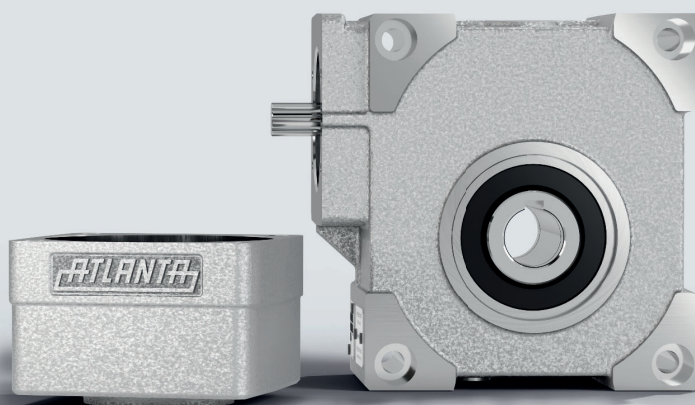
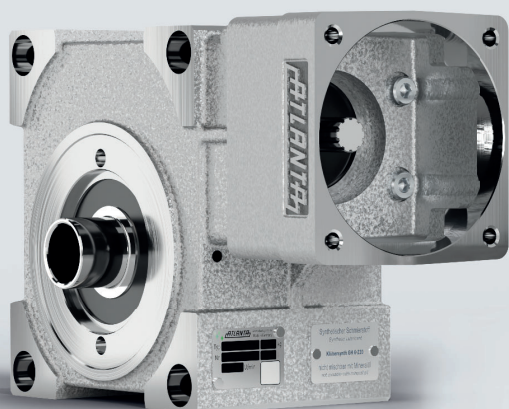


	Page
Center Distance 32 mm	B-38 – B-39
Center Distance 50 mm	B-40 – B-41
Center Distance 63 mm	B-42 – B-43
Center Distance 80 mm	B-44 – B-45
Center Distance 100 mm	B-46 – B-47
Selection And Ratings	B-48 – B-50



Center Distance $a_0 = 32 \text{ mm}$

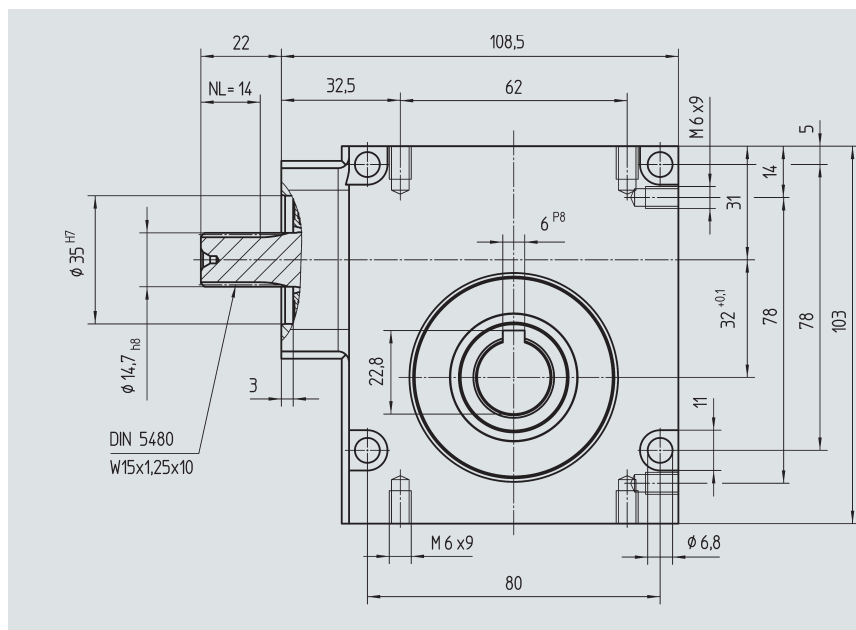


Fig. 1 Output shaft with key connection

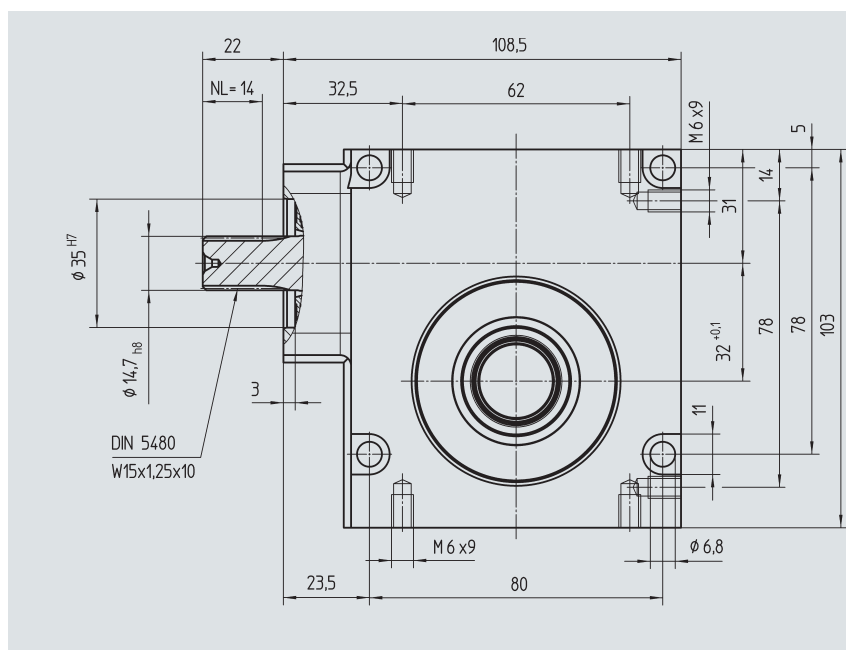
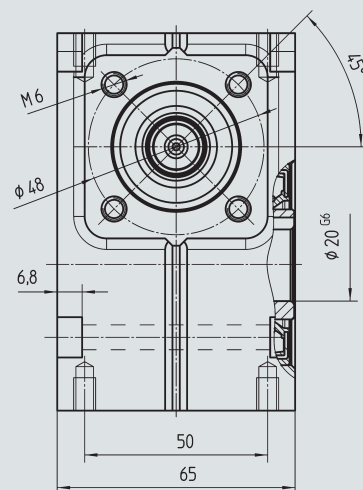
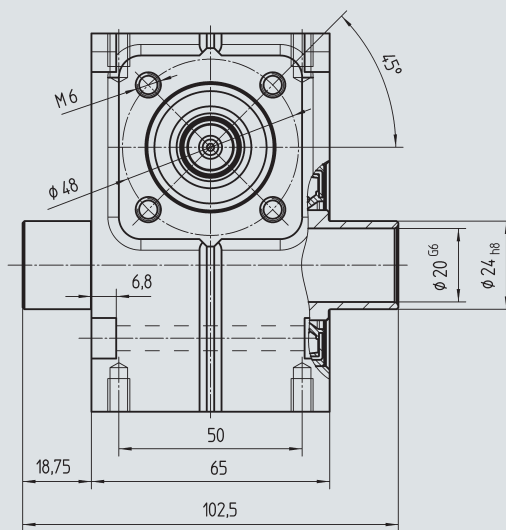


Fig. 2 Output shaft for clamp connection 80 81 024

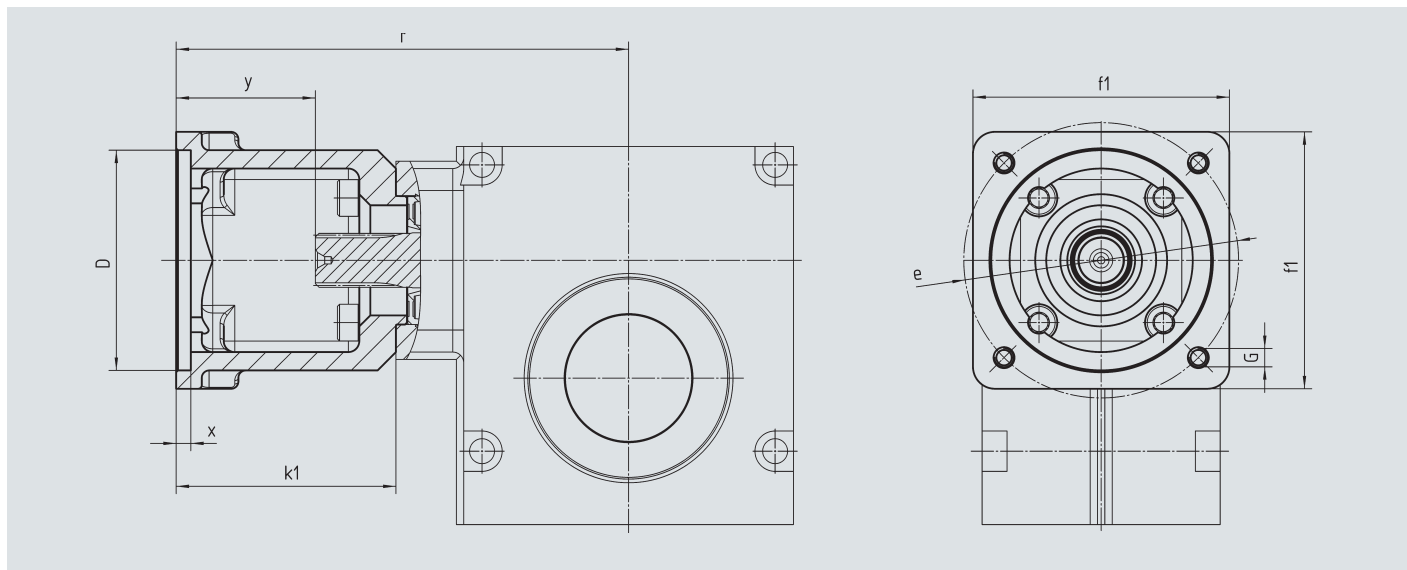


Order Code				
Fig. 1	Fig. 2	Ratio i		J _{red} 10 ⁻⁴ kg m ²
59 01 005	59 11 005	4.75	2.0	1.1109
59 01 007	59 11 007	6.75	2.0	1.0574
59 01 009	59 11 009	9.25	2.0	8.1272
59 01 015	59 11 015	14.50	2.0	8.4039
59 01 020	59 11 020	19.50	2.0	6.9016
59 01 029	59 11 029	29.00	2.0	8.4475
59 01 039	59 11 039	39.00	2.0	7.0256
59 01 050	59 11 050	50.00	2.0	6.4653

With food grade oil: Order Code 59 01 1xx / 59 11 1xx

In ATEX with food grade oil: Order Code 59 01 2xx / 59 112xx

Motor Flange



Center Distance $a_0 = 32 \text{ mm}$

Order Code	D ^{G7}	k ₁	r	x	y	f ₁	e	G	
65 59 101	40.0	56.5	120.0	2.5	34.5	60	63	M5	0.26
65 59 102	50.0	64.0	127.5	4.0	42.0	60	70	M5	0.29
65 59 103	60.0	60.0	123.5	3.5	38.0	70	75	M5	0.28
65 59 104	80.0	64.0	127.5	4.5	42.0	85	100	M6	0.30
65 59 105	60.0	64.0	127.5	4.5	42.0	85	90	M5	0.30
65 59 107	40.0	56.5	120.0	2.5	34.5	60	63	M4	0.31
65 59 108	70.0	64.0	127.5	5.0	42.0	85	90	M6	0.26

An order should contain gearbox 59 01 0xx / 59 11 0xx and flange 65 59 1xx

Center Distance $a_o = 50 \text{ mm}$

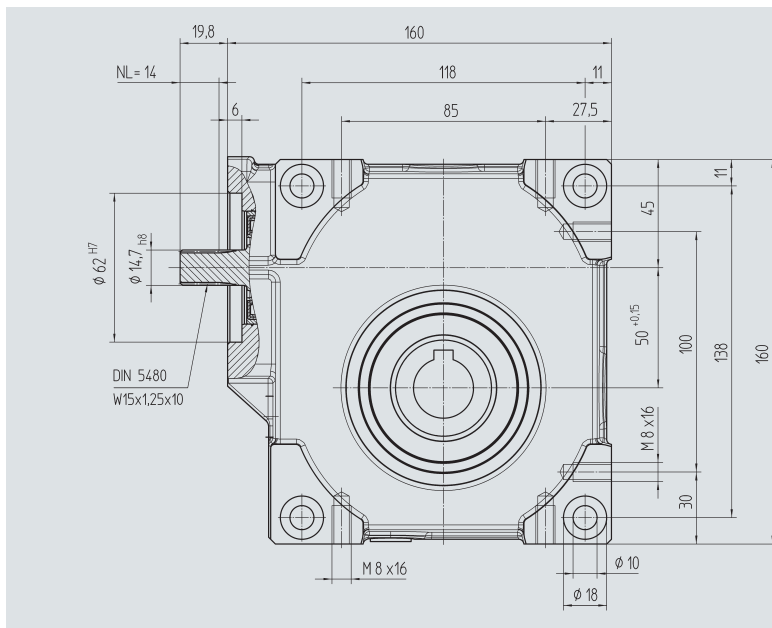


Fig. 1 Output shaft with key connection

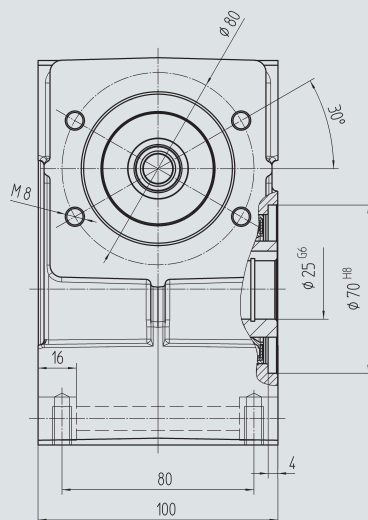
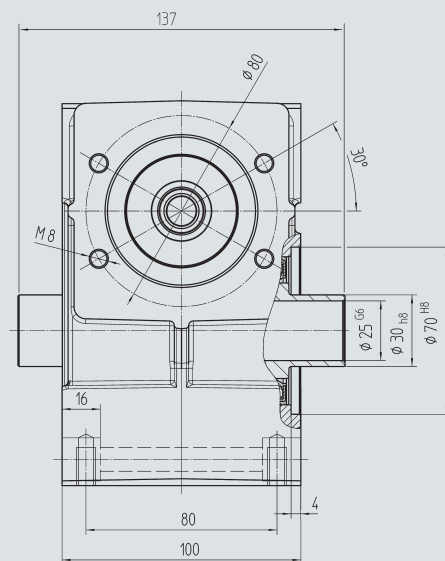
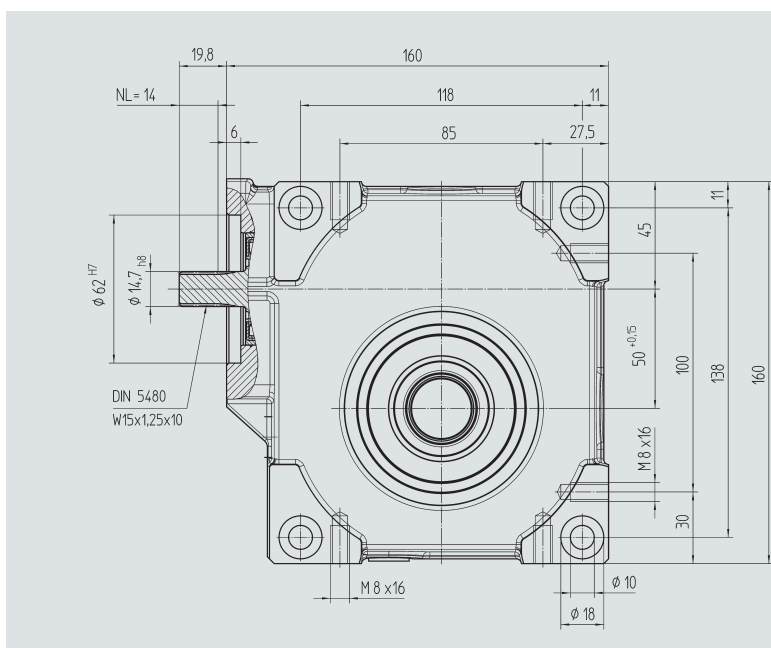


Fig. 2 Output shaft for clamp connection 80 83 030



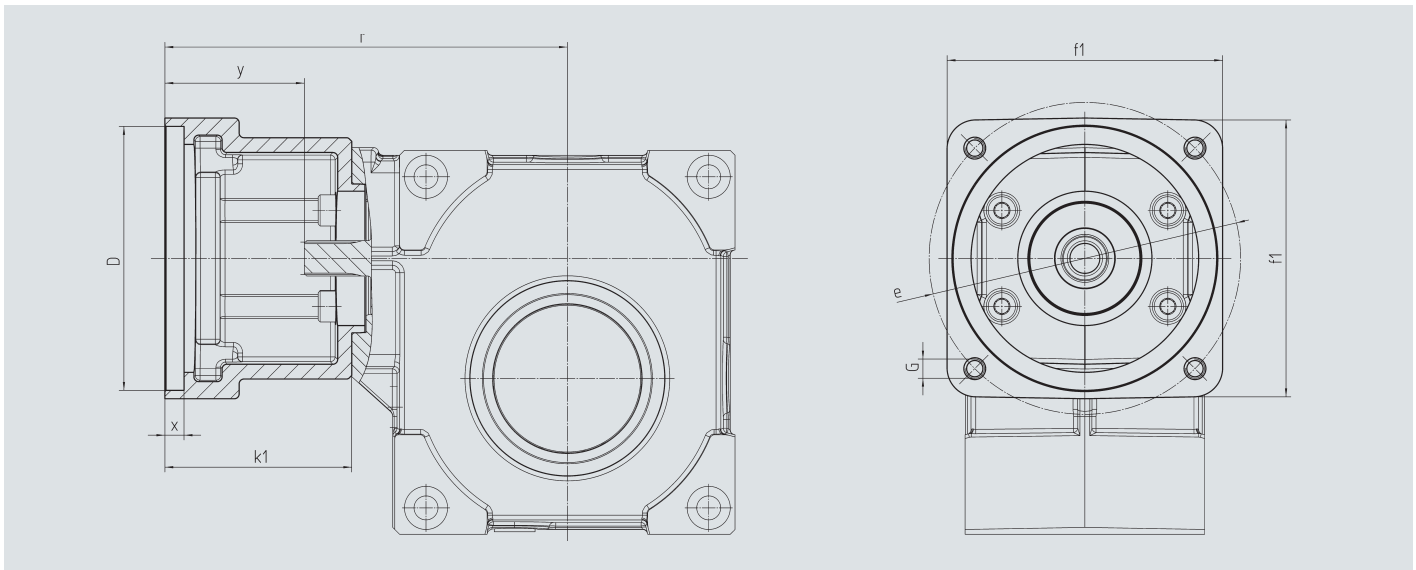
Order Code

Fig. 1	Fig. 2	Ratio i		$J_{red} \cdot 10^{-4} \text{ kg m}^2$
59 03 005	59 13 005	4.75	6.5	0.8280
59 03 007	59 13 007	6.75	6.5	0.4140
59 03 009	59 13 009	9.25	6.5	0.3490
59 03 015	59 13 015	14.50	6.5	0.2800
59 03 020	59 13 020	19.50	6.5	0.1960
59 03 029	59 13 029	29.00	6.5	0.2694
59 03 039	59 13 039	39.00	6.5	0.2310
59 03 050	59 13 050	50.00	6.5	0.2140

With food grade oil: Order Code 59 03 1xx / 59 13 1xx

In ATEX with food grade oil: Order Code 59 03 2xx / 59 13 2xx

Motor Flange



Center Distance $a_0 = 50 \text{ mm}$

Order Code	D_{67}	k_1	r	x	y	f_1	e	G	kg
65 59 301	95.0	62	152	12.5	42	100	115	M8	0.60
65 59 302	50.0	62	152	10.0	42	100	70; 95; 115	M4; M6; M8	0.70
65 59 303	80.0	62	152	10.0	42	100	100	M6	0.65
65 59 304	95.0	78	168	10.0	58	115	130	M8	0.80
65 59 306	60.0	74	164	21.0	54	100	75; 90; 115	M5; M5; M8	0.90
65 59 307	70.0	70	160	21.0	50	100	90; 115	M6; M8	0.80
65 59 401	95.0	73	163	8.0	53	100	115	M8	0.75
65 59 402	110.0	78	168	8.0	58	115	130	M8	0.80
65 59 403	95.0	73	163	12.0	53	115	130	M8	0.75
65 59 404	110.0	73	163	12.0	53	115	130	M8	0.70
65 59 405	95.0	78	168	11.0	58	140	165	M10	1.20
65 59 406	110.0	78	168	11.0	58	140	165	M10	1.15
65 59 407	130.0	78	168	11.0	58	140	165	M10	1.00
65 59 409	130.0	98	188	14.0	78	140	165	M10	1.10
65 59 410	110.0	74	164	8.0	54	120	145	M8	1.00
65 59 411	110.0	84	174	8.0	64	120	145	M8	1.20
65 59 412	114.3	105	195	8.0	85	180	200	M12	3.70
65 59 413	114.3	139	229	8.0	119	180	200	M12	3.35
65 59 414	114.3	91	181	8.0	71	180	200	M12	2.65
65 59 415	110.0	89	179	8.0	69	120	145	M8	1.30

An order should contain gearbox 59 03 0xx / 59 13 0xx and flange 65 59 3xx or 4xx.

Center Distance $a_o = 63 \text{ mm}$

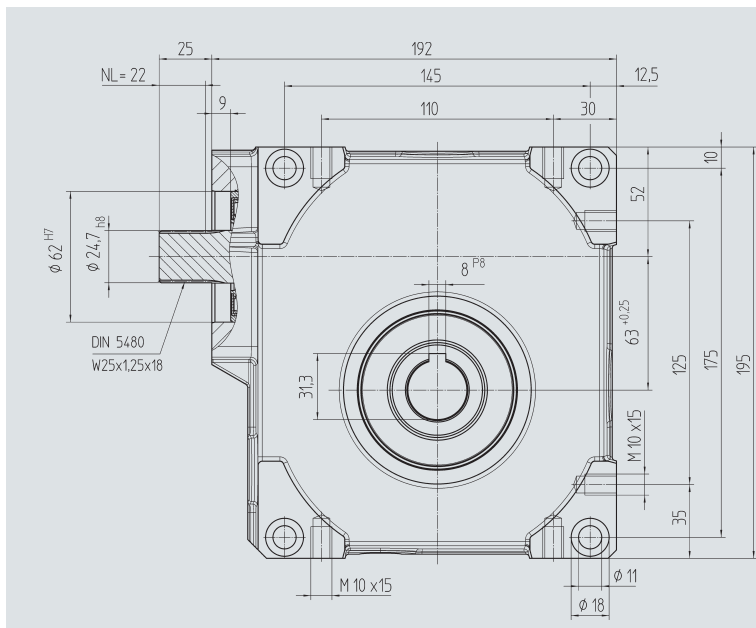


Fig. 1 Output shaft with key connection

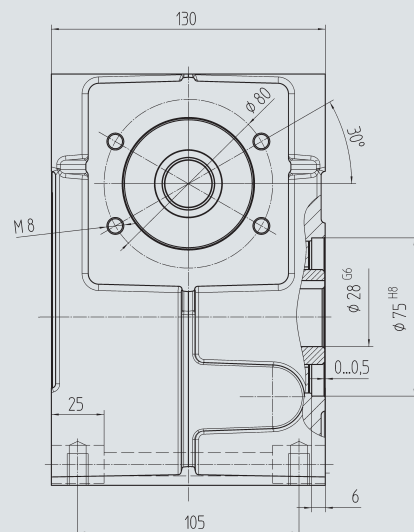
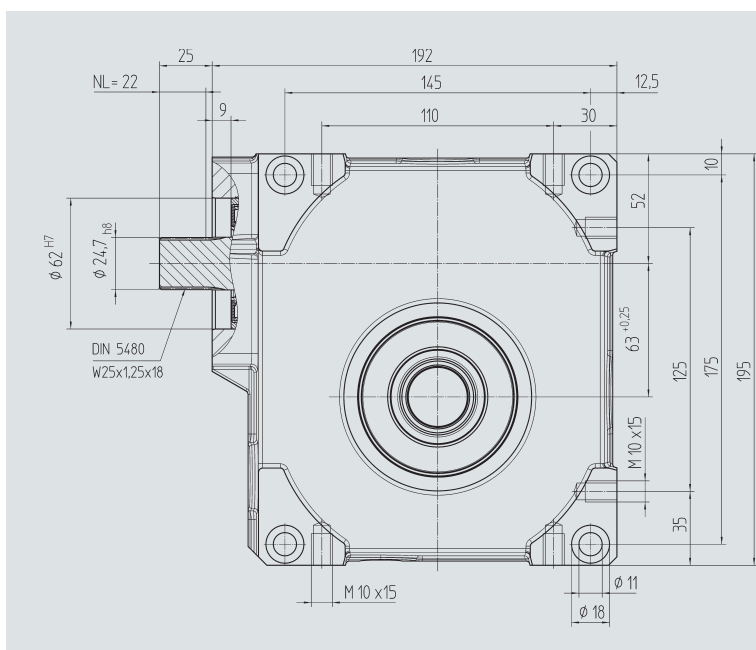


Fig. 2 Output shaft for clamp connection 80 84 036



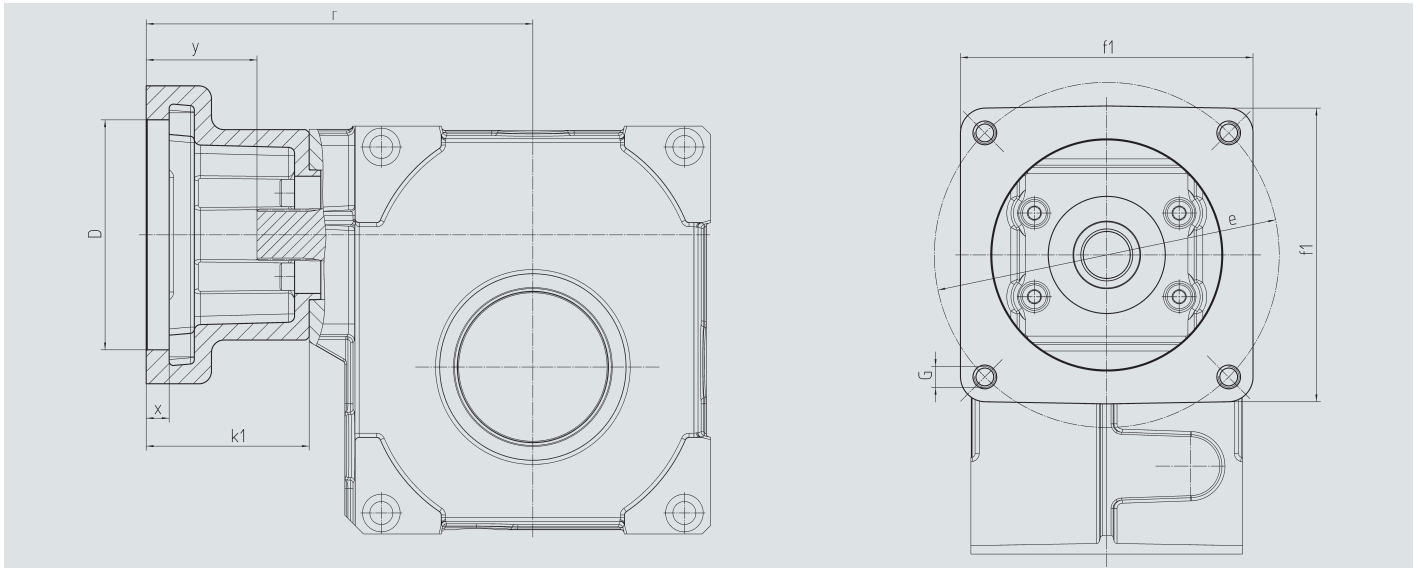
Order Code

Fig. 1	Fig. 2	Ratio i		$J_{red} \cdot 10^{-4} \text{ kg m}^2$
59 04 005	59 14 005	4.75	11.5	2.5350
59 04 007	59 14 007	6.75	11.5	1.3720
59 04 009	59 14 009	9.25	11.5	0.9825
59 04 015	59 14 015	14.50	11.5	0.9590
59 04 020	59 14 020	19.50	11.5	0.6940
59 04 029	59 14 029	29.00	11.5	0.9966
59 04 039	59 14 039	39.00	11.5	1.0100
59 04 052	59 14 052	52.00	11.5	0.5305

With food grade oil: Order Code 59 04 1xx / 59 14 1xx

In ATEX with food grade oil: Order Code 59 04 2xx / 59 14 2xx

Motor Flange



Center Distance $a_0 = 63 \text{ mm}$

Order Code	D ⁶⁷	k ₁	r	x	y	f ₁	e	G	kg
65 59 301	95.0	62	152	12.5	37	100	115	M8	0.60
65 59 302	50.0	62	152	10.0	37	100	70; 95; 115	M4; M6; M8	0.70
65 59 303	80.0	62	152	10.0	37	100	100	M6	0.65
65 59 304	95.0	78	168	10.0	53	115	130	M8	0.80
65 59 306	60.0	74	164	21.0	49	100	75; 90; 115	M5; M5; M8	0.90
65 59 307	70.0	70	160	21.0	45	100	90; 115	M6; M8	0.80
65 59 401	95.0	73	163	8.0	48	100	115	M8	0.75
65 59 402	110.0	78	168	8.0	53	115	130	M8	0.80
65 59 403	95.0	73	163	12.0	48	115	130	M8	0.75
65 59 404	110.0	73	163	12.0	48	115	130	M8	0.70
65 59 405	95.0	78	168	11.0	53	140	165	M10	1.20
65 59 406	110.0	78	168	11.0	53	140	165	M10	1.15
65 59 407	130.0	78	168	11.0	53	140	165	M10	1.00
65 59 409	130.0	98	188	14.0	73	140	165	M10	1.10
65 59 410	110.0	74	164	8.0	49	120	145	M8	1.00
65 59 411	110.0	84	174	8.0	59	120	145	M8	1.20
65 59 412	114.3	105	195	8.0	80	180	200	M12	3.70
65 59 413	114.3	139	229	8.0	114	180	200	M12	3.35
65 59 414	114.3	91	181	8.0	66	180	200	M12	2.65
65 59 415	110.0	89	179	8.0	64	120	145	M8	1.30

An order should contain gearbox 59 04 0xx / 59 14 0xx and flange 65 59 3xx or 4xx.

Center Distance $a_0 = 80 \text{ mm}$

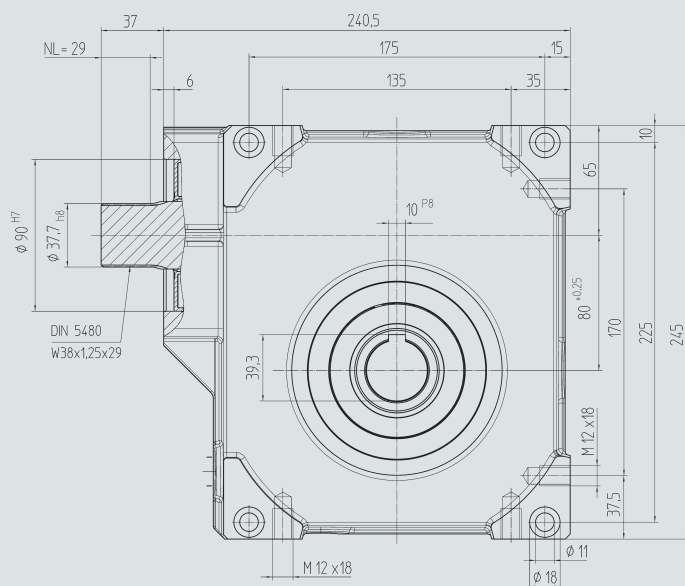


Fig. 1 Output shaft with key connection

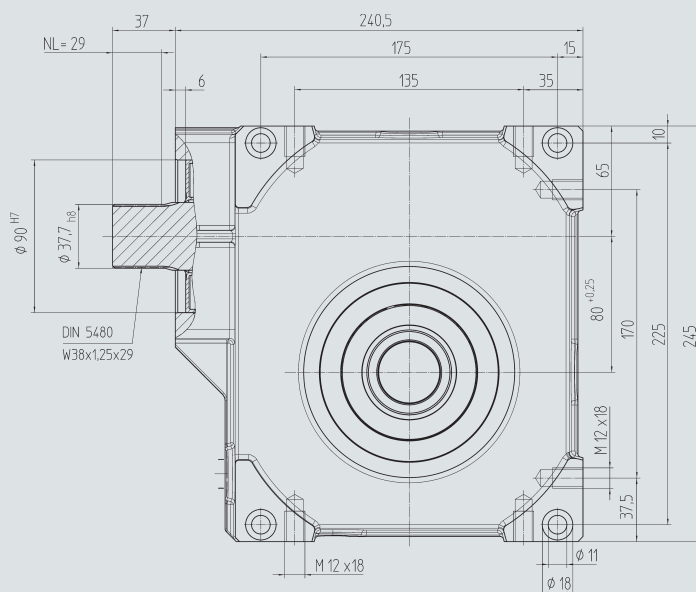
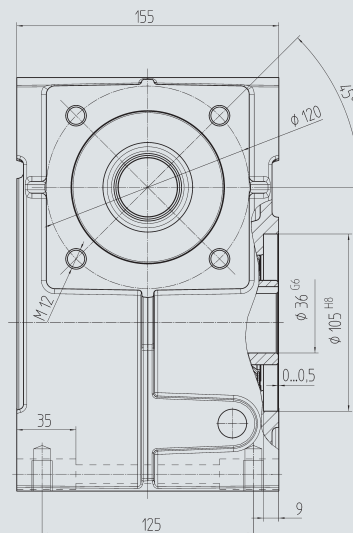
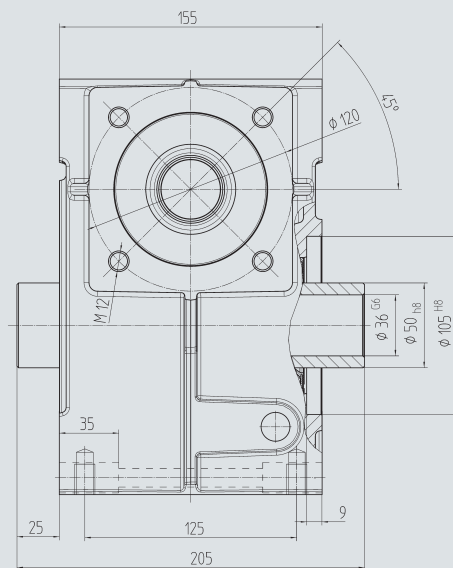


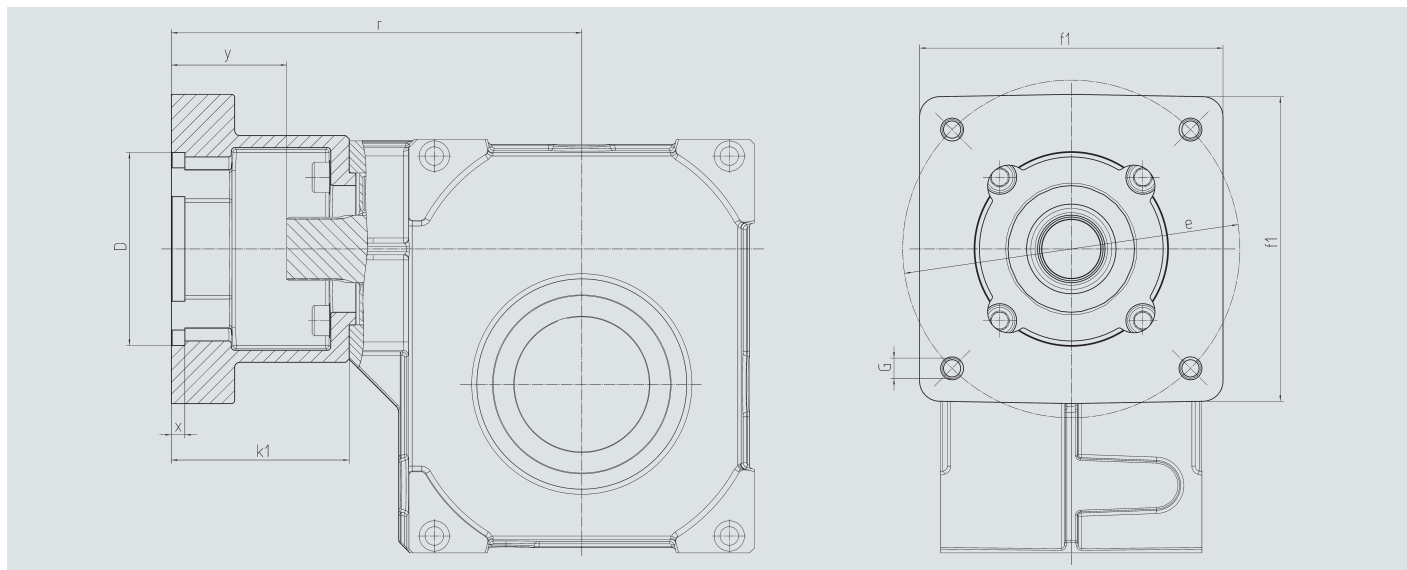
Fig. 2 Output shaft for clamp connection 80 85 050



Order Code				
Fig. 1	Fig. 2	Ratio i		$J_{red} \cdot 10^{-4} \text{ kg m}^2$
59 05 005	59 15 005	4.75	22.0	9.6180
59 05 007	59 15 007	6.75	22.0	6.0910
59 05 009	59 15 009	9.25	22.0	4.7650
59 05 015	59 15 015	14.50	22.0	5.3080
59 05 020	59 15 020	19.50	22.0	3.9350
59 05 029	59 15 029	29.00	22.0	4.0500
59 05 039	59 15 039	39.00	22.0	4.1800
59 05 052	59 15 052	52.00	22.0	3.7140

With food grade oil: Order Code 59 05 1xx / 59 15 1xx
In ATEX with food grade oil: Order Code 59 05 2xx / 59 15 2xx

Motor Flange



Center Distance $a_o = 80$ mm

Order Code	D ^{G7}	k ₁	r	x	y	f ₁	e	G	 kg
65 59 501	110.0	92.0	230.0	8.0	55.0	140	165	M10	2.00
65 59 502	130.0	92.0	230.0	8.0	55.0	140	165	M10	1.90
65 59 503	180.0	122.0	260.0	8.0	85.0	192	215	M12	3.40
65 59 504	180.0	127.0	265.0	8.0	90.0	192	215	M12	3.80
65 59 505	180.0	112.0	250.0	10.0	75.0	192	215	M12	2.70
65 59 506	130.0	112.0	250.0	10.0	75.0	192	215	M12	3.00
65 59 507	130.0	112.0	250.0	10.0	75.0	140	165	M10	2.50
65 59 508	110.0	90.0	228.0	8.0	53.0	140	145	M8	2.00
65 59 509	110.0	108.5	246.5	8.0	71.5	140	145	M8	2.50
65 59 510	114.3	129.5	267.5	8.0	92.5	180	200	M12	5.00
65 59 511	114.3	163.5	301.5	8.0	126.5	180	200	M12	4.20
65 59 512	114.3	105.5	243.5	8.0	68.5	180	200	M12	3.50
65 59 513	110.0	113.5	251.5	8.0	76.5	140	145	M8	2.70

An order should contain gearbox 59 05 0xx / 59 15 0xx and flange 65 59 5xx

Center Distance $a_o = 100$ mm

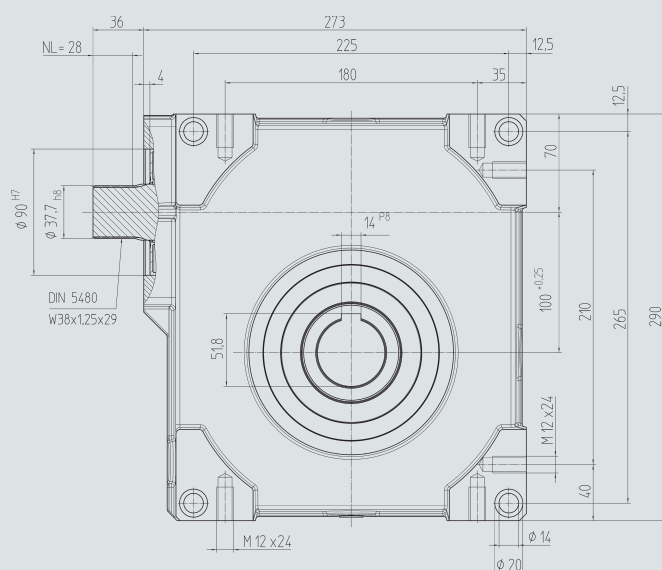


Fig. 1 Output shaft with key connection

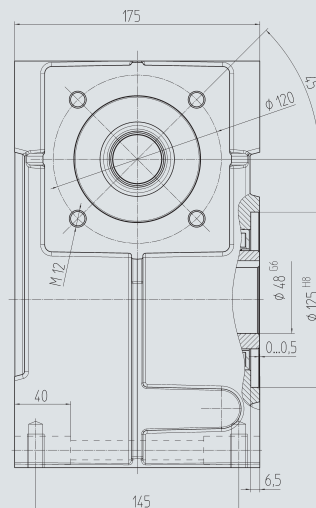
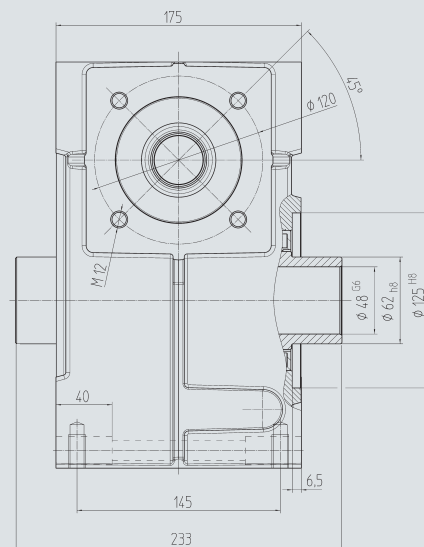
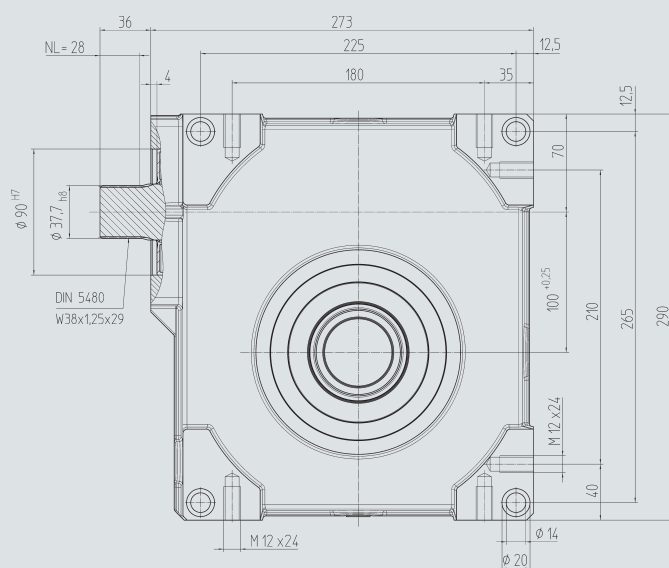


Fig. 2 Output shaft for clamp connection 80 86 062



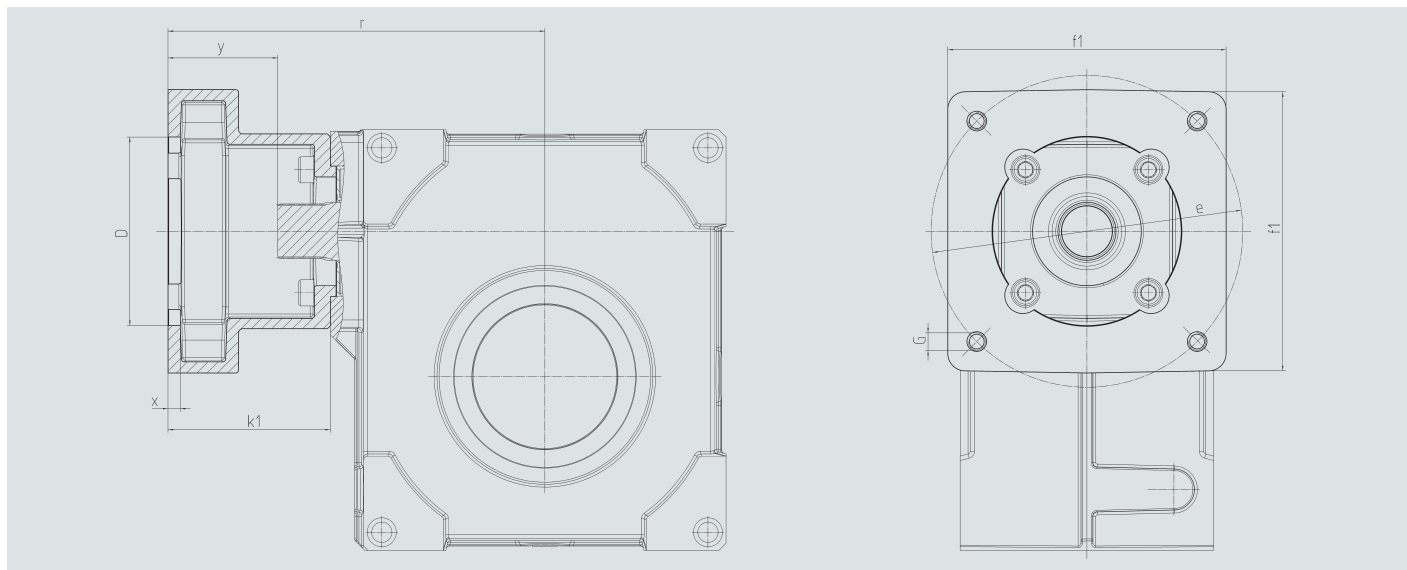
Order Code

Fig. 1	Fig. 2	Ratio i	J_{red} kg	J_{red} 10 ⁻⁴ kg m ²
59 06 005	59 16 005	4.75	37.0	22.9320
59 06 007	59 16 007	6.75	37.0	12.8835
59 06 009	59 16 009	9.25	37.0	8.0975
59 06 015	59 16 015	14.50	37.0	7.2190
59 06 020	59 16 020	19.50	37.0	5.4030
59 06 029	59 16 029	29.00	37.0	4.7207
59 06 039	59 16 039	39.00	37.0	8.4300
59 06 052	59 16 052	52.00	37.0	9.7400

With food grade oil: Order Code 59 06 1xx / 59 16 1xx

In ATEX with food grade oil: Order Code 59 06 2xx / 59 16 2xx

Motor Flange



Center Distance $a_0 = 100$ mm

Order Code	D ⁶⁷	k ₁	r	x	y	f ₁	e	G	kg
65 59 501	110.0	92.0	230.0	8.0	55.5	140	165	M10	2.00
65 59 502	130.0	92.0	230.0	8.0	55.5	140	165	M10	1.90
65 59 503	180.0	122.0	260.0	8.0	85.5	192	215	M12	3.40
65 59 504	180.0	127.0	265.0	8.0	90.5	192	215	M12	3.80
65 59 505	180.0	112.0	250.0	10.0	75.5	192	215	M12	2.70
65 59 506	130.0	112.0	250.0	10.0	75.5	192	215	M12	3.00
65 59 507	130.0	112.0	250.0	10.0	75.5	140	165	M10	2.50
65 59 508	110.0	90.0	228.0	8.0	53.5	140	145	M8	2.00
65 59 509	110.0	108.5	246.5	8.0	72.0	140	145	M8	2.50
65 59 510	114.3	129.5	267.5	8.0	93.0	180	200	M12	5.00
65 59 511	114.3	163.5	301.5	8.0	127.0	180	200	M12	4.20
65 59 512	114.3	105.5	243.5	8.0	69.0	180	200	M12	3.50
65 59 513	110.0	113.5	251.5	8.0	77.0	140	145	M8	2.70

An order should contain gearbox 59 06 0xx / 59 16 0xx and flange 65 59 5xx

The values in the tables are based upon wear or maximum flank load at 12,000 hours full load and on servo-operation. Please see here for also our manual on our webpage www.atlantadrives.com. With continuous full-load operation it may be necessary to consider temperature limits! Please ask us if in doubt.

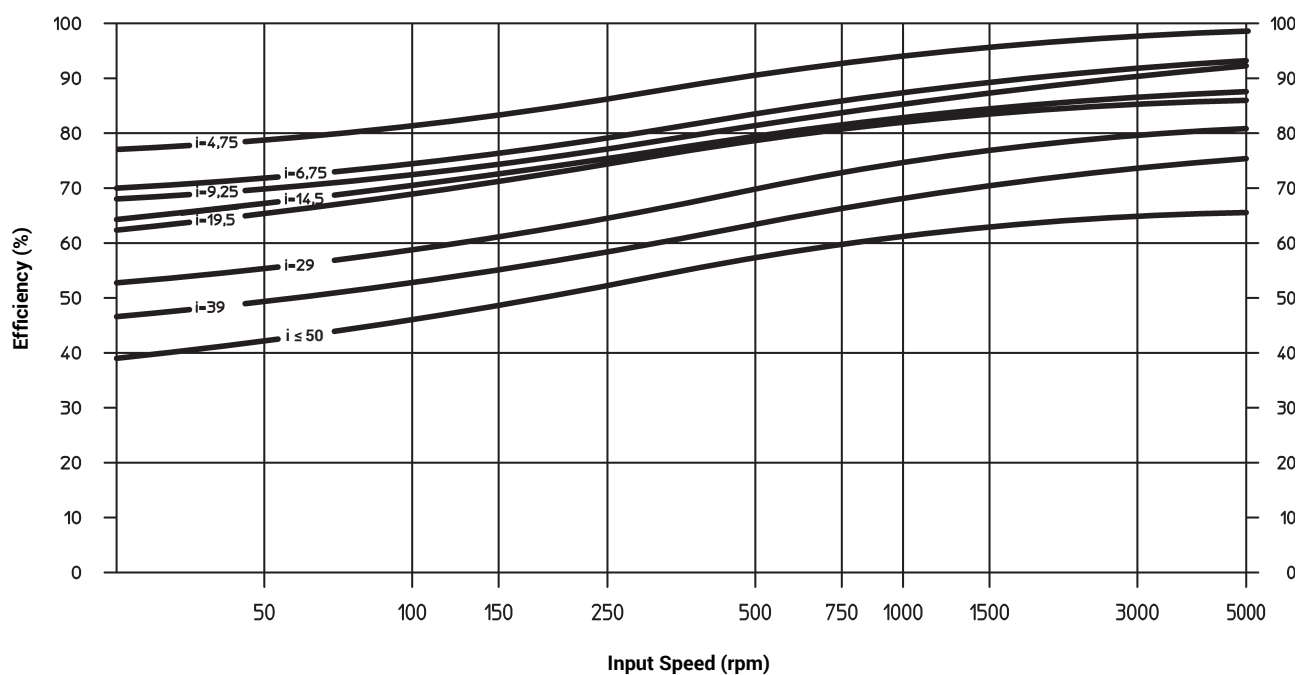
T_{2max} = static torque to avoid tooth fracture, T_1 = input torque in Nm, T_2 = output torque in Nm.

Order Code		a_0 (mm)	i	T_{2max}	Input Speed n_1 (rpm)											
					250		500		750		1000		1500		2000	
					T_1 (Nm)	T_2 (Nm)	T_1 (Nm)	T_2 (Nm)	T_1 (Nm)	T_2 (Nm)	T_1 (Nm)	T_2 (Nm)	T_1 (Nm)	T_2 (Nm)	T_1 (Nm)	T_2 (Nm)
59 01 003	59 11 003	32	3.00*													
59 01 005	59 11 005		4.75	135	3.2	12	4.2	16	4.1	16	4.4	17	3.8	17	4.3	17
59 01 007	59 11 007		6.75	100	2.0	10	2.6	14	2.8	15	2.9	16	2.8	17	3.0	17
59 01 009	59 11 009		9.25	65	1.3	9	1.8	12	1.8	13	2.0	14	1.8	15	2.1	16
59 01 015	59 11 015		14.50	85	1.0	10	1.3	14	1.4	15	1.5	16	1.4	17	1.5	17
59 01 020	59 11 020		19.50	55	0.7	9	0.9	12	0.9	12	1.0	13	0.9	14	1.1	15
59 01 029	59 11 029		29.00	70	0.5	9	0.7	12	0.7	13	0.8	14	0.7	15	0.8	16
59 01 039	59 11 039		39.00	50	0.5	10	0.6	13	0.7	14	0.7	15	0.6	16	0.7	17
59 01 050	59 11 050		50.00	35	0.4	8	0.5	11	0.5	11	0.6	12	0.4	13	0.6	14
59 03 003	59 13 003	50	3.00*													
59 03 005	59 13 005		4.75	550	11.6	48	15.1	65	15.1	65	16.3	70	16.4	70	16.5	70
59 03 007	59 13 007		6.75	400	7.2	42	9.4	56	9.9	59	10.5	63	11.4	69	11.4	69
59 03 009	59 13 009		9.25	275	4.8	35	6.3	48	6.5	51	6.9	54	7.4	58	7.9	62
59 03 015	59 13 015		14.50	350	3.7	42	4.8	57	5.0	60	5.3	65	5.8	70	5.9	72
59 03 020	59 13 020		19.50	250	2.4	33	3.1	45	3.3	48	3.4	50	3.7	55	3.9	58
59 03 029	59 13 029		29.00	300	1.9	36	2.4	48	2.6	52	2.7	55	2.9	60	3.1	63
59 03 039	59 13 039		39.00	200	1.8	39	2.3	52	2.4	56	2.5	60	2.7	65	2.8	68
59 03 050	59 13 050		50.00	150	1.5	31	1.9	42	1.9	44	2.0	47	2.1	50	2.2	53
59 04 003	59 14 003	63	3.00*													
59 04 005	59 14 005		4.75	1000	37.6	163	38.9	170	41.2	180	41.3	180	39.2	170	37.4	162
59 04 007	59 14 007		6.75	750	21.5	129	27.9	170	29.4	180	29.4	180	27.9	170	26.6	162
59 04 009	59 14 009		9.25	500	10.8	85	14.2	115	15.3	125	15.9	130	16.4	135	16.4	135
59 04 015	59 14 015		14.50	600	11.1	132	13.6	165	14.7	180	14.7	180	14.7	180	14.5	177
59 04 020	59 14 020		19.50	500	5.6	87	7.2	115	7.7	125	8.0	130	8.3	135	9.0	145
59 04 029	59 14 029		29.00	650	6.9	137	8.4	175	9.1	190	9.7	205	10.5	220	10.1	212
59 04 039	59 14 039		39.00	450	4.2	106	5.2	140	5.5	150	5.8	160	6.4	175	6.6	180
59 04 052	59 14 052		52.00	300	2.4	71	3.0	95	3.3	105	3.5	115	3.8	125	4.0	133
59 05 003	59 15 003	80	3.00*													
59 05 005	59 15 005		4.75	2000	102.9	453	94.9	420	85.9	380	81.5	360	75.0	330	71.5	313
59 05 007	59 15 007		6.75	1400	65.2	402	67.6	420	61.1	380	57.8	360	53.2	330	50.7	313
59 05 009	59 15 009		9.25	1100	37.5	310	44.2	370	44.1	370	42.9	360	39.3	330	37.5	313
59 05 015	59 15 015		14.50	1300	34.9	431	35.9	450	35.8	450	33.4	420	29.4	370	27.5	345
59 05 020	59 15 020		19.50	1000	21.9	353	22.5	370	24.2	400	24.1	400	21.7	360	20.9	347
59 05 029	59 15 029		29.00	1200	22.9	498	23.3	520	24.5	550	23.6	530	21.8	490	20.8	467
59 05 039	59 15 039		39.00	850	15.0	412	15.1	430	16.0	460	17.0	490	16.7	480	15.9	457
59 05 052	59 15 052		52.00	600	6.3	216	6.6	240	7.1	260	7.5	275	8.2	300	8.5	310
59 06 005	59 16 005	100	4.75	3300	234.2	1043	197.3	880	179.6	800	169.1	750	154.3	685	147.1	650
59 06 007	59 16 007		6.75	2300	127.2	797	131.8	830	119.1	750	114.8	720	105.3	660	101.3	633
59 06 009	59 16 009		9.25	1900	94.3	794	97.6	830	88.1	750	84.8	720	77.7	660	74.8	633
59 06 015	59 16 015		14.50	2050	70.0	892	72.2	930	68.2	880	62.9	810	55.9	720	53.5	687
59 06 020	59 16 020		19.50	1800	51.8	861	53.3	900	51.3	870	47.8	810	42.5	720	40.6	687
59 06 029	59 16 029		29.00	2300	48.7	1103	49.9	1150	46.1	1070	43.7	1010	36.8	850	36.2	833
59 06 039	59 16 039		39.00	1650	35.2	1034	35.8	1080	34.0	1030	33.0	1000	29.7	900	28.5	860
59 06 052	59 16 052		52.00	1100	20.7	759	20.0	760	21.5	820	22.3	850	20.6	785	19.7	750

* on request

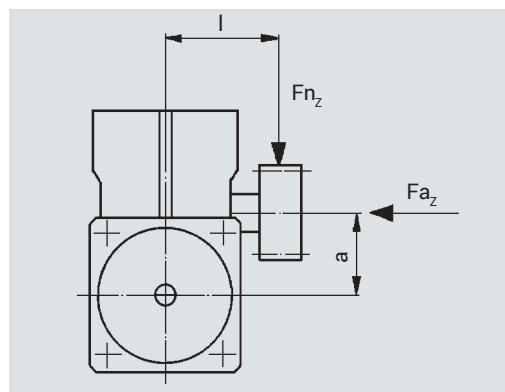
Input Speed n ₁ (rpm)															
2500		3000		3500		4000		4500		5000		5500		6000	
T ₁ (Nm)	T ₂ (Nm)	T ₁ (Nm)	T ₂ (Nm)	T ₁ (Nm)	T ₂ (Nm)	T ₁ (Nm)	T ₂ (Nm)	T ₁ (Nm)	T ₂ (Nm)	T ₁ (Nm)	T ₂ (Nm)	T ₁ (Nm)	T ₂ (Nm)	T ₁ (Nm)	T ₂ (Nm)
4.3	17	4.3	17	4.4	18	4.5	18	4.5	18	4.5	18	4.3	17	4.1	16
3.0	17	3.0	17	3.1	18	3.1	18	3.1	18	3.1	18	3.3	19	3.4	19
2.2	16	2.3	17	2.3	18	2.4	18	2.3	18	2.4	18	2.5	19	2.6	19
1.6	18	1.6	18	1.6	18	1.6	18	1.5	18	1.6	18	1.6	19	1.7	19
1.1	15	1.1	16	1.1	16	1.1	16	1.1	16	1.1	16	1.1	17	1.2	17
0.9	16	0.9	17	0.9	17	0.9	17	0.9	17	0.9	17	0.9	18	1.0	18
0.8	17	0.8	18	0.8	18	0.8	18	0.8	18	0.8	18	0.8	19	0.8	19
0.6	14	0.6	15	0.6	16	0.7	16	0.7	17	0.7	18	0.8	19	0.8	19
25.0	70	16.8	70	16.3	67	15.8	65	15.5	63	15.1	61	14.3	57	13.6	53
17.2	69	11.6	69	11.3	67	11.0	65	10.7	63	10.5	61	9.9	57	9.4	54
12.6	66	8.9	70	8.9	70	8.9	70	8.7	67	8.4	65	8.0	61	7.6	58
9.1	73	6.2	75	6.2	75	6.3	75	6.3	75	6.4	75	6.1	70	5.8	67
6.1	61	4.3	65	4.3	65	4.3	65	4.3	65	4.4	65	4.2	61	4.0	58
4.9	67	3.5	70	3.5	70	3.5	70	3.4	67	3.3	65	3.2	61	3.0	57
4.4	71	3.1	75	3.1	75	3.1	75	3.1	75	3.1	75	3.0	70	2.9	66
3.4	57	2.4	60	2.4	60	2.4	60	2.4	60	2.4	60	2.5	62	2.5	64
53.4	153	34.0	145	32.9	140	31.9	135	29.6	124	27.5	115				
38.1	153	24.1	145	23.4	140	22.7	135	21.1	125	19.8	116	18.6	109		
24.6	135	16.5	135	16.0	130	15.6	126	14.6	117	13.8	110	13.0	104	12.4	98
21.4	173	14.1	170	13.7	165	13.4	160	12.5	148	11.7	138	11.1	130		
14.4	155	10.3	165	9.9	160	9.7	155	9.1	144	8.6	136	8.2	128	7.8	121
14.6	203	9.4	195	9.3	190	9.1	185	8.5	171	8.0	159	7.6	149		
10.2	185	7.0	190	7.0	190	7.1	190	6.7	177	6.3	166	6.0	156	5.7	148
6.5	142	4.6	150	4.8	155	5.0	160	4.8	155	4.6	145	4.4	137	4.2	129
102.2	297	64.6	280	58.9	254	53.2	228								
72.4	297	45.7	280	42.0	256	38.2	232	35.3	213	32.9	198				
53.5	297	33.8	280	31.2	257	28.5	234	26.6	217	24.8	202	23.3	189		
38.5	320	23.8	295	21.9	270	20.0	245	18.5	226	17.3	210				
30.3	333	19.5	320	18.0	295	16.6	269	15.4	250	14.5	233	13.6	218		
29.9	443	19.0	420	17.5	384	16.0	348	14.9	322						
22.8	433	14.5	410	13.4	377	12.4	345	11.5	319	10.8	297	10.2	278		
13.2	320	9.1	330	9.1	330	9.2	330	8.6	308	8.2	288	7.8	271		
209.5	615	132.3	580												
146.1	607	93.5	580	84.3	521	69.2	426								
107.9	607	69.0	580	62.9	526	52.2	436	53.2	442	49.6	410				
76.6	653	48.6	620	44.0	559	40.2	509								
58.2	653	37.0	620	33.7	564	31.1	516	28.8	477	26.8	442				
53.6	817	35.2	800	31.9	721										
41.0	820	26.1	780	23.9	708	19.9	587	20.4	597						
28.2	715	18.0	680	16.5	621	15.3	570	14.3	528	12.6	461				

Gearing efficiency of servo-worm gearboxes with driving worm and under full load.



Additional Loads On Gearbox Output

The data given are reference values. You should consider the values arising from the choice of the tooth system. It is assumed that the point of action of the force is the center of the shaft. In cases where additional axial forces occur, over and above high transverse forces, please ask for advice.



Center Distance	a (mm)	32		50		63		80		100	
Dimension from center of housing to center of teeth											
I (mm)		70	100	90	140	110	160	125	175	140	190
Max. Additional Load:											
Radial F_{n_z}	[N]	2250	1600	3600	2300	5000	3500	8400	6000	10000	7500
Axial F_{a_z}	[N]	1500	1500	1800	1800	2500	2500	4000	4000	5000	5000
Only Axial Load ($F_n=0$)	F_{a_z} [N]	3000		3000		5000		12000		15000	