

SELECTION OF METRIC WORM AND WORM GEARS



The range of standard worms and worm gears is available in 7 module sizes and 8 standard ratios.
The size is identical to the centerline distance.
All sizes available on request.



Size	030	045	060	075	090	105	120	
Module	1.0	1.5	2.0	2.5	3.0	3.5	4.0	
Ratio and	4.63:1	5.57:1	6.83:1	8.6:1	11.25:1	15.33:1	23.5:1	47:1
No. of starts	8	7	6	5	4	3	2	1

The ratio 47:1 is self locking. All other ratios are not.
We suggest a tolerance of +/- 0.02mm on the centerline of the bores of the housing.

Selection of worm and worm gear

The nominal torque T_{2N} (Nm) is valid for servo applications that run under normal shock free operations and at an ambient temperature of 20°C. Other conditions have to be corrected by factors shown below.

Service coefficient

Shocks at output shaft	none	moderate	heavy
f_B	1.0	1.2	1.5

Starting factor

Starting frequency	≤10/h	≤60/h	≤360/h	≤1000/h
f_A	1.0	1.1	1.2	1.3

Temperature factor

Ambient Temperature	≤20°C	≤30°C	≤40°C	≤50°C
f_t	1.0	1.3	1.5	1.9

Duty factor

Duty cycle	≤40%	≤70%	≤100%
f_{ED}	1.0	1.2	1.4

T_2 (Nm): required torque for driven machine

All dimensions subject to change without notice.

METRIC WORM AND WORM GEAR EFFICIENCY TABLES



Size	Ratio	T_{2max}	$n_1(\text{min}^{-1})$ Input speed														
			3000 RPM			1500 RPM			1000 RPM			750 RPM			500 RPM		
			P_i	T_{2N}	η	P_i	T_{2N}	η	P_i	T_{2N}	η	P_i	T_{2N}	η	P_i	T_{2N}	η
030	4.63	68.9	0.573	7.36	0.87	0.350	8.68	0.84	0.263	9.54	0.82	0.215	10.18	0.80	0.162	11.12	0.78
	5.57	59.7	0.501	7.70	0.87	0.307	9.07	0.83	0.231	9.95	0.81	0.189	10.61	0.79	0.139	11.98	0.78
	6.83	54.0	0.434	8.08	0.87	0.267	9.50	0.82	0.210	10.42	0.79	0.164	11.08	0.78	0.121	12.36	0.78
	8.60	50.6	0.371	8.53	0.84	0.228	10.01	0.80	0.173	10.95	0.77	0.139	11.86	0.78	0.104	13.00	0.76
	11.25	48.5	0.310	9.08	0.82	0.190	10.74	0.79	0.144	11.75	0.76	0.118	12.49	0.74	0.089	13.57	0.71
	15.33	46.4	0.252	9.83	0.80	0.157	11.50	0.75	0.119	12.54	0.72	0.098	13.30	0.69	0.074	14.34	0.66
	23.50	45.2	0.190	10.82	0.74	0.124	12.58	0.68	0.095	13.63	0.64	0.078	14.35	0.61	0.060	15.29	0.57
	47.00	43.6	0.138	12.53	0.60	0.091	14.24	0.52	0.071	15.16	0.47	0.060	15.72	0.44	0.046	16.30	0.39
045	4.63	232.0	1.915	24.80	0.88	1.169	29.10	0.85	0.879	31.90	0.84	0.704	34.80	0.84	0.525	38.30	0.83
	5.57	201.0	1.676	25.90	0.87	1.018	30.60	0.85	0.757	33.90	0.84	0.616	36.30	0.83	0.461	39.90	0.81
	6.83	182.5	1.448	27.20	0.86	0.878	32.30	0.84	0.660	35.40	0.82	0.535	38.10	0.82	0.401	41.60	0.80
	8.60	171.0	1.237	28.60	0.85	0.747	34.20	0.84	0.560	37.60	0.81	0.457	40.10	0.80	0.344	43.70	0.77
	11.25	164.0	1.024	30.70	0.84	0.624	36.40	0.81	0.470	39.80	0.79	0.384	42.40	0.77	0.289	46.10	0.74
	15.33	157.3	0.836	32.90	0.81	0.521	38.30	0.75	0.386	42.80	0.76	0.316	45.50	0.74	0.239	49.10	0.70
	23.50	153.8	0.639	36.50	0.76	0.397	42.80	0.72	0.303	46.60	0.68	0.250	49.20	0.66	0.189	52.70	0.62
	47.00	149.6	0.442	42.10	0.64	0.289	47.70	0.55	0.226	50.60	0.50	0.190	52.20	0.46	0.138	58.80	0.47
060	4.63	551.0	04.47	58.90	0.89	2.710	69.40	0.88	2.020	76.70	0.88	1.638	82.10	0.85	1.199	91.90	0.87
	5.57	478.0	03.90	61.50	0.89	2.350	73.20	0.88	2.350	79.90	0.88	1.438	85.20	0.83	1.051	95.80	0.86
	6.83	433.0	03.37	64.60	0.88	2.050	76.00	0.85	1.539	83.20	0.83	1.229	90.60	0.83	0.910	99.80	0.84
	8.60	405.0	02.86	68.20	0.87	1.727	81.10	0.85	1.292	89.00	0.83	1.052	94.90	0.82	0.784	104.10	0.81
	11.25	389.0	02.36	73.10	0.86	1.442	85.80	0.83	1.083	93.90	0.80	0.878	100.50	0.80	0.658	109.20	0.77
	15.33	373.0	1.915	78.60	0.84	1.177	91.90	0.80	0.888	100.10	0.77	0.728	106.00	0.75	0.534	117.30	0.75
	23.50	365.0	1.452	86.60	0.80	0.894	101.60	0.76	0.678	110.40	0.73	0.556	116.70	0.70	0.420	125.10	0.66
	47.00	355.0	0.965	101.40	0.70	0.615	116.20	0.63	0.474	124.50	0.58	0.394	129.80	0.55	0.302	136.10	0.50
090	4.63	1817.0	14.82	200.00	0.92	8.88	239.00	0.91	6.590	264.00	0.90	5.350	282.00	0.90	3.990	310.00	0.88
	5.57	1612.0	12.97	209.00	0.91	7.77	249.00	0.90	5.770	275.00	0.89	4.680	294.00	0.88	3.490	322.00	0.87
	6.83	1461.0	11.23	219.00	0.90	6.69	262.00	0.90	4.970	289.00	0.89	4.030	310.00	0.88	2.980	340.00	0.87
	8.60	1367.0	9.49	232.00	0.89	5.70	275.00	0.88	4.230	304.00	0.87	3.430	325.00	0.86	2.560	356.00	0.85
	11.25	1313.0	7.85	247.00	0.88	4.75	292.00	0.86	3.530	322.00	0.85	2.860	344.00	0.84	2.130	375.00	0.82
	15.33	1292.0	6.33	266.00	0.86	3.86	312.00	0.83	2.880	343.00	0.81	2.340	365.00	0.80	1.750	397.00	0.77
	23.50	1232.0	4.77	294.00	0.82	2.93	342.00	0.78	2.210	372.00	0.75	1.810	393.00	0.72	1.330	433.00	0.75
	47.00	1200.0	3.13	341.00	0.73	1.97	391.00	0.66	1.514	418.00	0.61	1.256	435.00	0.58	0.926	476.00	0.57
120	4.63	4368.0	34.70	480.00	0.94	20.80	570.00	0.93	15.44	628.00	0.92	12.52	672.00	0.91	9.33	737.00	0.89
	5.57	3769.0	30.30	501.00	0.93	18.17	595.00	0.92	13.50	655.00	0.91	10.95	700.00	0.90	8.16	767.00	0.88
	6.83	3397.0	26.20	526.00	0.92	15.70	623.00	0.91	11.67	686.00	0.90	9.47	732.00	0.89	7.07	800.00	0.87
	8.60	3159.0	22.20	556.00	0.91	13.26	660.00	0.91	9.85	727.00	0.90	7.98	777.00	0.89	5.94	850.00	0.87
	11.25	3112.0	18.35	591.00	0.90	11.00	701.00	0.89	8.17	771.00	0.88	6.63	823.00	0.87	4.94	897.00	0.85
	15.33	2986.0	14.85	632.00	0.87	8.92	750.00	0.86	6.64	823.00	0.85	5.39	876.00	0.83	4.02	951.00	0.81
	23.50	2921.0	11.14	693.00	0.84	6.67	818.00	0.81	5.06	893.00	0.79	4.12	948.00	0.78	3.09	1021.00	0.74
	47.00	2847.0	7.20	816.00	0.75	4.47	940.00	0.71	3.39	1011.00	0.66	2.78	1065.00	0.64	2.09	1133.00	0.60

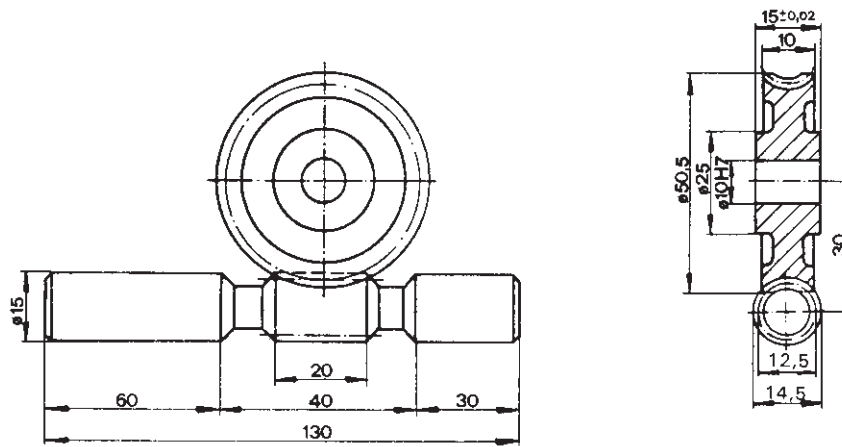
n_1 (min⁻¹) : Input speed
 T_{2max} (Nm) : Max. output torque
 T_{2N} (Nm) : Nominal output torque
 P_i (kW) : Input power
 η : Efficiency

All dimensions subject to change without notice.

METRIC WORM AND WORM GEARS

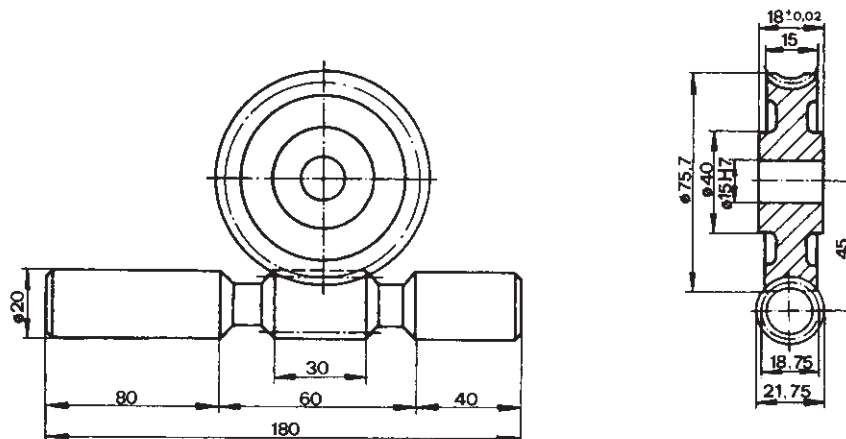
Material: Worm Gear: CuZn40A12 Worm: AISI 1146 DIN 17 210

Teeth: Pressure Angle 20° - Right Hand - Precision cut



Center Distance = 30mm

Ratio	Module	No. of Starts	No. of Teeth	Worm Shaft Part No.	Worm Wheel Part No.
47:1	1.0	1	47	S1001	R1001
23.5:1	1.0	2	47	S1002	R1002
15.33:1	1.0	3	46	S1003	R1003
11.25:1	1.0	4	45	S1004	R1004
8.6:1	1.0	5	43	S1005	R1005
6.83:1	1.0	6	41	S1006	R1006
5.57:1	1.0	7	39	S1007	R1007
4.63:1	1.0	8	37	S1008	R1008



Center Distance = 45mm

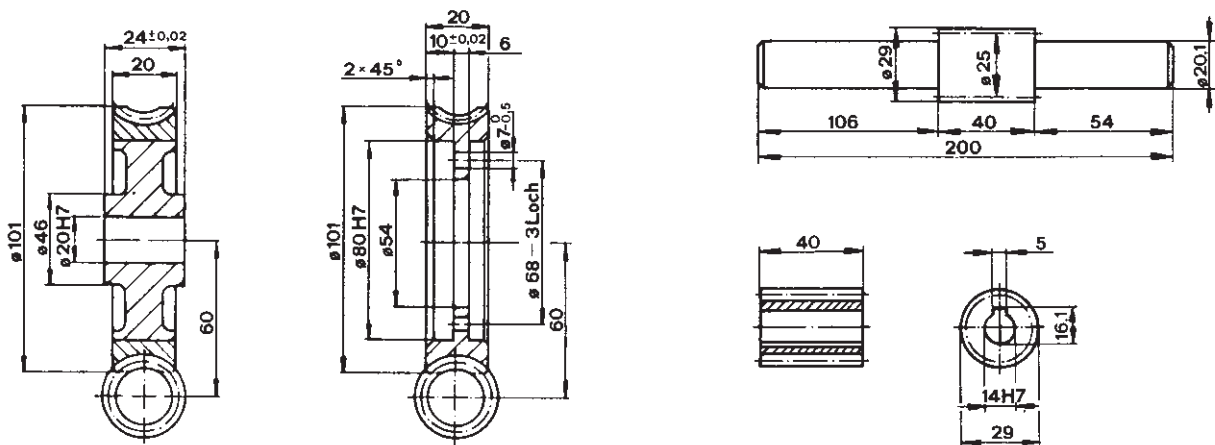
Ratio	Module	No. of Starts	No. of Teeth	Worm Shaft Part No.	Worm Wheel Part No.
47:1	1.5	1	47	S1501	R1501
23.5:1	1.5	2	47	S1502	R1502
15.33:1	1.5	3	46	S1503	R1503
11.25:1	1.5	4	45	S1504	R1504
8.6:1	1.5	5	43	S1505	R1505
6.83:1	1.5	6	41	S1506	R1506
5.57:1	1.5	7	39	S1507	R1507
4.63:1	1.5	8	37	S1508	R1508

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METRIC WORM AND WORM GEARS

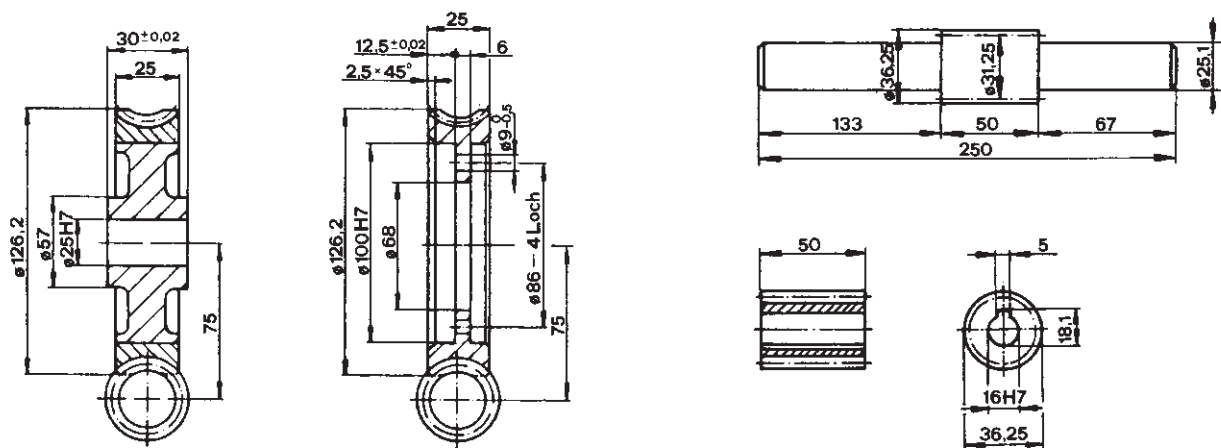
Material: Worm Gear: CuZn40A12 Worm: AISI 1146 DIN 17 210

Teeth: Pressure Angle 20° - Right Hand - Precision cut



Center Distance = 60mm

Ratio	Module	No. of Starts	No. of Teeth	Worm Shaft Part No.	Hollow Shaft Part No.	Worm Wheel Part No.	Worm Wheel Ring Part No.
47:1	2.0	1	47	S2001	B2001	R2001	K2001
23.5:1	2.0	2	47	S2002	B2002	R2002	K2002
15.33:1	2.0	3	46	S2003	B2003	R2003	K2003
11.25:1	2.0	4	45	S2004	B2004	R2004	K2004
8.6:1	2.0	5	43	S2005	B2005	R2005	K2005
6.83:1	2.0	6	41	S2006	B2006	R2006	K2006
5.57:1	2.0	7	39	S2007	B2007	R2007	K2007
4.63:1	2.0	8	37	S2008	B2008	R2008	K2008



Center Distance = 75mm

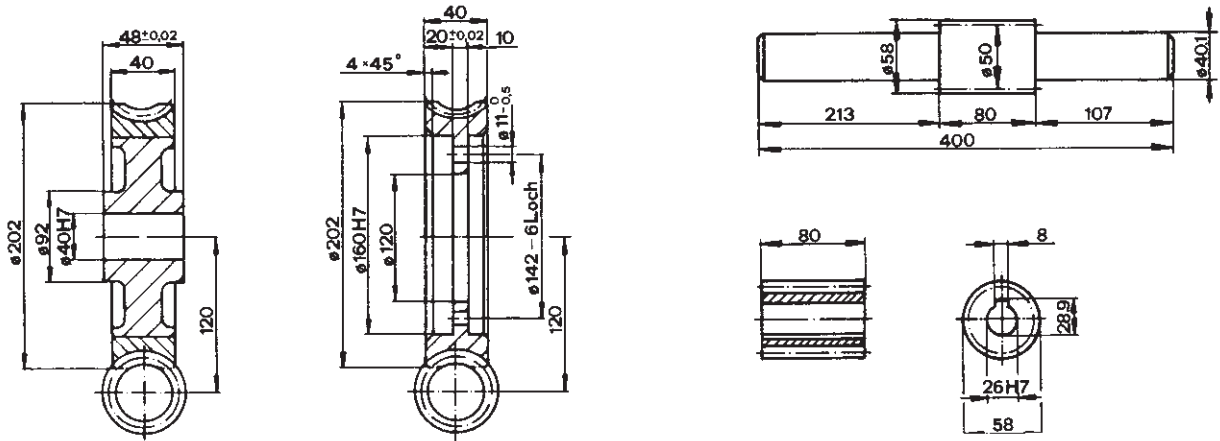
Ratio	Module	No. of Starts	No. of Teeth	Worm Shaft Part No.	Hollow Shaft Part No.	Worm Wheel Part No.	Worm Wheel Ring Part No.
47:1	2.5	1	47	S2501	B2501	R2501	K2501
23.5:1	2.5	2	47	S2502	B2502	R2502	K2502
15.33:1	2.5	3	46	S2503	B2503	R2503	K2503
11.25:1	2.5	4	45	S2504	B2504	R2504	K2504
8.6:1	2.5	5	43	S2505	B2505	R2505	K2505
6.83:1	2.5	6	41	S2506	B2506	R2506	K2506
5.57:1	2.5	7	39	S2507	B2507	R2507	K2507
4.63:1	2.5	8	37	S2508	B2508	R2508	K2508

All dimensions subject to change without notice.

METRIC WORM AND WORM GEARS

Material: Worm Gear: CuZn40A12 Worm: AISI 1146 DIN 17 210

Teeth: Pressure Angle 20° - Right Hand - Precision cut



Center Distance = 120mm

Ratio	Module	No. of Starts	No. of Teeth	Worm Shaft Part No.	Hollow Shaft Part No.	Worm Wheel Part No.	Worm Wheel Ring Part No.
47:1	4.0	1	47	S4001	B4001	R4001	K4001
23.5:1	4.0	2	47	S4002	B4002	R4002	K4002
15.33:1	4.0	3	46	S4003	B4003	R4003	K4003
11.25:1	4.0	4	45	S4004	B4004	R4004	K4004
8.6:1	4.0	5	43	S4005	B4005	R4005	K4005
6.83:1	4.0	6	41	S4006	B4006	R4006	K4006
5.57:1	4.0	7	39	S4007	B4007	R4007	K4007
4.63:1	4.0	8	37	S4008	B4008	R4008	K4008

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