side B



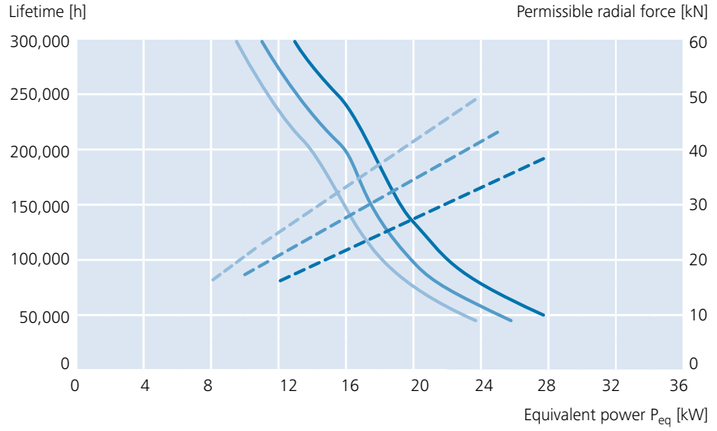


* Specify mounting side of shaft end on order** Position of oil sensor depends on output drive sides A and B
Strength class of screws 10.9
Parallel keys and parallel key grooves according to DIN 6885

Lubrication	Polyglycol
Ambient temperature	40 °C
Efficiency	≥ 94 %
Max. output torque	6.5 kNm (according to EN 115 » safety factor = 5)
Max. radial force	71 kN (according to EN 115 » safety factor = 5)

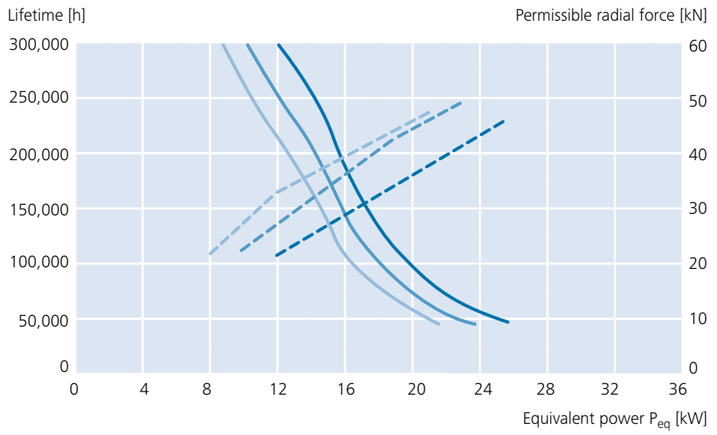
α = 60°
x = 300 mm

TRANSMISSION RATIO 20.4



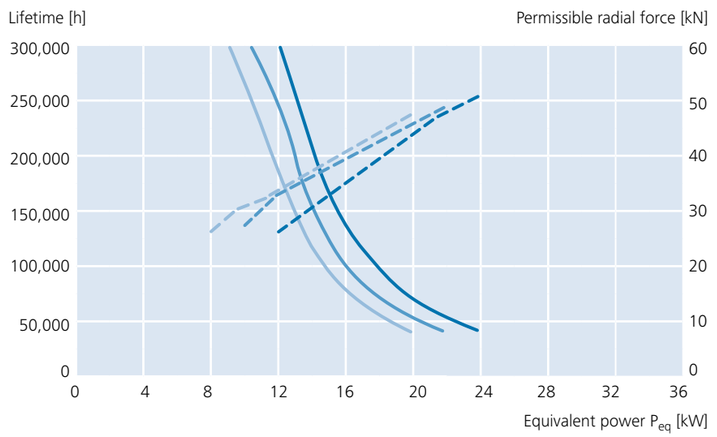
Life-time	Radial force	Input speed [rpm]	Max. rated motor power [kW]	Max. rated radial force [kN]
		980	27	54
		1,180	30	51
		1,480	30	41

TRANSMISSION RATIO 26.6



Life-time	Radial force	Input speed [rpm]	Max. rated motor power [kW]	Max. rated radial force [kN]
		980	25	58
		1,180	27	60
		1,480	30	53

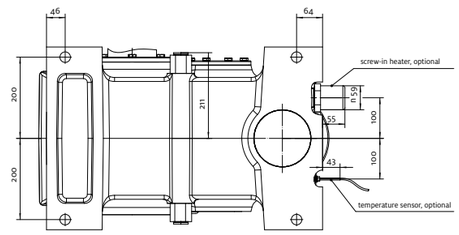
TRANSMISSION RATIO 32.84

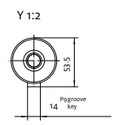


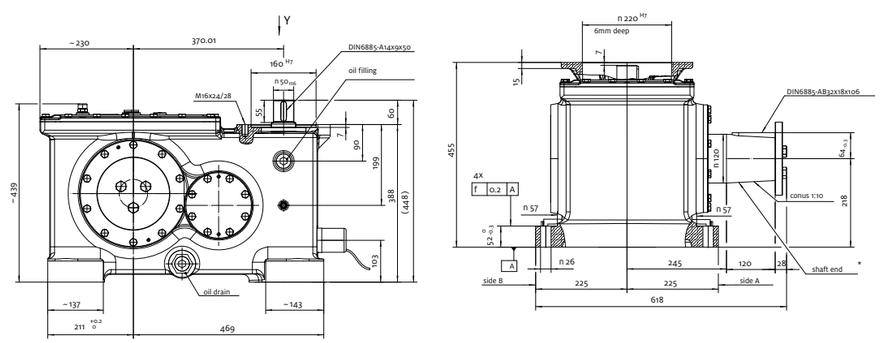
Life-time	Radial force	Input speed [rpm]	Max. rated motor power [kW]	Max. rated radial force [kN]
		980	21	56
		1,180	24	59
		1,480	27	59

The calculations of machine elements are based on the standards and guidelines reflecting the current state-of-the-art.
Tooth profiles comply with the latest revision of DIN 3996:2012.

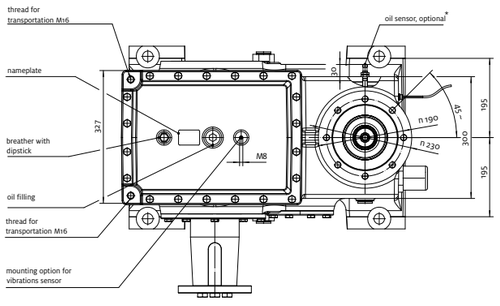
TECHNICAL DATA – SIZE FTSST 212.1



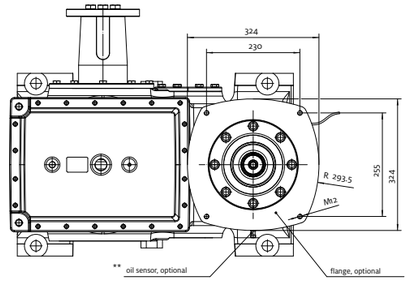




Output side A



Output side B

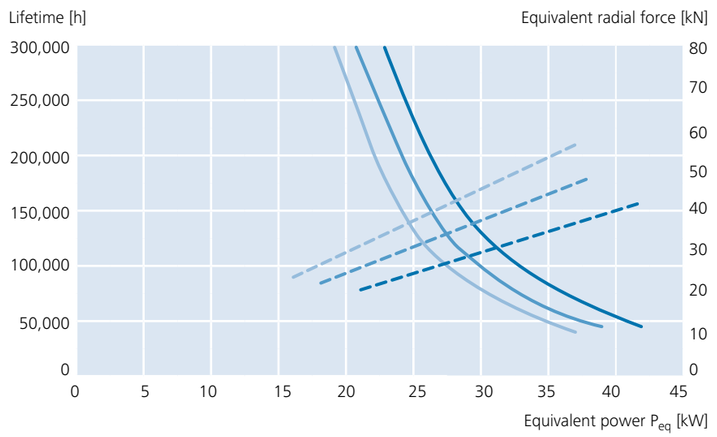


* Specify mounting side of shaft end on order
** Position of oil sensor depends on output drive sides A and B
Strength class of screws 10.9
Parallel keys and parallel key grooves according to DIN 6885

Lubrication	Polyglycol
Ambient temperature	40 °C
Efficiency	≥ 94 %
Max. output torque	12.2 kNm (according to EN 115 » safety factor = 5)
Max. radial force	100 kN (according to EN 115 » safety factor = 5)

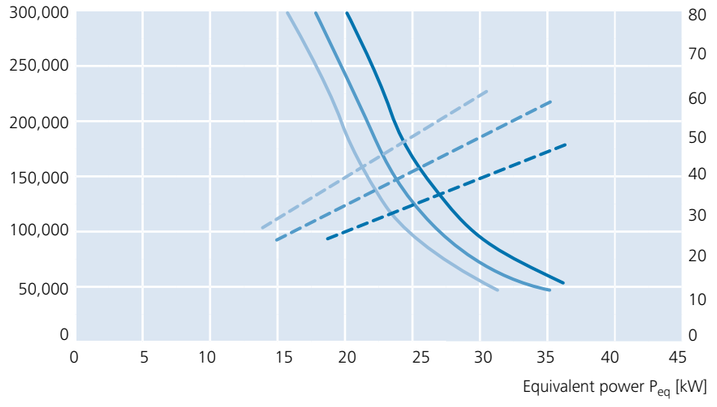
α = 60°
x = 305 mm

TRANSMISSION RATIO 20.4



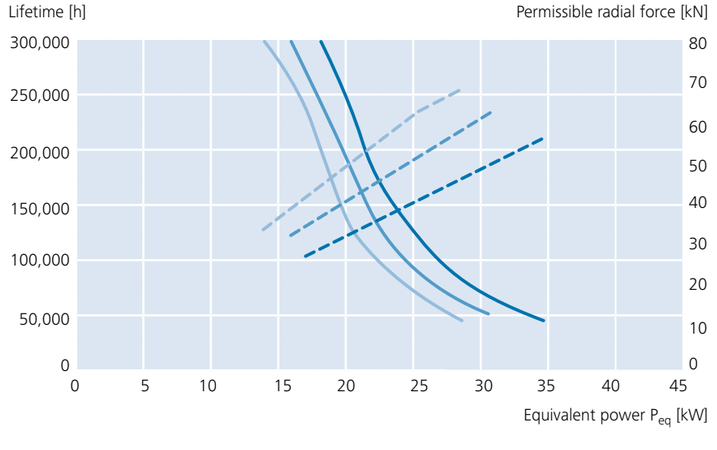
Life-time	Radial force	Input speed [rpm]	Max. rated motor power [kW]	Max. rated radial force [kN]
———	- - -	980	39	59
———	- - -	1,180	42	53
———	- - -	1,480	45	45

TRANSMISSION RATIO 25.7



Life-time	Radial force	Input speed [rpm]	Max. rated motor power [kW]	Max. rated radial force [kN]
———	- - -	980	36	61
———	- - -	1,180	39	63
———	- - -	1,480	42	54

TRANSMISSION RATIO 32.1



Life-time	Radial force	Input speed [rpm]	Max. rated motor power [kW]	Max. rated radial force [kN]
———	- - -	980	32	56
———	- - -	1,180	35	59
———	- - -	1,480	38	61

The calculations of machine elements are based on the standards and guidelines reflecting the current state-of-the-art.
Tooth profiles comply with the latest revision of DIN 3996:2012.

Large torques at low speed

Gear units in compliance with the slewing gear principle are the most compact worm gear units. They can withstand axial forces as well as radial forces and tilting moments at drive level. Irrespective of evenly circulating motion or back and forth movements – AUMA Drives slewing gear units work precisely and reliably in any environment. Our top class engineering, the robust design and perfect sealing against ingress of dirt warrant our quality. Our slewing gear units are perfectly suited as adjustable mechanisms for CPV trackers and part-turn units on cranes, as well as axial adjustment in foundry machines and other processing plants. Due to their self-locking feature, they are ideally suited for executing positioning tasks in any industrial sector.

DESIGN

For clearer visualisation, the slewing gear unit is shown in supine position. Relating to the mounting position provided for outdoor use, the output drive including worm wheel and sealing rings are pointing downward. The reason is to avoid water residues on the sealing elements. Primarily, slewing gear units are designed for receiving axial loads (pressure loads). For deviating service positions (e.g. also horizontal output drive axis) or force infeed (e.g. axial tensile loads), please do not hesitate to contact us.

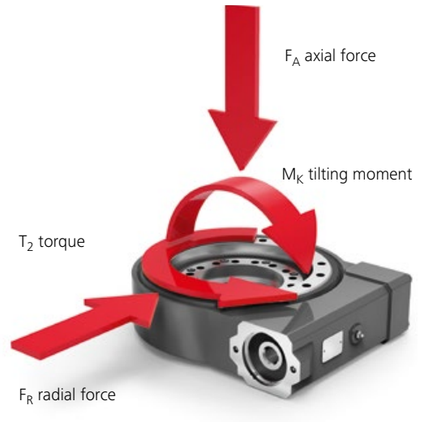
AUMA Drives slewing gear units are statically self-locking; however, backlash is possible under unfavourable conditions such as the occurrence of vibration. Slewing gear units can be used at ambient temperatures ranging from -20 °C to +70 °C. Standard surface protection is made of 2K-PUR wet paint and fulfils the requirements of ISO 12944 for corrosivity category C3-M. For outdoor use, our drive units include motor, primary gear stage and DRW up to IP68 protection degree and C4-M corrosivity category.

AUMA Drives slewing gear units are filled with grease upon delivery. Re-lubrication of the slewing gear unit at regular intervals is required to ensure their fault-free operation.

The slewing gear unit is to be fitted on an even, vibration absorbing and rigid machine frame. The base must be designed for the effective weights and torques so that no additional loads resulting from distortion or twisting can act on the slewing gear unit. The total run-out tolerance of the machine frame must be heeded according to the following table.

Type of slewing gear unit	DRW 180	DRW 240	DRW 285
Run-out tolerance [mm]	0.06	0.08	0.08

Slewing gear units can withstand axial forces as well as radial forces and tilting moments at output drive level. The maximum permissible loads for the corresponding slewing gear unit are indicated in the load diagrams. The load diagrams are valid for applied loads in axial direction. The operation point for the slewing gear unit may not exceed the limit value load curve neither for the selected screw connection (strength class 8.8 or 10.0) nor for the roller bearings.



Required tilting moment: $M_K \times f_B \leq$ permissible tilting moment $M_{K\,perm.}$
Required axial force: $F_A \times f_B \leq$ permissible axial force $F_{A\,perm.}$
Required radial force: $F_R \times f_B \leq$ permissible radial force $F_{R\,perm.}$

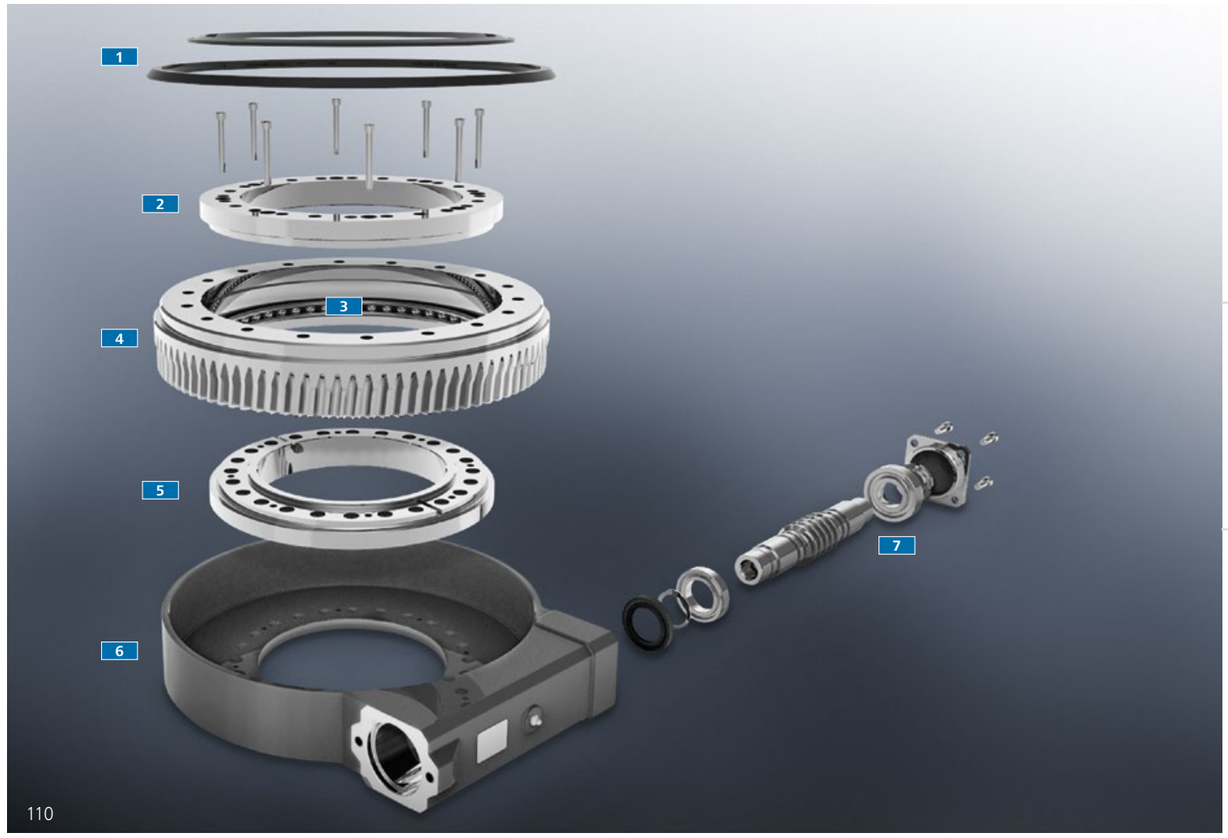
The required output torque T_2 must fulfil the following conditions:
Required output torque $T_2 \times f_B \leq$ rated output torque T_{2N}

With the selection of the operation factor f_B, the special service conditions in different applications are considered when selecting the size:

Application example	Principle of operation	Type of impact	Factor f_B
Rotary tables (light-duty)	Evenly circulating motion	slight	1.0…1.1
Solar installations, lifting work platforms	Back-and-forth movements	moderate	1.2…1.5
Foundry machines	Back-and-forth movements, impact movements	strong	1.6…2.0

Please do not hesitate to contact us for applications requiring particularly low circumferential backlash.

SLEWING GEAR UNITS – OVERVIEW



1 The sealing of the slewing gear unit against ingress contamination from outside is ensured by two double-lipped seals made of hydrated nitrile rubber (HNBR). These seals are characterised by their high resistance against technical oils containing additives, good cold flexibility (up to -40 °C), good ozone resistance as well as high friction resistance, withstanding high thermal impacts (up to 145 °C).

2 Inner body

3 Roller bearings

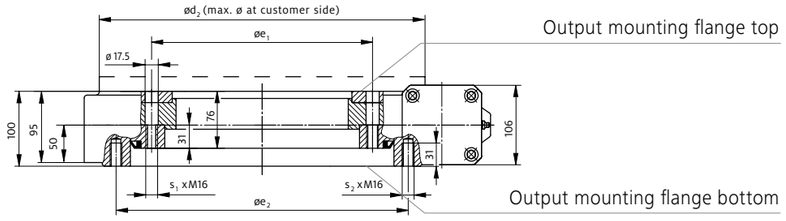
4 Worm wheel
Slewing gear units with worm wheels made of iron material are designed for on-times of S3 / 15 % and a maximum of 10 starts / hour. Use of slewing gear units with higher operation times require bronze worm wheels – please contact us!

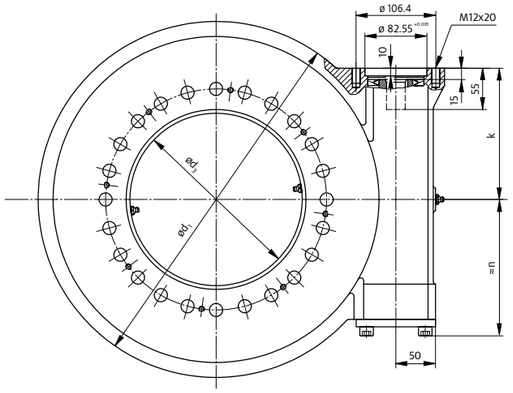
5 Inner body

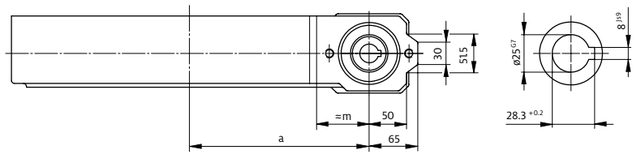
6 Housing

7 Worm shaft

DRW







Sizing and actual connection of (primary stage gear) motors are performed in compliance with customer specifications.

Size											
a	$Ød_1$	$Ød_2$	$Ød_3$	$Øe_1$	$Øe_2$	s_1	s_2	k	≈ m	≈ n	Weight [kg]
180	356	320	125	175	270	16	16	163	70	164	57
240	475	435	230	295	390	24	18	175	70	182	80
285	565	525	300	365	479.5	20	20	190	70	194	99

Operation mode	S3 / 15 %, maximum 10 starts per hour
Self-locking	static self-locking (Backlash can occur under unfavourable conditions e. g. vibration.)
Ambient temperature	–20 °C to +70 °C
Surface protection	2K-PUR wet paint
Lubrication	Synthetic low-viscosity grease

TORQUES, RADIAL AND AXIAL FORCES, TILTING MOMENTS

DRW 180

Output torque	T_{2N} = 5,500 Nm
Maximum torque	T_{2max} = 9,000 Nm
Transmission ratio	i = 62
Operation efficiency rating	η = 0.50
Output drive speed	$n_2 \leq 1.0$ rpm
Operation mode	S3 / 15 %

DRW 240

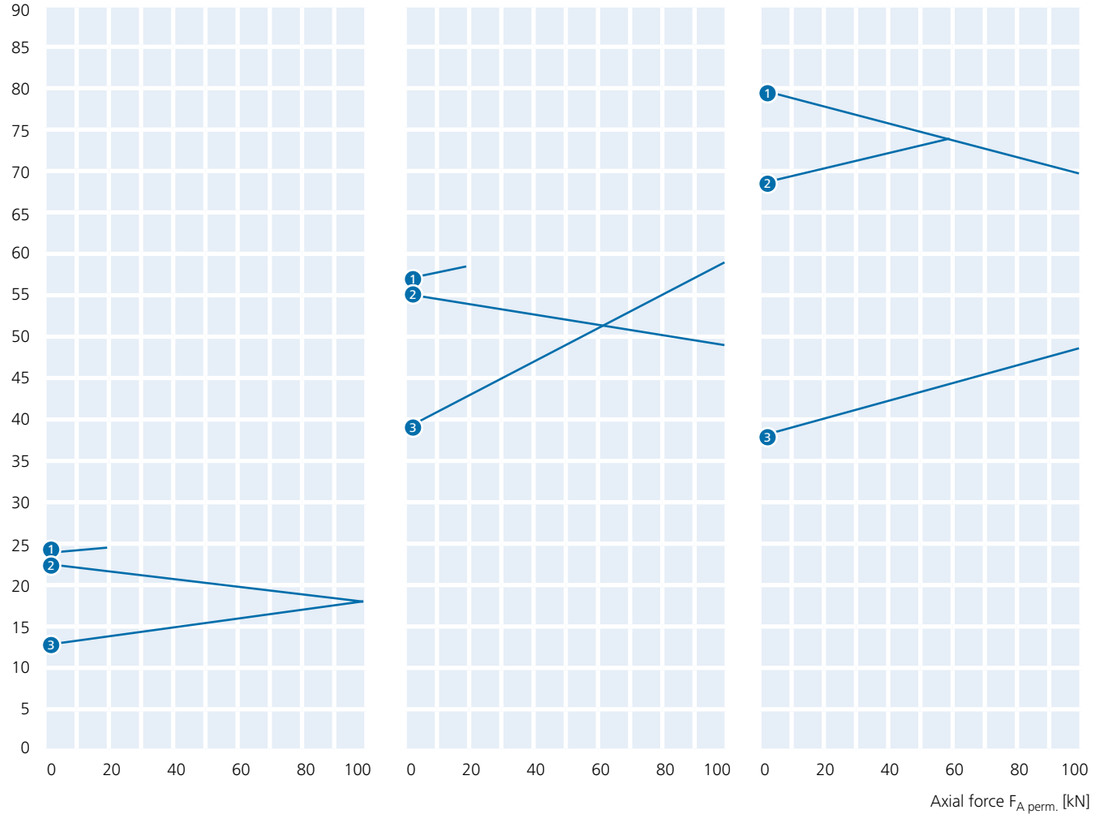
Output torque	T_{2N} = 9,900 Nm
Maximum torque	T_{2max} = 12,000 Nm
Transmission ratio	i = 86
Operation efficiency rating	η = 0.52
Output drive speed	$n_2 \leq 1.0$ rpm
Operation mode	S3 / 15 %

DRW 285

Output torque	T_{2N} = 11,000 Nm
Maximum torque	T_{2max} = 14,600 Nm
Transmission ratio	i = 104
Operation efficiency rating	η = 0.56
Output drive speed	$n_2 \leq 1.0$ rpm
Operation mode	S3 / 15 %

Permissible tilting moment
$M_{K\ perm.}$ [kNm]

Load diagram for effective load

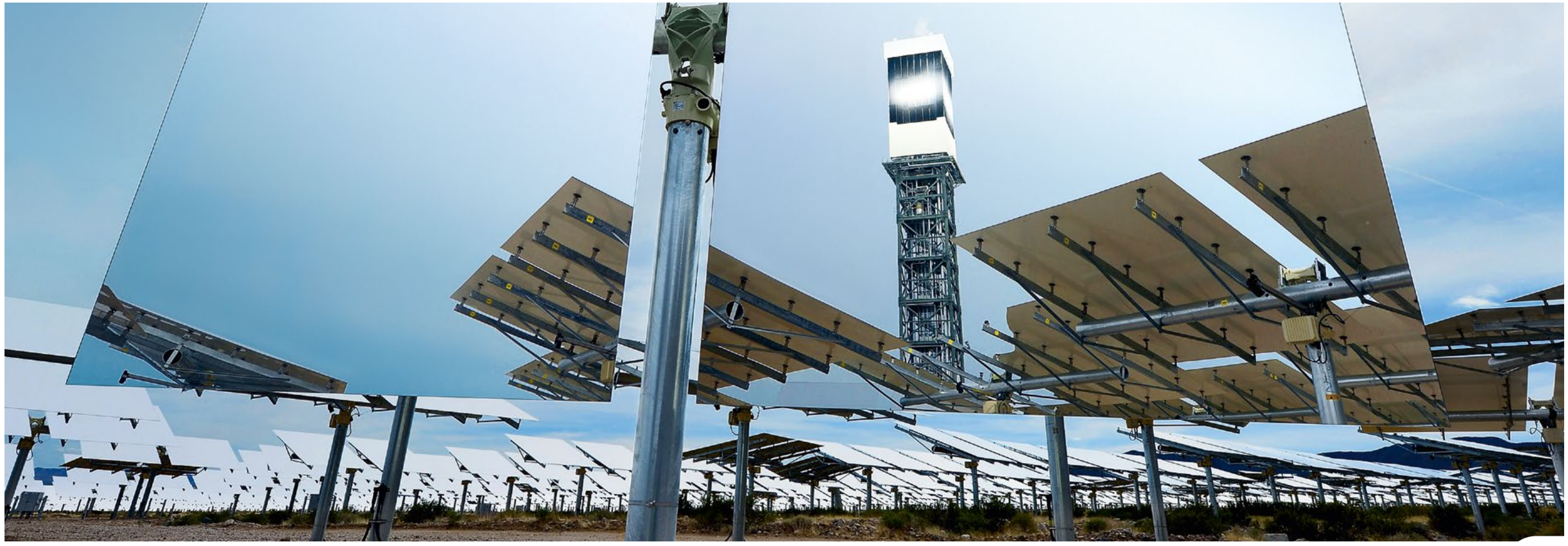


1. Roller bearings
2. when using screws M16-10.9 (permissible radial force $F_{R\ perm.} \leq 50{,}000$ N)
3. when using screws M16-8.8 (permissible radial force $F_{R\ perm.} \leq 30{,}000$ N)

1. Roller bearings
2. when using screws M16-10.9 (permissible radial force $F_{R\ perm.} \leq 70{,}000$ N)
3. when using screws M16-8.8 (permissible radial force $F_{R\ perm.} \leq 40{,}000$ N)

1. Roller bearings
2. when using screws M16-10.9 (permissible radial force $F_{R\ perm.} \leq 90{,}000$ N)
3. when using screws M16-8.8 (permissible radial force $F_{R\ perm.} \leq 55{,}000$ N)

The maximum output torques may be reached in momentary load peaks but never be exceeded.

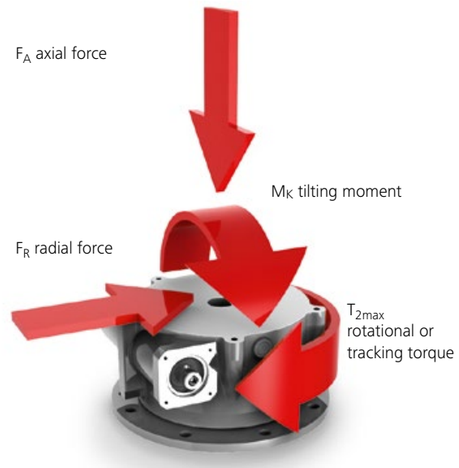


DRW 80 – PRECISION GEAR UNIT FOR HELIOSTATS AND CPV TRACKERS

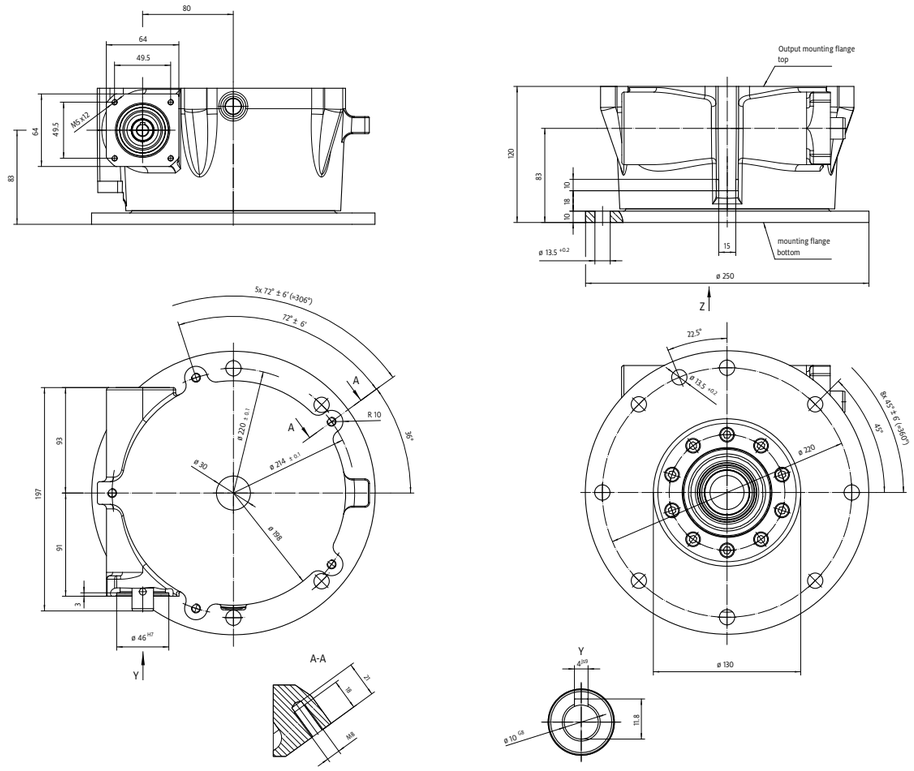
Drives for trackers in solar power plants require robust drive systems with high accuracy, efficiency and virtually maintenance-free long-term operation showing a high degree of reliability at the same time. Only components specially designed for outdoor use can meet these requirements. Worm gear units are ideally suited for the adjustment of heliostats or CPV trackers, since they can be used for virtually backlash-free transmission ratios and very slow movements.

By target-oriented selection of defined materials, required parameters such as perfect wear behaviour, high fatigue strength and long-term corrosion protection are achieved and implemented.

DRW 80 slewing gear units can absorb axial forces as well as radial forces and tilting moments at the output drive. Due to the specific design of DRW 80 type, loads acting by external forces must always be considered depending on the output torque T_2 or the maximum static torque T_{2max}. Please refer to the load diagrams for maximum permissible loads. Operation point for slewing gear unit may not exceed the respective limit value load curve (respectively indicated for cases F_R = 0; 2; 4 and 6 kN). The load diagrams apply to slewing gear units with flush loads in the axial direction on the mounting surfaces.



DRW



AUMA Drives supply complete drive systems on request. Sizing and actual connection of further drive components such as gear motors are performed in compliance with customer specifications.

Transmission ratio i	60:1
Self-locking	static self-locking *
Ambient temperature	–10 °C to +55 °C
Surface corrosion protection	2K-PUR wet paint, powder coating on request
Weight approx.	20 kg
Lubrication	lubricated for life
Maintenance	maintenance-free
Circumferential backlash on delivery**	< 0.7 mrad at load T_2 = 50 Nm

* Backlash can occur under unfavourable conditions (e.g. vibration.)
** Circumferential gear backlash directly depends on torque load (tracking torque T_2) and operating power. Please contact us indicating the load collective for detailed information on the backlash development over lifetime .

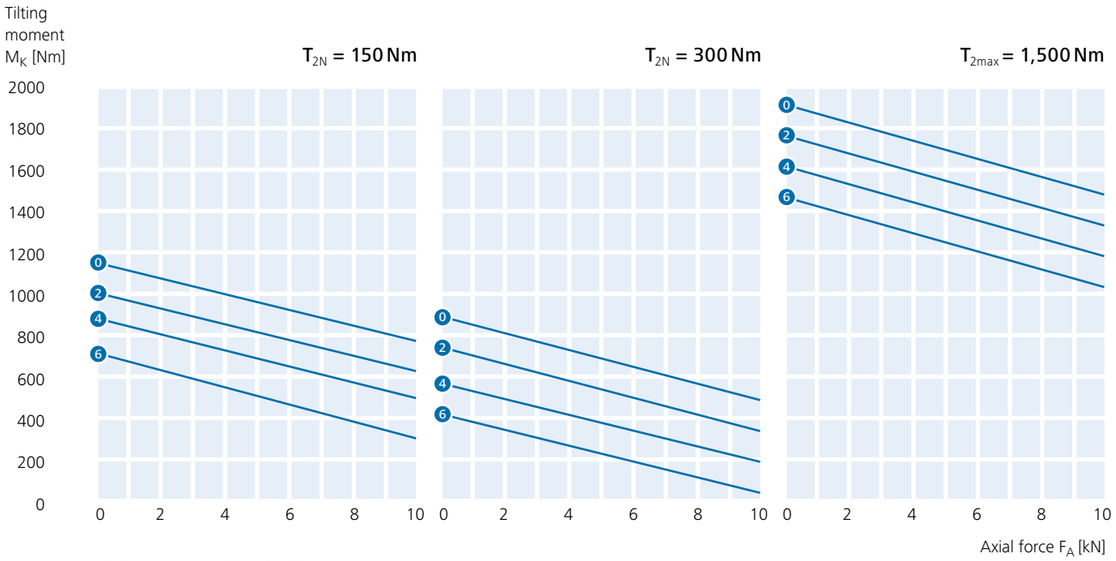
Dimensions in mm

TORQUES, RADIAL AND AXIAL FORCES, TILTING MOMENTS

The permissible output torque (tracking torque T_2) complies with the required accuracy or the maximum permissible circumferential backlash depending on the provided duration or operating power. Please contact us!

Maximum static output torque (idle torque) $T_{2max.stat.}$ = 1,500 Nm
Output speed n_2 < 1 rpm
Efficiency η ~ 30 %

PERMISSIBLE LOAD FOR OUTPUT TORQUE T_{2N}



0 Radial force F_R = 0 kN
2 Radial force F_R = 2 kN
4 Radial force F_R = 4 kN
6 Radial force F_R = 6 kN

Difference in quality between technical implementation and service: none

Our idea of after-sales service is rather traditional: For us, the customer is king and his/her requirements are at the centre of all our activities. Advice and after-sales service are as important as sophisticated technical implementation. We do not merely support you in selecting the right product but also look after transport logistics and timely commissioning on site. To ensure running operation and reduce downtimes to a minimum, we offer maintenance and revision services at regular intervals as well as comprehensive and efficient repair service. This includes, of course, immediate availability and supply of all spare parts required. In combination with our training courses, you can rely on comprehensive service and trust in smooth and reliable operation of your system.

COMPREHENSIVE AND RELIABLE SERVICE FOR THE ENTIRELIFETIME OF YOUR INSTALLATIONS

Of course, servicing by AUMA does not end upon the delivery of our products to the customer. Experienced key account specialists and veteran distribution partners are available to assist you at any time with any of your questions on our designs or on the overall system environment. An extensive network of experts – which consists of motor, brake and coupling manufacturers – enables quick and professional worldwide service.

COMMISSIONING

At your request, we will take care of the complete transport logistics involved in the delivery of drive systems purchased at AUMA. AUMA are your competent partner for commissioning your new installation and implementation into existing systems. On site, our highly qualified employees check installation parameters, perform test run and brief your staff in a comprehensive scope.

DIRECT LINK TO OUR EXPERTS

Certifications according to standards EN ISO 9001, DNV and ABS are among the most important quality parameters; these are likewise part of the productions standards implemented at AUMA Drives. Yet despite all our conscientiousness and highest quality standards – at times the devil is in the details. That is why you can conveniently view and download via our website all our technical data sheets and operation instructions for our products, in various file formats. This enables you to easily perform maintenance work and smallscale repairs yourself.

Also, if you nevertheless have any trouble, you can just contact our experts.

SPARE PARTS SERVICE

With our flexible spare parts service (also available at short notice), we avoid unnecessary downtimes for our customers' installations. For any questions on the supply of spare parts, our service department is certainly available to help you. All you need to tell us is the serial number on the name plate of the product to be replaced. Also, in the download area of our website, you will find the spare parts lists in 3D format, along with the parts lists. We will gladly assist you with parts identification as well as with troubleshooting – we will also advise you on the selection of a suitable replacement product.

An overview of our spare parts service

- Status analysis
- Damage analysis, assessment and documentation
- Preventive actions
- Development of individual supply concepts
- Fault analysis and troubleshooting
- Spare parts procurement
- Corrective maintenance and repair
- Spare parts lists in 3D format, along with parts lists for nearly all gear types

MAINTENANCE AND INSPECTION

Provide for the unexpected – with AUMA Drives. Our proactive and preventive maintenance, inspection and component-check measures for gear units enable us to detect the smallest of irregularities before a defect occurs – or at least before extensive damage occurs. Of course, if necessary, we will perform professional replacement services (for individual parts of units – such as the wheel sets).

COMPLAINTS

One of our products does not fulfill your high expectations, or you are experiencing problems in the operation of your installation? Please contact us. If you have any complaints or problems with the application, our expert personnel is certainly available to help – and provides customer support even at short notice for corrective maintenance and / or continuous enhancement of the installations and machines.

REPAIR SERVICE

Downtime strains your schedule, your budget and your nerves. Therefore, why we perform overhauls and repairs quickly and reliably – either on the customer's premises or in our own repair shop. In this context, our employees always stay abreast of the latest technical developments by way of continuous education and practical training.

TEST BENCH SERVICE

To guarantee their trouble-free operation, AUMA Drives products must successfully complete a test bench run. Our test benches were engineered at our factory in various design configurations and are used to subject gears with up to 140 kW drive output to a comprehensive and detailed functional test. In this process, the interplay of the individual components and their influence on the overall system are assessed; in addition, lifetime and wear tests are preformed. We will also make our test benches available to customers who would like to perform contracted tests.

AUTOMATION AND UPGRADING

You would like to automate or upgrade your installations even after commissioning? No problem. We supply custom-fit replacement parts – upon request, also as custom-manufactured components. All retrofitting measures are performed rapidly – most of them during active operation, to avoid downtime for the installation. A higher degree of automation sustainably reduces operating costs, thereby also generating enhanced productivity and efficiency at comparably moderate investment costs.

TRAINING

Regular and direct communication with our customers is the forerunner for new developments and essential to continuous quality assurance for our products. Close co-operation based on partnership is essential to ensure our mutual success. Of course, this involves sharing our skills, knowledge base and experience with our customers. For this reason, we organise individual training sessions upon request – or perform an on-site orientation for your employees on the operation of the systems.

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Solutions for a world in motion

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