

9.3.6 Type S 040 – Standard worm gearboxes



Characteristics

Characteristic	Standard	Option
Toothings	Hardened and ground worm shaft / bronze worm gear	See chapter 9.2.1
Gear ratio	5:1 to 83:1	
Housing / Flanges	Grey cast iron	
Threaded mounting hole	On gearbox side 1 and on the flanges	See chapter 9.2.3
Shaft	Material 1 C45, shaft ends greased Fit with ISO j6 tolerance with parallel keyway: according to DIN 6885 Sheet 1	See chapter 4.6.2
Hollow shaft	Material 1 C45, shafts greased Fit with ISO H7 tolerance with parallel keyway: according to DIN 6885 Sheet 1	See chapter 4.6.3
Radial shaft seal ring	NBR, form A	See chapter 4.8
Ambient temperature	-10°C to +90°C. The values of the performance tables are valid for 20°C	See chapter 4.9.3
Circumferential backlash	< 30 arcmin	See chapter 9.2.10
Protection class	IP 54	See chapter 4.5
Corrosion protection	Prime coat; layer thickness > 40 µm	See chapter 4.4
Bearing life L10h	more than 15,000h	See chapter 4.9.1
Oil change intervals	Not required if the oil temperature is kept < 90°C The lifetime of the bearings can be increased by the factor 1.5 if the oil is changed after the first 500 service hours and then every 5000 service hours.	See chapter 9.2.8
Lubricant	Synthetic lubricants	See chapter 9.2.8

Performance data

i	i ist		n ₁ [rpm]					
			3000	1500	1000	750	500	150
5:1	29:6	n ₂ [rpm]	600.0	300.0	200.0	150.0	100.0	30.0
		P _{1N} [kW]	2.26	1.43	1.09	0.87	0.64	0.25
		T _{2N} [Nm]	33	41	47	49	53	67
		P _{1NT} [kW]	1.85	1.25	1.10	0.90	0.80	0.00
		Efficiency	0.94	0.94	0.93	0.87	0.90	0.86
7.5:1	29:4	n ₂ [rpm]	400.0	200.0	133.0	100.0	66.0	20.0
		P _{1N} [kW]	1.68	1.06	0.81	0.65	0.48	0.19
		T _{2N} [Nm]	36	45	51	54	58	73
		P _{1NT} [kW]	1.45	0.95	0.77	0.70	0.61	0.00
		Efficiency	0.92	0.91	0.90	0.89	0.87	0.82
10:1	39:4	n ₂ [rpm]	300.0	150.0	100.0	75.0	50.0	15.0
		P _{1N} [kW]	1.39	0.77	0.55	0.43	0.32	0.13
		T _{2N} [Nm]	39	43	45	47	50	64
		P _{1NT} [kW]	1.28	0.83	0.69	0.63	0.87	0.00
		Efficiency	0.91	0.90	0.88	0.87	0.85	0.81
13:1	52:4	n ₂ [rpm]	230.0	115.0	76.0	57.0	38.0	11.0
		P _{1N} [kW]	0.85	0.45	0.32	0.26	0.19	0.08
		T _{2N} [Nm]	31	32	34	36	39	50
		P _{1NT} [kW]	1.13	0.75	0.63	0.57	0.52	0.00
		Efficiency	0.88	0.87	0.85	0.84	0.83	0.80
15:1	29:2	n ₂ [rpm]	200.0	100.0	66.0	50.0	33.0	10.0
		P _{1N} [kW]	0.93	0.60	0.48	0.39	0.29	0.12
		T _{2N} [Nm]	37	48	55	58	63	79
		P _{1NT} [kW]	0.85	0.55	0.46	0.41	0.36	0.00
		Efficiency	0.86	0.84	0.82	0.81	0.78	0.72
20:1	39:2	n ₂ [rpm]	150.0	75.0	50.0	37.0	25.0	7.5
		P _{1N} [kW]	0.82	0.49	0.36	0.28	0.21	0.09
		T _{2N} [Nm]	43	50	53	55	58	75
		P _{1NT} [kW]	0.77	0.49	0.42	0.38	0.34	0.00
		Efficiency	0.84	0.82	0.80	0.78	0.76	0.71

i	i ist		n ₁ [rpm]					
			3000	1500	1000	750	500	150
26:1	52:2	n ₂ [rpm]	115.0	57.0	38.0	28.0	19.0	5.8
		P _{1N} [kW]	0.55	0.30	0.21	0.17	0.12	0.05
		T _{2N} [Nm]	36	38	40	42	45	59
		P _{1NT} [kW]	0.68	0.44	0.38	0.34	0.31	0.00
		Efficiency	0.80	0.78	0.76	0.75	0.73	0.69
30:1	29:1	n ₂ [rpm]	100.0	50.0	33.0	25.0	16.0	5.0
		P _{1N} [kW]	0.53	0.37	0.29	0.24	0.18	0.08
		T _{2N} [Nm]	36	50	57	60	65	82
		P _{1NT} [kW]	0.51	0.33	0.28	0.26	0.23	0.00
		Efficiency	0.75	0.73	0.70	0.68	0.64	0.57
40:1	39:1	n ₂ [rpm]	75.0	37.0	25.0	18.0	12.0	3.8
		P _{1N} [kW]	0.48	0.32	0.25	0.20	0.15	0.07
		T _{2N} [Nm]	44	56	63	66	71	91
		P _{1NT} [kW]	0.46	0.30	0.25	0.23	0.21	0.00
		Efficiency	0.72	0.70	0.67	0.65	0.62	0.56
53:1	52:1	n ₂ [rpm]	57.0	28.0	18.0	14.0	9.4	2.8
		P _{1N} [kW]	0.39	0.21	0.15	0.13	0.09	0.04
		T _{2N} [Nm]	44	46	48	51	55	72
		P _{1NT} [kW]	0.42	0.28	0.24	0.22	0.20	0.00
		Efficiency	0.68	0.65	0.63	0.61	0.59	0.55
62:1	63:1	n ₂ [rpm]	48.0	24.0	16.0	12.0	8.1	2.4
		P _{1N} [kW]	0.36	0.20	0.15	0.12	0.09	0.03
		T _{2N} [Nm]	45	48	51	53	56	57
		P _{1NT} [kW]	0.35	0.23	0.20	0.18	0.16	0.00
		Efficiency	0.63	0.59	0.56	0.54	0.51	0.45
83:1	82:1	n ₂ [rpm]	36.0	18.0	12.0	9.0	6.0	1.8
		P _{1N} [kW]	0.25	0.14	0.10	0.08	0.05	0.02
		T _{2N} [Nm]	36	37	38	38	38	38
		P _{1NT} [kW]	0.32	0.21	0.18	0.17	0.15	0.00
		Efficiency	0.56	0.52	0.50	0.48	0.46	0.42

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	5:1	7.5:1	10:1	13:1	15:1	20:1	26:1	30:1	40:1	53:1	62:1	83:1
T _{2max} [Nm]	73	83	77	59	97	90	77	107	99	87	72	64

Permissible radial force F_{r1} and axial force F_{a1} on shaft N₁

n ₁ [rpm]	3000		1500		1000		750		500		150	
T ₁ [Nm]	F _r [N]	F _a [N]	F _r [N]	F _a [N]	F _r [N]	F _a [N]	F _r [N]	F _a [N]	F _r [N]	F _a [N]	F _r [N]	F _a [N]
< 10	250	125	310	155	350	175	400	200	450	225	550	275

Permissible radial force F_{r2} and axial force F_{a2} on shaft N₂

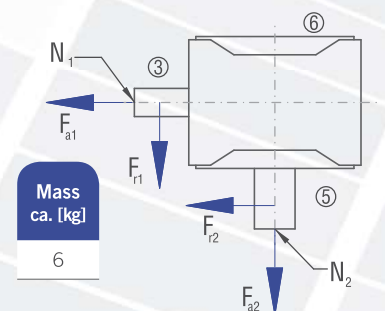
n ₂ [rpm]	200		125		75		50		30		10	
T ₂ [Nm]	F _r [N]	F _a [N]	F _r [N]	F _a [N]	F _r [N]	F _a [N]	F _r [N]	F _a [N]	F _r [N]	F _a [N]	F _r [N]	F _a [N]
< 80	970	485	1250	625	1380	690	1600	800	1800	900	2500	1250

Inertia moments/mass

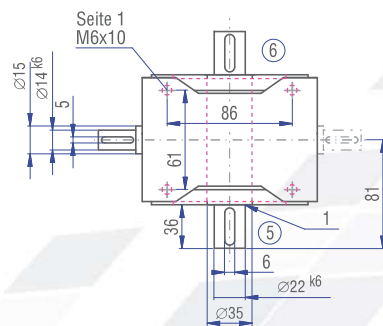
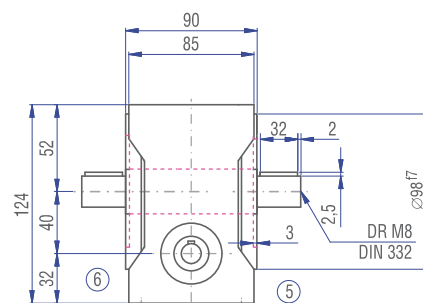
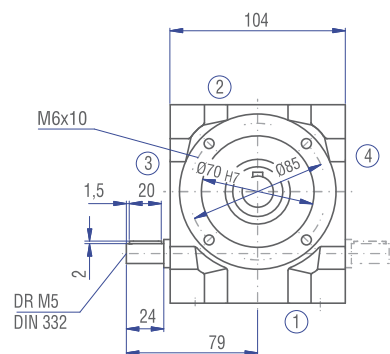
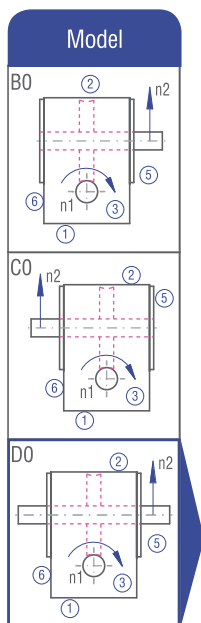
Inertia moment J₁ related to the fast-rotating shaft (N₁)

	Inertia moment [kgcm ²]											
	5:1	7.5:1	10:1	13:1	15:1	20:1	26:1	30:1	40:1	53:1	62:1	83:1
J ₁	0.33	0.25	0.18	0.15	0.19	0.15	0.13	0.18	0.14	0.12	0.13	0.12

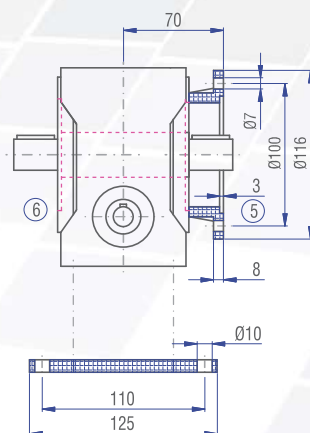
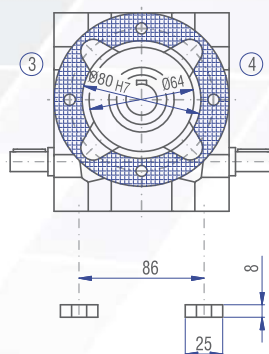
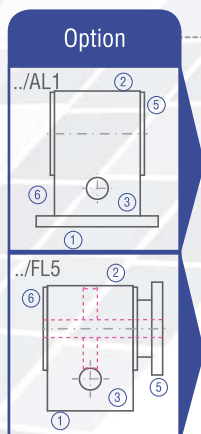
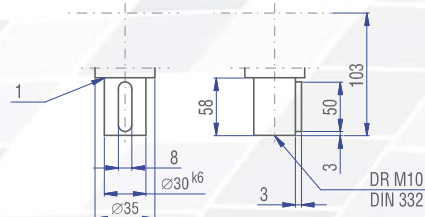
The mass of the gearbox may deviate depending on the gear ratio and the type.

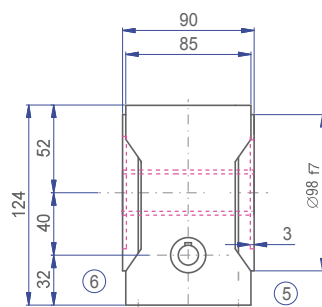
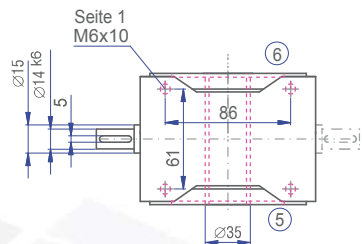
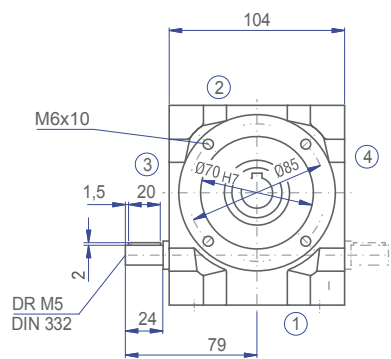


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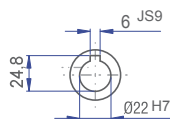


Implementation VV

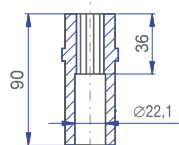




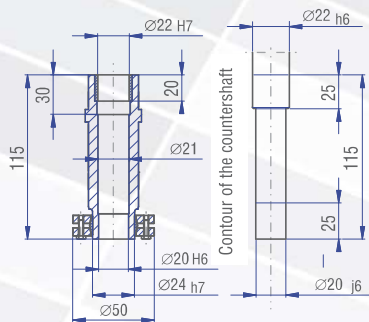
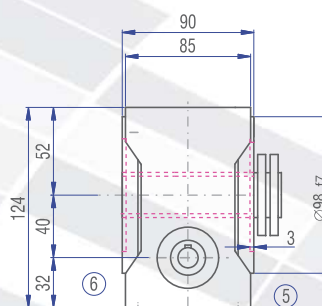
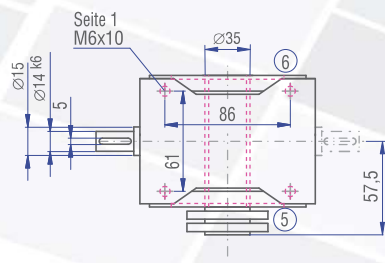
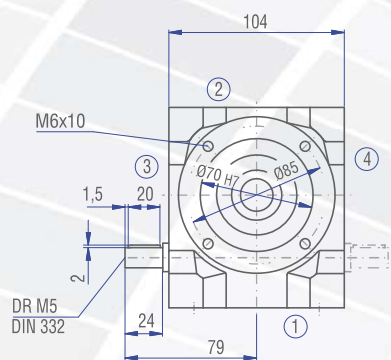
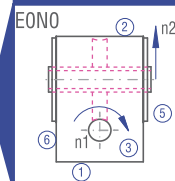
E0N0



E0K5 / E0K6



Model



Contour of the countershaft

Model

