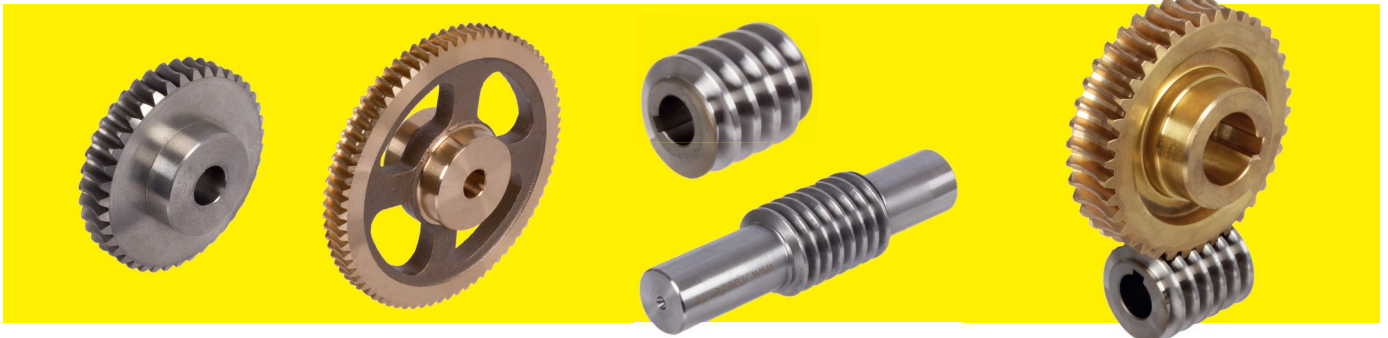


Worms and Worm Gears, General Basics and Overview



General descriptions:

- For right angled power transmission with simultaneous vertical offset (centre distance of the crossed axles).
- The movement usually takes place via the worm (the movement can be made via the gear wheel if necessary in the case of low transmissions up to 3:1).
- The selection/dimensioning is made as function of the torque (required torque on the worm gears).
- High transmissions up to approx. 100:1 are possible in just one stage.
- Several transmissions and centre distances on stock.
- Silent and low vibration.
- Power loss is greater than in spur and bevel gears, depending on the efficiency of transmission.
- Power loss is converted to frictional heat.
- Low transmission = higher efficiency and lower self-locking.
- High transmission = low efficiency and high self-locking.

Standard Worm Gears and Worm shafts page 286 - 293

For simple applications, e.g. manual operation or occasional motorised operation. Continuous operation is possible at medium torques. Reworking (custom bore, feather keyway, fixed thread) is an optional extra.

Single thread: For high to medium transmissions.

Double thread: For medium to low transmissions.

Sorted by number of threads and module. The gear wheels can be combined with worms having the same module and the same number of threads to make different transmissions. This results in the different centre distances.

<u>Single thread, right hand</u>		<u>Page</u>
Module 0.5 to 2.0	Worm Gears	286
	Worms	287
Module 3.0 to 5.0	Worm Gears	288
	Worms	289

<u>Double thread, right hand</u>		<u>Page</u>
Module 0.5 to 2.0	Worm Gears	290
	Worms	291
Module 3.0 to 4.0	Worm Gears	292
	Worms	293

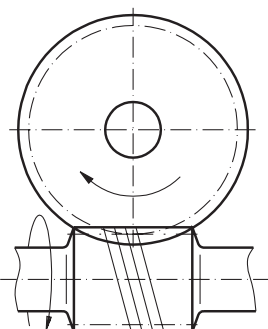
Precision worm gear sets page 295 - 304

Ideal for continuous operation at high speeds and torques. Mostly ready-to install without needing reworking. Hence they are also economical for simple applications.

Sorted by centre distance. The gear wheels can only be used with worms having the same centre distance and the same transmission. Several transmissions are available per centre distance.

<u>Centre distance</u>	<u>Page</u>	<u>Centre distance</u>	<u>Page</u>
17 mm	295	50 mm	300
22,62 mm	296	53 mm	300
25 mm	296	63 mm	301
31 mm	297	65 mm	301
33 mm	298	80 mm	302
35 mm	299	100 mm	303
40 mm	299	125 mm	304

Gear Set, Right Hand



The catalogue parts are right handed.

Left hand sets have to be custom made on request.

Recommendation regarding the Lubrication

<u>Peripheral Speed</u>	<u>Lubrication</u>	<u>Lubricant</u>
up to 1 m/s (gear submerged)	Dip-Feed Lubrication	Grease
up to 4 m/s (gear submerged)	Dip-Feed Lubrication	Oil
over 4 m/s (gear submerged)	Spray lubrication	Oil
up to 4 m/s (worm submerged)	Dip-Feed Lubrication	Grease
up to 10 m/s (worm submerged)	Dip-Feed Lubrication	Oil
over 10 m/s (worm submerged)	Spray lubrication	Oil

Worms and Worm Gears, General Basics

Efficiency and self-locking

The calculated efficiency depends on the friction conditions in the contact zone and where the bearings and seal are mounted. These conditions may vary depending on the environmental conditions or lubrication. This leads to a large array, where no exact statement regarding the self-locking capacity can be made. This array is marked with "limited".

A calculated self-locking capacity can be negatively influenced by various factors. For this reason we cannot grant any guarantee regarding the self-locking capacity.

Maximum Torque

The torque values are to be taken as Maximum Values that should under no circumstances be exceeded! Depending on the power of the gear unit, the prevailing temperature and lubrication conditions in the worm gear unit (depending on the cooling, lubricant, mounting etc.) operating set ups with increasing wear may occur - having a negative influence on the wear lifespan of the unit - although the permissible torques were not exceeded. In order to go to the upper limit of the maximum torques, the whole construction must have a rigid design (housing, bearing, bearing distance), to avoid negative influences due to deformation.

The stated torques were calculated presuming an alternating load. They are output torques (of the worm gear, not the worm shaft).

Torque Conversion

Output torque = Input Torque x Efficiency x Transmission

$$\text{Input torque} = \frac{\text{Output torque}}{\text{Efficiency} \times \text{Ratio}}$$

Worm dimensions

to be calculated	given unit	formula
Reference Circle Pitch = t_s	Lead and Number of Gears	$\frac{H}{z}$
Standard pitch = t_{n0}	Pitch and Lead Angle	$t_s \cdot \cos \gamma_m$
Real module = m_s	Reference Circle Pitch	$\frac{t_s}{\pi}$
Standard module = m_n	Standard pitch	$\frac{t_n}{\pi}$
med. lead angle = α_m	Lead and Pitch \emptyset	$t_{an} \gamma_m = \frac{H}{d \cdot \pi}$
Pitch \emptyset = d	Lead and Lead Angle	$\frac{H}{\pi \cdot t_{an} \gamma_m}$
Tip \emptyset = d_a	Pitch \emptyset and Standard Module	$d + 2m_n$
Lead = H	Number of Gears and Real Module	$z \cdot m_s \cdot \pi$

Worm Gear - Dimensions and Torque

to be calculated	given unit	formula
Pitch \emptyset = d		$z \cdot m_s$
Tip \emptyset = d_a in Median Plane of Gear		$\approx d + 2 m_s$
Output torque = M_d in Nm		$9550 \cdot \frac{P_2}{n_2}$

Material quality:
Information about the material quality can be found at each worm and worm gear.

Note Regarding the Torque-Values Stated in the Catalogue page 286 bis 293

The worm gear sets are calculated in accordance with DIN 3976 or Niemann/Winter (Niemann/Winter "Maschinenelemente Band III, 2. Auflage, Nachdruck 1986", Machine Components Volume III, 2nd Edition, Reprint 1986, Publisher: Springer-Verlag). The decisive strength criterion for small modules is the pitting resistance of the worm gear flanks and for larger modules usually the tooth-root strength of the worm gear.

Calcul. Factor/Determining Factor	Value	Note
Tooth root safety S_F	min. 2.0	-
Flank safety S_H	min. 1.3	Endurance strength 10,000 h
Application factor K_A	1.25	Industrial gear mechanisms, uniform, light shocks

The following permissible Hertzian stress was assumed for the materials used:

Material	permissible flank pressure s_{Hlim} in N/mm ²	Maximum Limit Stress before Tooth Fracture U_{lim} in N/mm ²
G-CuSn12	265	115
GG25	350	150

The load bearing capacity of a worm gear depends on various different factors. The stated torques are only reference values, serving to facilitate the selection process. If necessary a specific calculation of strength and load bearing capacity must be carried out for each application.

Depending on the operating conditions, the wear lifespan may be influenced by grease/oil lubrication. Please also note that insufficient lubrication may lead to scuffing of the gear flanks.

IMPORTANT: The torque values stated refer to the permissible output torques (of the worm gear).

Worm Gears Made from Bronze (G-CuSn12) with Hollow Teeth, Single-Thread, Right Hand

Single-thread worm gears to be paired with single-thread worms page 287. If the module (and number of threads) are matching, various ratios at various axle distances can be realized.

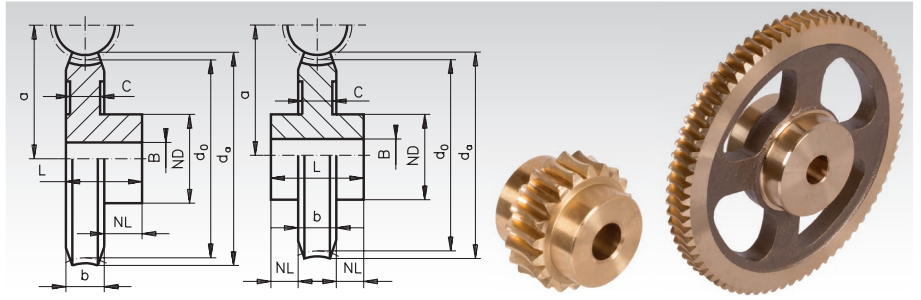
With one-sided hub up to Module 1.

With double-sided hub from Module 1.5.

Pressure angle 20°.

Efficiency: Module 0.5: approx. 0.53.
 Module 0.75: approx. 0.58.
 Module 1: approx. 0.53.
 Module 1.5: approx. 0.49.
 Module 2: approx. 0.50.

Self-locking capacity:
 Module 0.5 and 0.75 limited self-locking capacity. Other versions not self-locking.

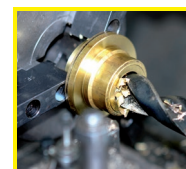


Ordering Details: e.g.: Product No. 300 007 00, Worm Gear Bronze, Module 0.5, 20 Teeth, Single-Thread, Right Hand

	Product No.	Number of Teeth	Transm. Ratio	d ₀ mm	d _a mm	ND mm	NL mm	b mm	L mm	C* mm	a mm	BH7 mm	perm. MT** Nm	Weight g
Module 0.5	300 007 00	20	20 : 1	10,0	11,2	8	5	3	8	-	8,5	3	0,13	3
	300 010 00	25	25 : 1	12,5	13,7	10	5	3	8	-	9,75	4	0,24	6
	300 020 00	50	50 : 1	25	26,2	10	5	3	8	-	16	4	0,87	16
	300 030 00	75	75 : 1	37,5	38,7	15	5	3	8	-	22,25	4	1,30	36
	300 032 00	100	100 : 1	50	51,2	15	5	3	8	-	28,5	5	1,73	60
Module 0.75	300 307 00	20	20 : 1	15	16,7	10	6	3	9	-	11,75	4	0,35	8
	300 310 00	25	25 : 1	18,75	20,4	12	6	3	9	-	13,62	4	0,59	13
	300 320 00	50	50 : 1	37,5	39,2	12	6	3	9	-	23	4	2,70	35
	300 330 00	75	75 : 1	56,25	57,9	15	6	3	9	-	32,37	4	4,10	73
	300 332 00	100	100 : 1	75	76,7	15	6	3	9	-	41,75	5	5,40	123
Module 1.0	300 605 00	16	16 : 1	16	18,8	12	8	6,5	14,5	-	15	5	0,29	16
	300 606 00	18	18 : 1	18	20,8	12	8	6,5	14,5	-	16	5	0,40	20
	300 607 00	20	20 : 1	20	22,8	16	8	6,5	14,5	-	17	5	0,52	30
	300 610 00	25	25 : 1	25	27,8	16	8	6,5	14,5	-	19,5	5	0,94	40
	300 615 00	35	35 : 1	35	37,8	16	10	6,5	16,5	-	24,5	6	2,40	70
	300 620 00	50	50 : 1	50	52,8	20	10	6,5	16,5	-	32	6	6,90	140
	300 630 00	75	75 : 1	75	77,8	30	10	6,5	16,5	4,5	44,5	6	14,60	200
	300 632 00	100	100 : 1	100	102,8	30	12	6,5	18,5	4,5	57	6	19,40	480
	300 635 00	125	125 : 1	125	127,8	40	12	6,5	18,5	4,5	69,5	8	24,10	580
300 640 00	150	150 : 1	150	152,8	40	12	6,5	18,5	4,5	82	8	28,90	590	
Module 1.5	301 005 00	16	16 : 1	24	28,4	18	6/6	12	24	-	24,5	8	1,33	60
	301 006 00	18	18 : 1	27	31,7	20	8/8	12	28	-	26	8	1,80	80
	301 007 00	20	20 : 1	30	34,7	25	8/8	12	28	-	27,5	10	2,30	130
	301 013 00	30	30 : 1	45	49,7	30	8/8	12	28	-	35	10	6,60	260
	301 018 00	40	40 : 1	60	64,7	30	10/10	12	32	-	42,5	10	14,80	400
	301 020 00	50	50 : 1	75	79,7	30	10/10	12	32	10	50	10	25,00	440
	301 030 00	75	75 : 1	112,5	117,2	40	10/10	12	32	10	68,75	12	37,00	860
301 032 00	100	100 : 1	150	154,7	45	10/10	12	32	10	87,5	12	49,00	1300	
Module 2.0	301 305 00	16	16 : 1	32	37,6	20	8/8	14	30	-	32	8	5,20	140
	301 306 00	18	18 : 1	36	41,6	25	8/8	14	30	-	34	10	7,00	250
	301 307 00	20	20 : 1	40	45,6	30	10/10	14	34	-	36	12	9,10	260
	301 313 00	30	30 : 1	60	65,6	40	10/10	14	34	-	46	12	26,40	600
	301 318 00	40	40 : 1	80	85,6	40	10/10	14	34	11	56	12	47,00	650
	301 320 00	50	50 : 1	100	105,6	40	10/10	14	34	11	66	12	58,30	760
	301 324 00	60	60 : 1	120	125,6	50	10/10	14	34	11	76	12	69,50	1200

*Depending on the blanks, worm gears are supplied with or without dimension C!

** Basis of calculations see page 285.



**Reworking within
24h-service possible.
Custom made parts
on request.**

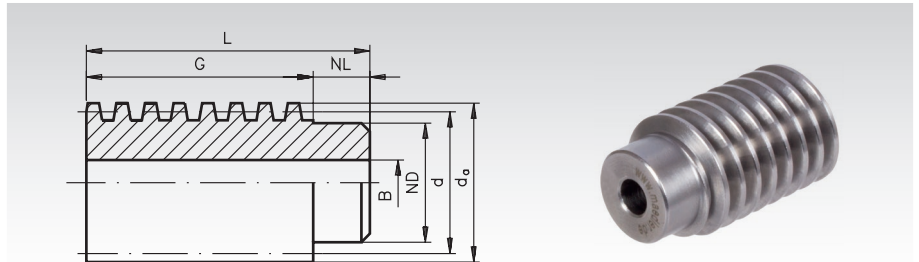
Hollow Worms and Worm Shafts Single-Thread, Right Hand

Single-thread worms to be paired with single-thread worm gears page 286. If the module (and number of threads) are matching,

various ratios at various axle distances can be realized. (see table page 286).

Hollow Worms, Milled, Made from Steel (11SMnPb30), Single-Thread, Right Hand

Pressure angle 20°.

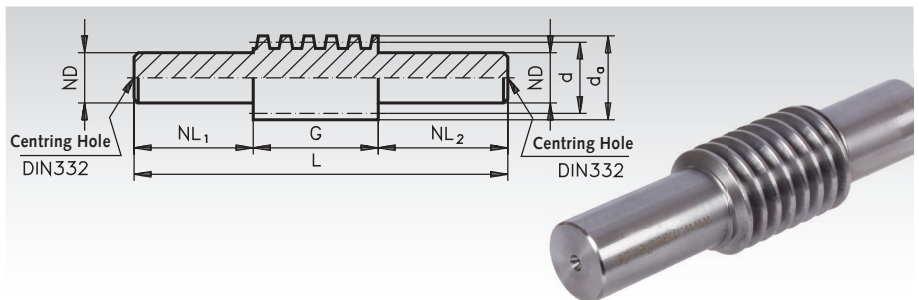


Ordering Details: e.g.: Product No. 300 000 00, Worm, 11SMnPb30, Module 0.5, Single Thread, Right Hand

	Product No.	d mm	d _a mm	ND mm	NL mm	G mm	L mm	BH7 mm	Weight g
Module 0.5	300 000 00	7	8	5,5	4	12	16	3	4
Module 0.75	300 300 00	8,5	10	6	4	16	20	4	6
Module 1.0	300 600 00	14	16	11	6	24	30	6	26
Module 1.5	301 000 00	25	28	21	10	40	50	8	160
Module 2.0	301 300 00	32	36	25	10	45	55	8	300

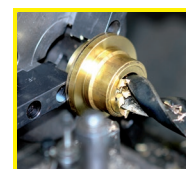
Worm Shafts Milled, with Centring Hole, Made from Steel (11SMnPb30), Single-Thread, Right Hand

Pressure angle 20°.



Ordering Details: e.g.: Product No. 300 001 00, Worm Shaft, 11SMnPb30, Module 0.5, Single Thread, Right Hand

	Product No.	d mm	d _a mm	ND ^{+0,2 +0,4} mm	NL ₁ mm	G mm	NL ₂ mm	L mm	Weight g
Module 0.5	300 001 00	7	8	5,5	18	12	10	40	9
Module 0.75	300 301 00	8,5	10	6	20	16	15	51	15
Module 1.0	300 601 00	14	16	10	30	24	20	74	60
Module 1.5	301 001 00	25	28	20	40	40	30	110	300
Module 2.0	301 301 00	32	36	25	50	45	36	131	620



**Reworking within
24h-service possible.
Custom made parts
on request.**

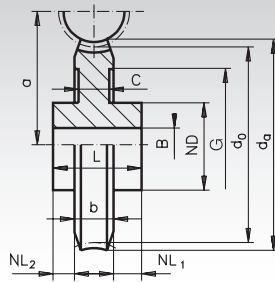
Worm Gears Made from Cast Iron (GG25) with Hollow Teeth, Single-Thread, Right Hand

Single-thread worm gears to be paired with single-thread worms page 289. If the module (and number of threads) are matching, various ratios at various axle distances can be realized.

Pressure angle 20°.

Efficiency: Module 3: approx. 0.46.
 Module 4: approx. 0.48.
 Module 5: approx. 0.49.
 Module 6: approx. 0.46.

Self-locking capacity: not self-locking.

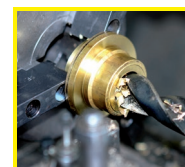


Ordering Details: e.g.: Product No. 310 005 00, worm gear, GG25, Module 3, 16 Teeth, Single Thread, Right Hand

	Procut No.	Number of teeth	Transm. Ratio	d ₀ mm	d _a mm	ND mm	NL ₁ /NL ₂ mm	b mm	L mm	G mm	C* mm	a mm	BH7 mm	perm. MT** Nm	Weight kg
Module 3.0	310 005 00	16	16 : 1	48	57	40	18/4	24	46	-	-	43	15	22	0,46
	310 006 00	18	18 : 1	54	63	40	18/4	24	46	-	-	46	15	27	0,55
	310 007 00	20	20 : 1	60	69	40	18/4	24	46	-	-	49	15	36	0,64
	310 011 00	26	26 : 1	78	87	45	18/4	24	46	60	12	58	18	73	1,20
	310 014 00	32	32 : 1	96	105	50	18/4	24	46	70	12	67	20	132	1,40
	310 018 00	40	40 : 1	120	129	65	18/4	24	46	90	12	79	25	189	2,20
	310 021 00	52	52 : 1	156	165	75	23/4	24	51	116	12	97	30	242	3,40
310 026 00	65	65 : 1	195	204	85	23/4	24	51	150	12	116,5	35	305	4,90	
Module 4.0	310 305 00	16	16 : 1	64	76	50	21/5	34	60	-	-	57	20	30	1,00
	310 306 00	18	18 : 1	72	84	50	21/5	34	60	-	-	61	20	42	1,50
	310 307 00	20	20 : 1	80	92	50	21/5	34	60	-	-	65	20	50	1,60
	310 311 00	26	26 : 1	104	116	55	21/5	34	60	80	14	77	22	102	2,10
	310 314 00	32	32 : 1	128	140	65	21/5	34	60	90	14	89	25	185	3,40
	310 318 00	40	40 : 1	160	172	75	21/5	34	60	125	14	105	30	355	4,50
	310 321 00	52	52 : 1	208	220	85	26/5	34	65	175	14	129	35	585	6,70
310 326 00	65	65 : 1	260	272	100	26/5	34	65	225	14	155	40	735	9,50	
Module 5.0	310 605 00	16	16 : 1	80	95	70	27/5	40	72	-	-	71	20	93	2,30
	310 611 00	26	26 : 1	130	145	70	27/5	40	72	99	16	96	28	343	4,20
	310 614 00	32	32 : 1	160	175	75	27/5	40	72	125	16	111	30	620	5,30
	310 618 00	40	40 : 1	200	215	85	27/5	40	72	160	16	131	35	874	7,40
	310 621 00	52	52 : 1	260	275	100	32/5	40	77	220	16	161	40	1135	11,80
310 626 00	65	65 : 1	325	340	115	32/5	40	77	280	16	193,5	45	1420	17,00	

*Depending on the blanks, worm gears are supplied with or without dimension C!

** Basis of calculations see page 285.



**Reworking within
 24h-service possible.
 Custom made parts
 on request.**

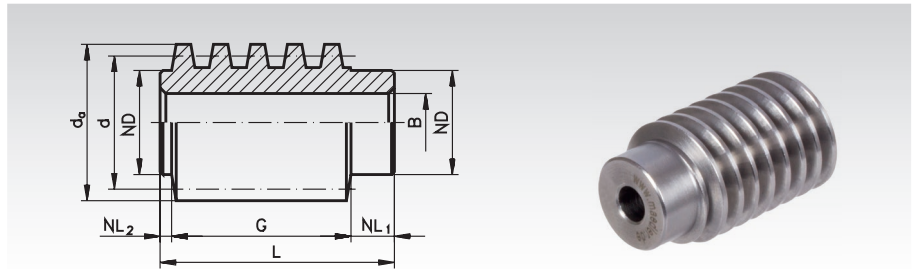
Hollow Worms and Worm Shafts Single-Thread, Right Hand

Single-thread worms to be paired with single-thread worm gears page 288. If the module (and number of threads) are matching,

various ratios at various axle distances can be realized (see table page 288).

Hollow Worms, Whirled, Made from Steel (C45), Single-Thread, Right Hand

Pressure angle 20°.

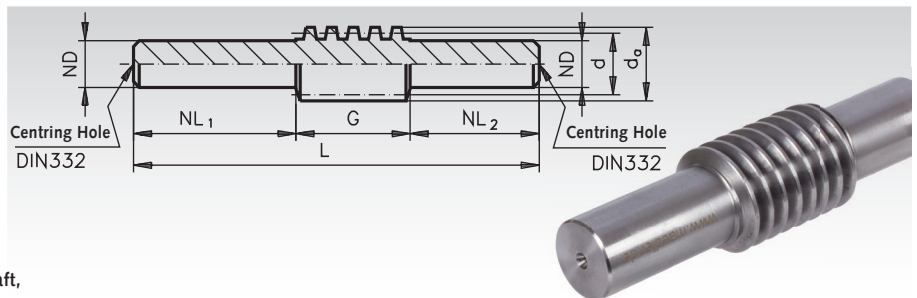


Ordering Details: e.g.: Product No. 310 000 00, Worm, Steel, Module 3, Single Thread, Right Hand

Product No.	d mm	da mm	ND mm	NL ₁ mm	G mm	NL ₂ mm	L mm	BH ⁷ mm	Weight kg	
Module 3.0	310 000 00	38	44	30	12	46	3	61	15	0,4
Module 4.0	310 300 00	50	58	40	15	62	4	81	20	1,2
Module 5.0	310 600 00	62	72	50	18	80	5	103	25	1,8

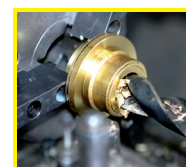
Worm Shafts, Whirled, with Centring Hole, Made from Steel (C45), Single-Thread, Right Hand

Pressure angle 20°.



Ordering Details: e.g.: Product No. 310 001 00, Worm Shaft, 11 SMnPb30, Module 3, Single Thread, Right Hand

Product No.	d mm	da mm	ND ^{+0,2 +0,4} mm	NL ₁ mm	G mm	NL ₂ mm	L mm	Weight kg	
Module 3.0	310 001 00	38	44	30	130	46	90	266	1,6
Module 4.0	310 301 00	50	58	40	175	62	120	357	3,8
Module 5.0	310 601 00	62	72	50	220	80	150	450	7,6



**Reworking within
24h-service possible.
Custom made parts
on request.**

Worm Gears Made from Bronze (G-CuSn12), with Hollow Teeth, Double-Thread, Right Hand

Worm gears with double thread matching the double-thread worms page 291. If the module (and number of threads) are matching, various ratios at various axle distances can be realized.

With one-sided hub up to Module 1.

With double-sided hub from Module 1.5.

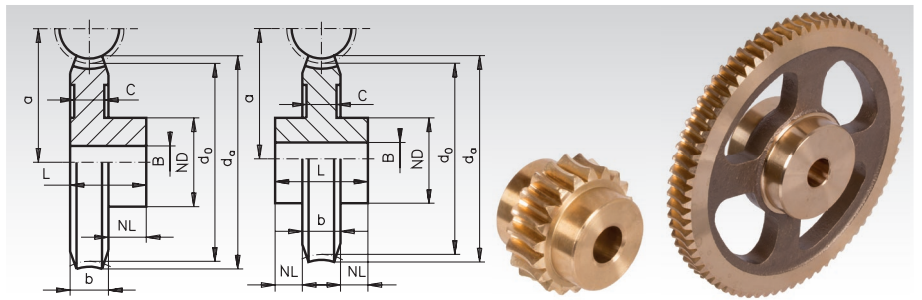
Pressure angle 20°.

Efficiency: Module 0.5: approx. 0.69.
 Module 0.75: approx. 0.73.
 Module 1: approx. 0.69.
 Module 1.5: approx. 0.49/0.65.
 Module 2: approx. 0.66.

Self-locking capacity: Module 0.5 and 0.75 limited self-locking capacity.

Other versions not self-locking.

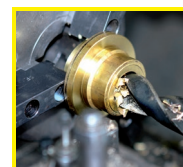
Ordering Details: e.g.: Product No. 300 207 00, Worm Gear, Bronze, Module 0.5, 20 Teeth, Double Thread, Right Hand



	Product No.	Number of Teeth	Transm. Ratio	d ₀ mm	d _a mm	ND mm	NL mm	b mm	L mm	C* mm	a mm	BH7 mm	perm. MT** Nm	Weight g
Module 0.5	300 207 00	20	10,0 : 1	10,0	11,2	8	5	3	8	-	8,5	3	0,06	3
	300 210 00	25	12,5 : 1	12,5	13,7	10	5	3	8	-	9,75	4	0,10	6
	300 220 00	50	25 : 1	25	26,2	10	5	3	8	-	16	4	0,75	16
	300 230 00	75	37,5 : 1	37,5	38,7	15	5	3	8	-	22,25	4	11,30	36
Module 0.75	300 507 00	20	10 : 1	15	16,7	10	6	3	9	-	11,75	4	0,14	8
	300 510 00	25	12,5 : 1	18,75	20,4	12	6	3	9	-	13,62	4	0,25	13
	300 520 00	50	25 : 1	37,5	39,2	12	6	3	9	-	23	4	2,00	35
	300 530 00	75	37,5 : 1	56,25	57,9	15	6	3	9	-	32,37	4	4,10	73
Module 1.0	300 805 00	16	8 : 1	16	18,8	12	8	6,5	14,5	-	15	5	0,14	16
	300 806 00	18	9 : 1	18	20,8	12	8	6,5	14,5	-	16	5	0,17	20
	300 807 00	20	10 : 1	20	22,8	16	8	6,5	14,5	-	17	5	0,24	30
	300 810 00	25	12,5 : 1	25	27,8	16	8	6,5	14,5	-	19,5	5	0,40	40
	300 815 00	35	17,5 : 1	35	37,8	16	10	6,5	16,5	-	24,5	6	1,10	70
	300 820 00	50	25 : 1	50	52,8	20	10	6,5	16,5	-	32	6	2,90	140
	300 830 00	75	37,5 : 1	75	77,8	30	10	6,5	16,5	4,5	44,5	6	10,50	200
300 832 00	100	50 : 1	100	102,8	30	12	6,5	18,5	4,5	57	6	19,40	480	
Module 1.5	301 205 00	16	8 : 1	24	28,4	18	6/6	12	24	-	24,5	8	0,60	60
	301 206 00	18	9 : 1	27	31,7	20	8/8	12	28	-	26	8	0,70	80
	301 207 00	20	10 : 1	30	34,7	25	8/8	12	28	-	27,5	10	1,10	130
	301 213 00	30	15 : 1	45	49,7	30	8/8	12	28	-	35	10	2,80	260
	301 218 00	40	20 : 1	60	64,7	30	10/10	12	32	-	42,5	10	6,90	400
	301 220 00	50	25 : 1	75	79,7	30	10/10	12	32	10	50	10	12,10	440
301 232 00	100	50 : 1	150	154,7	45	10/10	12	32	10	87,5	12	49,00	1300	
Module 2.0	301 505 00	16	8 : 1	32	37,6	20	8/8	14	30	-	32	8	2,40	140
	301 506 00	18	9 : 1	36	41,6	25	8/8	14	30	-	34	10	3,00	250
	301 507 00	20	10 : 1	40	45,6	30	10/10	14	34	-	36	12	4,10	260
	301 513 00	30	15 : 1	60	65,6	40	10/10	14	34	-	46	12	11,20	600
	301 518 00	40	20 : 1	80	85,6	40	10/10	14	34	11	56	12	26,80	650
	301 520 00	50	25 : 1	100	105,6	40	10/10	14	34	11	66	12	48,90	760
301 524 00	60	30 : 1	120	125,6	50	10/10	14	34	11	76	12	69,50	1200	

* Depending on the blanks, worm gears are supplied with or without dimension C!

** Basis of calculations see page 285.



**Reworking within
24h-service possible.
Custom made parts
on request.**

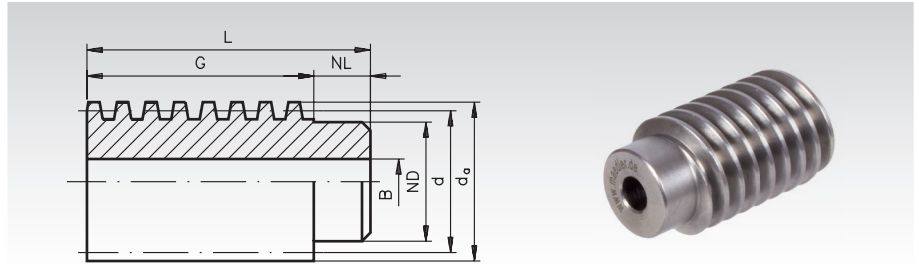
Hollow Worms and Worm Shafts, Double-Thread, Right Hand

Double-thread worms to be paired with single-thread worm gears page 290. If the module (and number of threads) are matching,

various ratios at various axle distances can be realized (see table page 290).

Hollow Worms, Whirled, Made from Steel (C45), Double-Thread, Right Hand

Pressure angle 20°.

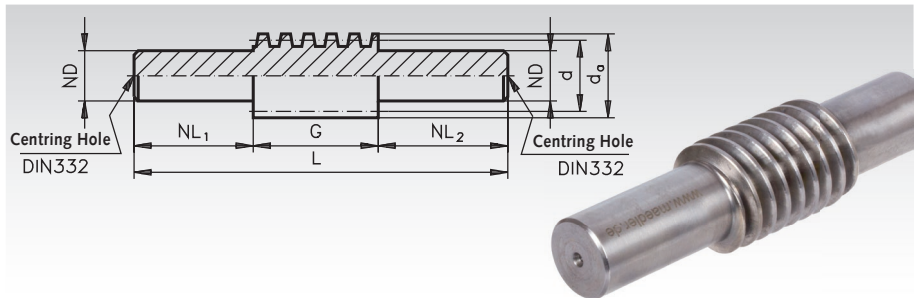


Ordering Details: e.g.: Product No. 300 200 00, Worm, 11SMnPb30, Module 0.5, Double-Thread, Right Hand

	Product No.	d mm	da mm	ND mm	NL mm	G mm	L mm	BH7 mm	Weight g
Module 0.5	300 200 00	7	8	5,5	4	12	16	3	4
Module 0.75	300 500 00	8,5	10	6	4	16	20	4	6
Module 1.0	300 800 00	14	16	11	6	24	30	6	26
Module 1.5	301 200 00	25	28	21	10	40	50	8	160
Module 2.0	301 500 00	32	36	25	10	45	55	8	300

Worm Shafts, Whirled, with Centring Hole, Made from Steel (C45), Double-Thread, Right Hand

Pressure angle 20°.



Ordering Details: e.g.: Product No. 300 201 00, Worm Shaft, 11SMnPb30, Module 0.5, Double-Thread, Right Hand

	Product No.	d mm	da mm	ND ^{+0,2 +0,4} mm	NL ₁ mm	G mm	NL ₂ mm	L mm	Weight g
Module 0.5	300 201 00	7	8	5,5	18	12	10	40	9
Module 0.75	300 501 00	8,5	10	6	20	16	15	51	15
Module 1.0	300 801 00	14	16	10	30	24	20	74	60
Module 1.5	301 201 00	25	28	20	40	40	30	110	300
Module 2.0	301 501 00	32	36	25	50	45	36	131	620



**Reworking within
24h-service possible.
Custom made parts
on request.**

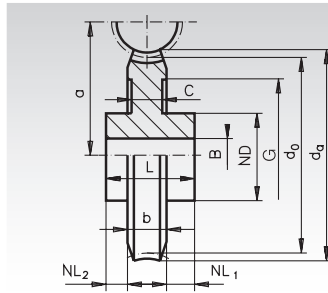
Worm Gears Made from Cast Iron (GG25), with Hollow Teeth, Double Thread, Right Hand

Double-threaded worm gears to be paired with double-threaded worms page 293. If the module (and number of threads) are matching, various ratios at various axle distances can be realized.

Pressure angle 20°.

Efficiency: Module 3 approx. 0.66.
 Module 4 approx. 0.67.
 Module 5 approx. 0.68.
 Module 6 approx. 0.65.

Self-locking capacity: not self-locking.

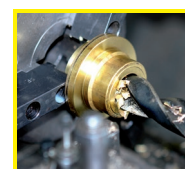


Ordering Details: e.g.: Product No. 310 205 00, Worm gear, GG25, Module 3, 16 Teeth, Double-Thread, Right Hand

	Product No.	Number of Teeth	Transm. Ratio	d ₀ mm	d _a mm	ND mm	NL ₁ /NL ₂ mm	b mm	L mm	G mm	C* mm	a mm	BH7 mm	perm. MT** Nm	Weight kg
Module 3.0	310 205 00	16	8 : 1	48	57	40	18/4	24	46	-	-	43	15	9	0,46
	310 207 00	20	10 : 1	60	69	40	18/4	24	46	-	-	49	15	16	0,64
	310 211 00	26	13 : 1	78	87	45	18/4	24	46	60	12	58	18	31	1,20
	310 214 00	32	16 : 1	96	105	50	18/4	24	46	70	12	67	20	60	1,40
	310 221 00	52	26 : 1	156	165	75	23/4	24	51	116	12	97	30	242	3,40
	310 226 00	65	32,5 : 1	195	204	85	23/4	24	51	150	12	116,5	35	305	4,90
Module 4.0	310 505 00	16	8 : 1	64	76	50	21/5	34	60	-	-	57	20	13	1,00
	310 507 00	20	10 : 1	80	92	50	21/5	34	60	-	-	65	20	21	1,60
	310 511 00	26	13 : 1	104	116	55	21/5	34	60	80	14	77	22	48	2,10

*Depending on the blanks, worm gears are supplied with or without dimension C!

** Basis of calculations see page 285.



**Reworking within
 24h-service possible.
 Custom made parts
 on request.**

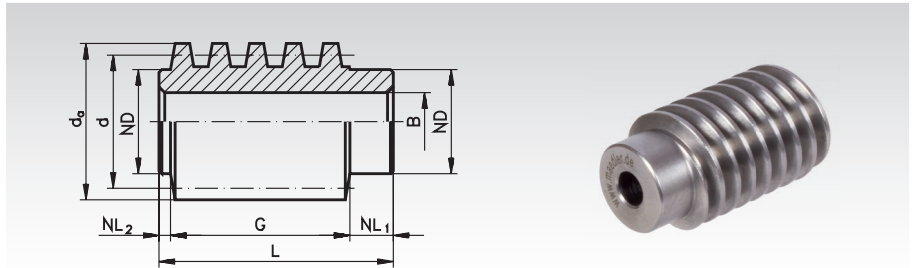
Hollow Worms and Worm Shafts Double-Thread, Right Hand

Double-threaded worms to be paired with double-threaded worm gears page 292. If the module (and number of threads) are match

various ratios at various axle distances can be realized (see table page 292).

Hollow Worms, Whirled, Made from Steel (C45), Double-Thread, Right Hand

Pressure angle 20°.

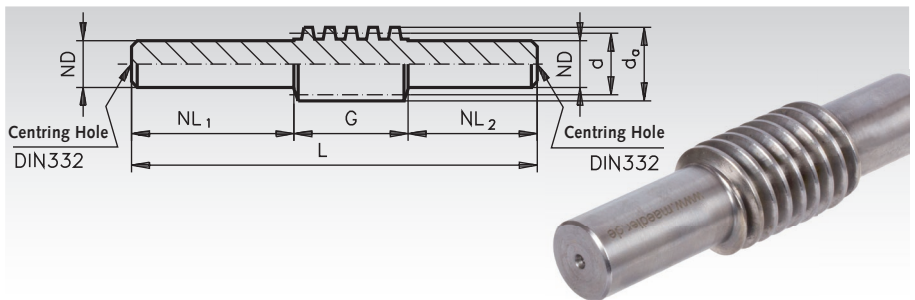


Ordering Details: e.g.: Product No. 310 200 00,
Worm, Steel, Module 3, Double-Thread, Right Hand

	Product No.	d mm	da mm	ND mm	NL ₁ mm	G mm	NL ₂ mm	L mm	B ^{H7} mm	Weight kg
Module 3.0	310 200 00	38	44	30	12	46	3	61	15	0,4
Module 4.0	310 500 00	50	58	40	15	62	4	81	20	1,2

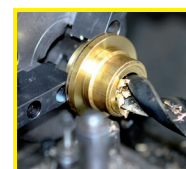
Worm Shafts, Whirled, with Centring Hole, Made from Steel (C45), Double-Thread, Right Hand

Pressure angle 20°.



Ordering Details: e.g.: Product No. 310 201 00,
Worm Shaft, 11SMnPb30, Module 3, Double-Thread,
Right Hand

	Product No.	d mm	da mm	ND ^{+0,2 +0,4} mm	NL ₁ mm	G mm	NL ₂ mm	L mm	Weight kg
Module 3.0	310 201 00	38	44	30	130	46	90	266	1,6
Module 4.0	310 501 00	50	58	40	175	62	120	357	3,8



**Reworking within
24h-service possible.
Custom made parts
on request.**

Note regarding the Precision Worm-Gear Sets page 295 to 302

Worm gears up to a centre distance of 65 mm are made from special brass CuZn40Al2/So, above made from bronze G-CuSn12 Ni.

Worms made from 11SMnPb30, inspected for fissures, case hardened or C45 induction hardened, hardness HV620-700, shafts (if used), bore and flanks ground.

Pressure angle 15° (to reduce the radial force at the worm shaft). Especially designed for use with high torques, ready bored and some with keyway.

IMPORTANT:

Some of the keyways are not in accordance with the DIN. Please take good note of the keywidth stated.

The stated torques are permissible driving torques for the worm gear, permissible at a speed of 2800 min⁻¹ at the worm shaft. The calculations are based on an expected service life of 3,000 h. With lower torques, or a shorter expected service life, the driving torque can be increased. The factor of security against rapture is 3.

The given torques are valid for shock-free drive, 10 starts per hour, operating time up to 40% and sufficient lubrication with mineral low-viscosity grease. Viscous synthetic oil should, however be preferred. The figures for efficiency stated in the table are theoretical values that can be negatively influenced by various factors.

For that reason we do not offer any guarantee regarding the efficiency and the self-locking capacity.

Precision Worm Gear Sets, Flank Clearance at Centre Distance $a = 17 - 100$ mm

Flank-clearance tolerances for worm gears are only valid for gears with a pressure angle of 15°.

Reference Diameter of the Worm Gear d_{m2} mm	Module m_n mm	Clearance at Centre Distance S_{a2}		Tolerance mm	Engagement Backlash S_{e2}		Circumferential Backlash at Pitch \emptyset			
		min. mm	max. mm		min. mm	max. mm	with γ_o up to 24°		with γ_o above 25°	
							min. mm	max. mm	min. mm	max. mm
over 12 up to 25	0,4 - 0,6	0,13	0,172	0,042	0,067	0,089	0,07	0,092	0,077	0,102
	>0,6 - 1,3	0,14	0,185	0,045	0,072	0,096	0,075	0,099	0,083	0,109
	>1,3 - 2,0	0,15	0,198	0,048	0,078	0,102	0,08	0,106	0,089	0,117
over 25 up to 50	0,4 - 0,6	0,14	0,185	0,045			0,075	0,099	0,083	0,108
	>0,6 - 1,3	0,15	0,198	0,048			0,08	0,106	0,089	0,117
	>1,3 - 2,0	0,16	0,212	0,052	0,083	0,11	0,086	0,114	0,095	0,125
	>2,0 - 4,0	0,17	0,231	0,056	0,091	0,12	0,094	0,124	0,103	0,137
over 50 up to 100	0,4 - 0,6	0,15	0,198	0,048			0,08	0,106	0,089	0,117
	>0,6 - 1,3	0,16	0,212	0,052			0,086	0,114	0,095	0,125
	>1,3 - 2,0	0,175	0,231	0,056			0,094	0,124	0,103	0,137
	>2,0 - 4,0	0,19	0,25	0,06	0,098	0,129	0,102	0,134	0,112	0,148

γ_o is the lead angle of the worm.

Self-locking capacity

The self-locking capacity is influenced by the lead angle, the surface structure of the flanks, the sliding speed, the lubricant and the heating. Dynamic and static self-locking capacity must be distinguished.

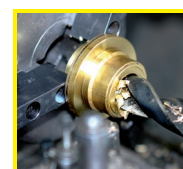
Dynamic self-locking capacity: up to 3° lead angle lubricated with grease; up to 2.5° lead angle lubricated with synthetic oils.

Static self-locking capacity: from 3° up to 5° lead angle lubricated with grease; from 2.5° up to 4.5° lead angle lubricated with synthetic oils.

With lead angles of 4.5° or 5° there is no self-locking capacity.

Shocks or vibration can override the self-locking capacity. Apart from that, various factors in connection with lubrication, gliding speed and load can create such favourable operating conditions that the self-locking capacity is negatively influenced.

For this reason we cannot grant any guarantee regarding the self-locking capacity.



Reworking within 24h-service possible. Custom made parts on request.

Precision Worm Gear Sets - Right Hand (Worm Gears and Hollow Worms)

Pressure angle 15°.

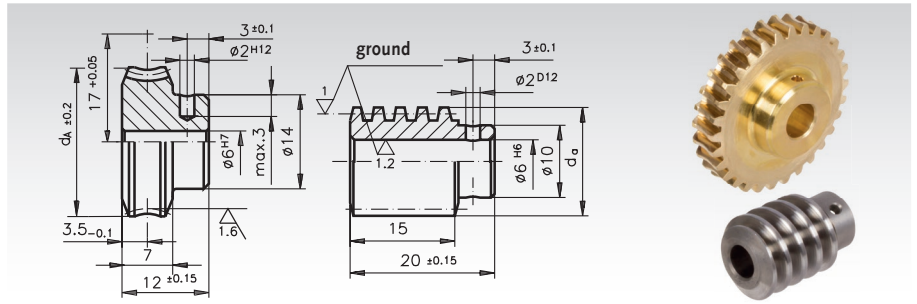
Material:

Worm gear: special brass CuZn40Al2/So.
Worm: 11SMnPb30, inspected for fissures, case hardened HV620-700, ground.
Can be built into gear systems, no reworking required, thus short assembly times.

Ordering Details: e.g.:

Product No. 320 002 00, Prec. Worm Gear A 17

Product No. 320 102 00, Prec. Worm A 17



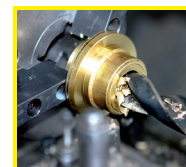
Centre Distance in Casing 17 mm + 0.05

Product No. Worm Gear	Product No. Worm	Trans- mission	Module	No. of Teeth	No. of Threads	Lead Angle	Worm Gear $d_A \pm 0.2$ mm	Worm d_a mm	Maximum Torque at 2800min ⁻¹ Nm	*** η	Weight Worm Gear g	Weight Worm g
320 002 00	320 102 00	*2,25 : 1	0,9	18	8	48° 15'	25,63	11,95	1,1	0,80	25	7
320 004 00	320 104 00	4,5 : 1	0,75	27	6	21° 50'	24,60	13,60	1,7	0,75	25	11
320 005 00	320 105 00	5 : 1	0,7	30	6	21° 37'	24,60	12,80	1,8	0,74	26	12
320 007 00	320 107 00	7 : 1	1,0	21	3	14° 4'	24,60	14,34	1,6	0,68	25	12
320 009 00	320 109 00	9 : 1	0,75	27	3	9° 40'	22,70	14,90	1,5	0,61	23	14
320 010 00	320 110 00	10 : 1	0,75	30	3	11° 48'	24,60	12,50	1,9	0,64	27	9
320 015 00	320 115 00	15 : 1	0,75	30	2	7° 38'	24,60	12,80	1,9	0,54	26	10
320 025 00	320 125 00	25 : 1	0,9	25	1	4° 32'	24,60	13,20	1,8	0,42	26	10
320 030 00	320 130 00	30 : 1	0,75	30	1	3° 45'	24,60	12,95	1,9	0,37	26	10
320 040 00	320 140 00	40 : 1	0,5	40	1	2° 3'	21,60	14,98	1,4	0,26	22	16
320 050 00	320 150 00	**50 : 1	0,5	50	1	3° 12'	27,20	9,95	1,0	0,33	32	5
320 060 00	320 160 00	60 : 1	0,4	60	1	2° 18'	26,00	10,75	1,6	0,26	30	8
320 075 00	320 175 00	75 : 1	0,3	75	1	1° 28'	24,00	12,34	1,3	0,19	26	10
320 080 00	320 180 00	80 : 1	0,3	80	1	1° 43'	26,00	10,60	1,4	0,21	30	10

* Worm only polished, worm gear with helical gearing.

** Worm with 9 mm hub diameter only.

*** The figures stated for the efficiency are only reference values, since - besides the lead angle - mounting, lubrication, speed and assembly also have an influence on the efficiency.



**Reworking within
24h-service possible.
Custom made parts
on request.**

Precision Worm Gear Sets - Right Hand (Worm Gears and Hollow Worms)

Pressure angle 15°.

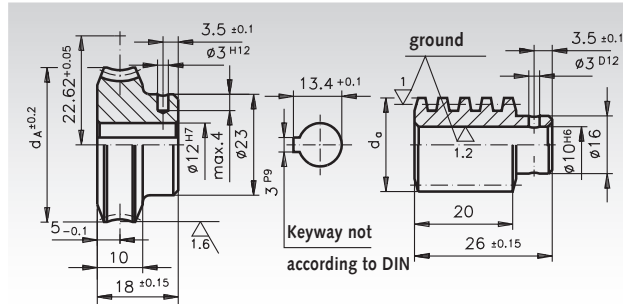
Material:

Worm gear: special brass CuZn40Al2/So.
Worm: 11SMnPb30, inspected for fissures, case hardened HV620-700, ground.
Can be built into gear systems, no reworking required, thus short assembly times.

Ordering Details: e.g.:

Product No. 320 303 00, Prec. Worm Gear A 22.62

Product No. 320 403 00, Prec. Worm A 22.62



Centre Distance in Casing 22.62 mm + 0.05

Product No. Worm Gear	Product No. Worm	Transmission	Module	No. of Teeth	No. of Threads	Lead Angle	Worm Gear $d_A \pm 0.2$ mm	Worm d_a mm	Maximum Torque at 2800min ⁻¹ Nm	** η	Weight Worm Gear g	Weight Worm g
320 303 00	320 403 00	3 : 1*	1,0	21	7	17° 36'	24,8	25,15	2,2	0,74	40	60
320 304 00	320 404 00	4 : 1	1,25	20	5	19° 32'	29,8	21,20	3,6	0,75	54	35
320 307 00	320 407 00	7 : 1	1,25	21	3	11° 46'	29,8	20,90	3,6	0,66	54	34
320 310 00	320 410 00	10,5 : 1	1,25	21	2	7° 41'	29,8	21,20	3,4	0,57	54	34
320 321 00	320 421 00	21 : 1	1,25	21	1	3° 48'	29,8	21,40	3,4	0,40	53	35
320 330 00	320 430 00	30 : 1	0,9	30	1	2° 50'	29,8	20,00	3,6	0,34	55	33
320 340 00	320 440 00	40 : 1	0,7	40	1	2° 20'	29,8	18,60	3,9	0,29	60	28

* Worm only polished.

** The figures stated for the efficiency are only reference values, as besides the lead angle, mounting, lubrication, speed and assembly also have an influence on the efficiency.

Precision Worm Gear Sets - Right Hand (Worm Gears and Hollow Worms)

Pressure angle 15°.

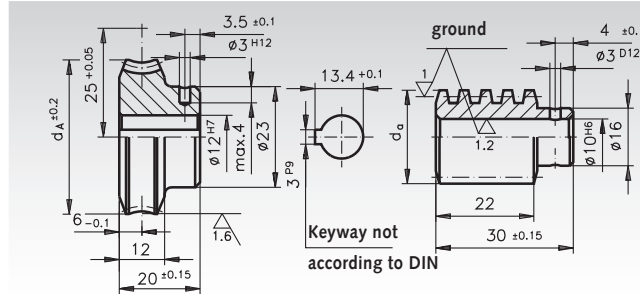
Material:

Worm gear: special brass CuZn40Al2/So.
Worm: 11SMnPb30, inspected for fissures, case hardened HV620-700, ground.
Can be built into gear systems, no reworking required, thus short assembly times.

Ordering Details: e.g.:

Product No. 320 604 00, Prec. Worm Gear A 25

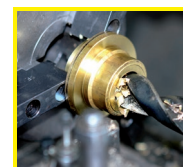
Product No. 320 704 00, Prec. Worm A 25



Centre Distance in Casing 25 mm + 0.05

Product No. Worm Gear	Product No. Worm	Transmission	Module	No. of Teeth	No. of Threads	Lead Angle	Worm Gear $d_A \pm 0.2$ mm	Worm d_a mm	Maximum Torque at 2800min ⁻¹ Nm	** η	Weight Worm Gear g	Weight Worm g
320 604 00	320 704 00	4 : 1	1,4	20	5	20° 29'	33,5	22,80	5,1	0,76	80	46
320 605 00	320 705 00	5 : 1	1,5	20	4	19° 15'	34,8	21,20	6,5	0,75	84	37
320 606 00	320 706 00	6,5 : 1	1,15	26	4	13° 52'	34,4	21,50	6,0	0,70	80	42
320 610 00	320 710 00	10 : 1	1,5	20	2	8° 48'	34,4	22,60	5,9	0,61	80	44
320 615 00	320 715 00	15 : 1	1,0	30	2	6° 29'	34,8	19,70	5,7	0,53	86	35
320 620 00	320 720 00	20 : 1	1,5	20	1	4° 19'	34,4	22,90	5,8	0,44	77	46
320 625 00	320 725 00	25 : 1	1,0	25	1	2° 18'	27,8	26,96	4,1	0,30	56	77
320 630 00	320 730 00	30 : 1	1,0	30	1	2° 53'	33,5	21,90	5,9	0,34	78	46
320 640 00	320 740 00	40 : 1	0,8	40	1	2° 33'	34,4	19,56	6,2	0,31	87	37
320 650 00	320 750 00	50 : 1	0,6	50	1	1° 43'	33,5	21,16	5,1	0,24	78	47

** The figures stated for the efficiency are only reference values, as besides the lead angle, mounting, lubrication, speed and assembly also have an influence on the efficiency.



**Reworking within
24h-service possible.
Custom made parts
on request.**

Precision Worm Gear Sets - Right Hand (Worm Gears and Hollow Worms)

Pressure angle 15°.

Material:

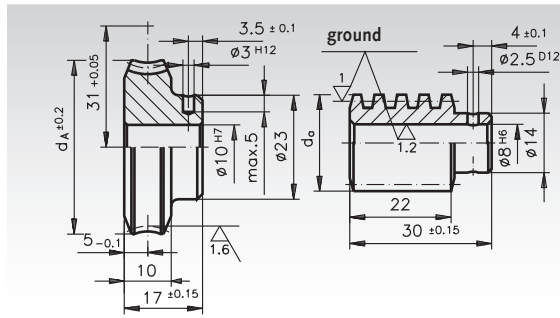
Worm gear: special brass CuZn40Al2/So.
Worm: 11SMnPb30,
inspected for fissures, case hardened
HV620-700, ground.

Can be built into gear systems, no reworking
required, thus short assembly times.

Ordering Details: e.g.:

Product No. 321 002 00, Prec. Worm Gear A 31

Product No. 321 102 00, Prec. Worm A 31

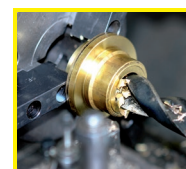


Centre Distance in Casing 31 mm + 0.05

Product No. Worm Gear	Product No. Worm	Trans- mission	Module	No. of Teeth	No. of Threads	Lead Angle	Worm Gear $d_A \pm 0.2$ mm	Worm d_a mm	Maximum Torque at 2800min ⁻¹ Nm	** η	Weight Worm Gear g	Weight Worm g
321 002 00	321 102 00	*2,5 : 1	1,25	25	10	45° 15'	46,9	20,10	4,4	0,82	132	39
321 004 00	321 104 00	4,28 : 1	1,25	30	7	25° 24'	45,0	22,90	9	0,79	122	38
321 005 00	321 105 00	5 : 1	1,3	30	6	23° 46'	46,5	21,95	9,5	0,78	150	52
321 006 00	321 106 00	6 : 1	1,3	30	5	18° 13'	45,0	23,40	7,6	0,74	120	52
321 007 00	321 107 00	7 : 1	1,5	28	4	20° 32'	48,8	20,10	9,7	0,75	128	47
321 008 00	321 108 00	8,33 : 1	1,75	25	3	19° 49'	51,0	19,00	10	0,74	150	29
321 010 00	321 110 00	10 : 1	1,4	30	3	12° 50'	47,0	21,70	9,5	0,68	130	44
321 012 00	321 112 00	12 : 1	1,25	36	3	13° 55'	50,0	18,10	12,1	0,69	150	40
321 015 00	321 115 00	15 : 1	1,5	30	2	10° 40'	50,0	19,20	10,7	0,64	145	32
321 018 00	321 118 00	18 : 1	1,25	36	2	8° 44'	48,8	18,96	10,3	0,59	145	33
321 020 00	321 120 00	20 : 1	0,75	60	3	7° 49'	48,0	18,04	8,3	0,57	145	34
321 022 00	321 122 00	22 : 1	1,0	44	2	6° 29'	48,0	19,70	9,6	0,53	138	39
321 023 00	321 123 00	23 : 1	2,0	23	1	7° 29'	52,0	19,35	10,5	0,56	148	28
321 024 00	321 124 00	24 : 1	1,75	24	1	5° 4'	47,0	23,30	9,2	0,48	125	49
321 025 00	321 125 00	25 : 1	1,75	25	1	5° 35'	48,5	21,50	9,6	0,49	132	40
321 028 00	321 128 00	28 : 1	1,5	28	1	4° 20'	46,5	22,85	9,1	0,44	125	49
321 030 00	321 130 00	30 : 1	1,5	30	1	5° 7'	48,8	19,80	10,3	0,47	142	54
321 032 00	321 132 00	32 : 1	1,4	32	1	4° 45'	48,8	19,70	10,2	0,45	142	35
321 038 00	321 138 00	38 : 1	1,25	38	1	5° 1'	51,2	16,80	11,4	0,46	158	24
321 045 00	321 145 00	45 : 1	1,0	45	1	3° 23'	48,8	18,93	9,5	0,37	142	36
321 050 00	321 150 00	50 : 1	0,9	50	1	3° 3'	48,0	18,70	9	0,35	143	35
321 055 00	321 155 00	55 : 1	0,9	55	1	4° 12'	52,0	14,10	10,4	0,40	172	17
321 060 00	321 160 00	60 : 1	0,75	60	1	2° 33'	48,0	18,40	8,2	0,31	144	35
321 070 00	321 170 00	70 : 1	0,7	70	1	3° 7'	52,0	14,30	9	0,34	170	19
321 075 00	321 175 00	75 : 1	0,6	75	1	2° 2'	47,0	18,10	7,3	0,26	143	35
321 090 00	321 190 00	90 : 1	0,5	90	1	1° 41'	48,0	18,00	6,4	0,23	143	35
321 100 00	321 200 00	100 : 1	0,5	100	1	2° 24'	52,7	12,96	7,4	0,28	175	16

* Worm only polished - worm gear with helical gearing.

** The figures stated for the efficiency are only reference values, since - besides the lead angle - mounting, lubrication, speed and assembly also have an influence on the efficiency.



**Reworking within
24h-service possible.
Custom made parts
on request.**

Precision Worm Gear Sets - Right Hand (Worm Gears and Hollow Worms)

Pressure angle 15°.

Material:

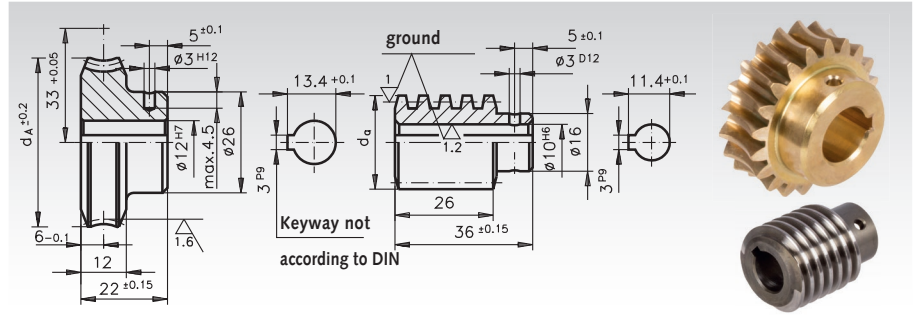
Worm gear: special brass CuZn40Al2/So.
Worm: 11SMnPb30, inspected for fissures,
case hardened HV620-700, ground.

Can be built into gear systems, no reworking
required, thus short assembly times.

Ordering Details: e.g.:

Product No. 321 303 00, Prec. Worm Gear A 33

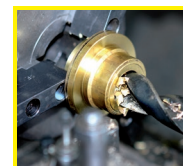
Product No. 321 403 00, Prec. Worm A 33



Centre Distance in Casing 33 mm + 0.05

Product No. Worm Gear	Product No. Worm	Trans- mission	Module	No. of Teeth	No. of Threads	Lead Angle	Worm Gear $d_A \pm 0.2$ mm	Worm d_a mm	Maximum Torque at 2800min ⁻¹ Nm	* η	Weight Worm Gear g	Weight Worm g
321 303 00	321 403 00	3,5 : 1	1,75	21	6	25° 57'	47,0	27,50	10,1	0,79	155	80
321 305 00	321 405 00	5 : 1	2,0	20	4	20° 50'	49,0	26,50	10,6	0,77	164	70
321 307 00	321 407 00	7 : 1	1,5	28	4	15° 32'	48,0	25,40	12,2	0,72	164	69
321 310 00	321 410 00	10 : 1	1,5	30	3	13° 10'	51,0	22,75	13,3	0,69	186	53
321 311 00	321 411 00	11,3 : 1	1,3	34	3	10° 42'	49,2	23,60	13,3	0,65	178	60
321 312 00	321 412 00	12 : 1	1,9	24	2	11° 14'	52,0	23,30	13,5	0,66	186	50
321 314 00	321 414 00	14 : 1	1,5	28	2	7° 20'	47,0	26,50	11,4	0,57	159	77
321 315 00	321 415 00	15 : 1	1,5	30	2	8° 25'	50,0	23,50	13,0	0,60	180	57
321 316 00	321 416 00	16 : 1	1,5	32	2	10° 1'	53,0	20,24	14,0	0,63	203	38
321 317 00	321 417 00	17 : 1	1,4	34	2	9° 3'	52,5	20,60	14,2	0,61	202	41
321 318 00	321 418 00	18 : 1	1,25	36	2	6° 57'	49,2	23,15	12,6	0,55	180	58
321 320 00	321 420 00	20 : 1	1,15	40	2	6° 43'	50,5	21,96	12,7	0,54	188	52
321 324 00	321 424 00	24 : 1	1,9	24	1	5° 27'	51,0	23,80	13,2	0,49	183	54
321 328 00	321 428 00	28 : 1	1,5	28	1	3° 36'	46,6	26,90	11,2	0,40	156	80
321 330 00	321 430 00	30 : 1	1,5	30	1	4° 8'	50,0	23,85	12,7	0,43	178	60
321 332 00	321 432 00	32 : 1	1,5	32	1	4° 50'	52,5	20,80	13,5	0,46	200	40
321 338 00	321 438 00	38 : 1	1,25	38	1	3° 55'	51,6	20,76	13,9	0,41	200	44
321 350 00	321 450 00	50 : 1	0,9	50	1	2° 27'	48,0	22,80	10,0	0,31	178	60
321 356 00	321 456 00	56 : 1	0,8	56	1	2° 10'	48,0	22,75	10,1	0,29	180	62
321 375 00	321 475 00	75 : 1	0,6	75	1	1° 41'	48,0	21,70	9,0	0,24	183	56

* The figures stated for the efficiency are only reference values, as besides the lead angle, mounting, lubrication, speed and assembly also have an influence on the efficiency.



**Reworking within
24h-service possible.
Custom made parts
on request.**

Precision Worm Gear Sets, Right Hand (Worm Gears and Hollow Worms)

Pressure angle 15°.

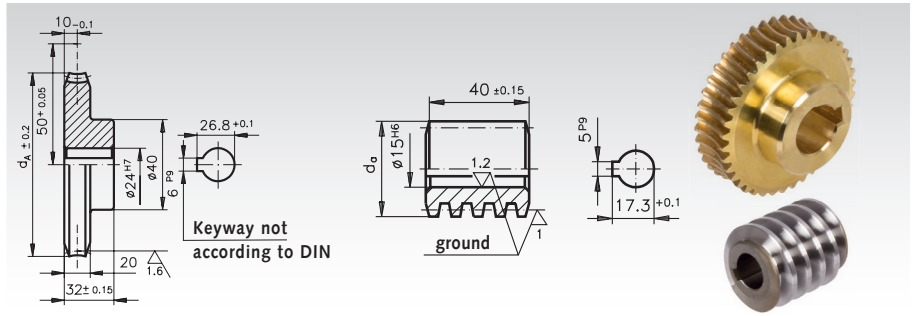
Material:

Worm Gear: special brass CuZn40Al2/So.
Worm: 11SMnPb30, inspected for fissures, case hardened HV620-700, ground.
Can be built into gear systems, no reworking required, thus short assembly times.

Ordering Details: e.g.:

Product No. 330 004 00, Prec. Worm Gear A 50.

Product No. 323 104 00, Prec. Worm A 50.



Centre distance in Housing 50 mm + 0,05

Product No. Worm Gear	Product No. Worm	Transmission	Module	No. of Teeth	No. of Threads	Lead Angle	Worm Gear $d_A \pm 0.2$ mm	Worm d_a mm	Maximum Torque at 2800min ⁻¹ Nm	* η	Weight Worm Gear g	Weight Worm g
330 004 00	323 104 00	4,25 : 1	3,5	17	4	25° 51'	77	39,10	34	0,80	580	200
330 006 00	323 106 00	6 : 1	3,5	18	3	19° 17'	77	38,80	52	0,77	580	180
330 008 00	323 109 00	8,66 : 1	2,5	26	3	13° 52'	77	36,29	64	0,72	600	176
330 012 00	323 113 00	12 : 1	2,75	24	2	10° 23'	77	36,00	66	0,66	620	156
330 014 00	323 115 00	13,5 : 1	2,5	27	2	9° 38'	77	34,90	63	0,65	630	160
330 019 00	323 121 00	19 : 1	3,5	19	1	6° 17'	77	39,00	78	0,55	590	190
330 023 00	323 125 00	23 : 1	3,0	23	1	5° 38'	77	36,58	71	0,52	600	170
330 027 00	323 130 00	27 : 1	2,5	27	1	3° 40'	77	35,73	65	0,48	620	170
330 035 00	323 138 00	35 : 1	2,0	35	1	3° 51'	77	33,78	57	0,43	630	150
330 046 00	323 150 00	46 : 1	1,5	46	1	2° 47'	74	33,85	51	0,36	620	170
330 055 00	323 160 00	55 : 1	1,25	55	1	2° 19'	74	33,40	46	0,31	620	170
330 069 00	323 175 00	69 : 1	1,0	69	1	1° 51'	74	32,90	41	0,27	620	170

Precision Worm Gear Sets, Right Hand (Worm Gears and Hollow Worms)

Pressure angle 15°.

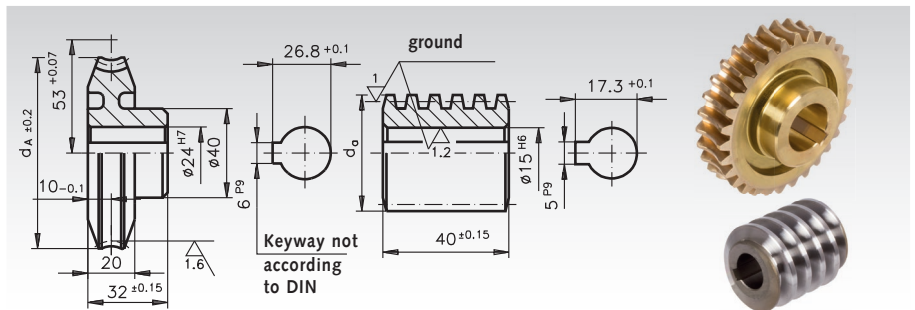
Material:

Worm Gear: special brass CuZn40Al2/So.
Worm: 11SMnPb30, inspected for fissures, case hardened HV620-700, ground.
Can be built into gear systems, no reworking required, thus short assembly times.

Ordering Details: e.g.:

Product No. 323 004 00, Prec. Worm Gear A 53.

Product No. 323 104 00, Prec. Worm A 53.



Centre distance in Housing 53 mm + 0,07

Product No. Worm Gear	Product No. Worm	Transmission	Module	No. of Teeth	No. of Threads	Lead Angle	Worm Gear $d_A \pm 0.2$ mm	Worm d_a mm	Maximum Torque at 2800min ⁻¹ Nm	* η	Weight Worm Gear g	Weight Worm g
323 004 00	323 104 00	4,75 : 1	3,5	19	4	25° 51'	83,0	39,10	45	0,80	590	200
323 006 00	323 106 00	6,67 : 1	3,5	20	3	19° 17'	84,0	38,80	67	0,77	600	180
323 009 00	323 109 00	9,67 : 1	2,5	29	3	13° 52'	82,0	36,29	77	0,72	620	176
323 013 00	323 113 00	13,5 : 1	2,75	27	2	10° 23'	84,0	36,00	80	0,66	630	156
323 015 00	323 115 00	15 : 1	2,5	30	2	9° 38'	83,0	34,90	75	0,65	650	160
323 021 00	323 121 00	21 : 1	3,5	21	1	6° 17'	83,0	39,00	94	0,55	600	190
323 025 00	323 125 00	25 : 1	3,0	25	1	5° 38'	84,0	36,58	84	0,52	630	170
323 028 00	323 128 00	28 : 1	2,5	28	1	3° 59'	77,5	41,00	87	0,44	500	250
323 030 00	323 130 00	30 : 1	2,5	30	1	4° 40'	83,0	35,73	77	0,48	640	170
323 038 00	323 138 00	38 : 1	2,0	38	1	3° 51'	83,0	33,78	68	0,43	660	150
323 050 00	323 150 00	50 : 1	1,5	50	1	2° 47'	81,0	33,85	60	0,36	640	170
323 060 00	323 160 00	60 : 1	1,25	60	1	2° 19'	80,0	33,40	55	0,31	650	170
323 075 00	323 175 00	75 : 1	1,0	75	1	1° 51'	78,0	32,90	49	0,27	640	170

* The figures stated for the efficiency are only reference values, as besides the lead angle, mounting, lubrication, speed and assembly also have an influence on the efficiency.

Precision Worm Gear Sets, Right Hand (Worm Gears and Hollow Worms)

Pressure angle 15°.

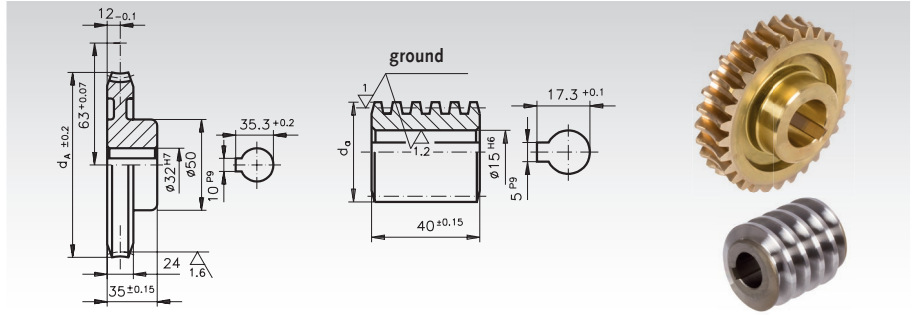
Material:

Worm Gear: special brass CuZn40Al2/So.
Worm: 11SMnPb30, inspected for fissures, case hardened HV620-700, ground.
Can be built into gear systems, no reworking required, thus short assembly times.

Ordering Details: e.g.:

Product No. 330 306 00, Prec. Worm Gear A 63.

Product No. 323 104 00, Prec. Worm A 63.



Centre distance in Housing 63 mm + 0,07

Product No. Worm Gear	Product No. Worm	Transmission	Module	No. of Teeth	No. of Threads	Lead Angle	Worm Gear $d_A \pm 0.2$ mm	Worm d_a mm	Maximum Torque at 2800min ⁻¹ Nm	* η	Weight Worm Gear g	Weight Worm g
330 306 00	323 104 00	6 : 1	3,5	24	4	25° 51'	104	39,10	89	0,80	1200	200
330 312 00	323 109 00	12 : 1	2,5	36	3	13° 52'	104	36,29	141	0,72	1100	180
330 319 00	330 419 00	19 : 1	2,5	38	2	10° 8'	104	33,40	133	0,65	1200	136
330 326 00	323 121 00	26 : 1	3,5	26	1	6° 17'	104	39,00	172	0,55	1065	190
330 334 00	330 434 00	34 : 1	2,75	34	1	5° 9'	104	36,10	148	0,50	1200	170
330 348 00	323 138 00	48 : 1	2,0	48	1	3° 51'	104	33,78	125	0,43	1200	150
330 363 00	323 150 00	63 : 1	1,5	63	1	2° 47'	101	33,85	111	0,36	1200	170
330 370 00	323 475 00	70 : 1	1,25	70	1	1° 59'	97	38,60	112	0,29	980	250

Precision Worm Gear Sets, Right Hand (Worm Gears and Hollow Worms)

Pressure angle 15°.

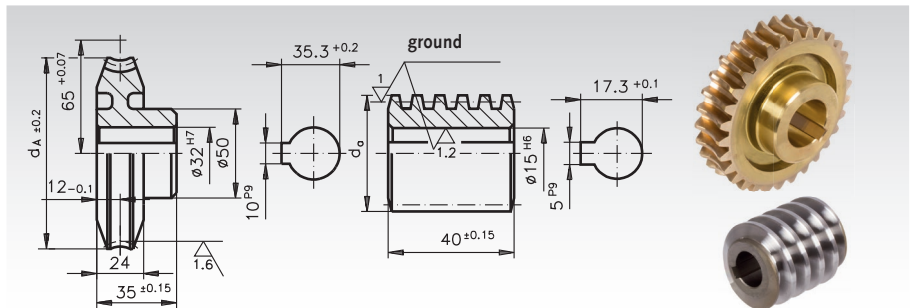
Material:

Worm Gear: special brass CuZn40Al2/So.
Worm: 11SMnPb30, inspected for fissures, case hardened HV620-700, ground.
Can be built into gear systems, no reworking required, thus short assembly times.

Ordering Details: e.g.:

Product No. 323 306 00, Prec. Worm Gear A 65.

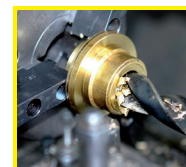
Product No. 323 104 00, Prec. Worm A 65.



Centre distance in Housing 65 mm + 0,07

Product No. Worm Gear	Product No. Worm	Transmission	Module	No. of Teeth	No. of Threads	Lead Angle	Worm Gear $d_A \pm 0.2$ mm	Worm d_a mm	Maximum Torque at 2800min ⁻¹ Nm	* η	Weight Worm Gear g	Weight Worm g
323 306 00	323 104 00	6,25 : 1	3,5	25	4	25° 51'	108,0	39,10	101	0,80	1200	200
323 312 00	323 109 00	12,66 : 1	2,5	38	3	13° 52'	108,0	36,29	156	0,72	1300	176
323 328 00	323 121 00	28 : 1	3,5	28	1	6° 17'	108,0	39,00	192	0,55	1200	190
323 350 00	323 138 00	50 : 1	2,0	50	1	3° 51'	108,0	33,78	137	0,43	1200	150
323 366 00	323 150 00	66 : 1	1,5	66	1	2° 47'	107,0	33,85	122	0,36	1200	170
323 375 00	323 475 00	75 : 1	1,25	75	1	1° 59'	100,0	38,60	125	0,29	1100	250

* The figures stated for the efficiency are only reference values, as besides the lead angle, mounting, lubrication, speed and assembly also have an influence on the efficiency.



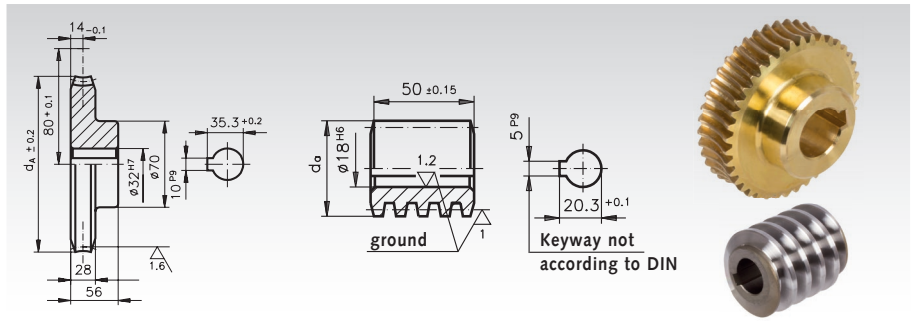
Reworking within 24h-service possible. Custom made parts on request.

Precision Worm Gear Sets, Right Hand (Worm Gears and Hollow Worms)

Pressure angle 15°.

Material:

Worm Gear: special brass CuZn40Al2/So.
Worm: 11SMnPb30, inspected for fissures, case hardened HV620-700, ground.
Can be built into gear systems, no reworking required, thus short assembly times.



Ordering Details: e.g.:

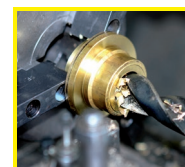
Product No. 330 607 00, Prec. Worm Gear A 80.

Product No. 330 707 00, Prec. Worm A 80.

Centre distance in Housing 80 mm + 0,1

Product No. Worm Gear	Product No. Worm	Trans- mission	Module	No. of Teeth	No. of Threads	Lead Angle	Worm Gear $d_A \pm 0.2$ mm	Worm d_a mm	Maximum Torque at 2800min ⁻¹ Nm	* η	Weight Worm Gear g	Weight Worm g
330 607 00	330 707 00	6,75 : 1	4,0	27	4	23° 35'	132	48,0	150	0,79	2900	280
330 612 00	330 712 00	12 : 1	2,5	48	4	16° 36'	132,5	40,0	243	0,75	3200	270
330 620 00	330 720 00	20 : 1	3,0	40	2	8° 58'	130,5	44,5	296	0,63	3033	340
330 630 00	330 730 00	30 : 1	4,0	30	1	5° 44'	132,5	48,0	348	0,53	2900	380
330 650 00	330 750 00	50 : 1	2,5	50	1	4° 6'	132,5	40,0	248	0,45	3200	266
330 680 00	330 780 00	80 : 1	1,5	80	1	2° 9'	124,5	43,0	213	0,30	2900	380

* The figures stated for the efficiency are only reference values, as besides the lead angle, mounting, lubrication, speed and assembly also have an influence on the efficiency.



Reworking within
24h-service possible.
Custom made parts
on request.

Precision Worm Gear Sets - Right Hand (Worm Gears and Worm Shafts)

Pressure angle: 20°.

Material: Worm gears with cast iron hub made from grey cast iron GG20 and toothed ring made from special worm-gear bronze (G-CuSn12Ni).

Worm shafts made from steel C45 hardened. Shaft ends soft. Tooth flanks ground.

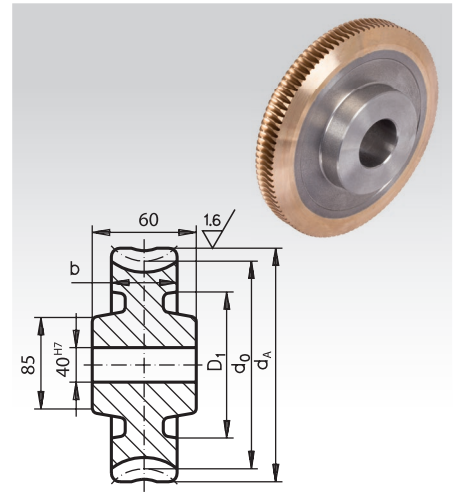
Worm Gears, Centre Distance in Casing $a = 100 \text{ mm} \pm 0.03$

Ordering Details: e.g.: Product No. 332 014 01, Prec.-Worm Gear, $a = 100$, $i = 14.5$

Product No.	Trans- mission	Module	Number of teeth	d_A mm	d_0 mm	D_1 mm	b mm	Md_2 at 2800min ⁻¹ Nm	η^*	Weight kg
332 014 01	14,5	5	29	165	150	-	38	485	0,87	5,95
332 026 01	26	3,15	52	176	166,5	115	26	430	0,84	5,15
332 029 01	29	5	29	165	150	-	38	550	0,75	5,8
332 039 01	39	4	39	172	160	-	32	470	0,76	5,7
332 062 01	62	2,5	62	165	157,5	112	28	510	0,66	4,9
332 082 01	82	2	82	170,5	164,5	118	26	450	0,62	4,7
332 107 01	107	1,6	107	177	172	128	26**	300	0,59	4,5

* The figures stated for the efficiency are only reference values, as besides the lead angle, mounting, lubrication, speed and assembly also have an influence on the efficiency.

** Width of the main body: 26 mm, tapered, to be paired with Tooth Width 20 mm.

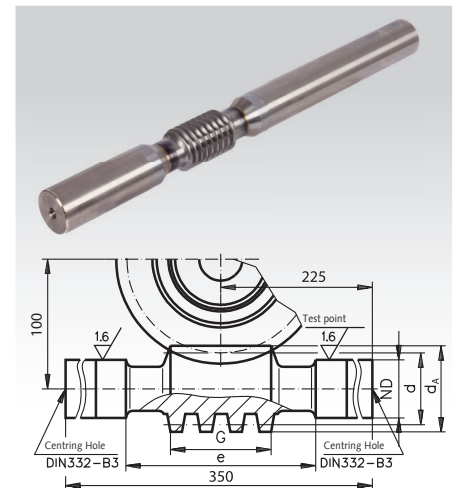


Worm Shafts, Centre Distance in Casing $a = 100 \text{ mm} \pm 0.03$

Ordering Details: e.g.: Product No. 332 014 02, Pr.-Worm Shaft, $a = 100$, $i = 14.5$

Product No.	Trans- mission	Module	Number of Threads	d_A mm	d mm	ND mm	G mm	e mm	η^*	Weight kg
332 014 02	14,5	5	2	60	50	40,5	70	110	0,87	3,85
332 026 02	26	3,15	2	39,8	33,5	40,5	58	110	0,84	3,05
332 029 02	29	5	1	60	50	40,5	70	110	0,75	3,86
332 039 02	39	4	1	48	40	40,5	64	110	0,76	3,3
332 062 02	62	2,5	1	47,5	42,5	40,5	50	90	0,66	3,5
332 082 02	82	2	1	39,5	35,5	40,5	46	90	0,62	3,2
332 107 02	107	1,6	1	31,2	28	30,5	42	90	0,59	1,85

* The figures stated for the efficiency are only reference values, as besides the lead angle, mounting, lubrication, speed and assembly also have an influence on the efficiency.



Self-locking capacity

The self-locking capacity is influenced by the lead angle, the surface structure of the flanks, the sliding speed, the lubricant and the heating.

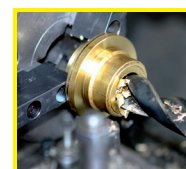
For worm gears with centre distance $a=100\text{mm}$ and 125mm :

Up to ratio 39:1 not self-locking.

From ratio 62:1 Static self-locking.

Shocks or vibration can override the self-locking capacity. Apart from that, various factors in connection with lubrication, gliding speed and load can create such favourable operating conditions that the self-locking capacity is negatively influenced.

For this reason we cannot grant any guarantee regarding the self-locking capacity.



**Reworking within
24h-service possible.
Custom made parts
on request.**

Precision Worm Gear Sets - Right Hand (Worm Gears and Worm Shafts)

Pressure angle: 20°.

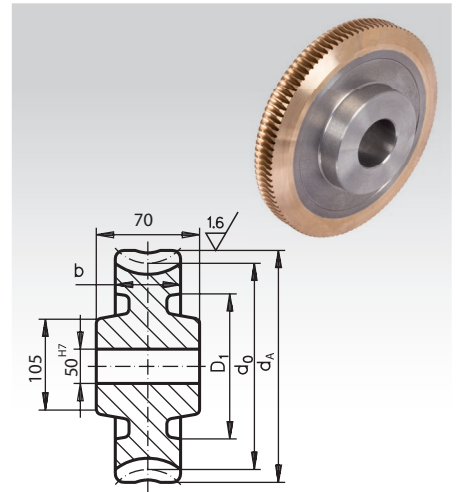
Material: Worm gears with cast iron hub made from grey cast iron GG20 and toothed ring made from special worm-gear bronze (G-CuSn12Ni).

Worm shafts made from Steel C45 hardened. Shaft ends not tempered. Tooth flanks ground.

Worm Gears, Centre Distance in Casing $a = 125 \text{ mm} \pm 0.03$

Ordering Details: e.g.: Product No. 332 214 01, Pr.-Worm Gear, $a = 125$, $i = 14.5$

Product No.	Trans- mission	Module	Number of teeth	d_A mm	d_0 mm	D_1 mm	b mm	Md_2 at 1500min ⁻¹ Nm	η^*	Weight kg
332 214 01	14,5	6,3	29	206	187	-	50	950	0,88	11,4
332 226 01	25,5	4	51	222	210	155	32	810	0,86	10,3
332 229 01	29	6,3	29	206	187	-	50	1110	0,79	11,45
332 239 01	39	5	39	215	200	136	38	1060	0,78	10,1
332 262 01	62	3,15	62	206,5	197	145	34	1160	0,68	8,5
332 282 01	82	2,5	82	215	207,5	160	34	860	0,66	7,97
332 307 01	107	2	107	221	214,5	168	34	580	0,62	7,9

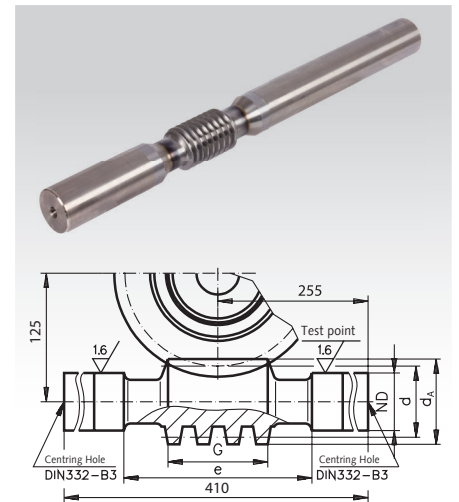


* The figures stated for the efficiency are only reference values, since - besides the lead angle - mounting, lubrication, speed and assembly also have an influence on the efficiency.

Worm Shafts, Centre Distance in Casing $a = 125 \text{ mm} \pm 0.03$

Ordering Details: e.g.: Product No. 332 214 02, Pr.-Worm Shaft, $a = 125$, $i = 14.5$

Product No.	Trans- mission	Module	Number of Threads	d_A mm	d mm	ND mm	G mm	e mm	η^*	Weight kg
332 214 02	14,5	6,3	2	75,6	63	50,5	85	135	0,88	7,05
332 226 02	25,5	4	2	48	40	50,5	75	135	0,86	5,42
332 229 02	29	6,3	1	75,6	63	50,5	85	135	0,79	7,05
332 239 02	39	5	1	60	50	50,5	82	135	0,78	6,06
332 262 02	62	3,15	1	59,3	53	50,5	64	105	0,68	6,35
332 282 02	82	2,5	1	47,5	42,5	45,5	58	105	0,66	4,9
332 307 02	107	2	1	39,5	35,5	40,5	52	105	0,62	3,75



* The figures stated for the efficiency are only reference values, since - besides the lead angle - mounting, lubrication, speed and assembly also have an influence on the efficiency.

Self-locking capacity

The self-locking capacity is influenced by the lead angle, the surface structure of the flanks, the sliding speed, the lubricant and the heating.

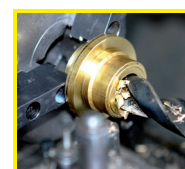
For worm gears with centre distance $a=100\text{mm}$ and 125mm :

Up to ratio 39:1 not self-locking.

From ratio 62:1 Static self-locking.

Shocks or vibration can override the self-locking capacity. Apart from that, various factors in connection with lubrication, gliding speed and load can create such favourable operating conditions that the self-locking capacity is negatively influenced.

For this reason we cannot grant any guarantee regarding the self-locking capacity.



**Reworking within
24h-service possible.
Custom made parts
on request.**