




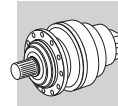


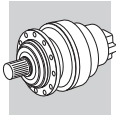
**P<sub>1</sub> = 7.5 kW n<sub>1</sub> = 1400 min<sup>-1</sup>**

n <sub>2</sub> min <sup>-1</sup>	M <sub>2</sub> Nm	S	i	Pt kW					Rn <sub>2</sub> [N]					
									MC/PC	MZ/PZ	HC	HZ	FZ	
0.28	182908	1.9	5164	—	3/V 19 L4	—	BN 132MA 4	—	—	—	638000	702000	200000	380
0.28	192202	1.3	5099	—	3/V 18 L4	—	BN 132MA 4	—	—	—	503000	565000	200000	372
0.29	180813	3.0	5040	—	3/V 21 L4	—	BN 132MA 4	—	—	—	779000	923000	1200000	388
0.32	172057	2.0	4457	—	3/V 19 L4	—	BN 132MA 4	—	—	—	638000	702000	200000	380
0.32	153545	1.2	4449	—	3/V 17 L4	—	BN 132MA 4	—	—	—	442000	470000	150000	364
0.33	165335	1.5	4386	—	3/V 18 L4	—	BN 132MA 4	—	—	—	503000	565000	200000	372
0.35	155642	1.2	4129	—	3/V 17 L4	—	BN 132MA 4	—	—	—	442000	470000	150000	364
0.35	154349	2.3	4095	—	3/V 19 L4	—	BN 132MA 4	—	—	—	638000	702000	200000	380
0.39	139310	1.8	3696	—	3/V 18 L4	—	BN 132MA 4	—	—	—	503000	565000	200000	372
0.41	127671	1.1	3514	—	3/V 16 L4	—	BN 132MA 4	—	—	—	345000	385000	150000	356
0.41	131751	1.9	3495	—	3/V 18 L4	—	BN 132MA 4	—	—	—	503000	565000	200000	372
0.44	118069	1.1	3250	—	3/V 16 L4	—	BN 132MA 4	—	—	—	345000	385000	150000	356
0.45	124709	2.7	3231	—	3/V 19 L4	—	BN 132MA 4	—	—	—	638000	702000	200000	380
0.45	119408	1.5	3168	—	3/V 17 L4	—	BN 132MA 4	—	—	—	442000	470000	150000	364
0.49	111013	2.3	2945	—	3/V 18 L4	—	BN 132MA 4	—	—	—	503000	565000	200000	372
0.52	106065	1.0	2780	—	3/V 15 L4	—	BN 132MA 4	—	—	—	206000	243000	90000	346
0.52	98235	1.7	2773	—	3/V 17 L4	—	BN 132MA 4	—	—	—	442000	470000	150000	364
0.53	99484	1.1	2738	—	3/V 16 L4	—	BN 132MA 4	—	—	—	345000	385000	150000	356
0.58	87546	1.0	2504	—	3/V 14 L4	—	BN 132MA 4	—	—	—	206000	243000	90000	336
0.58	95111	2.6	2464	—	3/V 18 L4	—	BN 132MA 4	—	—	—	503000	565000	200000	372
0.61	89370	1.5	2343	—	3/V 16 L4	—	BN 132MA 4	—	—	—	345000	385000	150000	356
0.62	79195	1.0	2318	—	3/V 15 L3	—	BN 132MA 4	—	—	—	206000	243000	90000	346
0.63	86504	2.5	2295	—	3/V 18 L4	—	BN 132MA 4	—	—	—	503000	565000	200000	372
0.66	82648	1.6	2167	—	3/V 16 L4	—	BN 132MA 4	—	—	—	345000	385000	150000	356
0.72	69058	1.0	1994	—	3/V 14 L3	—	BN 132MA 4	—	—	—	206000	243000	90000	336
0.72	68125	1.4	1994	—	3/V 15 L3	—	BN 132MA 4	—	—	—	206000	243000	90000	346
0.79	69639	1.6	1826	—	3/V 16 L4	—	BN 132MA 4	—	—	—	345000	385000	150000	356
0.86	59843	0.9	1682	—	3/V 13 L3	—	BN 132MA 4	—	—	—	192000	231000	80000	326
0.87	59104	1.3	1662	—	3/V 14 L3	—	BN 132MA 4	—	—	—	206000	243000	90000	336
0.87	59104	1.7	1662	—	3/V 15 L3	—	BN 132MA 4	—	—	—	206000	243000	90000	346
0.91	55031	1.0	1589	—	3/V 14 L3	—	BN 132MA 4	—	—	—	206000	243000	90000	336
0.91	54287	1.4	1589	—	3/V 16 L3	—	BN 132MA 4	—	—	—	345000	385000	150000	356
1.0	50423	1.1	1418	—	3/V 13 L3	—	BN 132MA 4	—	—	—	192000	230200	80000	326
1.0	49800	1.7	1400	—	3/V 15 L3	—	BN 132MA 4	—	—	—	206000	242900	90000	346
1.1	46368	1.0	1339	—	3/V 14 L3	—	BN 132MA 4	—	—	—	204100	239600	88700	336
1.1	45742	1.4	1339	—	3/V 16 L3	—	BN 132MA 4	—	—	—	339300	377400	147800	356
1.1	48527	2.0	1329	—	3/V 15 L3	—	BN 132MA 4	—	—	—	203700	239100	88500	346
1.1	47098	1.3	1324	—	3/V 14 L3	—	BN 132MA 4	—	—	—	203400	238800	88300	336
1.1	45911	1.2	1291	—	3/V 13 L3	—	BN 132MA 4	—	—	—	189100	223800	77900	326
1.2	47769	3.0	1215	—	3/V 17 L3	—	BN 132MA 4	—	—	—	423800	451200	143100	364
1.3	40889	2.3	1120	—	3/V 15 L3	—	BN 132MA 4	—	—	—	193500	227100	83500	346
1.3	39685	1.3	1116	—	3/V 14 L3	—	BN 132MA 4	—	—	—	193200	226900	83400	336
1.3	40250	1.0	1103	—	3/V 11 L3	—	BN 132MA 4	—	—	—	146000	181800	60000	316
1.3	38684	1.3	1088	—	3/V 13 L3	—	BN 132MA 4	—	—	—	179600	212600	73500	326
1.4	38670	2.3	1059	—	3/V 16 L3	—	BN 132MA 4	—	—	—	316300	351800	136700	356
1.4	39213	1.3	1009	—	3/V 13 L3	—	BN 132MA 4	—	—	—	175600	207900	71700	326
1.4	34779	1.0	1004	—	3/V 11 L3	—	BN 132MA 4	—	—	—	141900	176800	58200	316
1.4	38729	1.6	997	—	3/V 14 L3	—	BN 132MA 4	—	—	—	186800	219300	80400	336
1.4	38729	2.4	997	—	3/V 15 L3	—	BN 132MA 4	—	—	—	186800	219300	80400	346
1.6	32015	1.2	900	—	3/V 11 L3	—	BN 132MA 4	—	—	—	137300	171100	56100	316
1.6	32583	1.7	893	—	3/V 14 L3	—	BN 132MA 4	—	—	—	180700	212200	77500	336
1.7	31762	1.7	870	—	3/V 13 L3	—	BN 132MA 4	—	—	—	168000	198800	68300	326
1.7	30923	1.7	869	—	3/V 16 L3	—	BN 132MA 4	—	—	—	298100	331600	128000	356
1.7	32632	2.5	840	—	3/V 15 L3	—	BN 132MA 4	—	—	—	177500	208400	75900	346
1.7	32123	1.2	827	—	3/V 11 L3	—	BN 132MA 4	—	—	—	133900	166800	54500	316
1.8	30862	1.6	794	—	3/V 14 L3	—	BN 132MA 4	—	—	—	174500	204900	74500	336
1.8	30862	2.5	794	—	3/V 16 L3	—	BN 132MA 4	—	—	—	290200	322700	124200	356
1.9	27037	1.7	741	—	3/V 13 L3	—	BN 132MA 4	—	—	—	160100	189400	64700	326
2.0	26286	1.5	720	—	3/V 11 L3	—	BN 132MA 4	—	—	—	128400	160000	52100	316
2.1	25390	1.7	695	—	3/V 14 L3	—	BN 132MA 4	—	—	—	167700	196900	71300	336
2.2	26004	2.5	669	—	3/V 16 L3	—	BN 132MA 4	—	—	—	275600	306500	117300	356








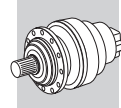
$P_1 = 7.5 \text{ kW}$   $n_1 = 1400 \text{ min}^{-1}$

$n_2$ min <sup>-1</sup>	$M_2$ Nm	S	i	Pt kW					Rn <sub>2</sub> [N]					
					MC/PC	MZ/PZ	HC	HZ	FZ					
2.2	25031	1.6	644	—	3/V 11 L3	—	BN 132MA 4	—	—	—	124200	154800	50200	316
2.3	24126	0.9	614	—	3/V 10 L3	—	BN 132MA 4	—	—	—	103600	130300	49400	306
2.6	22017	1.2	560	—	3/V 10 L3	—	BN 132MA 4	—	—	—	100800	126700	47900	306
2.8	19944	1.3	507	—	3/V 10 L3	—	BN 132MA 4	—	—	—	97800	123000	46300	306
3.3	16543	1.0	442	—	3/V 09 L3	—	BN 132MA 4	—	—	—	79200	102200	24500	296
3.3	17156	1.6	436	—	3/V 10 L3	—	BN 132MA 4	—	—	—	93500	117600	44100	306
3.9	13865	0.9	370	—	3/V 09 L3	—	BN 132MA 4	—	—	—	75100	96900	23100	296
6.5	9805	0.9	223	—	—	3/A 07 L2	BN 132MA 4	M 4LA 4	28100	35200	63500	83200	24400	287
7.3	8690	1.0	198	—	—	3/A 07 L2	BN 132MA 4	M 4LA 4	27000	33800	61200	80300	23400	287
7.6	8353	0.9	190	—	—	3/A 06 L2	BN 132MA 4	M 4LA 4	23900	27100	56300	65500	18000	277
8.0	7923	1.3	180	—	—	3/A 07 L2	BN 132MA 4	M 4LA 4	26100	32800	59600	78100	22700	287
8.8	7201	0.9	164	—	—	3/A 06 L2	BN 132MA 4	M 4LA 4	22800	25800	53800	62700	17100	277
9.3	6818	1.3	155	—	—	3/A 07 L2	BN 132MA 4	M 4LA 4	24900	31200	56900	74600	21600	287
10.2	6194	1.3	141	—	—	3/A 06 L2	BN 132MA 4	M 4LA 4	21700	24500	51400	59900	16300	277
10.3	6174	1.8	140	—	—	3/A 07 L2	BN 132MA 4	M 4LA 4	24000	30200	55300	72400	20900	287
11.1	5706	1.9	130	—	—	3/A 07 L2	BN 132MA 4	M 4LA 4	23400	29400	54000	70700	20400	287
11.6	5478	1.0	125	—	—	3/A 06 L2	BN 132MA 4	M 4LA 4	20800	23600	49600	57700	15600	277
12.8	4936	1.3	112	—	—	3/A 06 L2	BN 132MA 4	M 4LA 4	20100	22800	48000	55900	15100	277
13.2	4782	1.8	109	—	—	3/A 07 L2	BN 132MA 4	M 4LA 4	22100	27700	51200	67100	19200	287
14.7	4323	1.2	98.3	—	—	3/A 06 L2	BN 132MA 4	M 4LA 4	19200	21800	46200	53800	14400	277
16.3	3895	1.6	88.5	—	—	3/A 06 L2	BN 132MA 4	M 4LA 4	18600	21000	44700	52100	13900	277
16.4	3857	2.5	87.7	—	—	3/A 07 L2	BN 132MA 4	M 4LA 4	20600	25800	48000	62900	17900	287
16.8	3764	0.9	85.6	—	—	3/A 05 L2	BN 132MA 4	M 4LA 4	14700	17000	27100	32600	9450	267
17.7	3573	1.7	81.2	—	—	3/A 06 L2	BN 132MA 4	M 4LA 4	18000	20400	43600	50800	13500	277
19.0	3333	0.9	75.8	—	—	3/A 05 L2	BN 132MA 4	M 4LA 4	14100	16300	26100	31400	9080	267
19.9	3192	1.0	72.5	—	—	3/A 05 L2	BN 132MA 4	M 4LA 4	13900	16100	25800	31000	8950	267
20.6	3074	1.9	69.9	—	—	3/A 06 L2	BN 132MA 4	M 4LA 4	17200	19400	41700	48500	12900	277
21.1	3006	2.6	68.3	—	—	3/A 07 L2	BN 132MA 4	M 4LA 4	18900	23700	44500	58400	16400	287
23.0	2755	1.2	62.6	—	—	3/A 05 L2	BN 132MA 4	M 4LA 4	13300	15300	24700	29700	8520	267
23.1	2745	1.0	62.4	—	—	3/A 04 L2	BN 132MA 4	M 4LA 4	13300	15300	24600	29600	8510	257
23.9	2646	2.3	60.1	—	—	3/A 06 L2	BN 132MA 4	M 4LA 4	16300	18500	39800	46400	12300	277
25.1	2519	2.6	57.3	—	—	3/A 07 L2	BN 132MA 4	M 4LA 4	17800	22400	42200	55400	15500	287
25.2	2510	1.3	57.0	—	—	3/A 05 L2	BN 132MA 4	M 4LA 4	12900	14900	24000	28800	8260	267
25.9	2450	1.8	55.7	—	—	3/A 06 L2	BN 132MA 4	M 4LA 4	15900	18000	38900	45300	11900	277
26.4	2400	1.1	54.5	—	—	3/A 04 L2	BN 132MA 4	M 4LA 4	12700	14600	23700	28500	8140	257
27.0	2343	1.3	53.3	—	—	3/A 05 L2	BN 132MA 4	M 4LA 4	12600	14500	23500	28300	8070	267
27.8	2276	2.3	51.7	—	—	3/A 06 L2	BN 132MA 4	M 4LA 4	15500	17600	38100	44400	11700	277
29.0	2188	1.0	49.7	—	—	3/A 04 L2	BN 132MA 4	M 4LA 4	12300	14200	23000	27700	7890	257
31	2075	1.9	47.2	—	—	3/A 06 L2	BN 132MA 4	M 4LA 4	15000	17000	37000	43100	11300	277
33	1948	1.4	44.3	—	—	3/A 04 L2	BN 132MA 4	M 4LA 4	11800	13700	22200	26700	7590	257
33	1937	1.7	44.0	—	—	3/A 05 L2	BN 132MA 4	M 4LA 4	11800	13600	22200	26700	7580	267
35	1807	2.7	41.1	—	—	3/A 06 L2	BN 132MA 4	M 4LA 4	14400	16300	35500	41400	10800	277
37	1720	1.3	39.1	—	—	3/A 04 L2	BN 132MA 4	M 4LA 4	11400	13100	21400	25800	7280	257
37	1716	1.8	39.0	—	—	3/A 05 L2	BN 132MA 4	M 4LA 4	11300	13100	21400	25700	7280	267
41	1552	1.5	35.3	—	—	3/A 04 L2	BN 132MA 4	M 4LA 4	11000	12700	20800	25000	7040	257
41	1536	2.3	34.9	—	—	3/A 06 L2	BN 132MA 4	M 4LA 4	13600	15400	33900	39400	10200	277
44	1440	2.7	32.7	—	—	3/A 06 L2	BN 132MA 4	M 4LA 4	13300	15100	33200	38700	10000	277
45	1418	2.3	32.2	—	—	3/A 05 L2	BN 132MA 4	M 4LA 4	10600	12300	20200	24300	6830	267
48	1328	1.7	30.2	—	—	3/A 04 L2	BN 132MA 4	M 4LA 4	10400	12000	19800	23800	6680	257
52	1220	2.3	27.7	—	—	3/A 04 L2	BN 132MA 4	M 4LA 4	10100	11700	19300	23200	6490	257
52	1220	2.3	27.7	—	—	3/A 05 L2	BN 132MA 4	M 4LA 4	10100	11700	19300	23200	6490	267
52	1220	2.7	27.7	—	—	3/A 06 L2	BN 132MA 4	M 4LA 4	12600	14300	31600	36800	9470	277
56	1125	1.7	25.6	—	—	3/A 04 L2	BN 132MA 4	M 4LA 4	9850	11400	18800	22700	6320	257
65	972	2.3	22.1	—	—	3/A 04 L2	BN 132MA 4	M 4LA 4	9380	10800	18000	21700	6020	257
77	824	2.3	18.7	—	—	3/A 04 L2	BN 132MA 4	M 4LA 4	8880	10300	17200	20600	5700	257








**$P_1 = 9.2 \text{ kW}$   $n_1 = 1400 \text{ min}^{-1}$**

$n_2$ min <sup>-1</sup>	$M_2$ Nm	S	i	Pt kW					$Rn_2$ [N]					
									MC/PC	MZ/PZ	HC	HZ	FZ	
0.28	224367	1.6	5164	—	3/V 19 L4	—	BN 132MB 4	—	—	—	638000	702000	200000	380
0.28	235768	1.0	5099	—	3/V 18 L4	—	BN 132MB 4	—	—	—	503000	565000	200000	372
0.29	221798	2.4	5040	—	3/V 21 L4	—	BN 132MB 4	—	—	—	779000	923000	1200000	388
0.32	212907	2.5	4550	—	3/V 21 L4	—	BN 132MB 4	—	—	—	779000	923000	1200000	388
0.32	211057	1.6	4457	—	3/V 19 L4	—	BN 132MB 4	—	—	—	638000	702000	200000	380
0.32	188349	1.0	4449	—	3/V 17 L4	—	BN 132MB 4	—	—	—	442000	470000	150000	364
0.33	202811	1.2	4386	—	3/V 18 L4	—	BN 132MB 4	—	—	—	503000	565000	200000	372
0.35	190921	0.9	4129	—	3/V 17 L4	—	BN 132MB 4	—	—	—	442000	470000	150000	364
0.35	189335	1.8	4095	—	3/V 19 L4	—	BN 132MB 4	—	—	—	638000	702000	200000	380
0.38	176877	2.6	3780	—	3/V 21 L4	—	BN 132MB 4	—	—	—	779000	923000	1200000	388
0.39	170887	1.5	3696	—	3/V 18 L4	—	BN 132MB 4	—	—	—	503000	565000	200000	372
0.40	172465	2.9	3600	—	3/V 21 L4	—	BN 132MB 4	—	—	—	779000	923000	1200000	388
0.41	161615	1.5	3495	—	3/V 18 L4	—	BN 132MB 4	—	—	—	503000	565000	200000	372
0.44	144831	0.9	3250	—	3/V 16 L4	—	BN 132MB 4	—	—	—	345000	385000	150000	356
0.45	152976	2.2	3231	—	3/V 19 L4	—	BN 132MB 4	—	—	—	638000	702000	200000	380
0.45	146474	1.2	3168	—	3/V 17 L4	—	BN 132MB 4	—	—	—	442000	470000	150000	364
0.49	136176	1.8	2945	—	3/V 18 L4	—	BN 132MB 4	—	—	—	503000	565000	200000	372
0.52	120502	1.4	2773	—	3/V 17 L4	—	BN 132MB 4	—	—	—	442000	470000	150000	364
0.53	122033	0.9	2738	—	3/V 16 L4	—	BN 132MB 4	—	—	—	345000	385000	150000	356
0.56	122251	2.9	2582	—	3/V 19 L4	—	BN 132MB 4	—	—	—	638000	702000	200000	380
0.58	116670	2.1	2464	—	3/V 18 L4	—	BN 132MB 4	—	—	—	503000	565000	200000	372
0.61	109627	1.2	2343	—	3/V 16 L4	—	BN 132MB 4	—	—	—	345000	385000	150000	356
0.63	106111	2.0	2295	—	3/V 18 L4	—	BN 132MB 4	—	—	—	503000	565000	200000	372
0.66	101382	1.3	2167	—	3/V 16 L4	—	BN 132MB 4	—	—	—	345000	385000	150000	356
0.72	83567	1.1	1994	—	3/V 15 L3	—	BN 132MB 4	—	—	—	206000	243000	90000	346
0.78	90591	2.8	1848	—	3/V 18 L4	—	BN 132MB 4	—	—	—	503000	565000	200000	372
0.79	85423	1.3	1826	—	3/V 16 L4	—	BN 132MB 4	—	—	—	345000	385000	150000	356
0.82	85676	2.9	1748	—	3/V 18 L4	—	BN 132MB 4	—	—	—	503000	565000	200000	372
0.87	72501	1.1	1662	—	3/V 14 L3	—	BN 132MB 4	—	—	—	206000	243000	90000	336
0.87	72501	1.4	1662	—	3/V 15 L3	—	BN 132MB 4	—	—	—	206000	243000	90000	346
0.91	66592	1.1	1589	—	3/V 16 L3	—	BN 132MB 4	—	—	—	345000	385000	150000	356
1.0	61089	1.4	1400	—	3/V 15 L3	—	BN 132MB 4	—	—	—	206000	242900	90000	346
1.1	61912	2.5	1365	—	3/V 17 L3	—	BN 132MB 4	—	—	—	438900	467300	148700	364
1.1	56110	1.1	1339	—	3/V 16 L3	—	BN 132MB 4	—	—	—	339300	377400	147800	356
1.1	59527	1.7	1329	—	3/V 15 L3	—	BN 132MB 4	—	—	—	203700	239100	88500	346
1.1	57774	1.1	1324	—	3/V 14 L3	—	BN 132MB 4	—	—	—	203400	238800	88300	336
1.1	56318	0.9	1291	—	3/V 13 L3	—	BN 132MB 4	—	—	—	189100	223800	77900	326
1.2	58597	2.4	1215	—	3/V 17 L3	—	BN 132MB 4	—	—	—	423800	451200	143100	364
1.3	51435	2.5	1134	—	3/V 17 L3	—	BN 132MB 4	—	—	—	415100	442000	139800	364
1.3	50157	1.8	1120	—	3/V 15 L3	—	BN 132MB 4	—	—	—	193500	227100	83500	346
1.3	48680	1.1	1116	—	3/V 14 L3	—	BN 132MB 4	—	—	—	193200	226900	83400	336
1.3	47453	1.1	1088	—	3/V 13 L3	—	BN 132MB 4	—	—	—	179600	212600	73500	326
1.4	47436	1.8	1059	—	3/V 16 L3	—	BN 132MB 4	—	—	—	316300	351800	136700	356
1.4	49373	2.6	1024	—	3/V 17 L3	—	BN 132MB 4	—	—	—	402600	428600	135100	364
1.4	48101	1.1	1009	—	3/V 13 L3	—	BN 132MB 4	—	—	—	175600	207900	71700	326
1.4	47507	1.3	997	—	3/V 14 L3	—	BN 132MB 4	—	—	—	186800	219300	80400	336
1.4	47507	2.0	997	—	3/V 15 L3	—	BN 132MB 4	—	—	—	186800	219300	80400	346
1.6	39271	1.0	900	—	3/V 11 L3	—	BN 132MB 4	—	—	—	137300	171100	56100	316
1.6	39969	1.4	893	—	3/V 14 L3	—	BN 132MB 4	—	—	—	180700	212200	77500	336
1.7	38961	1.4	870	—	3/V 13 L3	—	BN 132MB 4	—	—	—	168000	198800	68300	326
1.7	37932	1.4	869	—	3/V 16 L3	—	BN 132MB 4	—	—	—	298100	331600	128000	356
1.7	41018	2.6	851	—	3/V 17 L3	—	BN 132MB 4	—	—	—	380800	405400	127000	364
1.7	40029	2.0	840	—	3/V 15 L3	—	BN 132MB 4	—	—	—	177500	208400	75900	346
1.7	39404	1.0	827	—	3/V 11 L3	—	BN 132MB 4	—	—	—	133900	166800	54500	316
1.8	37857	1.3	794	—	3/V 14 L3	—	BN 132MB 4	—	—	—	174500	204900	74500	336
1.8	37857	2.0	794	—	3/V 16 L3	—	BN 132MB 4	—	—	—	290200	322700	124200	356
1.9	33165	1.4	741	—	3/V 13 L3	—	BN 132MB 4	—	—	—	160100	189400	64700	326
2.0	32244	1.2	720	—	3/V 11 L3	—	BN 132MB 4	—	—	—	128400	160000	52100	316
2.1	31145	1.4	695	—	3/V 14 L3	—	BN 132MB 4	—	—	—	167700	196900	71300	336
2.2	31898	2.0	669	—	3/V 16 L3	—	BN 132MB 4	—	—	—	275600	306500	117300	356
2.2	32435	2.7	665	—	3/V 15 L3	—	BN 132MB 4	—	—	—	165400	194200	70200	346

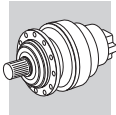


**$P_1 = 9.2 \text{ kW}$   $n_1 = 1400 \text{ min}^{-1}$**






$n_2$ min <sup>-1</sup>	$M_2$ Nm	S	i	Pt kW					$R_{n_2}$ [N]					
									MC/PC	MZ/PZ	HC	HZ	FZ	
2.2	30704	1.3	644	—	3/V 11 L3	—	BN 132MB 4	—	—	—	124200	154800	50200	316
2.6	27008	0.9	560	—	3/V 10 L3	—	BN 132MB 4	—	—	—	100800	126700	47900	306
2.6	27329	3.0	560	—	3/V 15 L3	—	BN 132MB 4	—	—	—	157100	184500	66300	346
2.7	25846	3.0	530	—	3/V 16 L3	—	BN 132MB 4	—	—	—	256900	285800	108500	356
2.8	24465	1.1	507	—	3/V 10 L3	—	BN 132MB 4	—	—	—	97800	123000	46300	306
3.2	21778	3.0	446	—	3/V 15 L3	—	BN 132MB 4	—	—	—	146800	172300	61500	346
3.2	21778	3.0	446	—	3/V 16 L3	—	BN 132MB 4	—	—	—	244100	271400	102500	356
3.3	21045	1.3	436	—	3/V 10 L3	—	BN 132MB 4	—	—	—	93500	117600	44100	306
8.0	9719	1.1	180	—	—	3/A 07 L2	BN 132MB 4	M 4LB 4	26100	32800	59600	78100	22700	287
9.3	8364	1.1	155	—	—	3/A 07 L2	BN 132MB 4	M 4LB 4	24900	31200	56900	74600	21600	287
10.2	7598	1.0	141	—	—	3/A 06 L2	BN 132MB 4	M 4LB 4	21700	24500	51400	59900	16300	277
10.3	7573	1.5	140	—	—	3/A 07 L2	BN 132MB 4	M 4LB 4	24000	30200	55300	72400	20900	287
11.1	6999	1.6	130	—	—	3/A 07 L2	BN 132MB 4	M 4LB 4	23400	29400	54000	70700	20400	287
12.8	6055	1.0	112	—	—	3/A 06 L2	BN 132MB 4	M 4LB 4	20100	22800	48000	55900	15100	277
13.2	5866	1.5	109	—	—	3/A 07 L2	BN 132MB 4	M 4LB 4	22100	27700	51200	67100	19200	287
14.7	5302	1.0	98.3	—	—	3/A 06 L2	BN 132MB 4	M 4LB 4	19200	21800	46200	53800	14400	277
16.3	4778	1.3	88.5	—	—	3/A 06 L2	BN 132MB 4	M 4LB 4	18600	21000	44700	52100	13900	277
16.4	4732	2.0	87.7	—	—	3/A 07 L2	BN 132MB 4	M 4LB 4	20600	25800	48000	62900	17900	287
17.7	4383	1.4	81.2	—	—	3/A 06 L2	BN 132MB 4	M 4LB 4	18000	20400	43600	50800	13500	277
20.6	3770	1.5	69.9	—	—	3/A 06 L2	BN 132MB 4	M 4LB 4	17200	19400	41700	48500	12900	277
21.1	3687	2.2	68.3	—	—	3/A 07 L2	BN 132MB 4	M 4LB 4	18900	23700	44500	58400	16400	287
23.0	3380	1.0	62.6	—	—	3/A 05 L2	BN 132MB 4	M 4LB 4	13300	15300	24700	29700	8520	267
23.9	3246	1.9	60.1	—	—	3/A 06 L2	BN 132MB 4	M 4LB 4	16300	18500	39800	46400	12300	277
25.1	3090	2.2	57.3	—	—	3/A 07 L2	BN 132MB 4	M 4LB 4	17800	22400	42200	55400	15500	287
25.2	3078	1.1	57.0	—	—	3/A 05 L2	BN 132MB 4	M 4LB 4	12900	14900	24000	28800	8260	267
25.9	3005	1.5	55.7	—	—	3/A 06 L2	BN 132MB 4	M 4LB 4	15900	18000	38900	45300	11900	277
26.4	2944	0.9	54.5	—	—	3/A 04 L2	BN 132MB 4	M 4LB 4	12700	14600	23700	28500	8140	257
27.0	2874	1.1	53.3	—	—	3/A 05 L2	BN 132MB 4	M 4LB 4	12600	14500	23500	28300	8070	267
27.8	2792	1.9	51.7	—	—	3/A 06 L2	BN 132MB 4	M 4LB 4	15500	17600	38100	44400	11700	277
31	2545	1.5	47.2	—	—	3/A 06 L2	BN 132MB 4	M 4LB 4	15000	17000	37000	43100	11300	277
33	2389	1.2	44.3	—	—	3/A 04 L2	BN 132MB 4	M 4LB 4	11800	13700	22200	26700	7590	257
33	2376	1.4	44.0	—	—	3/A 05 L2	BN 132MB 4	M 4LB 4	11800	13600	22200	26700	7580	267
35	2216	2.2	41.1	—	—	3/A 06 L2	BN 132MB 4	M 4LB 4	14400	16300	35500	41400	10800	277
37	2110	1.1	39.1	—	—	3/A 04 L2	BN 132MB 4	M 4LB 4	11400	13100	21400	25800	7280	257
37	2105	1.4	39.0	—	—	3/A 05 L2	BN 132MB 4	M 4LB 4	11300	13100	21400	25700	7280	267
41	1904	1.2	35.3	—	—	3/A 04 L2	BN 132MB 4	M 4LB 4	11000	12700	20800	25000	7040	257
41	1885	1.9	34.9	—	—	3/A 06 L2	BN 132MB 4	M 4LB 4	13600	15400	33900	39400	10200	277
44	1766	2.2	32.7	—	—	3/A 06 L2	BN 132MB 4	M 4LB 4	13300	15100	33200	38700	10000	277
45	1740	1.9	32.2	—	—	3/A 05 L2	BN 132MB 4	M 4LB 4	10600	12300	20200	24300	6830	267
48	1629	1.4	30.2	—	—	3/A 04 L2	BN 132MB 4	M 4LB 4	10400	12000	19800	23800	6680	257
52	1497	1.8	27.7	—	—	3/A 04 L2	BN 132MB 4	M 4LB 4	10100	11700	19300	23200	6490	257
52	1497	1.9	27.7	—	—	3/A 05 L2	BN 132MB 4	M 4LB 4	10100	11700	19300	23200	6490	267
52	1496	2.2	27.7	—	—	3/A 06 L2	BN 132MB 4	M 4LB 4	12600	14300	31600	36800	9470	277
56	1379	1.4	25.6	—	—	3/A 04 L2	BN 132MB 4	M 4LB 4	9850	11400	18800	22700	6320	257
65	1193	1.9	22.1	—	—	3/A 04 L2	BN 132MB 4	M 4LB 4	9380	10800	18000	21700	6020	257
77	1010	1.9	18.7	—	—	3/A 04 L2	BN 132MB 4	M 4LB 4	8880	10300	17200	20600	5700	257

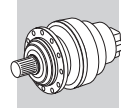
**$P_1 = 11 \text{ kW}$   $n_1 = 1400 \text{ min}^{-1}$**

0.28	268265	1.3	5164	—	3/V 19 L4	—	BN 160MR 4	—	—	—	638000	702000	200000	380
0.29	265193	2.0	5040	—	3/V 21 L4	—	BN 160MR 4	—	—	—	779000	923000	1200000	388
0.32	254563	2.1	4550	—	3/V 21 L4	—	BN 160MR 4	—	—	—	779000	923000	1200000	388
0.32	252351	1.3	4457	—	3/V 19 L4	—	BN 160MR 4	—	—	—	638000	702000	200000	380
0.33	242492	1.0	4386	—	3/V 18 L4	—	BN 160MR 4	—	—	—	503000	565000	200000	372
0.35	226379	1.5	4095	—	3/V 19 L4	—	BN 160MR 4	—	—	—	638000	702000	200000	380
0.38	211483	2.2	3780	—	3/V 21 L4	—	BN 160MR 4	—	—	—	779000	923000	1200000	388
0.39	204322	1.2	3696	—	3/V 18 L4	—	BN 160MR 4	—	—	—	503000	565000	200000	372
0.40	206208	2.4	3600	—	3/V 21 L4	—	BN 160MR 4	—	—	—	779000	923000	1200000	388
0.41	193236	1.3	3495	—	3/V 18 L4	—	BN 160MR 4	—	—	—	503000	565000	200000	372








**P<sub>1</sub> = 11 kW n<sub>1</sub> = 1400 min<sup>-1</sup>**

n <sub>2</sub> min <sup>-1</sup>	M <sub>2</sub> Nm	S	i	Pt kW					Rn <sub>2</sub> [N]					
									MC/PC	MZ/PZ	HC	HZ	FZ	
0.45	182907	1.9	3231	—	3/V 19 L4	—	BN 160MR 4	—	—	—	638000	702000	200000	380
0.45	175132	1.0	3168	—	3/V 17 L4	—	BN 160MR 4	—	—	—	442000	470000	150000	364
0.49	162819	1.5	2945	—	3/V 18 L4	—	BN 160MR 4	—	—	—	503000	565000	200000	372
0.52	144078	1.2	2773	—	3/V 17 L4	—	BN 160MR 4	—	—	—	442000	470000	150000	364
0.56	146170	2.4	2582	—	3/V 19 L4	—	BN 160MR 4	—	—	—	638000	702000	200000	380
0.58	145664	1.1	2485	—	3/V 17 L4	—	BN 160MR 4	—	—	—	442000	470000	150000	364
0.58	139497	1.8	2464	—	3/V 18 L4	—	BN 160MR 4	—	—	—	503000	565000	200000	372
0.61	131075	1.0	2343	—	3/V 16 L4	—	BN 160MR 4	—	—	—	345000	385000	150000	356
0.63	126872	1.7	2295	—	3/V 18 L4	—	BN 160MR 4	—	—	—	503000	565000	200000	372
0.66	121217	1.1	2167	—	3/V 16 L4	—	BN 160MR 4	—	—	—	345000	385000	150000	356
0.70	121013	1.5	2065	—	3/V 17 L4	—	BN 160MR 4	—	—	—	442000	470000	150000	364
0.72	99917	0.9	1994	—	3/V 15 L3	—	BN 160MR 4	—	—	—	206000	243000	90000	346
0.78	108315	2.3	1848	—	3/V 18 L4	—	BN 160MR 4	—	—	—	503000	565000	200000	372
0.79	102137	1.1	1826	—	3/V 16 L4	—	BN 160MR 4	—	—	—	345000	385000	150000	356
0.81	100747	1.8	1780	—	3/V 17 L4	—	BN 160MR 4	—	—	—	442000	470000	150000	364
0.82	102438	2.4	1748	—	3/V 18 L4	—	BN 160MR 4	—	—	—	503000	565000	200000	372
0.87	86686	1.1	1662	—	3/V 15 L3	—	BN 160MR 4	—	—	—	206000	243000	90000	346
0.91	79621	0.9	1589	—	3/V 16 L3	—	BN 160MR 4	—	—	—	345000	385000	150000	356
0.98	86314	2.9	1473	—	3/V 18 L4	—	BN 160MR 4	—	—	—	503000	565000	200000	372
1.0	73041	1.2	1400	—	3/V 15 L3	—	BN 160MR 4	—	—	—	206000	242900	90000	346
1.1	74026	2.1	1365	—	3/V 17 L3	—	BN 160MR 4	—	—	—	438900	467300	148700	364
1.1	67088	0.9	1339	—	3/V 16 L3	—	BN 160MR 4	—	—	—	339300	377400	147800	356
1.1	71173	1.4	1329	—	3/V 15 L3	—	BN 160MR 4	—	—	—	203700	239100	88500	346
1.2	70061	2.0	1215	—	3/V 17 L3	—	BN 160MR 4	—	—	—	423800	451200	143100	364
1.3	61498	2.1	1134	—	3/V 17 L3	—	BN 160MR 4	—	—	—	415100	442000	139800	364
1.3	59970	1.5	1120	—	3/V 15 L3	—	BN 160MR 4	—	—	—	193500	227100	83500	346
1.4	56716	1.5	1059	—	3/V 16 L3	—	BN 160MR 4	—	—	—	316300	351800	136700	356
1.4	59033	2.2	1024	—	3/V 17 L3	—	BN 160MR 4	—	—	—	402600	428600	135100	364
1.4	57512	0.9	1009	—	3/V 13 L3	—	BN 160MR 4	—	—	—	175600	207900	71700	326
1.4	56802	1.1	997	—	3/V 14 L3	—	BN 160MR 4	—	—	—	186800	219300	80400	336
1.4	56802	1.7	997	—	3/V 15 L3	—	BN 160MR 4	—	—	—	186800	219300	80400	346
1.6	47789	1.2	893	—	3/V 14 L3	—	BN 160MR 4	—	—	—	180700	212200	77500	336
1.7	46584	1.2	870	—	3/V 13 L3	—	BN 160MR 4	—	—	—	168000	198800	68300	326
1.7	45354	1.2	869	—	3/V 16 L3	—	BN 160MR 4	—	—	—	298100	331600	128000	356
1.7	49043	2.2	851	—	3/V 17 L3	—	BN 160MR 4	—	—	—	380800	405400	127000	364
1.7	47861	1.7	840	—	3/V 15 L3	—	BN 160MR 4	—	—	—	177500	208400	75900	346
1.8	47264	0.9	810	—	3/V 13 L3	—	BN 160MR 4	—	—	—	164400	194600	66700	326
1.8	47820	2.8	810	—	3/V 17 L3	—	BN 160MR 4	—	—	—	375300	399500	125000	364
1.8	45264	1.1	794	—	3/V 14 L3	—	BN 160MR 4	—	—	—	174500	204900	74500	336
1.8	45264	1.7	794	—	3/V 16 L3	—	BN 160MR 4	—	—	—	290200	322700	124200	356
1.9	39654	1.2	741	—	3/V 13 L3	—	BN 160MR 4	—	—	—	160100	189400	64700	326
2.0	38552	1.0	720	—	3/V 11 L3	—	BN 160MR 4	—	—	—	128400	160000	52100	316
2.1	37238	1.2	695	—	3/V 14 L3	—	BN 160MR 4	—	—	—	167700	196900	71300	336
2.1	39265	1.3	673	—	3/V 13 L3	—	BN 160MR 4	—	—	—	155500	184100	62700	326
2.2	38139	1.7	669	—	3/V 16 L3	—	BN 160MR 4	—	—	—	275600	306500	117300	356
2.2	38780	1.8	665	—	3/V 14 L3	—	BN 160MR 4	—	—	—	165400	194200	70200	336
2.2	38780	2.3	665	—	3/V 15 L3	—	BN 160MR 4	—	—	—	165400	194200	70200	346
2.2	36711	1.1	644	—	3/V 11 L3	—	BN 160MR 4	—	—	—	124200	154800	50200	316
2.5	35005	1.6	579	—	3/V 14 L3	—	BN 160MR 4	—	—	—	158800	186400	67100	336
2.5	33085	1.5	567	—	3/V 13 L3	—	BN 160MR 4	—	—	—	147700	174800	59200	326
2.6	32676	2.5	560	—	3/V 15 L3	—	BN 160MR 4	—	—	—	157100	184500	66300	346
2.6	32163	1.1	551	—	3/V 11 L3	—	BN 160MR 4	—	—	—	118600	147700	47600	316
2.7	30903	2.5	530	—	3/V 16 L3	—	BN 160MR 4	—	—	—	256900	285800	108500	356
2.8	30124	1.7	516	—	3/V 13 L3	—	BN 160MR 4	—	—	—	143600	170000	57400	326
2.8	29746	1.2	510	—	3/V 11 L3	—	BN 160MR 4	—	—	—	115800	144300	46400	316
2.9	30112	1.9	498	—	3/V 14 L3	—	BN 160MR 4	—	—	—	151700	178200	63800	336
2.9	30112	2.8	498	—	3/V 15 L3	—	BN 160MR 4	—	—	—	151700	178200	63800	346
3.2	26039	1.8	446	—	3/V 14 L3	—	BN 160MR 4	—	—	—	146800	172300	61500	336
3.2	26039	2.5	446	—	3/V 15 L3	—	BN 160MR 4	—	—	—	146800	172300	61500	346
3.2	26039	2.5	446	—	3/V 16 L3	—	BN 160MR 4	—	—	—	244100	271400	102500	356
3.3	25162	1.1	436	—	3/V 10 L3	—	BN 160MR 4	—	—	—	93500	117600	44100	306

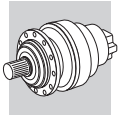


**$P_1 = 11 \text{ kW}$   $n_1 = 1400 \text{ min}^{-1}$**

$n_2$ min <sup>-1</sup>	$M_2$ Nm	S	i	Pt kW					$Rn_2$ [N]					
									MC/PC	MZ/PZ	HC	HZ	FZ	
3.4	25064	1.6	430	—	3/V 11 L3	—	BN 160MR 4	—	—	—	110000	137000	43800	316
3.4	25689	1.8	425	—	3/V 13 L3	—	BN 160MR 4	—	—	—	135500	160400	53800	326
3.6	23995	1.9	397	—	3/V 14 L3	—	BN 160MR 4	—	—	—	141800	166400	59100	336
3.6	23995	3.0	397	—	3/V 16 L3	—	BN 160MR 4	—	—	—	235700	262100	98600	356
3.7	23602	2.9	386	—	3/V 15 L3	—	BN 160MR 4	—	—	—	140600	165000	58600	346
3.9	21606	1.8	370	—	3/V 13 L3	—	BN 160MR 4	—	—	—	130000	153900	51400	326
8.0	11620	0.9	180	—	—	3/A 07 L2	BN 160MR 4	M 4LC 4	26100	32800	59600	78100	22700	287
9.3	10000	0.9	155	—	—	3/A 07 L2	BN 160MR 4	M 4LC 4	24900	31200	56900	74600	21600	287
10.3	9055	1.2	140	—	—	3/A 07 L2	BN 160MR 4	M 4LC 4	24000	30200	55300	72400	20900	287
11.1	8368	1.3	130	—	—	3/A 07 L2	BN 160MR 4	M 4LC 4	23400	29400	54000	70700	20400	287
13.2	7013	1.3	109	—	—	3/A 07 L2	BN 160MR 4	M 4LC 4	22100	27700	51200	67100	19200	287
16.3	5713	1.1	88.5	—	—	3/A 06 L2	BN 160MR 4	M 4LC 4	18600	21000	44700	52100	13900	277
16.4	5658	1.7	87.7	—	—	3/A 07 L2	BN 160MR 4	M 4LC 4	20600	25800	48000	62900	17900	287
17.7	5241	1.2	81.2	—	—	3/A 06 L2	BN 160MR 4	M 4LC 4	18000	20400	43600	50800	13500	277
20.6	4508	1.3	69.9	—	—	3/A 06 L2	BN 160MR 4	M 4LC 4	17200	19400	41700	48500	12900	277
21.1	4408	1.8	68.3	—	—	3/A 07 L2	BN 160MR 4	M 4LC 4	18900	23700	44500	58400	16400	287
23.9	3881	1.5	60.1	—	—	3/A 06 L2	BN 160MR 4	M 4LC 4	16300	18500	39800	46400	12300	277
25.1	3695	1.8	57.3	—	—	3/A 07 L2	BN 160MR 4	M 4LC 4	17800	22400	42200	55400	15500	287
25.2	3681	0.9	57.0	—	—	3/A 05 L2	—	M 4LC 4	12900	14900	24000	28800	8260	267
25.9	3593	1.3	55.7	—	—	3/A 06 L2	BN 160MR 4	M 4LC 4	15900	18000	38900	45300	11900	277
27.8	3338	1.5	51.7	—	—	3/A 06 L2	BN 160MR 4	M 4LC 4	15500	17600	38100	44400	11700	277
29.3	3176	2.5	49.2	—	—	3/A 07 L2	BN 160MR 4	M 4LC 4	17000	21300	40400	52900	14700	287
31	3043	1.3	47.2	—	—	3/A 06 L2	BN 160MR 4	M 4LC 4	15000	17000	37000	43100	11300	277
33	2856	1.0	44.3	—	—	3/A 04 L2	—	M 4LC 4	11800	13700	22200	26700	7590	257
33	2841	1.2	44.0	—	—	3/A 05 L2	—	M 4LC 4	11800	13600	22200	26700	7580	267
35	2650	1.9	41.1	—	—	3/A 06 L2	BN 160MR 4	M 4LC 4	14400	16300	35500	41400	10800	277
37	2523	0.9	39.1	—	—	3/A 04 L2	—	M 4LC 4	11400	13100	21400	25800	7280	257
37	2517	1.2	39.0	—	—	3/A 05 L2	—	M 4LC 4	11300	13100	21400	25700	7280	267
41	2276	1.0	35.3	—	—	3/A 04 L2	—	M 4LC 4	11000	12700	20800	25000	7040	257
41	2253	1.5	34.9	—	—	3/A 06 L2	BN 160MR 4	M 4LC 4	13600	15400	33900	39400	10200	277
44	2112	1.9	32.7	—	—	3/A 06 L2	BN 160MR 4	M 4LC 4	13300	15100	33200	38700	10000	277
45	2080	1.6	32.2	—	—	3/A 05 L2	—	M 4LC 4	10600	12300	20200	24300	6830	267
48	1947	1.2	30.2	—	—	3/A 04 L2	—	M 4LC 4	10400	12000	19800	23800	6680	257
52	1790	1.5	27.7	—	—	3/A 04 L2	—	M 4LC 4	10100	11700	19300	23200	6490	257
52	1790	1.6	27.7	—	—	3/A 05 L2	—	M 4LC 4	10100	11700	19300	23200	6490	267
52	1789	1.9	27.7	—	—	3/A 06 L2	BN 160MR 4	M 4LC 4	12600	14300	31600	36800	9470	277
56	1649	1.2	25.6	—	—	3/A 04 L2	—	M 4LC 4	9850	11400	18800	22700	6320	257
65	1426	1.6	22.1	—	—	3/A 04 L2	—	M 4LC 4	9380	10800	18000	21700	6020	257
77	1208	1.6	18.7	—	—	3/A 04 L2	—	M 4LC 4	8880	10300	17200	20600	5700	257

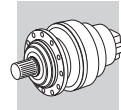
**$P_1 = 15 \text{ kW}$   $n_1 = 1400 \text{ min}^{-1}$**

0.28	360805	1.0	5164	—	3/V 19 L4	—	BN 160L 4	—	—	—	638000	702000	200000	380
0.29	356673	1.5	5040	—	3/V 21 L4	—	BN 160L 4	—	—	—	779000	923000	1200000	388
0.32	342376	1.6	4550	—	3/V 21 L4	—	BN 160L 4	—	—	—	779000	923000	1200000	388
0.33	339401	1.0	4457	—	3/V 19 L4	—	BN 160L 4	—	—	—	638000	702000	200000	380
0.36	304470	1.1	4095	—	3/V 19 L4	—	BN 160L 4	—	—	—	638000	702000	200000	380
0.39	284435	1.6	3780	—	3/V 21 L4	—	BN 160L 4	—	—	—	779000	923000	1200000	388
0.40	274804	0.9	3696	—	3/V 18 L4	—	BN 160L 4	—	—	—	503000	565000	200000	372
0.41	277341	1.8	3600	—	3/V 21 L4	—	BN 160L 4	—	—	—	779000	923000	1200000	388
0.42	259893	1.0	3495	—	3/V 18 L4	—	BN 160L 4	—	—	—	503000	565000	200000	372
0.45	246001	1.4	3231	—	3/V 19 L4	—	BN 160L 4	—	—	—	638000	702000	200000	380
0.50	218984	1.1	2945	—	3/V 18 L4	—	BN 160L 4	—	—	—	503000	565000	200000	372
0.54	212843	2.3	2700	—	3/V 21 L4	—	BN 160L 4	—	—	—	779000	923000	1200000	388
0.57	196592	1.8	2582	—	3/V 19 L4	—	BN 160L 4	—	—	—	638000	702000	200000	380
0.58	194138	2.6	2520	—	3/V 21 L4	—	BN 160L 4	—	—	—	779000	923000	1200000	388
0.59	187617	1.3	2464	—	3/V 18 L4	—	BN 160L 4	—	—	—	503000	565000	200000	372
0.64	170637	1.2	2295	—	3/V 18 L4	—	BN 160L 4	—	—	—	503000	565000	200000	372
0.71	162758	1.1	2065	—	3/V 17 L4	—	BN 160L 4	—	—	—	442000	470000	150000	364



**P<sub>1</sub> = 15 kW n<sub>1</sub> = 1400 min<sup>-1</sup>**

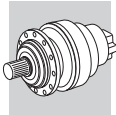
n <sub>2</sub> min <sup>-1</sup>	M <sub>2</sub> Nm	S	i	Pt kW					MC/PC	MZ/PZ	Rn <sub>2</sub> [N]			
					HC	HZ	FZ							
0.79	145679	1.7	1848	—	3/V 18 L4	—	BN 160L 4	—	—	—	503000	565000	200000	372
0.82	135500	1.3	1780	—	3/V 17 L4	—	BN 160L 4	—	—	—	442000	470000	150000	364
0.84	137775	1.8	1748	—	3/V 18 L4	—	BN 160L 4	—	—	—	503000	565000	200000	372
0.99	116088	2.2	1473	—	3/V 18 L4	—	BN 160L 4	—	—	—	503000	565000	200000	372
1.1	99561	1.5	1365	—	3/V 17 L3	—	BN 160L 4	—	—	—	438900	467300	148700	364
1.1	95725	1.0	1329	—	3/V 15 L3	—	BN 160L 4	—	—	—	203700	239100	88500	346
1.2	98223	2.5	1232	—	3/V 18 L4	—	BN 160L 4	—	—	—	503000	544900	191700	372
1.2	94230	1.5	1215	—	3/V 17 L3	—	BN 160L 4	—	—	—	423800	451200	143100	364
1.3	92894	2.7	1165	—	3/V 18 L4	—	BN 160L 4	—	—	—	503000	535800	188100	372
1.3	82713	1.5	1134	—	3/V 17 L3	—	BN 160L 4	—	—	—	415100	442000	139800	364
1.3	80657	1.1	1120	—	3/V 15 L3	—	BN 160L 4	—	—	—	193500	227100	83500	346
1.4	76281	1.1	1059	—	3/V 16 L3	—	BN 160L 4	—	—	—	316300	351800	136700	356
1.4	79397	1.6	1024	—	3/V 17 L3	—	BN 160L 4	—	—	—	402600	428600	135100	364
1.5	76396	1.2	997	—	3/V 15 L3	—	BN 160L 4	—	—	—	186800	219300	80400	346
1.7	65961	1.6	851	—	3/V 17 L3	—	BN 160L 4	—	—	—	380800	405400	127000	364
1.7	64371	1.2	840	—	3/V 15 L3	—	BN 160L 4	—	—	—	177500	208400	75900	346
1.8	64315	2.1	810	—	3/V 17 L3	—	BN 160L 4	—	—	—	375300	399500	125000	364
1.8	60878	1.2	794	—	3/V 16 L3	—	BN 160L 4	—	—	—	290200	322700	124200	356
2.1	54192	2.6	683	—	3/V 17 L3	—	BN 160L 4	—	—	—	356500	379500	118100	364
2.2	52810	0.9	673	—	3/V 13 L3	—	BN 160L 4	—	—	—	155500	184100	62700	326
2.2	51295	1.2	669	—	3/V 16 L3	—	BN 160L 4	—	—	—	275600	306500	117300	356
2.2	52158	1.4	665	—	3/V 14 L3	—	BN 160L 4	—	—	—	165400	194200	70200	336
2.2	52158	1.7	665	—	3/V 15 L3	—	BN 160L 4	—	—	—	165400	194200	70200	346
2.4	49358	2.6	608	—	3/V 17 L3	—	BN 160L 4	—	—	—	344200	366500	113600	364
2.5	47080	1.2	579	—	3/V 14 L3	—	BN 160L 4	—	—	—	158800	186400	67100	336
2.6	44497	1.1	567	—	3/V 13 L3	—	BN 160L 4	—	—	—	147700	174800	59200	326
2.6	45021	2.6	567	—	3/V 17 L3	—	BN 160L 4	—	—	—	337200	359000	111000	364
2.6	43948	1.9	560	—	3/V 15 L3	—	BN 160L 4	—	—	—	157100	184500	66300	346
2.8	41563	1.9	530	—	3/V 16 L3	—	BN 160L 4	—	—	—	256900	285800	108500	356
2.8	40516	1.3	516	—	3/V 13 L3	—	BN 160L 4	—	—	—	143600	170000	57400	326
2.9	40499	1.4	498	—	3/V 14 L3	—	BN 160L 4	—	—	—	151700	178200	63800	336
2.9	40499	2.1	498	—	3/V 15 L3	—	BN 160L 4	—	—	—	151700	178200	63800	346
3.3	35021	1.4	446	—	3/V 14 L3	—	BN 160L 4	—	—	—	146800	172300	61500	336
3.3	35021	1.9	446	—	3/V 15 L3	—	BN 160L 4	—	—	—	146800	172300	61500	346
3.3	35021	1.9	446	—	3/V 16 L3	—	BN 160L 4	—	—	—	244100	271400	102500	356
3.4	33710	1.2	430	—	3/V 11 L3	—	BN 160L 4	—	—	—	110000	137000	43800	316
3.4	34551	1.4	425	—	3/V 13 L3	—	BN 160L 4	—	—	—	135500	160400	53800	326
3.7	32273	1.4	397	—	3/V 14 L3	—	BN 160L 4	—	—	—	141800	166400	59100	336
3.7	32273	2.2	397	—	3/V 16 L3	—	BN 160L 4	—	—	—	235700	262100	98600	356
3.8	31743	2.1	386	—	3/V 15 L3	—	BN 160L 4	—	—	—	140600	165000	58600	346
3.9	29059	1.4	370	—	3/V 13 L3	—	BN 160L 4	—	—	—	130000	153900	51400	326
10.4	12178	0.9	140	—	—	3/A 07 L2	BN 160L 4	M 5SB 4	24000	30200	55300	72400	20900	287
11.3	11255	1.0	130	—	—	3/A 07 L2	BN 160L 4	M 5SB 4	23400	29400	54000	70700	20400	287
13.4	9433	0.9	109	—	—	3/A 07 L2	BN 160L 4	M 5SB 4	22100	27700	51200	67100	19200	287
16.7	7609	1.3	87.7	—	—	3/A 07 L2	BN 160L 4	M 5SB 4	20600	25800	48000	62900	17900	287
20.9	6063	0.9	69.9	—	—	3/A 06 L2	BN 160L 4	—	17200	19400	41700	48500	12900	267
21.4	5929	1.3	68.3	—	—	3/A 07 L2	BN 160L 4	M 5SB 4	18900	23700	44500	58400	16400	287
24.3	5219	1.2	60.1	—	—	3/A 06 L2	BN 160L 4	—	16300	18500	39800	46400	12300	267
25.5	4969	1.3	57.3	—	—	3/A 07 L2	BN 160L 4	M 5SB 4	17800	22400	42200	55400	15500	287
26.2	4832	0.9	55.7	—	—	3/A 06 L2	BN 160L 4	—	15900	18000	38900	45300	11900	267
28.2	4490	1.2	51.7	—	—	3/A 06 L2	BN 160L 4	—	15500	17600	38100	44400	11700	267
29.7	4272	1.9	49.2	—	—	3/A 07 L2	BN 160L 4	M 5SB 4	17000	21300	40400	52900	14700	287
31	4093	0.9	47.2	—	—	3/A 06 L2	BN 160L 4	—	15000	17000	37000	43100	11300	267
35	3600	2.3	41.5	—	—	3/A 07 L2	BN 160L 4	M 5SB 4	16000	20100	38300	50200	13900	287
36	3564	1.4	41.1	—	—	3/A 06 L2	BN 160L 4	—	14400	16300	35500	41400	10800	267
42	3031	1.2	34.9	—	—	3/A 06 L2	BN 160L 4	—	13600	15400	33900	39400	10200	267
45	2840	1.4	32.7	—	—	3/A 06 L2	BN 160L 4	—	13300	15100	33200	38700	10000	267
45	2805	2.8	32.3	—	—	3/A 07 L2	BN 160L 4	M 5SB 4	14700	18500	35600	46600	12800	287
53	2406	1.4	27.7	—	—	3/A 06 L2	BN 160L 4	—	12600	14300	31600	36800	9470	267
54	2351	2.8	27.1	—	—	3/A 07 L2	BN 160L 4	M 5SB 4	13900	17400	33700	44200	12100	287



**P<sub>1</sub> = 18.5 kW** n<sub>1</sub> = 1400 min<sup>-1</sup>

n <sub>2</sub> min <sup>-1</sup>	M <sub>2</sub> Nm	S	i	Pt kW					MC/PC	MZ/PZ	Rn <sub>2</sub> [N]			
					HC	HZ	FZ							
0.29	439897	1.2	5040	—	3/V 21 L4	—	BN 180M 4	—	—	—	779000	923000	1200000	388
0.32	422264	1.3	4550	—	3/V 21 L4	—	BN 180M 4	—	—	—	779000	923000	1200000	388
0.36	375513	0.9	4095	—	3/V 19 L4	—	BN 180M 4	—	—	—	638000	702000	200000	380
0.39	350804	1.3	3780	—	3/V 21 L4	—	BN 180M 4	—	—	—	779000	923000	1200000	388
0.41	342053	1.5	3600	—	3/V 21 L4	—	BN 180M 4	—	—	—	779000	923000	1200000	388
0.45	303402	1.1	3231	—	3/V 19 L4	—	BN 180M 4	—	—	—	638000	702000	200000	380
0.50	270081	0.9	2945	—	3/V 18 L4	—	BN 180M 4	—	—	—	503000	565000	200000	372
0.54	262506	1.9	2700	—	3/V 21 L4	—	BN 180M 4	—	—	—	779000	923000	1200000	388
0.57	242464	1.4	2582	—	3/V 19 L4	—	BN 180M 4	—	—	—	638000	702000	200000	380
0.58	239437	2.1	2520	—	3/V 21 L4	—	BN 180M 4	—	—	—	779000	923000	1200000	388
0.59	231394	1.1	2464	—	3/V 18 L4	—	BN 180M 4	—	—	—	503000	565000	200000	372
0.64	210452	1.0	2295	—	3/V 18 L4	—	BN 180M 4	—	—	—	503000	565000	200000	372
0.64	221186	2.4	2275	—	3/V 21 L4	—	BN 180M 4	—	—	—	779000	923000	1200000	388
0.77	183754	2.5	1890	—	3/V 21 L4	—	BN 180M 4	—	—	—	779000	923000	1200000	388
0.79	179671	1.4	1848	—	3/V 18 L4	—	BN 180M 4	—	—	—	503000	565000	200000	372
0.81	178981	2.8	1800	—	3/V 21 L4	—	BN 180M 4	—	—	—	779000	923000	1200000	388
0.82	167117	1.1	1780	—	3/V 17 L4	—	BN 180M 4	—	—	—	442000	470000	150000	364
0.84	169922	1.5	1748	—	3/V 18 L4	—	BN 180M 4	—	—	—	503000	565000	200000	372
0.99	143175	1.7	1473	—	3/V 18 L4	—	BN 180M 4	—	—	—	503000	565000	200000	372
1.1	122792	1.3	1365	—	3/V 17 L3	—	BN 180M 4	—	—	—	438900	467300	148700	364
1.2	121142	2.1	1232	—	3/V 18 L4	—	BN 180M 4	—	—	—	503000	544900	191700	372
1.2	116216	1.2	1215	—	3/V 17 L3	—	BN 180M 4	—	—	—	423800	451200	143100	364
1.3	114569	2.2	1165	—	3/V 18 L4	—	BN 180M 4	—	—	—	503000	535800	188100	372
1.3	102012	1.3	1134	—	3/V 17 L3	—	BN 180M 4	—	—	—	415100	442000	139800	364
1.3	99477	0.9	1120	—	3/V 15 L3	—	BN 180M 4	—	—	—	193500	227100	83500	346
1.4	94080	0.9	1059	—	3/V 16 L3	—	BN 180M 4	—	—	—	316300	351800	136700	356
1.4	97923	1.3	1024	—	3/V 17 L3	—	BN 180M 4	—	—	—	402600	428600	135100	364
1.5	94222	1.0	997	—	3/V 15 L3	—	BN 180M 4	—	—	—	186800	219300	80400	346
1.5	96535	2.5	982	—	3/V 18 L4	—	BN 180M 4	—	—	—	498800	509000	177700	372
1.7	81351	1.3	851	—	3/V 17 L3	—	BN 180M 4	—	—	—	380800	405400	127000	364
1.7	79391	1.0	840	—	3/V 15 L3	—	BN 180M 4	—	—	—	177500	208400	75900	346
1.8	79322	1.7	810	—	3/V 17 L3	—	BN 180M 4	—	—	—	375300	399500	125000	364
1.8	75083	1.0	794	—	3/V 16 L3	—	BN 180M 4	—	—	—	290200	322700	124200	356
1.9	75222	2.5	765	—	3/V 18 L4	—	BN 180M 4	—	—	—	462800	472300	163500	372
2.1	66836	2.1	683	—	3/V 17 L3	—	BN 180M 4	—	—	—	356500	379500	118100	364
2.2	63264	1.0	669	—	3/V 16 L3	—	BN 180M 4	—	—	—	275600	306500	117300	356
2.2	64328	1.1	665	—	3/V 14 L3	—	BN 180M 4	—	—	—	165400	194200	70200	336
2.2	64328	1.4	665	—	3/V 15 L3	—	BN 180M 4	—	—	—	165400	194200	70200	346
2.4	60875	2.1	608	—	3/V 17 L3	—	BN 180M 4	—	—	—	344200	366500	113600	364
2.5	58066	1.0	579	—	3/V 14 L3	—	BN 180M 4	—	—	—	158800	186400	67100	336
2.6	55526	2.1	567	—	3/V 17 L3	—	BN 180M 4	—	—	—	337200	359000	111000	364
2.6	54202	1.5	560	—	3/V 15 L3	—	BN 180M 4	—	—	—	157100	184500	66300	346
2.8	51262	1.5	530	—	3/V 16 L3	—	BN 180M 4	—	—	—	256900	285800	108500	356
2.8	49969	1.0	516	—	3/V 13 L3	—	BN 180M 4	—	—	—	143600	170000	57400	326
2.9	51293	2.5	512	—	3/V 17 L3	—	BN 180M 4	—	—	—	327000	348200	107300	364
2.9	49949	1.2	498	—	3/V 14 L3	—	BN 180M 4	—	—	—	151700	178200	63800	336
2.9	49949	1.7	498	—	3/V 15 L3	—	BN 180M 4	—	—	—	151700	178200	63800	346
3.3	43193	1.1	446	—	3/V 14 L3	—	BN 180M 4	—	—	—	146800	172300	61500	336
3.3	43193	1.5	446	—	3/V 15 L3	—	BN 180M 4	—	—	—	146800	172300	61500	346
3.3	43193	1.5	446	—	3/V 16 L3	—	BN 180M 4	—	—	—	244100	271400	102500	356
3.4	41576	1.0	430	—	3/V 11 L3	—	BN 180M 4	—	—	—	110000	137000	43800	316
3.4	42613	1.1	425	—	3/V 13 L3	—	BN 180M 4	—	—	—	135500	160400	53800	326
3.4	42613	2.5	425	—	3/V 17 L3	—	BN 180M 4	—	—	—	309300	329300	100800	364
3.6	41506	2.9	405	—	3/V 17 L3	—	BN 180M 4	—	—	—	304800	324500	99200	364
3.7	39803	1.2	397	—	3/V 14 L3	—	BN 180M 4	—	—	—	141800	166400	59100	336
3.7	39803	1.8	397	—	3/V 16 L3	—	BN 180M 4	—	—	—	235700	262100	98600	356
3.8	39150	1.7	386	—	3/V 15 L3	—	BN 180M 4	—	—	—	140600	165000	58600	346
3.9	35840	1.1	370	—	3/V 13 L3	—	BN 180M 4	—	—	—	130000	153900	51400	326
16.7	9385	1.0	87.7	—	—	3/A 07 L2	BN 180M 4	M 5LA 4	20600	25800	48000	62900	17900	287
21.4	7313	1.1	68.3	—	—	3/A 07 L2	BN 180M 4	M 5LA 4	18900	23700	44500	58400	16400	287
24.3	6437	0.9	60.1	—	—	3/A 06 L2	BN 180M 4	—	16300	18500	39800	46400	12300	277



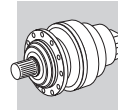


**P<sub>1</sub> = 18.5 kW n<sub>1</sub> = 1400 min<sup>-1</sup>**

n <sub>2</sub> min <sup>-1</sup>	M <sub>2</sub> Nm	S	i	Pt kW					Rn <sub>2</sub> [N]					
									MC/PC	MZ/PZ	HC	HZ	FZ	
25.5	6129	1.1	57.3	—	—	3/A 07 L2	BN 180M 4	M 5LA 4	17800	22400	42200	55400	15500	287
28.2	5537	0.9	51.7	—	—	3/A 06 L2	BN 180M 4	—	15500	17600	38100	44400	11700	277
29.7	5269	1.5	49.2	—	—	3/A 07 L2	BN 180M 4	M 5LA 4	17000	21300	40400	52900	14700	287
35	4439	1.9	41.5	—	—	3/A 07 L2	BN 180M 4	M 5LA 4	16000	20100	38300	50200	13900	287
36	4395	1.1	41.1	—	—	3/A 06 L2	BN 180M 4	—	14400	16300	35500	41400	10800	277
42	3738	0.9	34.9	—	—	3/A 06 L2	BN 180M 4	—	13600	15400	33900	39400	10200	277
45	3503	1.1	32.7	—	—	3/A 06 L2	BN 180M 4	—	13300	15100	33200	38700	10000	277
45	3459	2.3	32.3	—	—	3/A 07 L2	BN 180M 4	M 5LA 4	14700	18500	35600	46600	12800	287
53	2967	1.1	27.7	—	—	3/A 06 L2	BN 180M 4	—	12600	14300	31600	36800	9470	277
54	2899	2.3	27.1	—	—	3/A 07 L2	BN 180M 4	M 5LA 4	13900	17400	33700	44200	12100	287

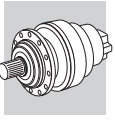
**P<sub>1</sub> = 22 kW n<sub>1</sub> = 1400 min<sup>-1</sup>**

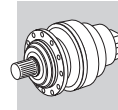
0,29	523120	1,0	5040	—	3/V 21 L4	—	BN 180L 4	—	—	—	779000	923000	1200000	388
0,32	502151	1,1	4550	—	3/V 21 L4	—	BN 180L 4	—	—	—	779000	923000	1200000	388
0,39	417172	1,1	3780	—	3/V 21 L4	—	BN 180L 4	—	—	—	779000	923000	1200000	388
0,41	406766	1,2	3600	—	3/V 21 L4	—	BN 180L 4	—	—	—	779000	923000	1200000	388
0,45	360802	0,9	3231	—	3/V 19 L4	—	BN 180L 4	—	—	—	638000	702000	200000	380
0,54	312169	1,6	2700	—	3/V 21 L4	—	BN 180L 4	—	—	—	779000	923000	1200000	388
0,57	288335	1,2	2582	—	3/V 19 L4	—	BN 180L 4	—	—	—	638000	702000	200000	380
0,58	284736	1,8	2520	—	3/V 21 L4	—	BN 180L 4	—	—	—	779000	923000	1200000	388
0,59	275172	0,9	2464	—	3/V 18 L4	—	BN 180L 4	—	—	—	503000	565000	200000	372
0,64	263032	2,1	2275	—	3/V 21 L4	—	BN 180L 4	—	—	—	779000	923000	1200000	388
0,77	218519	2,1	1890	—	3/V 21 L4	—	BN 180L 4	—	—	—	779000	923000	1200000	388
0,79	213663	1,2	1848	—	3/V 18 L4	—	BN 180L 4	—	—	—	503000	565000	200000	372
0,81	212843	2,3	1800	—	3/V 21 L4	—	BN 180L 4	—	—	—	779000	923000	1200000	388
0,82	198734	0,9	1780	—	3/V 17 L4	—	BN 180L 4	—	—	—	442000	470000	150000	364
0,84	202070	1,2	1748	—	3/V 18 L4	—	BN 180L 4	—	—	—	503000	565000	200000	372
0,96	179340	2,9	1517	—	3/V 21 L4	—	BN 180L 4	—	—	—	779000	923000	1200000	388
0,99	170262	1,5	1473	—	3/V 18 L4	—	BN 180L 4	—	—	—	503000	565000	200000	372
1,1	146023	1,1	1365	—	3/V 17 L3	—	BN 180L 4	—	—	—	438900	467300	148700	364
1,2	148990	2,9	1260	—	3/V 21 L4	—	BN 180L 4	—	—	—	757900	898800	1158600	388
1,2	144060	1,7	1232	—	3/V 18 L4	—	BN 180L 4	—	—	—	503000	544900	191700	372
1,2	138203	1,0	1215	—	3/V 17 L3	—	BN 180L 4	—	—	—	423800	451200	143100	364
1,3	136244	1,8	1165	—	3/V 18 L4	—	BN 180L 4	—	—	—	503000	535800	188100	372
1,3	121312	1,1	1134	—	3/V 17 L3	—	BN 180L 4	—	—	—	415100	442000	139800	364
1,4	116449	1,1	1024	—	3/V 17 L3	—	BN 180L 4	—	—	—	402600	428600	135100	364
1,5	114798	2,1	982	—	3/V 18 L4	—	BN 180L 4	—	—	—	498800	509000	177700	372
1,7	96742	1,1	851	—	3/V 17 L3	—	BN 180L 4	—	—	—	380800	405400	127000	364
1,8	94329	1,4	810	—	3/V 17 L3	—	BN 180L 4	—	—	—	375300	399500	125000	364
1,9	89453	2,1	765	—	3/V 18 L4	—	BN 180L 4	—	—	—	462800	472300	163500	372
2,1	79481	1,8	683	—	3/V 17 L3	—	BN 180L 4	—	—	—	356500	379500	118100	364
2,2	76498	0,9	665	—	3/V 14 L3	—	BN 180L 4	—	—	—	165400	194200	70200	336
2,2	76498	1,2	665	—	3/V 15 L3	—	BN 180L 4	—	—	—	165400	194200	70200	346
2,4	72392	1,8	608	—	3/V 17 L3	—	BN 180L 4	—	—	—	344200	366500	113600	364
2,6	66030	1,8	567	—	3/V 17 L3	—	BN 180L 4	—	—	—	337200	359000	111000	364
2,6	64457	1,3	560	—	3/V 15 L3	—	BN 180L 4	—	—	—	157100	184500	66300	346
2,8	60960	1,3	530	—	3/V 16 L3	—	BN 180L 4	—	—	—	256900	285800	108500	356
2,9	60997	2,1	512	—	3/V 17 L3	—	BN 180L 4	—	—	—	327000	348200	107300	364
2,9	59399	1,0	498	—	3/V 14 L3	—	BN 180L 4	—	—	—	151700	178200	63800	336
2,9	59399	1,4	498	—	3/V 15 L3	—	BN 180L 4	—	—	—	151700	178200	63800	346
3,3	51364	0,9	446	—	3/V 14 L3	—	BN 180L 4	—	—	—	146800	172300	61500	336
3,3	51364	1,3	446	—	3/V 15 L3	—	BN 180L 4	—	—	—	146800	172300	61500	346
3,3	51364	1,3	446	—	3/V 16 L3	—	BN 180L 4	—	—	—	244100	271400	102500	356
3,4	50675	0,9	425	—	3/V 13 L3	—	BN 180L 4	—	—	—	135500	160400	53800	326
3,4	50675	2,1	425	—	3/V 17 L3	—	BN 180L 4	—	—	—	309300	329300	100800	364
3,6	49358	2,4	405	—	3/V 17 L3	—	BN 180L 4	—	—	—	304800	324500	99200	364
3,7	47333	1,0	397	—	3/V 14 L3	—	BN 180L 4	—	—	—	141800	166400	59100	336
3,7	47333	1,5	397	—	3/V 16 L3	—	BN 180L 4	—	—	—	235700	262100	98600	356



$P_1 = 22 \text{ kW}$   $n_1 = 1400 \text{ min}^{-1}$

$n_2$ min <sup>-1</sup>	$M_2$ Nm	S	i	Pt kW					$R_{n_2}$ [N]					
					MC/PC	MZ/PZ	HC	HZ	FZ					
<b>3,8</b>	46557	1,4	386	—	<b>3/V 15 L3</b>	—	<b>BN 180L 4</b>	—	—	140600	165000	58600	346	
<b>3,9</b>	42621	0,9	370	—	<b>3/V 13 L3</b>	—	<b>BN 180L 4</b>	—	—	130000	153900	51400	326	
<b>21,4</b>	8696	0,9	68	—	—	<b>3/A 07 L2</b>	<b>BN 180L 4</b>	—	18900	23700	44500	58400	16400	287
<b>25,5</b>	7288	0,9	57	—	—	<b>3/A 07 L2</b>	<b>BN 180L 4</b>	—	17800	22400	42200	55400	15500	287
<b>29,7</b>	6266	1,3	49	—	—	<b>3/A 07 L2</b>	<b>BN 180L 4</b>	—	17000	21300	40400	52900	14700	287
<b>35</b>	5279	1,6	41	—	—	<b>3/A 07 L2</b>	<b>BN 180L 4</b>	—	16000	20100	38300	50200	13900	287
<b>36</b>	5227	0,9	41	—	—	<b>3/A 06 L2</b>	<b>BN 180L 4</b>	—	14400	16300	35500	41400	10800	277
<b>45</b>	4166	0,9	33	—	—	<b>3/A 06 L2</b>	<b>BN 180L 4</b>	—	13300	15100	33200	38700	10000	277
<b>45</b>	4114	1,9	32	—	—	<b>3/A 07 L2</b>	<b>BN 180L 4</b>	—	14700	18500	35600	46600	12800	287
<b>53</b>	3528	0,9	28	—	—	<b>3/A 06 L2</b>	<b>BN 180L 4</b>	—	12600	14300	31600	36800	9470	277
<b>54</b>	3448	1,9	27	—	—	<b>3/A 07 L2</b>	<b>BN 180L 4</b>	—	13900	17400	33700	44200	12100	287





**26.0 - DATI TECNICI RIDOTTO-  
RI COMBINATI VITE-  
PLANETARI - 3/V**

**26.0 - 3/V - PLANETARYWORM  
RATING CHARTS**

**26.0 - 3/VF - TECHNISCHE  
DATEN DER GETRIEBE**

**26.0 - DONNEES TECHNIQUES  
REDUCTEURS COMBINÉ  
3/V**

Guida alla consultazione delle  
tabelle.

Reading the rating chart

Anleitung für die richtige Konsul-  
tation der Tabellen.

Guide pour la consultation des  
tableaux.

3/V 00L3

1000 Nm

n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC)			Rn <sub>2</sub> [N]					
										MC/PC	MZ/PZ	HC	HZ	FZ	
<b>1400</b>	3/V 00L3	<b>415</b>	3.4	950	0.50	-	63	71	80	8120	8120	21300	24500	5340	230
	3/V 00L3	<b>436</b>	3.2	700	0.37	-	63	71	-	8250	8250	21600	24800	5420	230
	3/V 00L3	<b>509</b>	2.8	980	0.42	-	63	71	80	8680	8680	22600	26000	5710	230
	3/V 00L3	<b>562</b>	2.5	730	0.29	-	63	71	80	8980	8980	23300	26800	5900	230
	3/V 00L3	<b>654</b>	2.1	1000	0.36	-	63	71	-	9440	9440	24400	28100	6210	230

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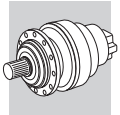
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1	Coppia massima trasmissibile dal riduttore	<i>Gearbox max. transmissible torque</i>	Nenn-Drehmoment am Abtrieb des Bezuggetriebes	<i>Couple maximum du réducteur</i>
2	Velocità di comando riduttore	<i>Gearbox drive speed</i>	Drehzahl am Getriebeantrieb	<i>Vitesse angulaire à l'entrée du réducteur</i>
3	Grandezza riduttore in esecuzione combinata vite + epicicloidale	<i>Frame size of combined worm + planetary gearbox</i>	Baugröße des Getriebes 300 + kombinierten Schneckengetriebe	<i>Taille réducteur combiné série 300 + réducteur à vis sans fin</i>
4	Rapporto di riduzione	<i>Gear ratio</i>	Übersetzung	<i>Rapport de réduction</i>
5	Velocità angolare in uscita riduttore	<i>Gearbox output speed</i>	Drehzahl am Getriebeabtrieb	<i>Vitesse angulaire en sortie réducteur</i>
6	Coppia nominale all'albero lento del riduttore, basata su: - fattore di sicurezza S=1 - durata di 10000 h	<i>Gearbox rated output torque, based on: - safety factor S=1 - 10000 hrs theoretical lifetime</i>	Nenn-Drehmoment am Getriebeabtrieb mit Sicherheitsfaktor S=1 für eine Dauer von 10000 h	<i>Couple nominal à la sortie du réducteur avec facteur de sécurité S=1 pendant une durée de 10000 h</i>
7	Potenza nominale all'albero veloce del riduttore, basata su: - fattore di sicurezza S=1 - durata teorica di 10000 h	<i>Gearbox rated input power, based on: - safety factor S=1 - 10000 hrs theoretical lifetime</i>	Nenn-Leistung im Getriebeantrieb mit: - Sicherheitsfaktor S=1 - Dauer von 10000 h	<i>Puissance nominale en entrée réducteur avec facteur de sécurité S=1 pendant une durée de 10000 h</i>
8	Potenza termica riduttore	<i>Gearbox thermal capacity</i>	Wärmeleistung	<i>Puissance thermique réducteur</i>
9	Grandezza motore elettrico IEC installabile. - Le predisposizioni contrassegnate con * sono dotate di una linguetta ribassata.	<i>Frame size of compatible IEC electric motor - IEC inputs marked with * feature a lowered key.</i>	Baugröße einbaubarer IEC-Elektromotor. - Alle Getriebe, die * gekennzeichnet sind, werden mit einer weiter unten eingebauten Passfeder geliefert.	<i>Taille IEC moteur électrique à installer. - Les moteurs dont les prédispositions sont repérées par * sont dotées en série d'une clavette à hauteur réduite.</i>
10	Carichi radiali applicabili all'albero lento, basati su - fattore di sicurezza S=1 - durata teorica 10000 h Per forze non applicate in mezzzeria riferirsi ai diagrammi riportati a seguito delle pagine dimensionali del riduttore in oggetto	<i>Permitted overhung loading on output shaft, based on: - safety factor S=1 - 10000 hrs theoretical lifetime For forces applying off the shaft midpoint, see diagrams provided in the pages following dimensions of the gearbox under study</i>	Auf die Mitte der Abtriebswelle für eine Dauer von 10000 Std. applizierbare Nenn-Radialkräfte und Sicherheitsfaktor S=1 Für andere Kraftangriffspunkte verweisen wir auf die Diagramme, die den Seiten mit den Maßen der gewählten Größe folgen	<i>Charges radiales nominales applicables à la moitié de l'arbre pendant : - facteur de sécurité S=1 - durée de 10000 h Pour d'autres positions de charge, voir diagrammes figurant à la suite des pages dimensions de la taille sélectionnée</i>
11	Pagina delle dimensioni	<i>Page installation drawing can be found at</i>	Maßseiten	<i>Page avec les dimensions</i>






### 3/V 00L3

### 1000 Nm

n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC) 			MC/PC	MZ/PZ	Rn <sub>2</sub> [N]			
							B5	B14				HC	HZ	FZ	
1400	3/V 00L3	415	3.4	950	0.50	—	63	71	80	8120	8120	21300	24500	5340	230
	3/V 00L3	436	3.2	700	0.37	—	63	71	—	8250	8250	21600	24800	5420	230
	3/V 00L3	509	2.8	980	0.42	—	63	71	80	8680	8680	22600	26000	5710	230
	3/V 00L3	562	2.5	730	0.29	—	63	71	80	8980	8980	23300	26800	5900	230
	3/V 00L3	654	2.1	1000	0.36	—	63	71	—	9440	9440	24400	28100	6210	230
	3/V 00L3	689	2.0	1000	0.32	—	63	71	80	9610	9610	24800	28500	6320	230
	3/V 00L3	818	1.7	1000	0.30	—	63	71	—	10200	10200	26100	30000	6690	230
	3/V 00L3	903	1.5	800	0.22	—	63	71	—	10500	10500	26900	30900	6910	230
	3/V 00L3	997	1.4	810	0.17	—	63	71	80	10900	10900	27700	31800	7140	230
	3/V 00L3	1107	1.3	1000	0.22	—	63	71	—	11300	11300	28600	32800	7400	230
	3/V 00L3	1198	1.2	840	0.16	—	63	71	—	11600	11600	29300	33600	7600	230
	3/V 00L3	1381	1.0	1000	0.18	—	63	71	—	12000	12100	30600	34000	7960	230
	3/V 00L3	1495	0.94	860	0.13	—	63	71	—	12000	12400	31000	34000	8000	230
	3/V 00L3	1869	0.75	860	0.11	—	63	71	—	12000	12500	31000	34000	8000	230
	3/V 00L3	2337	0.60	860	0.09	—	63	71	—	12000	12500	31000	34000	8000	230




### 3/V 01L3

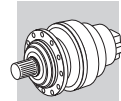
### 2000 Nm

n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC) 			MC/PC	MZ/PZ	Rn <sub>2</sub> [N]			
							B5	B14				HC	HZ	FZ	
1400	3/V 01L3	430	3.3	1880	0.84	—	63	71	80	8210	8210	21500	24700	5400	238
	3/V 01L3	443	3.2	1370	0.62	—	63	71	80	8290	8290	21700	25000	5450	238
	3/V 01L3	509	2.8	1270	0.55	—	63	71	80	8680	8680	22600	26000	5710	238
	3/V 01L3	562	2.5	1400	0.55	—	63	71	80	8980	8980	23300	26800	5900	238
	3/V 01L3	654	2.1	1180	0.42	—	63	71	—	9440	9440	24400	28100	6210	238
	3/V 01L3	689	2.0	1710	0.55	—	63	71	80	9610	9610	24800	28500	6320	238
	3/V 01L3	799	1.8	1540	0.40	—	63	71	80	10100	10100	25900	29800	6640	238
	3/V 01L3	903	1.5	1230	0.34	—	63	71	—	10500	10500	26900	30900	6910	238
	3/V 01L3	997	1.4	1600	0.33	—	63	71	80	10900	10900	27700	31800	7140	238
	3/V 01L3	1105	1.3	1990	0.42	—	63	71	—	11200	11200	28600	32800	7390	238
	3/V 01L3	1198	1.2	1650	0.32	—	63	71	—	11600	11600	29300	33600	7600	238
	3/V 01L3	1381	1.0	1880	0.34	—	63	71	—	12000	12100	30600	34000	7960	238
	3/V 01L3	1495	0.94	1700	0.26	—	63	71	—	12000	12400	31000	34000	8000	238
	3/V 01L3	1869	0.75	1700	0.22	—	63	71	—	12000	12500	31000	34000	8000	238
	3/V 01L3	2337	0.60	1700	0.18	—	63	71	—	12000	12500	31000	34000	8000	238

### 3/V 03L3




### 2800 Nm

n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC) 			MC/PC	MZ/PZ	Rn <sub>2</sub> [N]			
							B5	B14				HC	HZ	FZ	
1400	3/V 03L3	395	3.5	2170	1.1	—	71	80	90	24500	28300	42800	51500	15700	246
	3/V 03L3	460	3.0	2190	1.0	—	71	80	90	25800	29800	44900	54000	16600	246
	3/V 03L3	502	2.8	1970	0.75	—	71	80	90	26600	30700	46000	55400	17100	246
	3/V 03L3	544	2.6	2730	1.1	—	71	80	90	27300	31500	47200	56700	17500	246
	3/V 03L3	623	2.2	2210	0.75	—	71	80	90	28600	33000	49100	59100	18300	246
	3/V 03L3	736	1.9	2710	0.78	—	71	80	90	30200	34900	51600	62100	19400	246
	3/V 03L3	793	1.8	2110	0.56	—	71	80	90	31000	35700	52800	63500	19900	246
	3/V 03L3	923	1.5	2660	0.61	—	71	80	90	32600	37600	55300	66500	20900	246
	3/V 03L3	1023	1.4	2710	0.62	—	71	80	—	33700	38900	57000	68600	21600	246
	3/V 03L3	1189	1.2	2240	0.44	—	71	80	—	35400	40900	59600	71800	22700	246
	3/V 03L3	1385	1.0	2840	0.48	—	71	80	—	36000	42000	62400	74000	23900	246
	3/V 03L3	1610	0.87	2300	0.33	—	71	80	—	36000	42000	64000	74000	24000	246
	3/V 03L3	1728	0.81	2850	0.38	—	71	80	—	36000	42000	64000	74000	24000	246
	3/V 03L3	2009	0.70	2300	0.27	—	71	80	—	36000	42000	64000	74000	24000	246
	3/V 03L3	2511	0.56	2300	0.21	—	71	80	—	36000	42000	64000	74000	24000	246






### 3/V 04L3

### 3600 Nm

n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC) 				Rn <sub>2</sub> [N]						
							MC/PC	MZ/PZ	HC	HZ	FZ						
1400	3/V 04L3	384	3.6	3510	1.8	—	B5		B5 / B14			24300	28100	42500	51100	15600	256
	3/V 04L3	453	3.1	3690	1.6	—	71	80	90	100							
	3/V 04L3	501	2.8	3010	1.3	—	71	80	90	100							
	3/V 04L3	568	2.5	3090	1.1	—	71	80	90	100							
	3/V 04L3	623	2.2	3540	1.2	—	71	80	90	100							
	3/V 04L3	710	2.0	2490	0.64	—	71	80	90	100							
	3/V 04L3	769	1.8	3220	0.82	—	71	80	90	100							
	3/V 04L3	887	1.6	2570	0.53	—	71	80	90	100							
	3/V 04L3	981	1.4	3860	0.85	—	71	80	90	100							
	3/V 04L3	1152	1.2	3410	0.60	—	71	80	90	100							
	3/V 04L3	1231	1.1	3440	0.60	—	71	80	90	100							
	3/V 04L3	1419	1.0	2750	0.39	—	71	80	90	100							
	3/V 04L3	1536	0.91	3500	0.49	—	71	80	90	100							
	3/V 04L3	1774	0.79	2750	0.31	—	71	80	90	100							
	3/V 04L3	1893	0.74	2750	0.31	—	71	80	90	100							
	3/V 04L3	2366	0.59	2750	0.25	—	71	80	90	100							




### 3/V 05L3

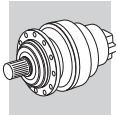
### 4600 Nm

n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC) 				Rn <sub>2</sub> [N]						
							MC/PC	MZ/PZ	HC	HZ	FZ						
1400	3/V 05L3	397	3.5	3770	1.7	—	B5		B5 / B14			24600	28400	42900	51600	15800	266
	3/V 05L3	462	3.0	4760	1.9	—	71	80	90	100							
	3/V 05L3	529	2.6	3920	1.4	—	71	80	90	100							
	3/V 05L3	576	2.4	4920	1.6	—	71	80	90	100							
	3/V 05L3	623	2.2	4480	1.5	—	71	80	90	100							
	3/V 05L3	715	2.0	4110	1.1	—	71	80	90	100							
	3/V 05L3	793	1.8	4190	1.1	—	71	80	90	100							
	3/V 05L3	894	1.6	4270	0.93	—	71	80	90	100							
	3/V 05L3	1057	1.3	4390	0.90	—	71	80	90	100							
	3/V 05L3	1116	1.3	4430	0.77	—	71	80	90	100							
	3/V 05L3	1231	1.1	5500	1.0	—	71	80	90	100							
	3/V 05L3	1431	1.0	4600	0.70	—	71	80	90	100							
	3/V 05L3	1674	0.84	4100	0.50	—	71	80	90	100							
	3/V 05L3	1786	0.78	4600	0.56	—	71	80	90	100							
	3/V 05L3	2232	0.63	4100	0.40	—	71	80	90	100							

### 3/V 06L3




### 8500 Nm

n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC) 					Rn <sub>2</sub> [N]					
							MC/PC	MZ/PZ	HC	HZ	FZ						
1400	3/V 06L3	395	3.5	7400	3.4	—	B5		B5 / B14			30600	34600	70100	81600	23000	276
	3/V 06L3	427	3.3	8220	3.5	—	71	80	90	100	112						
	3/V 06L3	527	2.7	7400	2.6	—	71	80	90	100	112						
	3/V 06L3	569	2.5	8520	2.8	—	71	80	90	100	112						
	3/V 06L3	661	2.1	8640	2.4	—	71	80	90	100	112						
	3/V 06L3	698	2.0	7490	2.0	—	71	80	90	100	112						
	3/V 06L3	791	1.8	7440	1.9	—	71	80	90	100	112						
	3/V 06L3	930	1.5	7890	1.6	—	71	80	90	100	112						
	3/V 06L3	992	1.4	8990	1.9	—	71	80	90	100	112						
	3/V 06L3	1153	1.2	8210	1.5	—	71	80	90	100	112						
	3/V 06L3	1212	1.2	7480	1.3	—	71	80	90	100	112						
	3/V 06L3	1395	1.0	8490	1.2	—	71	80	90	100	112						
	3/V 06L3	1768	0.79	8500	1.0	—	71	80	90	100	112						
	3/V 06L3	2139	0.65	8500	0.85	—	71	80	90	100	112						
	3/V 06L3	2588	0.54	7000	0.58	—	71	80	90	100	112						






### 3/V 07L3

14000 Nm

n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC) 					Rn <sub>2</sub> [N]					
							MC/PC	MZ/PZ	HC	HZ	FZ	MC/PC	MZ/PZ	HC	HZ	FZ	
1400	3/V 07L3	386	3.6	9110	4.2	—	B5 / B14					33700	42300	74900	98100	29300	286
	3/V 07L3	460	3.0	12300	5.0	—	80	90	100	112	132						
	3/V 07L3	507	2.8	13600	5.0	—	80	90	100	112	132						
	3/V 07L3	655	2.1	14000	4.3	—	80	90	100	112	132						
	3/V 07L3	761	1.8	14000	3.7	—	80	90	100	112	132						
	3/V 07L3	773	1.8	10100	2.4	—	80	90	100	112	132						
	3/V 07L3	920	1.5	12300	2.7	—	80	90	100	112	132						
	3/V 07L3	1015	1.4	14300	2.9	—	80	90	100	112	132						
	3/V 07L3	1159	1.2	10700	1.9	—	80	90	100	112	132						
	3/V 07L3	1288	1.1	13800	2.3	—	80	90	100	112	132						
	3/V 07L3	1411	1.0	12300	1.8	—	80	90	100	112	132						
	3/V 07L3	1545	0.91	11000	1.5	—	80	90	100	112	132						
	3/V 07L3	1964	0.71	12300	1.4	—	80	90	100	112	132						
	3/V 07L3	2150	0.65	11000	1.1	—	80	90	100	112	132						
	3/V 07L3	2472	0.57	11000	1.0	—	80	90	100	112	132						




### 3/V 09L3

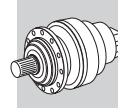
20000 Nm

n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC) 					Rn <sub>2</sub> [N]					
							MC/PC	MZ/PZ	HC	HZ	FZ	MC/PC	MZ/PZ	HC	HZ	FZ	
1400	3/V 09L3	370	3.8	13000	6.8	—	B5					—	—	75100	96900	23100	296
	3/V 09L3	442	3.2	16700	7.4	—	100	112	132	—	—						
	3/V 09L3	507	2.8	14300	5.2	—	-	-	132	—	—						
	3/V 09L3	655	2.1	17600	5.2	—	100	112	132	—	—						
	3/V 09L3	761	1.8	14400	3.7	—	100	112	132	—	—						
	3/V 09L3	800	1.8	20900	5.3	—	100	112	132	—	—						
	3/V 09L3	840	1.7	19300	4.5	—	100	112	132	—	—						
	3/V 09L3	1004	1.4	17800	3.6	—	100	112	132	—	—						
	3/V 09L3	1159	1.2	16400	2.8	—	100	112	132	—	—						
	3/V 09L3	1288	1.1	20700	3.3	—	100	112	132	—	—						
	3/V 09L3	1497	0.94	18300	2.5	—	100	112	132	—	—						
	3/V 09L3	1623	0.86	14500	1.9	—	100	112	—	—	—						
	3/V 09L3	1792	0.78	21000	2.5	—	100	112	—	—	—						
	3/V 09L3	2150	0.65	17000	1.6	—	100	112	132	—	—						
	3/V 09L3	2472	0.57	17000	1.5	—	100	112	—	—	—						

### 3/V 10L3




30000 Nm

n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC) 					Rn <sub>2</sub> [N]					
							MC/PC	MZ/PZ	HC	HZ	FZ	MC/PC	MZ/PZ	HC	HZ	FZ	
1400	3/V 10L3	436	3.2	26700	11.3	—	B5					—	—	93500	117600	44100	306
	3/V 10L3	507	2.8	25800	9.4	—	—	—	132	160 (*)	—						
	3/V 10L3	560	2.5	25400	8.4	—	—	—	132	160 (*)	—						
	3/V 10L3	614	2.3	21800	6.6	—	—	—	132	160 (*)	—						
	3/V 10L3	701	2.0	22300	5.7	—	—	—	132	160 (*)	—						
	3/V 10L3	773	1.8	22800	5.5	—	—	—	132	160 (*)	—						
	3/V 10L3	920	1.5	21800	4.6	—	100	112	132	—	—						
	3/V 10L3	1004	1.4	30000	6.0	—	100	112	132	—	—						
	3/V 10L3	1120	1.3	28400	5.1	—	100	112	132	—	—						
	3/V 10L3	1227	1.1	21800	3.6	—	100	112	132	—	—						
	3/V 10L3	1411	1.0	21800	3.1	—	100	112	132	—	—						






## 3/V 10L4

## 30000 Nm

n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC) 					MC/PC	MZ/PZ	Rn <sub>2</sub> [N]			
							B5	B5 / B14						HC	HZ	FZ	
1400	3/V 10L4	1657	0.84	22900	2.6	—	71	80	90	100	112	—	—	133000	166000	65000	306
	3/V 10L4	1826	0.77	24900	2.6	—	71	80	90	100	112	—	—	133000	166000	65000	306
	3/V 10L4	2016	0.69	29400	2.8	—	71	80	90	100	112	—	—	133000	166000	65000	306
	3/V 10L4	2209	0.63	22900	2.0	—	71	80	90	100	112	—	—	133000	166000	65000	306
	3/V 10L4	2455	0.57	30000	2.3	—	71	80	90	100	112	—	—	133000	166000	65000	306
	3/V 10L4	2835	0.49	29300	2.0	—	71	80	90	100	112	—	—	133000	166000	65000	306
	3/V 10L4	3273	0.43	30000	1.8	—	71	80	90	100	112	—	—	133000	166000	65000	306
	3/V 10L4	3570	0.39	29500	1.7	—	71	80	90	100	112	—	—	133000	166000	65000	306
	3/V 10L4	4036	0.35	29500	1.4	—	71	80	90	100	112	—	—	133000	166000	65000	306
	3/V 10L4	4637	0.30	29500	1.4	—	71	80	90	100	112	—	—	133000	166000	65000	306
	3/V 10L4	5081	0.28	22900	1.0	—	71	80	90	100	112	—	—	133000	166000	65000	306




## 3/V 11L3

## 43000 Nm

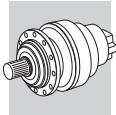
n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC) 					MC/PC	MZ/PZ	Rn <sub>2</sub> [N]			
							B5							HC	HZ	FZ	
1400	3/V 11L3	430	3.3	40000	17.1	—	—	—	—	160	180 (*)	—	—	110000	137000	43800	316
	3/V 11L3	510	2.7	34500	12.4	—	—	—	—	160	180 (*)	—	—	115800	144300	46400	316
	3/V 11L3	551	2.5	36400	12.1	—	—	—	—	160	180 (*)	—	—	118600	147700	47600	316
	3/V 11L3	644	2.2	40000	11.7	—	—	—	132	160	—	—	—	124200	154800	50200	316
	3/V 11L3	720	1.9	38200	10.6	—	—	—	132	160	—	—	—	128400	160000	52100	316
	3/V 11L3	827	1.7	39100	8.9	—	—	—	132	160	—	—	—	133900	166800	54500	316
	3/V 11L3	900	1.6	39700	9.1	—	100	112	132	—	—	—	—	137300	171100	56100	316
	3/V 11L3	1004	1.4	35700	7.5	—	100	112	132	—	—	—	—	141900	176800	58200	316
	3/V 11L3	1103	1.3	41200	7.5	—	—	—	132	160	—	—	—	146000	181800	60000	316
	3/V 11L3	1274	1.1	35100	5.7	—	100	112	132	—	—	—	—	152400	189900	63000	316
	3/V 11L3	1378	1.0	42900	6.4	—	100	112	132	—	—	—	—	156100	194400	64700	316
	3/V 11L3	1636	0.86	43000	5.4	—	100	112	132	—	—	—	—	157000	195000	65000	316
	3/V 11L3	1963	0.71	43000	4.6	—	100	112	132	—	—	—	—	157000	195000	65000	316
	3/V 11L3	2329	0.60	34000	3.1	—	100	112	132	—	—	—	—	157000	195000	65000	316

## 3/V 11L4

## 43000 Nm




n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC) 					MC/PC	MZ/PZ	Rn <sub>2</sub> [N]			
							B5 / B14				B5			HC	HZ	FZ	
1400	3/V 11L4	2510	0.56	45000	3.4	—	80	90	100	112	132	—	—	157000	195000	65000	316
	3/V 11L4	2887	0.48	45000	3.0	—	80	90	100	112	132	—	—	157000	195000	65000	316
	3/V 11L4	3222	0.43	44100	2.6	—	80	90	100	112	132	—	—	157000	195000	65000	316
	3/V 11L4	3557	0.39	42300	2.6	—	80	90	100	112	132	—	—	157000	195000	65000	316
	3/V 11L4	4000	0.35	35700	1.9	—	80	90	100	112	132	—	—	157000	195000	65000	316
	3/V 11L4	4410	0.32	43000	2.0	—	80	90	100	112	132	—	—	157000	195000	65000	316
	3/V 11L4	5021	0.28	45000	1.9	—	80	90	100	112	132	—	—	157000	195000	65000	316








### 3/V 13L3

50000 Nm

n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC) 				MC/PC	MZ/PZ	Rn <sub>2</sub> [N]				
							B5	160	180 (*)	132			160	180 (*)	HC		HZ
1400	3/V 13L3	370	3.8	39500	19.6	—	—	—	—	160	180 (*)	—	—	130000	153900	51400	326
	3/V 13L3	425	3.3	46900	19.5	—	—	—	—	160	180 (*)	—	—	135500	160400	53800	326
	3/V 13L3	516	2.7	52000	18.5	—	—	—	—	160	180 (*)	—	—	143600	170000	57400	326
	3/V 13L3	567	2.5	48300	15.6	—	—	—	—	160	180 (*)	—	—	147700	174800	59200	326
	3/V 13L3	673	2.1	49500	13.5	—	—	—	—	160	180 (*)	—	—	155500	184100	62700	326
	3/V 13L3	741	1.9	45800	12.4	—	—	—	132	160	—	—	—	160100	189400	64700	326
	3/V 13L3	810	1.7	44900	10.2	—	—	—	—	160	180 (*)	—	—	164400	194600	66700	326
	3/V 13L3	870	1.6	53800	12.4	—	—	—	132	160	—	—	—	168000	198800	68300	326
	3/V 13L3	1009	1.4	52500	9.8	—	—	—	132	160	—	—	—	175600	207900	71700	326
	3/V 13L3	1088	1.3	51200	9.6	—	100	112	132	—	—	—	—	179600	212600	73500	326
	3/V 13L3	1291	1.1	52900	8.4	—	100	112	132	—	—	—	—	189100	223800	77900	326
	3/V 13L3	1418	1.0	55000	8.0	—	100	112	132	—	—	—	—	192000	230200	80000	326
	3/V 13L3	1620	0.86	49000	6.0	—	—	—	132	160	—	—	—	192000	231000	80000	326
	3/V 13L3	1682	0.83	55000	6.7	—	100	112	132	—	—	—	—	192000	231000	80000	326
	3/V 13L3	2019	0.69	55000	5.7	—	100	112	132	—	—	—	—	192000	231000	80000	326
	3/V 13L3	2430	0.58	49000	4.2	—	100	112	132	—	—	—	—	192000	231000	80000	326




### 3/V 13L4

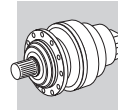
55000 Nm

n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC) 					MC/PC	MZ/PZ	Rn <sub>2</sub> [N]			
							B5 / B14	B5	80	90	100			112	132	80	
1400	3/V 13L4	2773	0.50	55000	4.1	—	80	90	100	112	132	—	—	192000	231000	80000	326
	3/V 13L4	3263	0.43	55000	3.2	—	80	90	100	112	132	—	—	192000	231000	80000	326
	3/V 13L4	3515	0.40	55000	3.0	—	80	90	100	112	132	—	—	192000	231000	80000	326
	3/V 13L4	4046	0.35	55000	2.8	—	80	90	100	112	132	—	—	192000	231000	80000	326
	3/V 13L4	4536	0.31	55000	2.5	—	80	90	100	112	132	—	—	192000	231000	80000	326
	3/V 13L4	5046	0.28	53000	2.3	—	80	90	100	112	132	—	—	192000	231000	80000	326

### 3/V 14L3




78000 Nm

n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC) 				MC/PC	MZ/PZ	Rn <sub>2</sub> [N]				
							B5	160	180 (*)	132			160	180 (*)	HC		HZ
1400	3/V 14L3	397	3.5	46100	21	—	—	—	—	160	180 (*)	—	—	141800	166400	59100	336
	3/V 14L3	446	3.1	47700	19.6	—	—	—	—	160	180 (*)	—	—	146800	172300	61500	336
	3/V 14L3	498	2.8	57800	21	—	—	—	—	160	180 (*)	—	—	151700	178200	63800	336
	3/V 14L3	579	2.4	56300	17.2	—	—	—	—	160	180 (*)	—	—	158800	186400	67100	336
	3/V 14L3	665	2.1	71000	19.6	—	—	—	—	160	180 (*)	—	—	165400	194200	70200	336
	3/V 14L3	695	2.0	43000	12.4	—	—	—	132	160	—	—	—	167700	196900	71300	336
	3/V 14L3	794	1.8	49300	11.7	—	—	—	132	160	—	—	—	174500	204900	74500	336
	3/V 14L3	893	1.6	55200	12.4	—	—	—	132	160	—	—	—	180700	212200	77500	336
	3/V 14L3	997	1.4	61900	11.7	—	—	—	132	160	—	—	—	186800	219300	80400	336
	3/V 14L3	1116	1.3	52500	9.6	—	100	112	132	—	—	—	—	193200	226900	83400	336
	3/V 14L3	1324	1.1	62300	9.6	—	100	112	132	—	—	—	—	203400	238800	88300	336
	3/V 14L3	1339	1.0	47700	7.5	—	100	112	132	—	—	—	—	204100	239600	88700	336
	3/V 14L3	1589	0.88	56600	7.5	—	100	112	132	—	—	—	—	206000	243000	90000	336
	3/V 14L3	1662	0.84	78200	9.6	—	100	112	132	—	—	—	—	206000	243000	90000	336
	3/V 14L3	1994	0.70	71000	7.5	—	100	112	132	—	—	—	—	206000	243000	90000	336
	3/V 14L3	2318	0.60	64000	5.8	—	100	112	132	—	—	—	—	206000	243000	90000	336






### 3/V 14L4

### 84000 Nm

n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC) 					Rn <sub>2</sub> [N]					
							MC/PC	MZ/PZ	HC	HZ	FZ	MC/PC	MZ/PZ	HC		HZ	FZ
1400	3/V 14L4	2504	0.56	84000	7.0	—	B5					—	—	206000	243000	90000	336
	3/V 14L4	2782	0.50	84000	6.1	—	100	112	132	—	—	206000	243000	90000	336		
	3/V 14L4	3182	0.44	84000	5.1	—	100	112	132	—	—	206000	243000	90000	336		
	3/V 14L4	3472	0.40	79200	4.4	—	—	—	132	—	—	206000	243000	90000	336		
	3/V 14L4	3993	0.35	79200	3.8	—	100	112	132	—	—	206000	243000	90000	336		
	3/V 14L4	4312	0.32	84000	4.1	—	100	112	132	—	—	206000	243000	90000	336		
	3/V 14L4	4959	0.28	84000	3.5	—	100	112	132	—	—	206000	243000	90000	336		




### 3/V 15L3

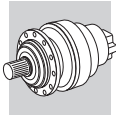
### 95000 Nm

n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC) 					Rn <sub>2</sub> [N]					
							MC/PC	MZ/PZ	HC	HZ	FZ	MC/PC	MZ/PZ	HC		HZ	FZ
1400	3/V 15L3	386	3.6	67300	30	—	B5					—	—	140600	165000	58600	346
	3/V 15L3	446	3.1	65100	27	—	132	160	180	200	225	—	—	146800	172300	61500	346
	3/V 15L3	498	2.8	85600	30	—	132	160	180	200	225	—	—	151700	178200	63800	346
	3/V 15L3	560	2.5	81700	27	—	132	160	180	200	225	—	—	157100	184500	66300	346
	3/V 15L3	665	2.1	89100	25	—	132	160	180	200	225	—	—	165400	194200	70200	346
	3/V 15L3	840	1.7	80400	18.0	—	132	160	180	200	225	—	—	177500	208400	75900	346
	3/V 15L3	997	1.4	94400	17.8	—	132	160	180	200	225	—	—	186800	219300	80400	346
	3/V 15L3	1120	1.3	92200	16.4	—	132	160	180	200	225	—	—	193500	227100	83500	346
	3/V 15L3	1329	1.1	98300	14.8	—	132	160	180	200	225	—	—	203700	239100	88500	346
	3/V 15L3	1400	1.0	86900	12.7	—	132	160	180	200	225	—	—	206000	242900	90000	346
	3/V 15L3	1662	0.84	99000	12.2	—	132	160	180	200	225	—	—	206000	243000	90000	346
	3/V 15L3	1994	0.70	94300	10.1	—	132	160	180	200	225	—	—	206000	243000	90000	346
	3/V 15L3	2318	0.60	80000	7.4	—	132	160	180	200	225	—	—	206000	243000	90000	346

### 3/V 15L4




### 100000 Nm

n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC) 					Rn <sub>2</sub> [N]					
							MC/PC	MZ/PZ	HC	HZ	FZ	MC/PC	MZ/PZ	HC		HZ	FZ
1400	3/V 15L4	2780	0.50	105000	7.2	—	B5					—	—	206000	243000	90000	346
	3/V 15L4	3300	0.42	105000	6.1	—	—	—	132	160 (*)	—	—	—	206000	243000	90000	346
	3/V 15L4	3489	0.40	99000	5.4	—	—	—	132	160 (*)	—	—	—	206000	243000	90000	346
	3/V 15L4	4171	0.34	105000	5.1	—	100	112	132	—	—	—	—	206000	243000	90000	346
	3/V 15L4	4950	0.28	105000	4.3	—	100	112	132	—	—	—	—	206000	243000	90000	346
	3/V 15L4	5234	0.27	99000	3.8	—	100	112	132	—	—	—	—	206000	243000	90000	346






### 3/V 16L3

**130000 Nm**

n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC) 					MC/PC	MZ/PZ	R <sub>n2</sub> [N]			
							HC	HZ	FZ								
1400	3/V 16L3	397	3.5	71000	32	—	B5					—	—	235700	262100	98600	356
	3/V 16L3	446	3.1	65100	27	—	132	160	180	200	225	—	—	244100	271400	102500	356
	3/V 16L3	530	2.6	77200	27	—	132	160	180	200	225	—	—	256900	285800	108500	356
	3/V 16L3	669	2.1	64000	18.0	—	132	160	180	200	225	—	—	275600	306500	117300	356
	3/V 16L3	794	1.8	76000	18.0	—	132	160	180	200	225	—	—	290200	322700	124200	356
	3/V 16L3	869	1.6	54000	12.7	—	132	160	180	200	225	—	—	298100	331600	128000	356
	3/V 16L3	1059	1.3	87200	16.4	—	132	160	180	200	225	—	—	316300	351800	136700	356
	3/V 16L3	1339	1.0	63300	10.1	—	132	160	180	200	225	—	—	339300	377400	147800	356
	3/V 16L3	1589	1.88	75100	10.1	—	132	160	180	200	225	—	—	345000	385000	150000	356




### 3/V 16L4

**130000 Nm**

n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC) 					MC/PC	MZ/PZ	R <sub>n2</sub> [N]			
							HC	HZ	FZ								
1400	3/V 16L4	1826	0.77	108300	11.3	—	B5					—	—	345000	385000	150000	356
	3/V 16L4	2167	0.65	128500	11.3	—	—	—	132	160 (*)	—	—	—	345000	385000	150000	356
	3/V 16L4	2343	0.60	135000	11.0	—	—	—	132	160 (*)	—	—	—	345000	385000	150000	356
	3/V 16L4	2738	0.51	114100	8.4	—	100	112	132	—	—	—	—	345000	385000	150000	356
	3/V 16L4	3250	0.43	132000	8.2	—	100	112	132	—	—	—	—	345000	385000	150000	356
	3/V 16L4	3514	0.40	135000	7.7	—	100	112	132	—	—	—	—	345000	385000	150000	356
	3/V 16L4	4171	0.34	132000	6.4	—	100	112	132	—	—	—	—	345000	385000	150000	356
	3/V 16L4	4950	0.28	124000	5.0	—	100	112	132	—	—	—	—	345000	385000	150000	356




### 3/V 17L3

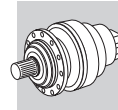
**150000 Nm**

n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC) 					MC/PC	MZ/PZ	R <sub>n2</sub> [N]			
							HC	HZ	FZ								
1400	3/V 17L3	405	3.5	120700	52	—	B5					—	—	304800	324500	99200	364
	3/V 17L3	425	3.3	106700	44	—	132	160	180	200	225	—	—	309300	329300	100800	364
	3/V 17L3	512	2.7	128400	44	—	132	160	180	200	225	—	—	327000	348200	107300	364
	3/V 17L3	567	2.5	118700	38	—	132	160	180	200	225	—	—	337200	359000	111000	364
	3/V 17L3	608	2.3	127600	37	—	132	160	180	200	225	—	—	344200	366500	113600	364
	3/V 17L3	683	2.1	142900	38	—	132	160	180	200	225	—	—	356500	379500	118100	364
	3/V 17L3	810	1.7	133300	30	—	132	160	180	200	225	—	—	375300	399500	125000	364
	3/V 17L3	851	1.6	106700	23.3	—	132	160	180	200	225	—	—	380800	405400	127000	364
	3/V 17L3	1024	1.4	128400	23.3	—	132	160	180	200	225	—	—	402600	428600	135100	364
	3/V 17L3	1134	1.2	128000	22.3	—	132	160	180	200	225	—	—	415100	442000	139800	364
	3/V 17L3	1215	1.2	141900	21.7	—	132	160	180	200	225	—	—	423800	451200	143100	364
	3/V 17L3	1365	1.0	154100	22.3	—	132	160	180	200	225	—	—	438900	467300	148700	364

### 3/V 17L4




**180000 Nm**

n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC) 					MC/PC	MZ/PZ	R <sub>n2</sub> [N]			
							HC	HZ	FZ								
1400	3/V 17L4	1780	0.79	180000	19.1	—	B5					—	—	442000	470000	150000	364
	3/V 17L4	2065	0.68	179000	15.8	—	—	—	—	160	180 (*)	—	—	442000	470000	150000	364
	3/V 17L4	2485	0.56	155000	11.4	—	—	—	—	160	180 (*)	—	—	442000	470000	150000	364
	3/V 17L4	2773	0.50	166400	12.4	—	—	—	132	160	—	—	—	442000	470000	150000	364
	3/V 17L4	3168	0.44	180000	11.0	—	—	—	132	160	—	—	—	442000	470000	150000	364
	3/V 17L4	3583	0.39	170000	9.0	—	—	—	—	160	180 (*)	—	—	442000	470000	150000	364
	3/V 17L4	4129	0.34	179000	8.4	—	—	—	132	160	—	—	—	442000	470000	150000	364
	3/V 17L4	4449	0.31	180000	8.6	—	100	112	132	—	—	—	—	442000	470000	150000	364
	3/V 17L4	4970	0.28	155000	6.0	—	—	—	132	160	—	—	—	442000	470000	150000	364






### 3/V 18L4

**250000 Nm**

n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC) 					MC/PC	MZ/PZ	Rn <sub>2</sub> [N]			
							B5							HC	HZ	FZ	
<b>1400</b>	3/V 18L4	<b>765</b>	1.8	185000	44	—	132	160	180	200	225	—	—	462800	472300	163500	372
	3/V 18L4	<b>982</b>	1.4	237400	44	—	132	160	180	200	225	—	—	498800	509000	177700	372
	3/V 18L4	<b>1165</b>	1.2	250000	39	—	132	160	180	200	225	—	—	503000	535800	188100	372
	3/V 18L4	<b>1232</b>	1.1	250000	37	—	132	160	180	200	225	—	—	503000	544900	191700	372
	3/V 18L4	<b>1473</b>	0.95	250000	31	—	132	160	180	200	225	—	—	503000	565000	200000	372
	3/V 18L4	<b>1748</b>	0.80	250000	26	—	132	160	180	200	225	—	—	503000	565000	200000	372
	3/V 18L4	<b>1848</b>	0.76	250000	25	—	132	160	180	200	225	—	—	503000	565000	200000	372
	3/V 18L4	<b>2295</b>	0.61	212900	18.0	—	132	160	180	200	225	—	—	503000	565000	200000	372
	3/V 18L4	<b>2464</b>	0.57	250000	19.2	—	132	160	180	200	225	—	—	503000	565000	200000	372
	3/V 18L4	<b>2945</b>	0.48	250000	16.4	—	132	160	180	200	225	—	—	503000	565000	200000	372
	3/V 18L4	<b>3495</b>	0.40	250000	13.8	—	132	160	180	200	225	—	—	503000	565000	200000	372
	3/V 18L4	<b>3696</b>	0.38	250000	13.1	—	132	160	180	200	225	—	—	503000	565000	200000	372
	3/V 18L4	<b>4386</b>	0.32	250000	11.0	—	132	160	180	200	225	—	—	503000	565000	200000	372
	3/V 18L4	<b>5099</b>	0.27	244000	9.3	—	132	160	180	200	225	—	—	503000	565000	200000	372




### 3/V 19L4

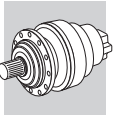
**350000 Nm**

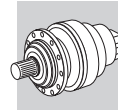
n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC) 					MC/PC	MZ/PZ	Rn <sub>2</sub> [N]			
							B5							HC	HZ	FZ	
<b>1400</b>	3/V 19L4	<b>2582</b>	0.54	350000	26	—	132	160	180	200	225	—	—	638000	702000	200000	380
	3/V 19L4	<b>3231</b>	0.43	340000	19.9	—	132	160	180	200	225	—	—	638000	702000	200000	380
	3/V 19L4	<b>4095</b>	0.34	350000	16.5	—	132	160	180	200	225	—	—	638000	702000	200000	380
	3/V 19L4	<b>4457</b>	0.31	340000	14.4	—	132	160	180	200	225	—	—	638000	702000	200000	380
	3/V 19L4	<b>5164</b>	0.27	350000	14.0	—	132	160	180	200	225	—	—	638000	702000	200000	380

### 3/V 21L4

**520000 Nm**

n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC) 					MC/PC	MZ/PZ	Rn <sub>2</sub> [N]			
							B5							HC	HZ	FZ	
<b>1400</b>	3/V 21L4	<b>1062</b>	1.3	443000	74	—	132	160	180	200	225	—	—	720000	853800	1094300	388
	3/V 21L4	<b>1260</b>	1.1	425500	60	—	132	160	180	200	225	—	—	757900	898800	1158600	388
	3/V 21L4	<b>1517</b>	0.92	512200	60	—	132	160	180	200	225	—	—	779000	923000	1200000	388
	3/V 21L4	<b>1800</b>	0.78	498000	49	—	132	160	180	200	225	—	—	779000	923000	1200000	388
	3/V 21L4	<b>1890</b>	0.74	460000	44	—	132	160	180	200	225	—	—	779000	923000	1200000	388
	3/V 21L4	<b>2275</b>	0.62	540000	43	—	132	160	180	200	225	—	—	779000	923000	1200000	388
	3/V 21L4	<b>2520</b>	0.56	511700	38	—	132	160	180	200	225	—	—	779000	923000	1200000	388
	3/V 21L4	<b>2700</b>	0.52	498000	34	—	132	160	180	200	225	—	—	779000	923000	1200000	388
	3/V 21L4	<b>3600</b>	0.39	498000	25.8	—	132	160	180	200	225	—	—	779000	923000	1200000	388
	3/V 21L4	<b>3780</b>	0.37	460000	23.5	—	132	160	180	200	225	—	—	779000	923000	1200000	388
	3/V 21L4	<b>4550</b>	0.31	540000	22.7	—	132	160	180	200	225	—	—	779000	923000	1200000	388
	3/V 21L4	<b>5040</b>	0.28	540000	21.8	—	132	160	180	200	225	—	—	779000	923000	1200000	388





**27.0 - DATI TECNICI RIDOTTO-  
RI COMBINATI - 3/A**

**27.0 - 3/A - COMBINED UNIT-  
SRATING CHARTS**

**27.0 - 3/A - TECHNISCHE  
DATEN DER GETRIEBE**

**27.0 - DONNEES TECHNIQUES  
REDUCTEURS COMBINÉ  
3/A**

Guida alla consultazione delle  
tabelle.

Reading the rating chart.




Anleitung für die richtige Konsul-  
tation der Tabellen.

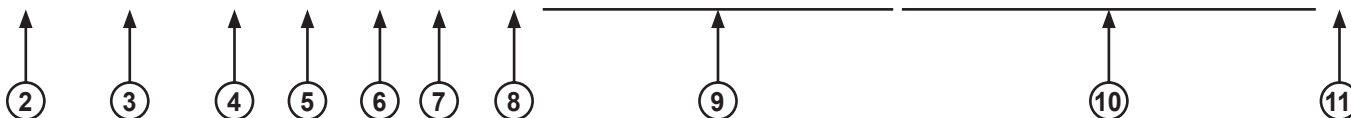
Guide pour la consultation des  
tableaux.



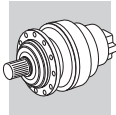
**3/A 00L2**

**650 Nm**

n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC) 						Rn <sub>2</sub> [N]					
							MC/PC	MZ/PZ	HC	HZ	FZ							
<b>1400</b>	3/A 00 L2	19.1	73	470	4.0	—	63	71	80	90	100	112	2910	2910	8460	9720	1910	231
	3/A 00 L2	23.4	60	580	4.0	—	63	71	80	90	100	112	3110	3110	9000	10300	2050	231
	3/A 00 L2	31.7	44	650	3.3	—	63	71	80	90	100	112	3440	3440	9850	11300	2260	231
	3/A 00 L2	39.6	35	550	2.2	—	63	71	80	90	100	112	3710	3710	10500	12100	2440	231
	3/A 00 L2	41.5	34	650	2.5	—	63	71	80	90	100	112	3770	3770	10700	12300	2480	231






1	Coppia massima trasmissibile dal riduttore	<i>Gearbox max. transmissible torque</i>	Nenn-Drehmoment am Abtrieb des Bezuggetriebes	<i>Couple maximum du réducteur</i>
2	Velocità di comando riduttore	<i>Gearbox drive speed</i>	Drehzahl am Getriebeantrieb	<i>Vitesse angulaire à l'entrée du réducteur</i>
3	Grandezza riduttore in esecuzione combinata planetario-ortogonale	<i>Frame size of combined planetary+bevel helical unit</i>	Baugröße des kombinierten Getriebes 300 + Kegelfradgetriebe Serie A	<i>Taille réducteur combiné série 300 + réducteur à axes orthogonaux série A</i>
4	Rapporto di riduzione	<i>Gear ratio</i>	Übersetzung	<i>Rapport de réduction</i>
5	Velocità angolare all'albero lento	<i>Gearbox output speed</i>	Drehzahl am Getriebeabtrieb	<i>Vitesse angulaire en sortie réducteur</i>
6	Coppia nominale all'albero lento del riduttore, basata su: - fattore di sicurezza S=1 - durata teorica di 10000 h	<i>Gearbox rated output torque, based on: - safety factor S=1 - 10000 h theoretical lifetime</i>	Nenn-Drehmoment am Getriebeabtrieb mit: - Sicherheitsfaktor S=1 - Dauer von 10000 h	<i>Couple nominal à la sortie du réducteur pendant : - facteur de sécurité S=1 - durée de 10000 h</i>
7	Potenza nominale all'albero veloce del riduttore, basata su: - fattore di sicurezza S=1 - durata teorica di 10000 h	<i>Gearbox rated input power, based on: - safety factor S=1 - 10000 h theoretical lifetime</i>	Nenn-Leistung im Getriebeantrieb mit: - Sicherheitsfaktor S=1 - Dauer von 10000 h	<i>Puissance nominale en entrée réducteur pendant : - facteur de sécurité S=1 - durée de 10000 h</i>
8	Potenza termica riduttore	<i>Gearbox thermal capacity</i>	Wärmeleistung	<i>Puissance thermique réducteur</i>
9	Grandezza motore elettrico IEC installabile	<i>Frame size of available IEC motor</i>	Baugröße einbaubarer IEC-Elektromotor	<i>Taille IEC moteur électrique à installer</i>
10	Carichi radiali applicabili all'albero lento, basati su: - fattore di sicurezza S=1 - durata teorica 10000 h Per forze non applicate in mezzzeria riferirsi ai diagrammi riportati a seguito delle pagine dimensionali del riduttore in oggetto	<i>Permitted overhung loading on output shaft, based on: - safety factor S=1 - 10000 hrs theoretical lifetime For forces applying off the shaft midpoint, see diagrams provided in the pages following dimensions of the gearbox under study</i>	Auf die Mitte der Abtriebswelle für: - Dauer von 10000 Std. applizierbare Nenn-Radialkräfte - Sicherheitsfaktor S=1 Für andere Kraftangriffspunkte verweisen wir auf die Diagramme, die den Seiten mit den Maßen der gewählten Größe folgen	<i>Charges radiales nominales applicables à la moitié de l'arbre pendant : - facteur de sécurité S=1 - durée de 10000 h Pour d'autres positions de charge, voir diagrammes figurant à la suite des pages dimensions de la taille sélectionnée</i>
11	Pagina delle dimensioni	<i>Page installation drawing can be found at</i>	Maßseiten	<i>Page avec les dimensions</i>






### 3/A 00L2

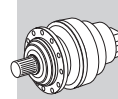
### 650 Nm

n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC) 						Rn <sub>2</sub> [N]					
							MC/PC	MZ/PZ	HC	HZ	FZ	MC/PC	MZ/PZ	HC	HZ	FZ		
<b>1400</b>	3/A 00 L2	19.1	73	470	4.0	—	63	71	80	90	100	112	2910	2910	8460	9720	1910	231
	3/A 00 L2	23.4	60	580	4.0	—	63	71	80	90	100	112	3110	3110	9000	10300	2050	231
	3/A 00 L2	31.7	44	650	3.3	—	63	71	80	90	100	112	3440	3440	9850	11300	2260	231
	3/A 00 L2	39.6	35	550	2.2	—	63	71	80	90	100	112	3710	3710	10500	12100	2440	231
	3/A 00 L2	41.5	34	650	2.5	—	63	71	80	90	100	112	3770	3770	10700	12300	2480	231
	3/A 00 L2	51.8	27.0	550	1.7	—	63	71	80	90	100	112	4060	4060	11400	13100	2670	231
	3/A 00 L2	61.2	22.9	650	1.7	—	63	71	80	90	100	112	4290	4290	12000	13800	2820	231
	3/A 00 L2	71.0	19.7	650	1.5	—	63	71	80	90	100	112	4500	4500	12500	14400	2960	231
	3/A 00 L2	80.2	17.5	650	1.3	—	63	71	80	90	100	112	4690	4690	13000	14900	3080	231
	3/A 00 L2	88.6	15.8	550	1.0	—	63	71	80	90	100	112	4850	4850	13400	15400	3190	231
	3/A 00 L2	100	14.0	550	0.88	—	63	71	80	90	100	112	5050	5050	13900	16000	3320	231
	3/A 00 L2	107	13.0	650	0.97	—	63	71	80	90	100	112	5170	5170	14200	16300	3400	231
	3/A 00 L2	134	10.5	550	0.66	—	63	71	80	90	100	112	5570	5570	15200	17400	3660	231
	3/A 00 L2	171	8.2	550	0.52	—	63	71	80	90	100	112	6040	6040	16300	18800	3970	231
	3/A 00 L2	203	6.9	650	0.52	—	63	71	80	90	100	112	6390	6390	17200	19700	4200	231
	3/A 00 L2	219	6.4	620	0.46	—	63	71	80	90	100	112	6550	6550	17600	20200	4310	231
	3/A 00 L2	253	5.5	550	0.35	—	63	71	80	90	100	112	6880	6880	18400	21100	4520	231
	3/A 00 L2	296	4.7	660	0.36	—	63	71	80	90	100	112	7250	7250	19200	22100	4770	231
	3/A 00 L2	319	4.4	440	0.22	—	63	71	—	—	—	—	7430	7430	19700	22600	4890	231
	3/A 00 L2	369	3.8	570	0.25	—	63	71	80	90	100	112	7800	7800	20600	23600	5130	231
	3/A 00 L2	391	3.6	540	0.22	—	63	71	—	—	—	—	7950	7950	20900	24000	5230	231
	3/A 00 L2	441	3.2	700	0.26	—	63	71	—	—	—	—	8280	8280	21700	24900	5440	231
	3/A 00 L2	550	2.5	600	0.17	—	63	71	—	—	—	—	8910	8910	23200	26600	5860	231
	3/A 00 L2	660	2.1	620	0.15	—	63	71	—	—	—	—	9470	9470	24500	28100	6220	231

### 3/A 01L2




### 1100 Nm

n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC) 						Rn <sub>2</sub> [N]					
							MC/PC	MZ/PZ	HC	HZ	FZ	MC/PC	MZ/PZ	HC	HZ	FZ		
<b>1400</b>	3/A 01 L2	18.8	74	710	6.1	—	—	—	80	90	100	112	2890	2890	8420	9670	1900	239
	3/A 01 L2	23.0	61	870	6.1	—	—	—	80	90	100	112	3090	3090	8950	10300	2030	239
	3/A 01 L2	31.2	45	1180	6.1	—	—	—	80	90	100	112	3420	3420	9800	11300	2250	239
	3/A 01 L2	35.8	39	760	3.4	—	—	—	80	90	100	112	3590	3590	10200	11700	2360	239
	3/A 01 L2	40.1	35	870	3.5	—	63	71	80	90	100	112	3720	3720	10600	12100	2450	239
	3/A 01 L2	43.9	32	930	3.4	—	—	—	80	90	100	112	3840	3840	10900	12500	2520	239
	3/A 01 L2	49.1	28.5	830	2.7	—	63	71	80	90	100	112	3980	3980	11200	12900	2620	239
	3/A 01 L2	54.2	25.8	1180	3.5	—	63	71	80	90	100	112	4120	4120	11600	13300	2710	239
	3/A 01 L2	59.4	23.6	1260	3.4	—	—	—	80	90	100	112	4240	4240	11900	13700	2790	239
	3/A 01 L2	74.2	18.9	1150	2.5	—	—	—	80	90	100	112	4570	4570	12700	14600	3000	239
	3/A 01 L2	81.3	17.2	1300	2.6	—	63	71	80	90	100	112	4710	4710	13100	15000	3100	239
	3/A 01 L2	102	13.8	1150	1.8	—	63	71	80	90	100	112	5070	5070	14000	16000	3340	239
	3/A 01 L2	133	10.5	1300	1.6	—	63	71	80	90	100	112	5560	5560	15200	17400	3650	239
	3/A 01 L2	166	8.4	1150	1.1	—	63	71	80	90	100	112	5980	5980	16200	18600	3930	239
	3/A 01 L2	184	7.6	1030	0.90	—	63	71	80	90	100	112	6190	6190	16700	19200	4070	239
	3/A 01 L2	204	6.9	1300	1.0	—	63	71	80	90	100	112	6410	6410	17200	19800	4210	239
	3/A 01 L2	220	6.4	830	0.61	—	63	71	80	90	100	112	6560	6560	17600	20200	4310	239
	3/A 01 L2	255	5.5	1150	0.73	—	63	71	80	90	100	112	6900	6900	18400	21100	4530	239
	3/A 01 L2	269	5.2	1010	0.61	—	63	71	80	90	100	112	7020	7020	18700	21500	4620	239
	3/A 01 L2	311	4.5	1150	0.59	—	63	71	80	90	100	112	7370	7370	19500	22400	4850	239
	3/A 01 L2	364	3.8	1350	0.60	—	63	71	80	90	100	112	7770	7770	20500	23500	5110	239
	3/A 01 L2	393	3.6	830	0.34	—	63	71	—	—	—	—	7970	7970	21000	24100	5240	239
	3/A 01 L2	454	3.1	1150	0.41	—	63	71	80	90	100	112	8360	8360	21900	25100	5500	239
	3/A 01 L2	533	2.6	1120	0.34	—	63	71	—	—	—	—	8820	8820	23000	26400	5800	239
	3/A 01 L2	665	2.1	1150	0.28	—	63	71	—	—	—	—	9490	9490	24500	28200	6240	239



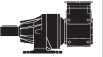


## 3/A 03L2

## 1800 Nm

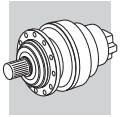
n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P <sub>-</sub> (IEC) 						R <sub>n2</sub> [N]					
													MC/PC	MZ/PZ	HC	HZ	FZ	
<b>1400</b>	3/A 03 L2	19.4	72	1050	8.7	—	—	—	80	90	100	112	8990	10400	17400	20900	5770	247
	3/A 03 L2	23.0	61	1240	8.7	—	—	—	80	90	100	112	9500	11000	18200	22000	6100	247
	3/A 03 L2	28.8	49	1550	8.7	—	—	—	80	90	100	112	10300	11800	19500	23500	6580	247
	3/A 03 L2	33.5	42	1760	8.4	—	—	—	80	90	100	112	10800	12400	20400	24600	6910	247
	3/A 03 L2	40.5	35	1650	6.6	—	—	—	80	90	100	112	11500	13300	21600	26000	7370	247
	3/A 03 L2	43.4	32	1760	6.5	—	—	—	80	90	100	112	11800	13600	22100	26600	7540	247
	3/A 03 L2	52.5	26.7	1650	5.1	—	—	—	80	90	100	112	12500	14500	23400	28100	8030	247
	3/A 03 L2	52.5	26.7	1650	5.1	—	—	—	80	90	100	112	12500	14500	23400	28100	8030	247
	3/A 03 L2	62.9	22.2	1550	4.0	—	63	71	80	90	100	112	13300	15400	24700	29700	8530	247
	3/A 03 L2	73.2	19.1	1780	3.9	—	63	71	80	90	100	112	14000	16100	25800	31100	8970	247
	3/A 03 L2	88.5	15.8	1650	3.0	—	63	71	80	90	100	112	14900	17200	27400	32900	9560	247
	3/A 03 L2	96.9	14.4	1690	2.8	—	63	71	80	90	100	112	15400	17700	28100	33800	9850	247
	3/A 03 L2	182	7.7	1800	1.6	—	63	71	80	90	100	112	18900	21900	33900	40800	12200	247
	3/A 03 L2	220	6.4	1650	1.2	—	63	71	80	90	100	112	20200	23300	35900	43200	12900	247
	3/A 03 L2	269	5.2	1800	1.1	—	63	71	80	90	100	112	21600	24900	38200	45900	13900	247
	3/A 03 L2	269	5.2	1800	1.1	—	63	71	80	90	100	112	21600	24900	38200	45900	13900	247
	3/A 03 L2	326	4.3	1670	0.83	—	63	71	80	90	100	112	23000	26600	40400	48600	14800	247
	3/A 03 L2	352	4.0	2020	0.92	—	63	71	80	90	100	112	23600	27300	41400	49800	15100	247
	3/A 03 L2	409	3.4	1910	0.75	—	63	71	80	90	100	112	24800	28700	43300	52100	15900	247
	3/A 03 L2	495	2.8	1730	0.56	—	63	71	80	90	100	112	26500	30500	45800	55200	17000	247
3/A 03 L2	574	2.4	1760	0.49	—	63	71	80	90	100	112	27800	32100	47900	57700	17800	247	
3/A 03 L2	605	2.3	1800	0.48	—	63	71	80	90	100	112	28300	32600	48700	58600	18100	247	
3/A 03 L2	731	1.9	1820	0.40	—	63	71	80	90	100	112	30100	34800	51500	62000	19300	247	

## 3/A 04L2

## 2900 Nm




n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P <sub>-</sub> (IEC) 						R <sub>n2</sub> [N]						
													MC/PC	MZ/PZ	HC	HZ	FZ		
<b>1400</b>	3/A 04 L2	18.7	75	1920	16.5	—	—	—	80	90	100	112	132	8880	10300	17200	20600	5700	257
	3/A 04 L2	22.1	63	2270	16.5	—	—	—	80	90	100	112	132	9380	10800	18000	21700	6020	257
	3/A 04 L2	25.6	55	1920	12.1	—	—	—	80	90	100	112	132	9850	11400	18800	22700	6320	257
	3/A 04 L2	27.7	50	2750	15.9	—	—	—	80	90	100	112	132	10100	11700	19300	23200	6490	257
	3/A 04 L2	30.2	46	2270	12.1	—	—	—	80	90	100	112	132	10400	12000	19800	23800	6680	257
	3/A 04 L2	35.3	40	2270	10.3	—	—	—	80	90	100	112	132	11000	12700	20800	25000	7040	257
	3/A 04 L2	39.1	36	2270	9.3	—	—	—	80	90	100	112	132	11400	13100	21400	25800	7280	257
	3/A 04 L2	44.3	32	2770	10.1	—	—	—	80	90	100	112	132	11800	13700	22200	26700	7590	257
	3/A 04 L2	49.7	28.2	2270	7.3	—	63	71	80	90	100	112	132	12300	14200	23000	27700	7890	257
	3/A 04 L2	54.5	25.7	2680	7.9	—	—	—	80	90	100	112	132	12700	14600	23700	28500	8140	257
	3/A 04 L2	62.4	22.4	2790	7.2	—	63	71	80	90	100	112	132	13300	15300	24600	29600	8510	257
	3/A 04 L2	68.4	20.5	2510	5.9	—	—	—	80	90	100	112	132	13700	15800	25300	30500	8770	257
	3/A 04 L2	81.7	17.1	2370	4.7	—	63	71	80	90	100	112	132	14500	16800	26700	32100	9310	257
	3/A 04 L2	90.7	15.4	2470	4.4	—	—	—	80	90	100	112	132	15000	17300	27600	33200	9640	257
	3/A 04 L2	102	13.7	2550	4.0	—	63	71	80	90	100	112	132	15600	18000	28500	34300	10000	257
	3/A 04 L2	117	12.0	2370	3.3	—	—	—	80	90	100	112	132	16400	18900	29700	35800	10500	257
	3/A 04 L2	129	10.8	2720	3.4	—	63	71	80	90	100	112	132	16900	19500	30600	36900	10800	257
	3/A 04 L2	149	9.4	2300	2.5	—	63	71	80	90	100	112	132	17700	20500	32000	38500	11400	257
	3/A 04 L2	162	8.6	2900	2.9	—	63	71	80	90	100	112	132	18200	21100	32800	39500	11700	257
	3/A 04 L2	174	8.1	2970	2.7	—	63	71	80	90	100	112	—	18700	21500	33500	40300	12000	257
	3/A 04 L2	205	6.8	3500	2.7	—	63	71	80	90	100	112	—	19700	22800	35200	42400	12700	257
	3/A 04 L2	226	6.2	3500	2.5	—	63	71	80	90	100	112	—	20400	23500	36200	43600	13100	257
	3/A 04 L2	250	5.6	3500	2.3	—	63	71	80	90	100	112	—	21100	24300	37300	44900	13500	257
	3/A 04 L2	283	4.9	2800	1.6	—	63	71	80	90	100	112	—	22000	25400	38800	46700	14100	257
	3/A 04 L2	317	4.4	2310	1.2	—	63	71	80	90	100	112	—	22800	26300	40100	48300	14600	257
	3/A 04 L2	349	4.0	2320	1.1	—	63	71	80	90	100	112	—	23500	27200	41300	49700	15100	257
	3/A 04 L2	386	3.6	2340	0.97	—	63	71	80	90	100	112	—	24400	28100	42600	51200	15600	257
	3/A 04 L2	469	3.0	2370	0.81	—	63	71	80	90	100	112	—	26000	30000	45100	54300	16700	257
	3/A 04 L2	521	2.7	2390	0.74	—	63	71	80	90	100	112	—	26900	31100	46500	56000	17300	257








### 3/A 05L2

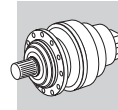
### 3600 Nm

n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC) 							R <sub>n2</sub> [N]					
							MC/PC	MZ/PZ	HC	HZ	FZ	MC/PC	MZ/PZ	HC	HZ	FZ			
1400	3/A 05L2	18.7	75	1920	16.5	—	—	—	80	90	100	112	132	8880	10300	17200	20600	5700	267
	3/A 05L2	22.1	63	2270	16.5	—	—	—	80	90	100	112	132	9380	10800	18000	21700	6020	267
	3/A 05L2	27.7	51	2850	16.5	—	—	—	80	90	100	112	132	10100	11700	19300	23200	6490	267
	3/A 05L2	32.2	43	3310	16.5	—	—	—	80	90	100	112	132	10600	12300	20200	24300	6830	267
	3/A 05L2	39.0	36	3020	12.5	—	—	—	80	90	100	112	132	11300	13100	21400	25700	7280	267
	3/A 05L2	44.0	32	3310	12.1	—	—	—	80	90	100	112	132	11800	13600	22200	26700	7580	267
	3/A 05L2	53.3	26.3	3040	9.2	—	—	—	80	90	100	112	132	12600	14500	23500	28300	8070	267
	3/A 05L2	57.0	24.5	3310	9.3	—	—	—	80	90	100	112	132	12900	14900	24000	28800	8260	267
	3/A 05L2	62.6	22.4	3220	8.3	—	—	—	80	90	100	112	132	13300	15300	24700	29700	8520	267
	3/A 05L2	72.5	19.3	3310	7.3	—	63	71	80	90	100	112	132	13900	16100	25800	31000	8950	267
	3/A 05L2	75.8	18.5	3060	6.5	—	—	—	80	90	100	112	132	14100	16300	26100	31400	9080	267
	3/A 05L2	85.6	16.4	3520	6.6	—	—	—	80	90	100	112	132	14700	17000	27100	32600	9450	267
	3/A 05L2	104	13.5	3080	4.8	—	—	—	80	90	100	112	132	15700	18100	28700	34500	10100	267
	3/A 05L2	121	11.6	3520	4.7	—	63	71	80	90	100	112	132	16500	19100	30000	36200	10600	267
	3/A 05L2	141	9.9	3600	4.1	—	63	71	80	90	100	112	132	17400	20100	31400	37800	11200	267
	3/A 05L2	162	8.6	2900	2.9	—	63	71	80	90	100	112	132	18200	21100	32800	39500	11700	267
	3/A 05L2	175	8.0	3600	3.3	—	63	71	80	90	100	112	132	18700	21600	33600	40400	12000	267
	3/A 05L2	212	6.6	3100	2.3	—	63	71	80	90	100	112	132	19900	23000	35600	42800	12800	267
	3/A 05L2	212	6.6	3100	2.3	—	63	71	80	90	100	112	132	19900	23000	35600	42800	12800	267
	3/A 05L2	241	5.8	4290	2.9	—	63	71	80	90	100	112	132	20800	24000	36900	44400	13300	267
	3/A 05L2	280	5.0	3600	2.1	—	63	71	80	90	100	112	132	21900	25200	38600	46500	14000	267
	3/A 05L2	329	4.3	3680	1.8	—	63	71	80	90	100	112	—	23100	26700	40600	48800	14800	267
	3/A 05L2	398	3.5	3200	1.3	—	63	71	80	90	100	112	—	24600	28400	42900	51700	15800	267
	3/A 05L2	422	3.3	4400	1.7	—	63	71	80	90	100	112	—	25100	29000	43700	52600	16100	267
	3/A 05L2	491	2.9	3880	1.3	—	63	71	80	90	100	112	—	26400	30500	45700	55000	16900	267
	3/A 05L2	594	2.4	3330	0.90	—	63	71	80	90	100	112	—	28100	32500	48400	58300	18000	267

### 3/A 06L2




### 6500 Nm

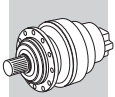
n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC) 										R <sub>n2</sub> [N]					
							MC/PC	MZ/PZ	HC	HZ	FZ	MC/PC	MZ/PZ	HC	HZ	FZ						
1400	3/A 06L2	27.7	51	3320	19.2	—	—	—	80	90	100	112	132	160	180	12600	14300	31600	36800	9470	277	
	3/A 06L2	32.7	43	3920	19.2	—	—	—	80	90	100	112	132	160	180	13300	15100	33200	38700	10000	277	
	3/A 06L2	34.9	40	3490	16.1	—	—	—	80	90	100	112	132	160	180	13600	15400	33900	39400	10200	277	
	3/A 06L2	41.1	34	4910	19.2	—	—	—	80	90	100	112	132	160	180	14400	16300	35500	41400	10800	277	
	3/A 06L2	47.2	29.7	3840	13.1	—	—	—	80	90	100	112	132	160	180	15000	17000	37000	43100	11300	277	
	3/A 06L2	51.7	27.1	5170	16.1	—	—	—	80	90	100	112	132	160	180	15500	17600	38100	44400	11700	277	
	3/A 06L2	55.7	25.1	4530	13.1	—	—	—	80	90	100	112	132	160	180	15900	18000	38900	45300	11900	277	
	3/A 06L2	60.1	23.3	6010	16.1	—	—	—	80	90	100	112	132	160	180	16300	18500	39800	46400	12300	277	
	3/A 06L2	69.9	20.0	5690	13.1	—	—	—	80	90	100	112	132	160	180	17200	19400	41700	48500	12900	277	
	3/A 06L2	81.2	17.2	6220	12.3	—	—	—	80	90	100	112	132	160	180	18000	20400	43600	50800	13500	277	
	3/A 06L2	88.5	15.8	6210	11.3	—	—	—	80	90	100	112	132	160	180	18600	21000	44700	52100	13900	277	
	3/A 06L2	98.2	14.2	5310	8.7	—	—	—	80	90	100	112	132	160	180	19200	21800	46200	53800	14400	277	
	3/A 06L2	112	12.5	6180	9.2	—	—	—	80	90	100	112	132	160	180	20100	22800	48000	55900	15100	277	
	3/A 06L2	125	11.2	5440	7.0	—	—	—	80	90	100	112	132	160	180	20800	23600	49600	57700	15600	277	
	3/A 06L2	141	9.9	7760	9.2	—	—	—	80	90	100	112	132	160	180	21700	24500	51400	59900	16300	277	
	3/A 06L2	164	8.6	6500	6.6	—	—	—	80	90	100	112	132	160	180	22800	25800	53800	62700	17100	277	
	3/A 06L2	190	7.4	7760	6.8	—	—	—	80	90	100	112	132	160	180	23900	27100	56300	65500	18000	277	
	3/A 06L2	198	7.1	5500	4.6	—	—	—	80	90	100	112	132	160	180	24300	27500	57000	66300	18200	277	
	3/A 06L2	221	6.3	6500	4.9	—	—	—	80	90	100	112	132	160	180	25200	28500	58900	68500	18900	277	
	3/A 06L2	267	5.2	5500	3.4	—	—	—	80	90	100	112	132	160	180	26800	30400	62300	72600	20100	277	
	3/A 06L2	276	5.1	7760	4.7	—	63	71	80	90	100	112	132	160	180	27100	30700	62900	73300	20400	277	
	3/A 06L2	321	4.4	6630	3.4	—	63	71	80	90	100	112	132	160	180	28500	32300	65800	76700	21400	277	
	3/A 06L2	388	3.6	5680	2.4	—	63	71	80	90	100	112	132	160	180	30400	34400	69700	81200	22800	277	
	3/A 06L2	380	3.7	6180	2.7	—	63	71	80	90	100	112	132	160	180	30200	34200	69300	80700	22700	277	
	3/A 06L2	435	3.2	7760	3.0	—	63	71	80	90	100	112	132	160	180	31500	35700	72100	84000	23700	277	
	3/A 06L2	505	2.8	7090	2.3	—	63	71	80	90	100	112	132	160	180	33200	37600	75500	87900	24900	277	
	3/A 06L2	555	2.5	7190	2.2	—	63	71	80	90	100	112	132	160	180	34200	38800	77600	90400	25700	277	
	3/A 06L2	611	2.3	6000	1.6	—	63	71	80	90	100	112	132	160	180	35300	40000	79900	93000	26600	277	
	3/A 06L2	671	2.1	6100	1.5	—	63	71	80	90	100	112	132	160	180	36500	41300	82200	95700	27400	277	



### 3/A 07L2

### 9000 Nm

n <sub>1</sub> min <sup>-1</sup>		i	n <sub>2</sub> min <sup>-1</sup>	M <sub>n2</sub> Nm	P <sub>n1</sub> kW	Pt kW	P (IEC) 										Rn <sub>2</sub> [N]					
							MC/PC	MZ/PZ	HC	HZ	FZ	MC/PC	MZ/PZ	HC	HZ	FZ						
<b>1400</b>	3/A 07L2	27.1	52	6650	39	—	—	—	—	—	—	—	132	160	180	13900	17400	33700	44200	12100	287	
	3/A 07L2	32.3	43	7940	39	—	—	—	—	—	—	—	132	160	180	14700	18500	35600	46600	12800	287	
	3/A 07L2	41.5	34	8310	32	—	—	—	—	—	—	—	132	160	180	16000	20100	38300	50200	13900	287	
	3/A 07L2	49.2	28.4	8040	26	—	—	—	—	—	—	—	132	160	180	17000	21300	40400	52900	14700	287	
	3/A 07L2	57.3	24.5	6650	18.7	—	—	—	80	90	100	112	132	160	180	17800	22400	42200	55400	15500	287	
	3/A 07L2	68.3	20.5	7940	18.7	—	—	—	80	90	100	112	132	160	180	18900	23700	44500	58400	16400	287	
	3/A 07L2	87.7	16.0	9590	17.6	—	—	—	80	90	100	112	132	160	180	20600	25800	48000	62900	17900	287	
	3/A 07L2	109	12.9	8830	13.5	—	—	—	80	90	100	112	132	160	180	22100	27700	51200	67100	19200	287	
	3/A 07L2	130	10.8	11100	14.2	—	—	—	80	90	100	112	132	160	180	23400	29400	54000	70700	20400	287	
	3/A 07L2	140	10.0	11100	13.2	—	—	—	80	90	100	112	132	160	180	24000	30200	55300	72400	20900	287	
	3/A 07L2	155	9.0	9000	9.6	—	—	—	80	90	100	112	132	160	180	24900	31200	56900	74600	21600	287	
	3/A 07L2	180	7.8	10600	9.8	—	—	—	80	90	100	112	132	160	180	26100	32800	59600	78100	22700	287	
	3/A 07L2	198	7.1	8700	7.3	—	—	—	80	90	100	112	132	160	180	27000	33800	61200	80300	23400	287	
	3/A 07L2	223	6.3	9000	6.7	—	63	71	80	90	100	112	132	160	180	28100	35200	63500	83200	24400	287	
	3/A 07L2	241	5.8	9000	6.2	—	63	71	80	90	100	112	132	160	180	28800	36200	65000	85200	25000	287	
	3/A 07L2	282	5.0	8710	5.1	—	—	—	80	90	100	112	132	160	180	30300	38100	68100	89300	26400	287	
3/A 07L2	341	4.1	11100	5.4	—	63	71	80	90	100	112	132	160	180	32300	40600	72200	94600	28100	287		
3/A 07L2	405	3.5	9170	3.8	—	63	71	80	90	100	112	132	160	180	34200	43000	76000	99500	29800	287		
3/A 07L2	439	3.2	9270	3.5	—	63	71	80	90	100	112	132	160	180	35200	44100	77800	102000	30600	287		



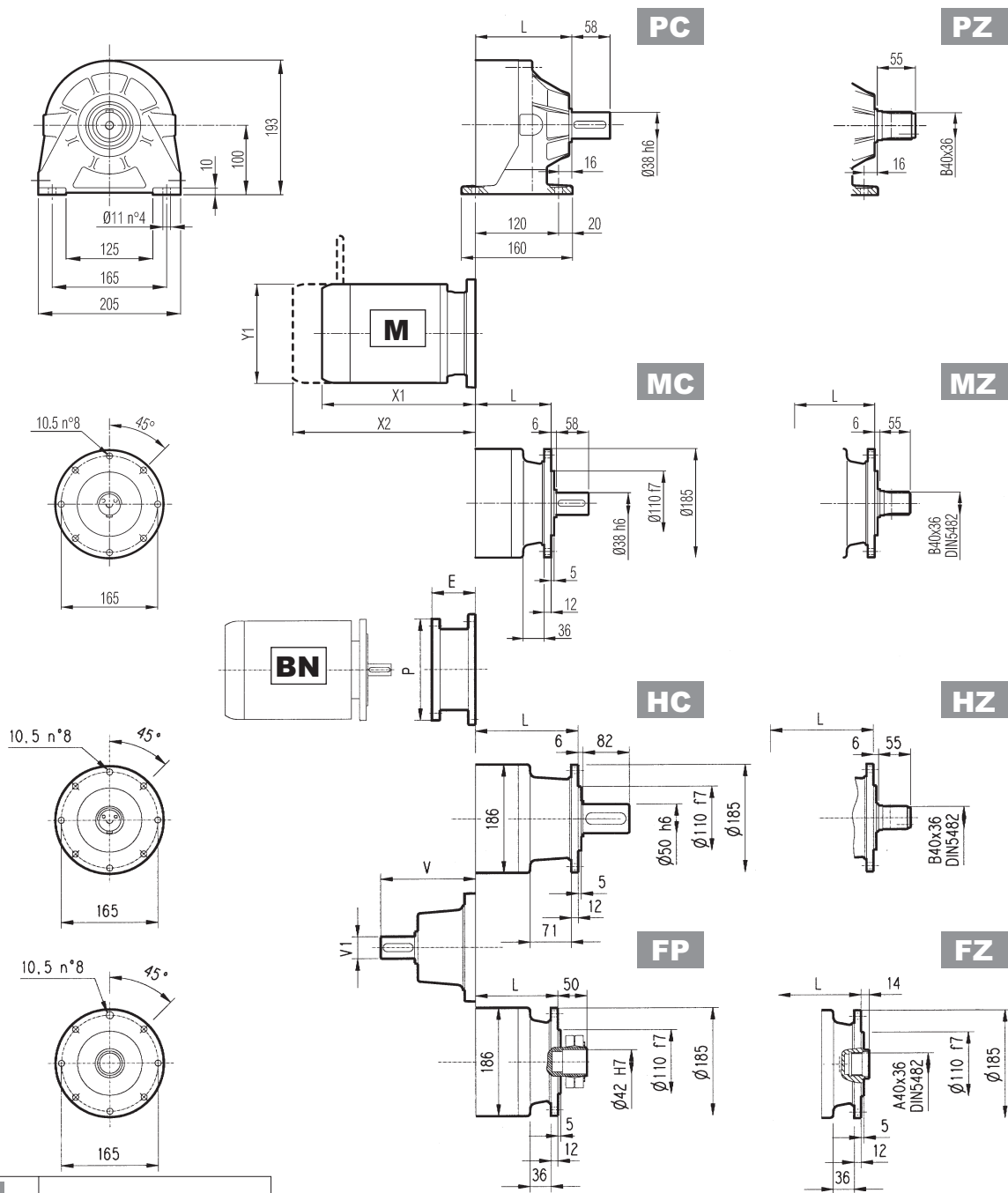
# 300 L

## 28.0 - DIMENSIONI

## 28.0 - DIMENSIONS

## 28.0 - ABMESSUNGEN

## 28.0 - DIMENSIONS



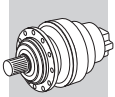
**FP**  $M_{2max} = 1200 \text{ Nm}$

	L				$\text{Kg}$				V	V1	$\text{Kg}$	V	V1	$\text{Kg}$
	MC - MZ	PC - PZ	HC - HZ	FP - FZ	MC - MZ	PC - PZ	HC - HZ	FP - FZ						
300 L1	80	86	115	80	18	23	20	16	137.5	24	6	158	38	7
300 L2	133	139	168	133	22	27	24	20	137.5	24	6	158	38	7
300 L3	186	192	221	186	26	31	28	24	137.5	24	6	158	38	7
300 L4	239	245	274	239	30	35	32	28	137.5	24	6	158	38	7

	P71		P80		P90		P100		P112		P132	
	E	P	E	P	E	P	E	P	E	P	E	P
300 L1	65	160	84	200	84	200	94	250	94	250	114	300
300 L2	65	160	84	200	84	200	94	250	94	250	114	300
300 L3	65	160	84	200	84	200	94	250	94	250	114	300
300 L4	65	160	84	200	84	200	94	250	94	250	114	300

	S1 + M1S			S1 + M1L			S2 + M2S			S3 + M3S			S3 + M3L			S4 + M4		
	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1
300 L1	229	292	138	253	314	138	280	352	156	325	421	195	357	449	195	460	571	258
300 L2	229	292	138	253	314	138	280	352	156	325	421	195	357	449	195	460	571	258
300 L3	229	292	138	253	314	138	280	352	156	325	421	195	357	449	195	460	571	258
300 L4	229	292	138	253	314	138	280	352	156	325	421	195	357	449	195	460	571	258

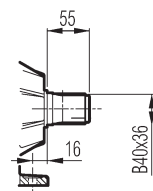
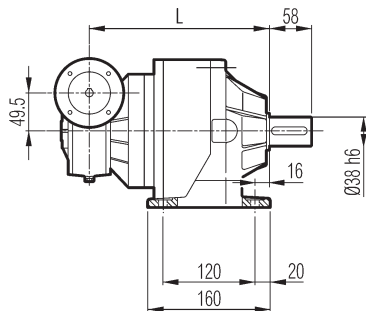
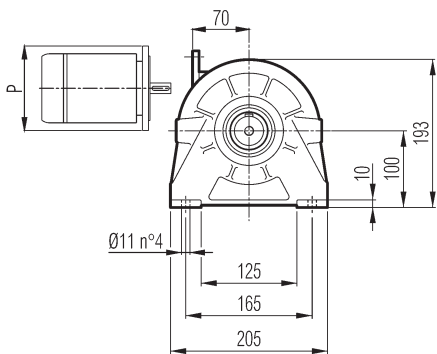




# 3/V 00L3

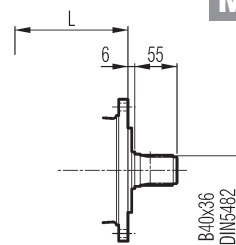
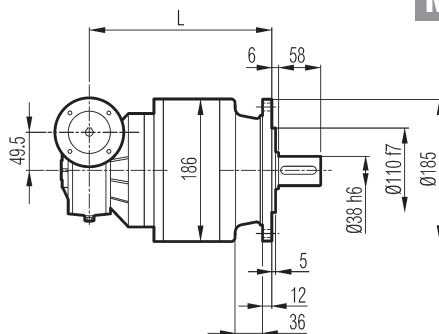
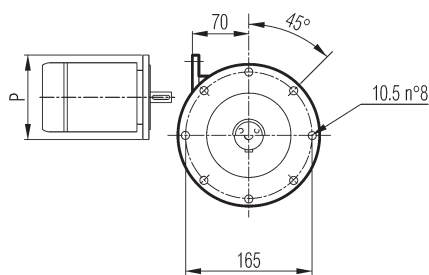
**PC**

**PZ**



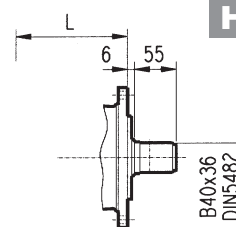
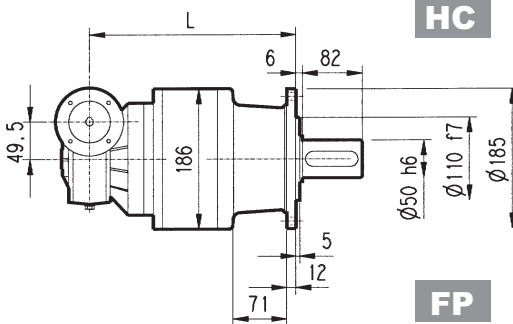
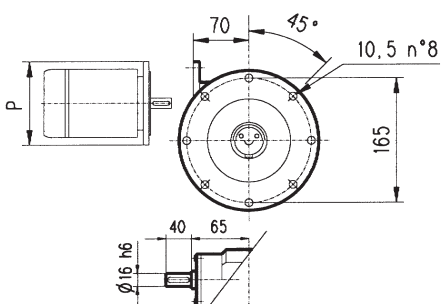
**MC**

**MZ**



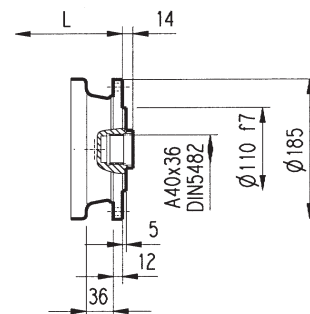
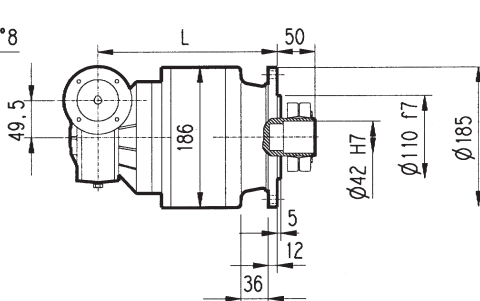
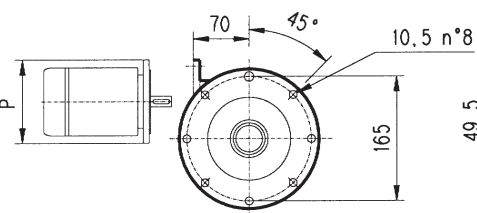
**HC**

**HZ**



**FP**

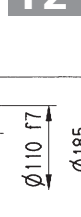
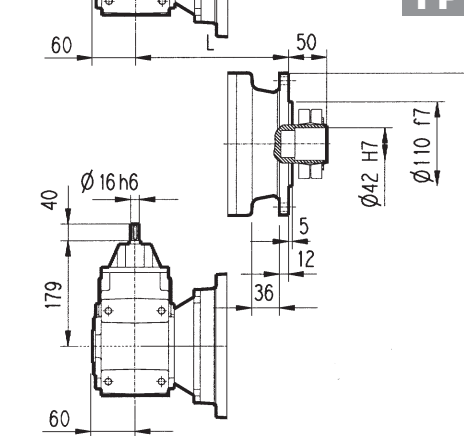
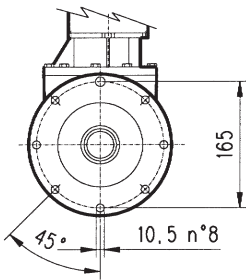
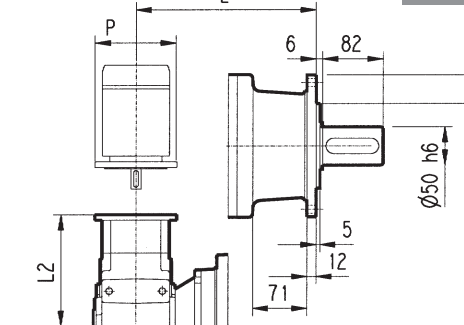
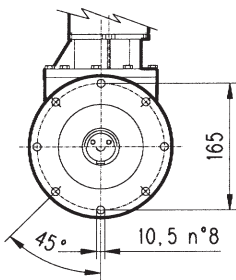
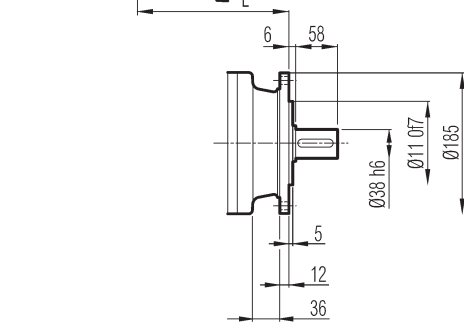
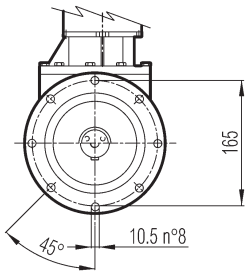
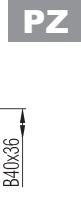
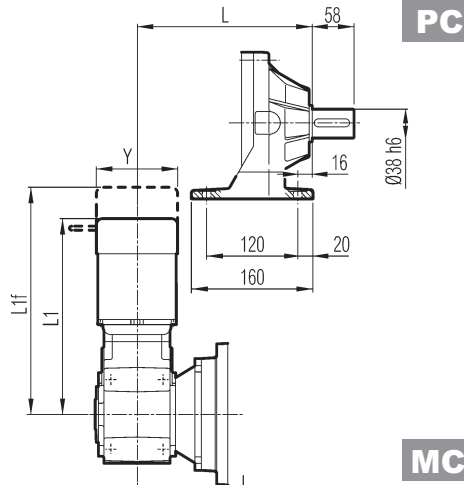
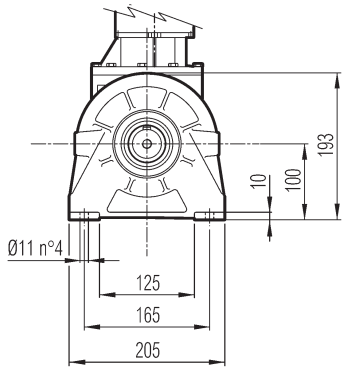
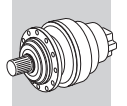
**FZ**



**FP**

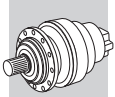
**M<sub>2max</sub> = 1200 Nm**

3/V 00L3	L				Kg				P63	P71	P80
	MC - MZ	PC - PZ	HC - HZ	FP - FZ	MC - MZ	PC - PZ	HC - HZ	FP - FZ	P	P	P
	255	261	290	255	25	30	27	23	140	160	200



**FP**  $M_{2max} = 1200 \text{ Nm}$

3/A 00L2	L												$\overset{\text{Kg}}{\text{Kg}}$												
	MC - MZ		PC - PZ		HC - HZ		FP - FZ		MC - MZ		PC - PZ		HC - HZ		FP - FZ										
	193		199		228		193		38		43		40		36										
	P63		P71		P80		P90		P100		S1 + M1S		S1 + M1L		S2 + M2S		S3 + M3SA		S3 + M3LA						
	L2	P	L2	P	L2	P	L2	P	L2	P	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y			
3/A 00L2	212.5	140	212.5	160	232	200	232	200	242	250	340	406	138	368	428	138	394	466	156	439	535	195	470	563	195

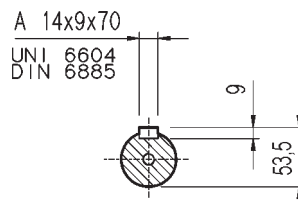
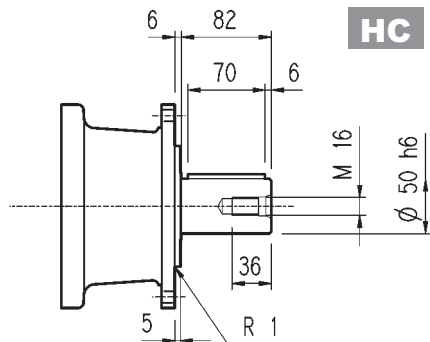
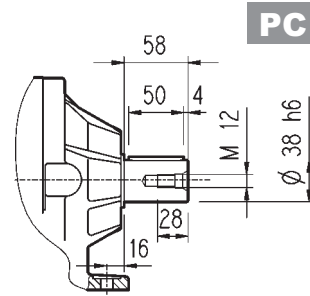
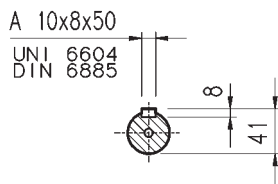
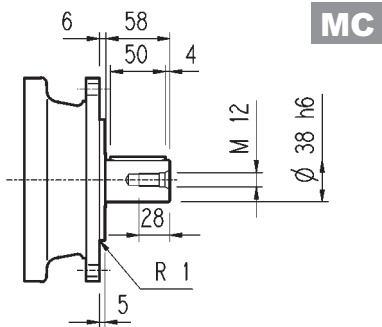


**300 L**

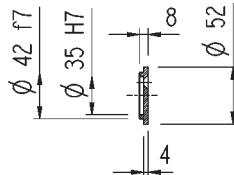
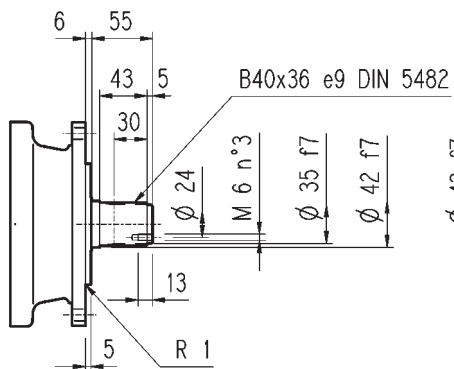
**300 R**

**3/V 00L3**

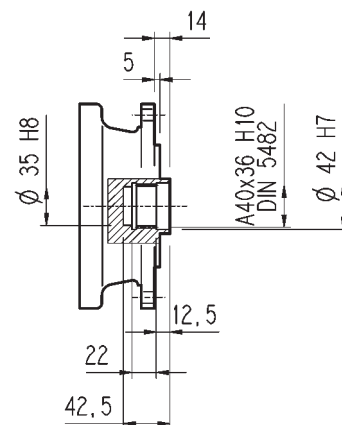
**3/A 00L2**



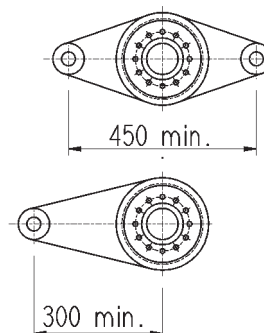
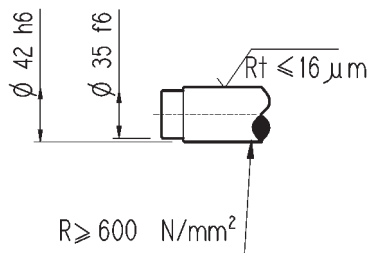
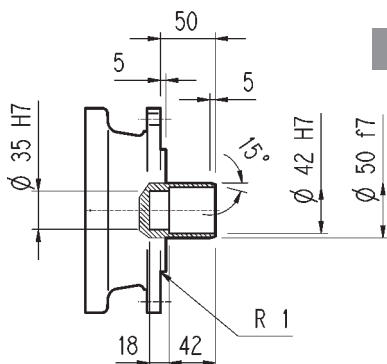
**MZ HZ**



**FZ**



**FP**



**FP**

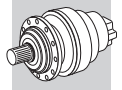
$M_{2max} = 1200 \text{ Nm}$

300 L

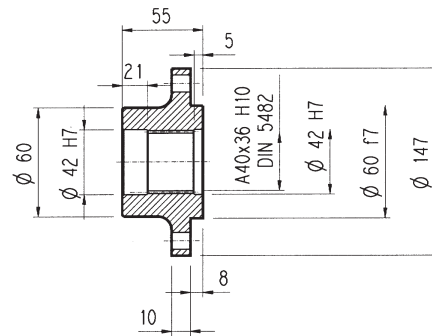
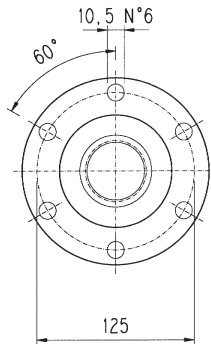
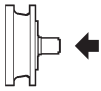
300 R

3/V 00L3

3/A 00L2


**Flangia / Flange**  
**Flansch / Brides**

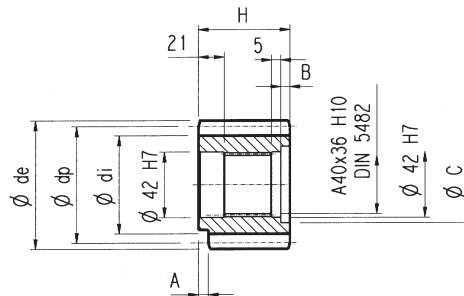
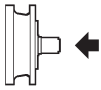
WOA



Materiale : Acciaio C40  
 Material : Steel C40  
 Material : Stahl C40  
 Matière : Acier C40

**Pignoni / Pinion gears**  
**Ritzel / Pignons**

P...

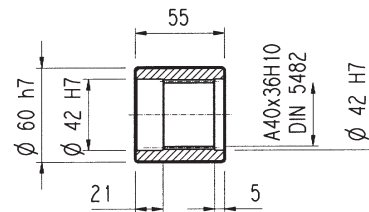
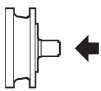


	m	z	x	dp	di	de	H	A	B	C	☆
PBE	4.5	14	0.507	63	56	75.5	55	0	0	0	□
PCE	5	14	0.500	70	62.5	84.8	65	0	10	53	□
PDC	6	12	0.250	72	61	84.8	59	14	4	54	□
PDE	6	14	0.500	84	73	99.6	65	0	10	54	□

☆	Materiale / Material / Material / Matière
□	Acciaio 39NiCrMo3 Bonificato Steel 39NiCrMo3 hardened and tempered Vergüteter Stahl 39NiCrMo3 Acier bonifiée 39NiCrMo3
■	Acciaio 18NiCrMo5 Cementato e temprato Steel 18NiCrMo5 Case hardened Einsatzstahl 18NiCrMo5 Einsatzgehärtet Acier cimenté et trempé 18NiCrMo5

**Manicotti lisci / Sleeve couplings**  
**Naben / Manchons lisses a cannelure interieure**

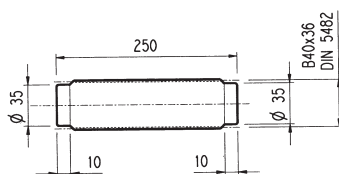
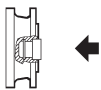
MOA



Materiale : Acciaio 16CrNi4  
 Material : Steel 16CrNi4  
 Material : Stahl 16CrNi4  
 Matière : Acier 16CrNi4

**Barre scanalate / Spined bars**  
**Vielkeilwellen / Barre cannelée**

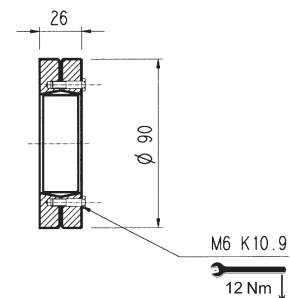
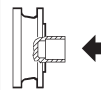
B0A



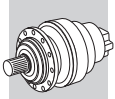
Mat. acciaio 18NiCrMo5 UNI 5331 da cementare e temprare 50-55 HRC  
 Case hardening steel 18NiCrMo5 UNI 5331 must be case hardened to 50-55 HRC  
 Material: Einsatzstahl 18NiCrMo5 UNI 5331 muss einsatzgehärtet werden 50-55 HRC  
 Acier 18 NiCrMo5 UNI 5331 doit être cémenté trempé 50-55 HRC

**Giunto ad attrito / Shrink disc**  
**Schrumpfscheibe / Frette de serrage**

GOA

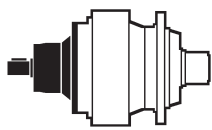
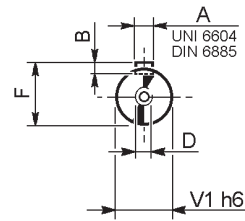
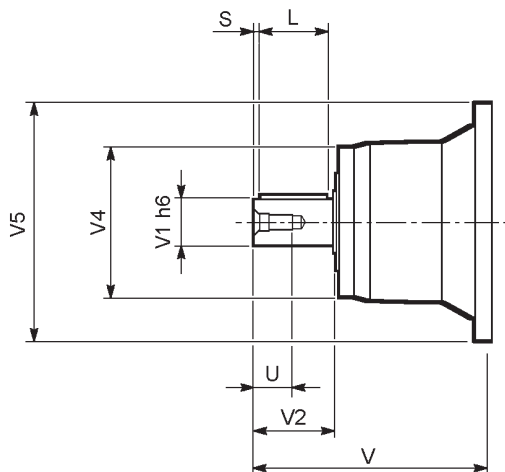






**300 L**

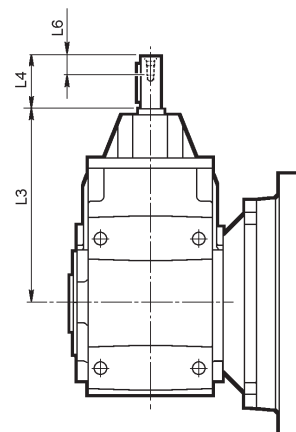
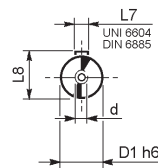
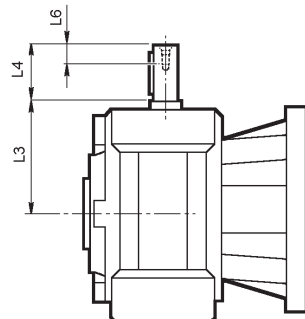
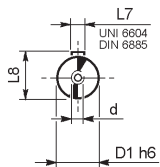
**300 R**



	input	V	V1	V2	V4	V5	A	B	F	L	S	D	U
300 L1	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28
300 L2	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28
300 L3	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28
300 L4	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28
300 R2-R3-R4	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28

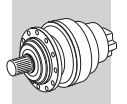
**3/V 00L3**

**3/A 00L2**



	D1 h6	L3	L4	L6	L7	L8	d
3/V 00L3_HS	16	65	40	16	5	18	M6

	D1 h6	L3	L4	L6	L7	L8	d
3/A 00L2_HS	16	179	40	16	5	18	M6

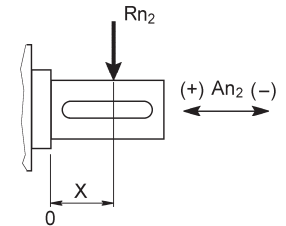
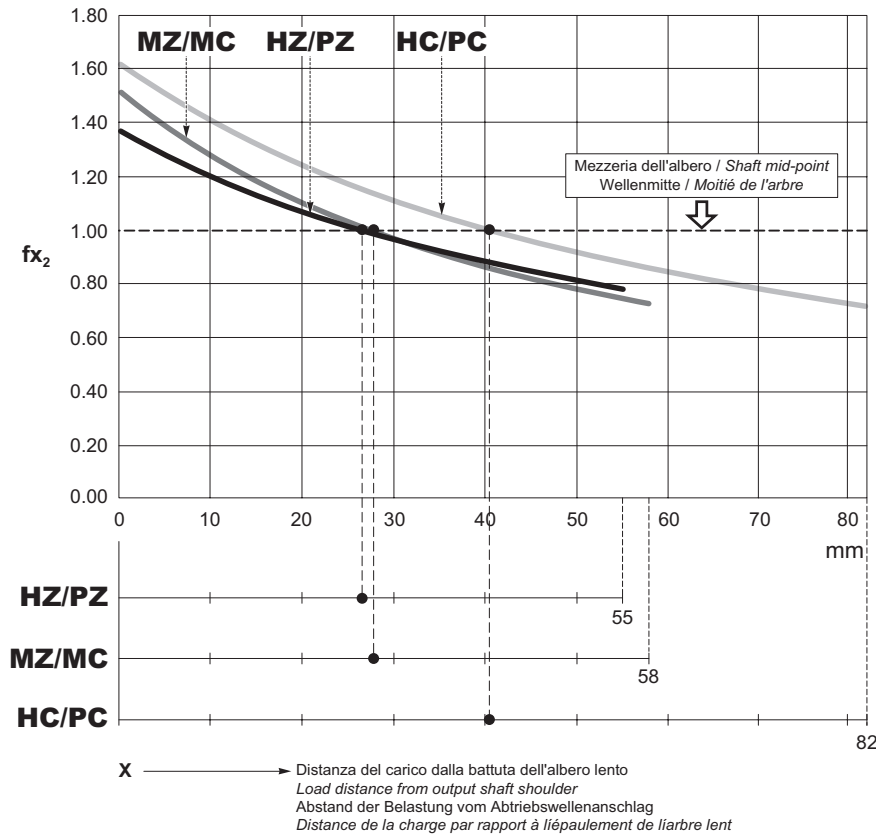


Fattore di posizione per carichi radiali sugli alberi in uscita.

Load application point factor for radial loading on output shaft.

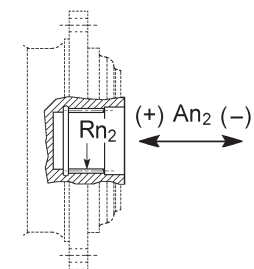
Positionsfaktor für Radialkräfte an der Abtriebswelle.

Facteur de position pour charges radiales sur les arbres en sortie.



$$R_{x2} = R_{n2} \cdot f_{x2}$$

$A_{n2} (\pm) = R_{n2} \cdot f_{a2} (\pm)$		
	$f_{a2} (+)$	$f_{a2} (-)$
HZ	1.18	1.18
HC	1.29	1.29
MC	2.20	2.20
MZ	2.04	2.04



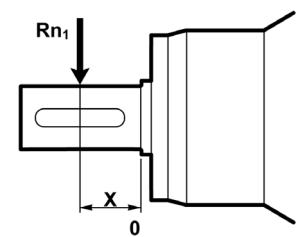
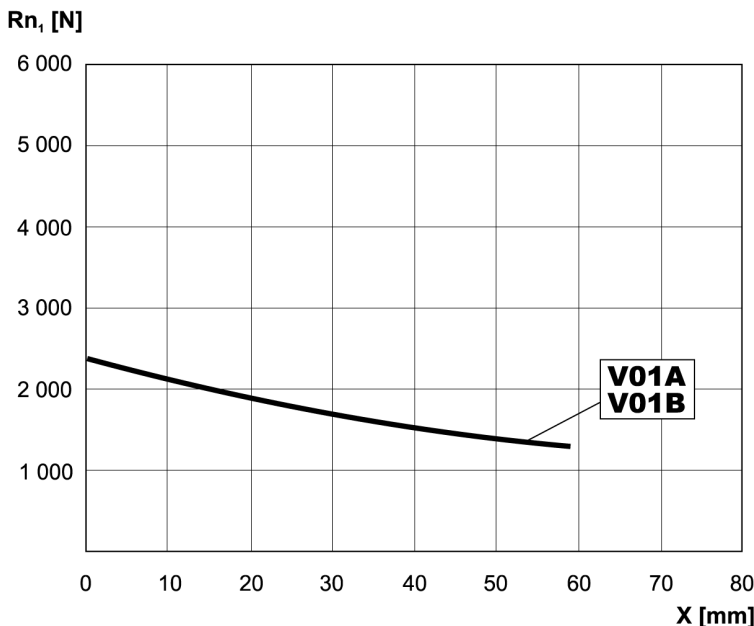
$A_{n2} (\pm) = R_{n2} \cdot f_{a2} (\pm)$		
	$f_{a2} (+)$	$f_{a2} (-)$
FZ	1.00	1.00

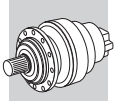
Carichi radiali ammissibili sull'albero veloce per  $n_1 = 1000 \text{ min}^{-1}$  e 10000 h di vita teorica. Per velocità di comando e/o durate diverse vedi il capitolo: Verifiche.

Permitted overhung loads on input shaft when  $n_1 = 1000 \text{ min}^{-1}$  and theoretical lifetime = 10000 h. For drive speed and/or lifetimes other than those specified here, see Chapter: Verifications.

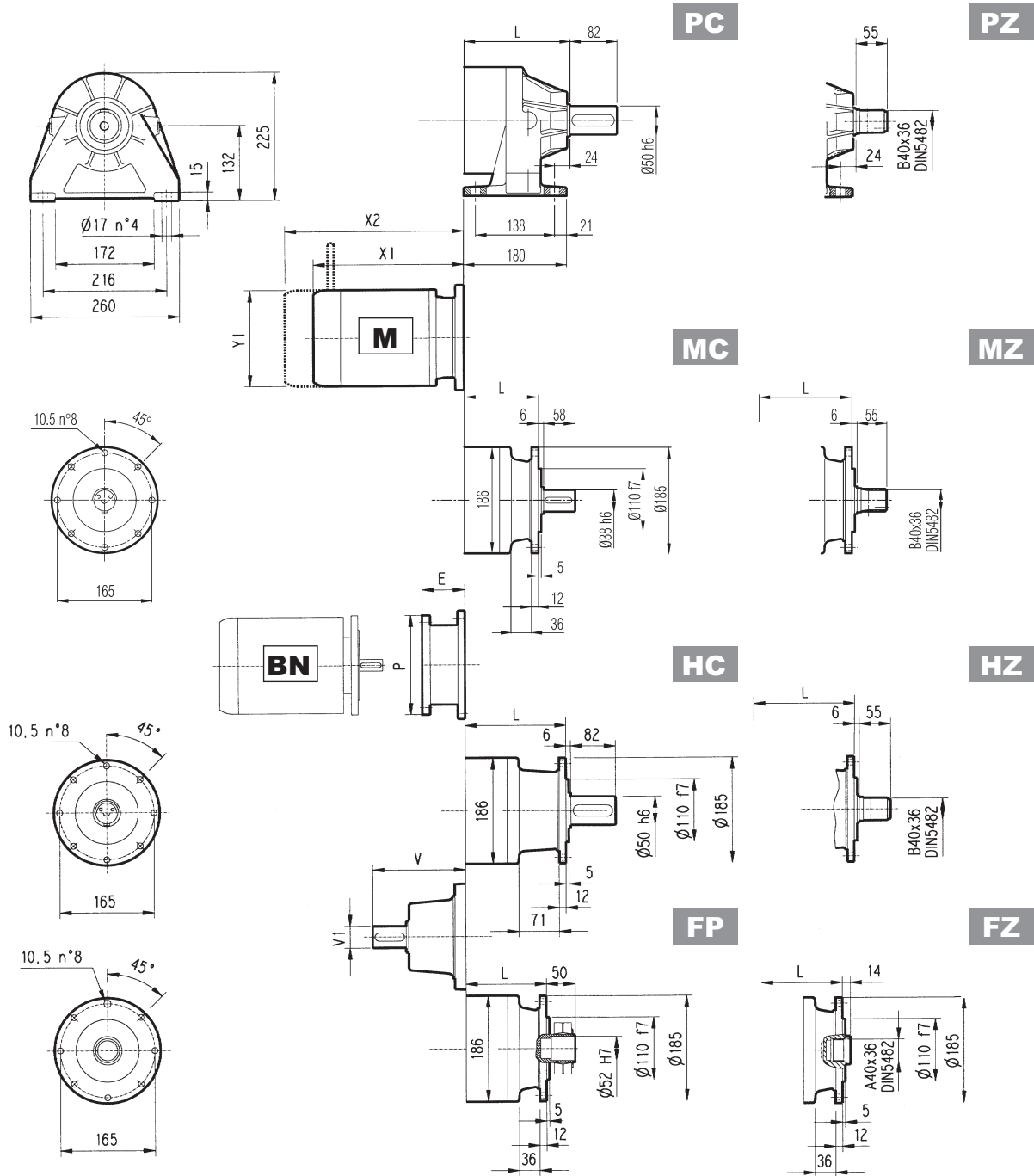
Zulässige Radialkräfte an den Antriebswellen für  $n_1 = 1000 \text{ min}^{-1}$  und 10000 std. Im Hinblick auf Geschwindigkeit und/oder anderweitige Dauern verweisen wir auf Par: Prüfungen

Charges radiales admissibles sur les arbres d'entrée pour  $n_1 = 1000 \text{ min}^{-1}$  et 10000 h. Pour des vitesses et/ou durées différentes, voir par. Vérifications.





# 301 L

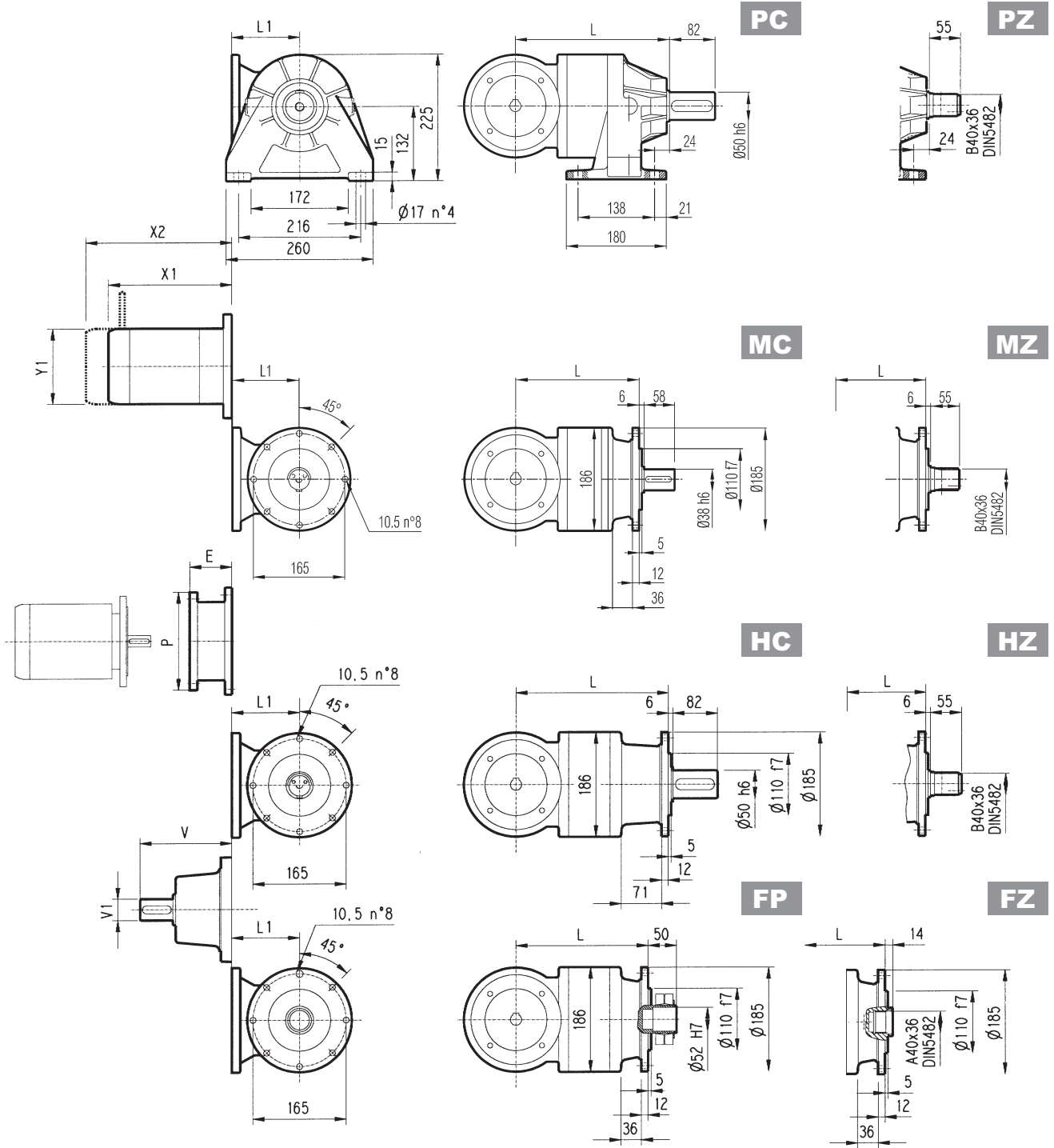
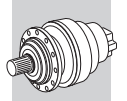


**FP**  $M_{2max} = 2400 \text{ Nm}$

	L				Kg				Kg					
	MC - MZ	PC - PZ	HC - HZ	FP - FZ	MC - MZ	PC - PZ	HC - HZ	FP - FZ	V	V1	V	V1	Kg	
301 L1	92	132	126	92	21	26	23	19	137.5	24	6	158	38	7
301 L2	145	185	176	145	25	30	27	23	137.5	24	6	158	38	7
301 L3	198	238	232	198	29	34	31	27	137.5	24	6	158	38	7
301 L4	251	291	285	251	33	38	35	31	137.5	24	6	158	38	7

	P71		P80		P90		P100		P112		P132	
	E	P	E	P	E	P	E	P	E	P	E	P
301 L1	65	160	84	200	84	200	94	250	94	250	114	300
301 L2	65	160	84	200	84	200	94	250	94	250	114	300
301 L3	65	160	84	200	84	200	94	250	94	250	114	300
301 L4	65	160	84	200	84	200	94	250	94	250	114	300

	S1 + M1S			S1 + M1L			S2 + M2S			S3 + M3S			S3 + M3L			S4 + M4		
	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1
301 L1	229	292	138	253	314	138	280	352	156	325	421	195	357	449	195	460	571	258
301 L2	229	292	138	253	314	138	280	352	156	325	421	195	357	449	195	460	571	258
301 L3	229	292	138	253	314	138	280	352	156	325	421	195	357	449	195	460	571	258
301 L4	229	292	138	253	314	138	280	352	156	325	421	195	357	449	195	460	571	258

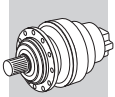


**FP**  $M_{2max} = 2400 \text{ Nm}$

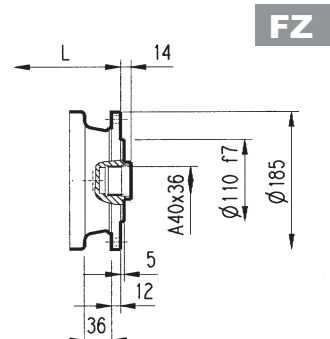
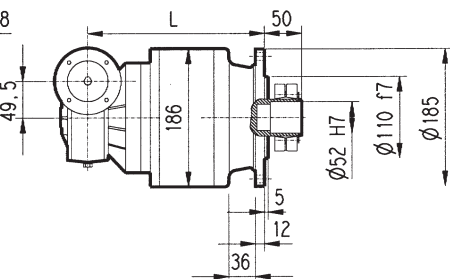
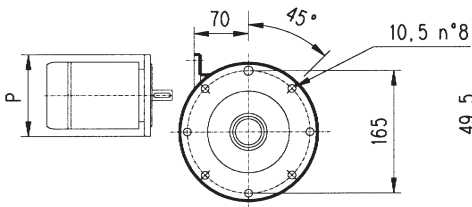
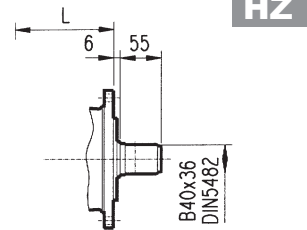
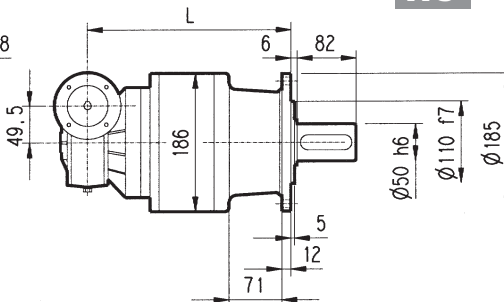
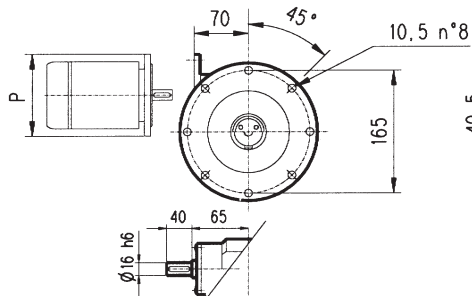
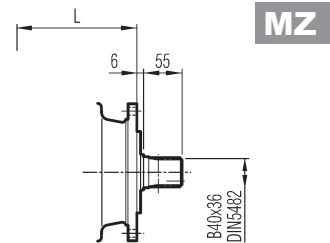
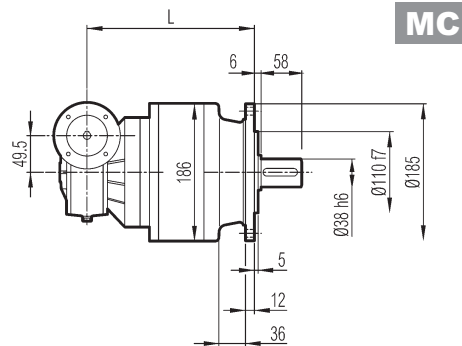
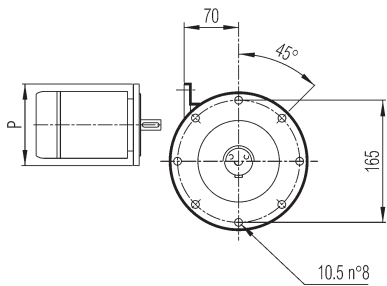
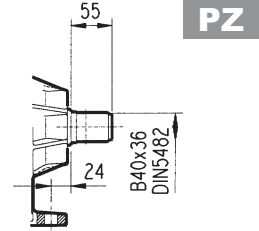
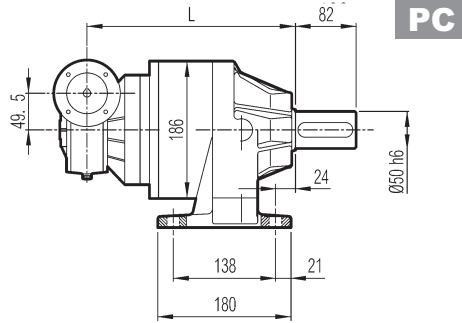
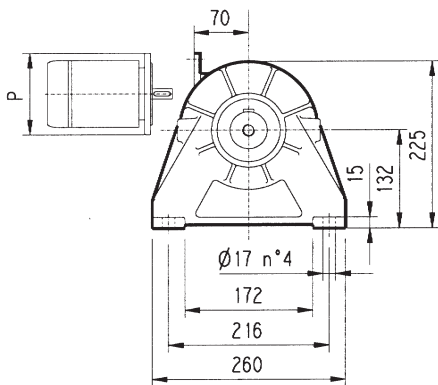
	L				L1	Kg				V	V1	Kg	V	V1	Kg
	MC - MZ	PC - PZ	HC - HZ	FP - FZ		MC - MZ	PC - PZ	HC - HZ	FP - FZ						
301 R2	184	225	219	184	122	35	42	37	33	137.5	24	6	158	38	7
301 R3	237	278	272	237	122	39	46	41	37	137.5	24	6	158	38	7
301 R4	290	331	325	290	122	43	50	45	41	137.5	24	6	158	38	7

	P71		P80		P90		P100		P112		P132	
	E	P	E	P	E	P	E	P	E	P	E	P
301 R2	65	160	84	200	84	200	94	250	94	250	114	300
301 R3	65	160	84	200	84	200	94	250	94	250	114	300
301 R4	65	160	84	200	84	200	94	250	94	250	114	300

	S1 + M1S			S1 + M1L			S2 + M2S			S3 + M3S			S3 + M3L			S4 + M4		
	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1
301 R2	229	292	138	253	314	138	328	400	156	373	469	195	405	497	195	508	619	258
301 R3	229	292	138	253	314	138	328	400	156	373	469	195	405	497	195	-	-	-
301 R4	229	292	138	253	314	138	328	400	156	373	469	195	-	-	-	-	-	-

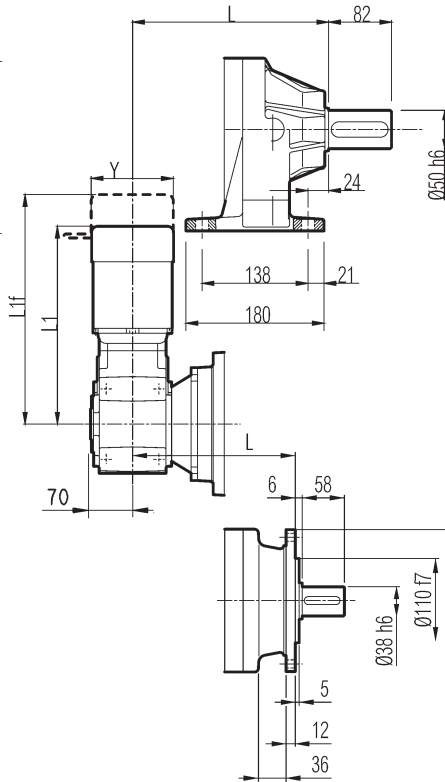
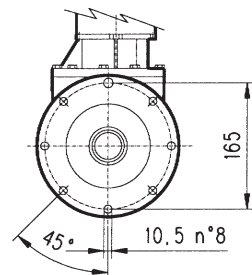
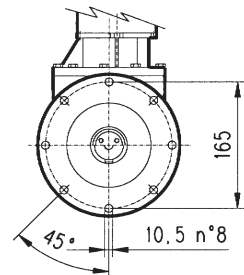
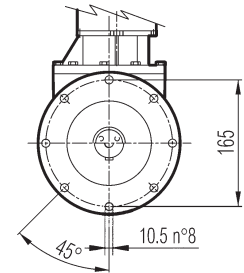
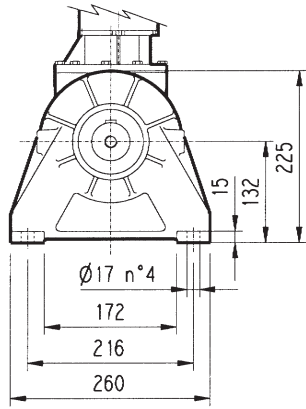
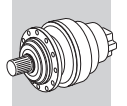


# 3/V 01L3



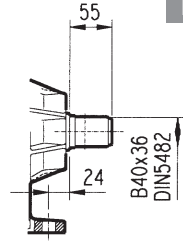
**FP**  $M_{2max} = 2400 \text{ Nm}$

3/V 01L3	L				$\frac{kg}{kg}$				P63	P71	P80
	MC - MZ	PC - PZ	HC - HZ	FP - FZ	MC - MZ	PC - PZ	HC - HZ	FP - FZ	P	P	P
	267	308	302	267	28	35	30	26	140	160	200



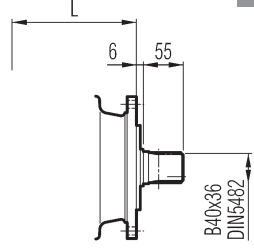
PC

PZ



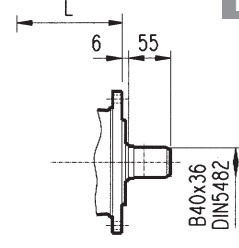
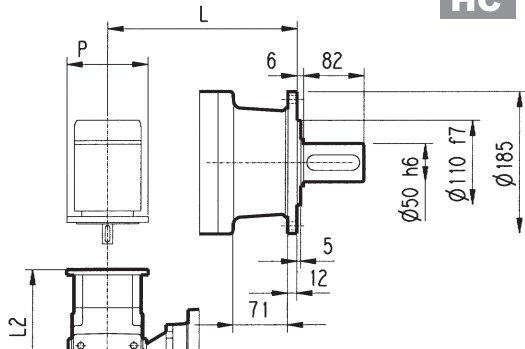
MC

MZ



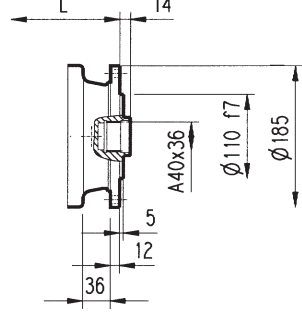
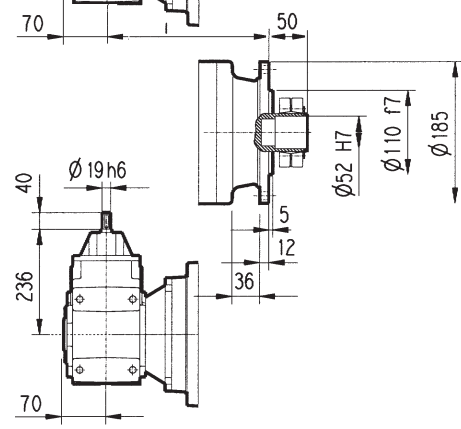
HC

HZ



FP

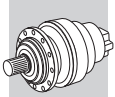
FZ



**FP**  $M_{2max} = 2400 \text{ Nm}$

3/A 01L2	L								Kg			
	MC - MZ		PC - PZ		HC - HZ		FP - FZ			MC - MZ	PC - PZ	HC - HZ
	202	208	237	202	40	46	43	40				

3/A 01L2	P63		P71		P80		P90		P100		S1 + M1S			S1 + M1L			S2 + M2S			S3 + M3SA			S3 + M3LA		
	L2	P	L2	P	L2	P	L2	P	L2	P	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y
	226	140	226	160	245.5	200	245.5	200	255.5	250	354	420	138	382	442	138	408	480	156	453	549	195	484	577	195

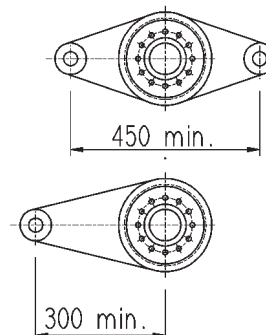
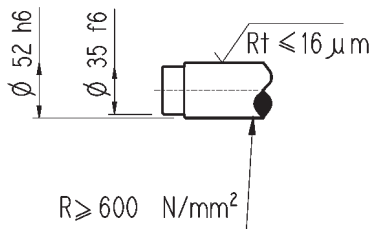
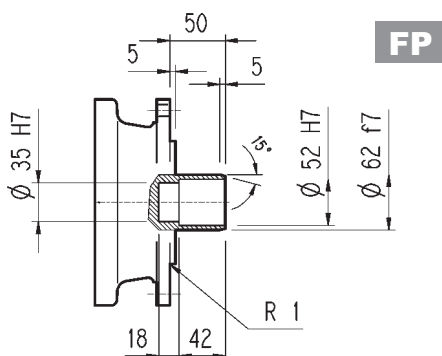
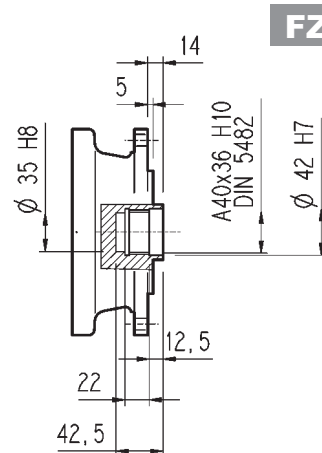
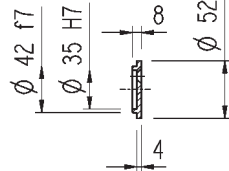
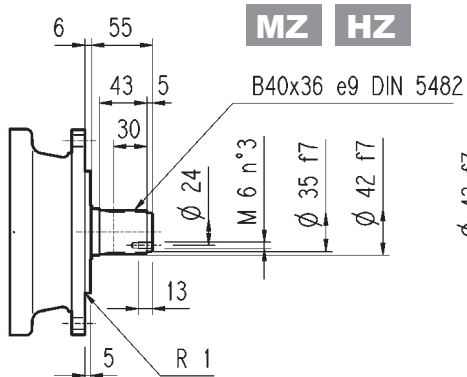
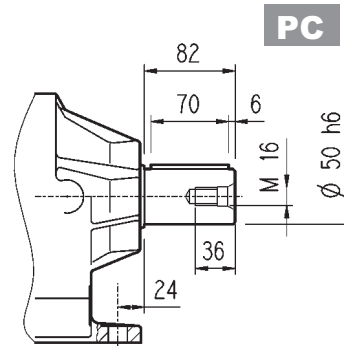
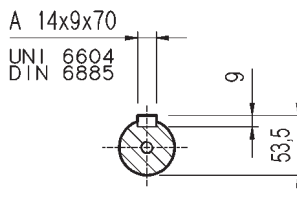
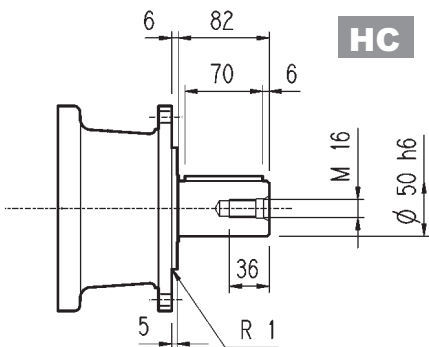
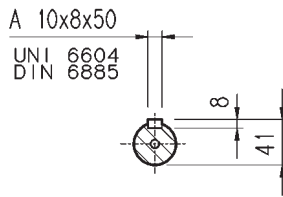
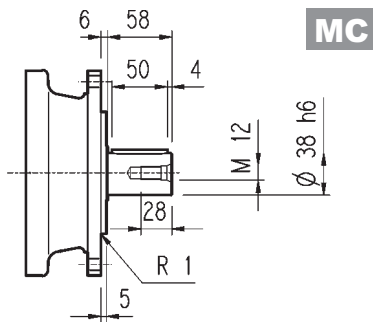


**301 L**

**301 R**

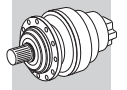
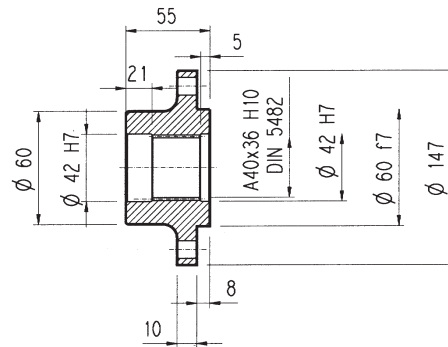
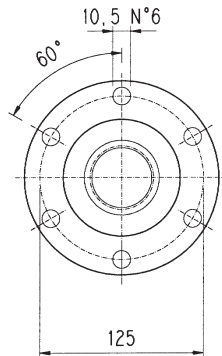
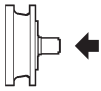
**3/V 01L3**

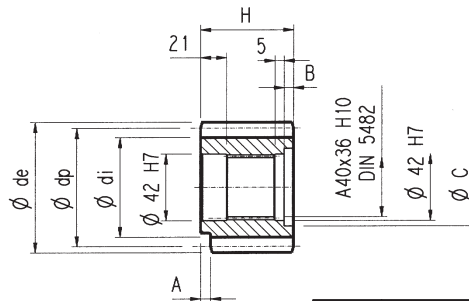
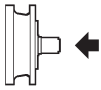
**3/A 01L2**



**FP**

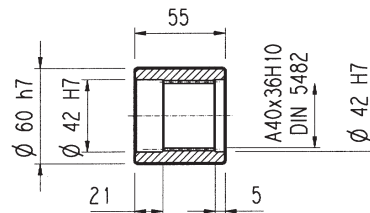
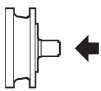
**M<sub>2max</sub> = 2400 Nm**

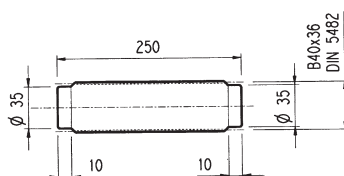
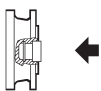
**301 L****301 R****3/V 01L3****3/A 01L2**
**Flangia / Flange**  
**Flansch / Brides**
**WOA**
 Materiale : Acciaio C40  
 Material : Steel C40  
 Material : Stahl C40  
 Matière : Acier C40

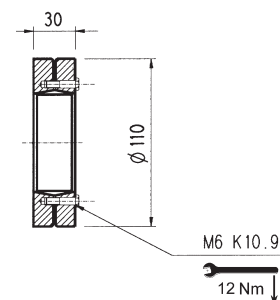
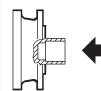
**Pignoni / Pinion gears**  
**Ritzel / Pignons**
**P...**

	m	z	x	dp	di	de	H	A	B	C	☆
PBE	4.5	14	0.507	63	56	75.5	55	0	0	0	□
PCE	5	14	0.500	70	62.5	84.8	65	0	10	53	□
PDC	6	12	0.250	72	61	84.8	59	14	4	54	□
PDE	6	14	0.500	84	73	99.6	65	0	10	54	□

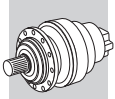
☆	Materiale / Material / Material / Matière
□	Acciaio 39NiCrMo3 Bonificato Steel 39NiCrMo3 hardened and tempered Vergüteter Stahl 39NiCrMo3 Acier bonifié 39NiCrMo3
■	Acciaio 18NiCrMo5 Cementato e temprato Steel 18NiCrMo5 Case hardened Einsatzstahl 18NiCrMo5 Einsatzgehärtet Acier cimenté et tempré 18NiCrMo5

**Manicotti lisci / Sleeve couplings**  
**Naben / Manchons lisses a cannelure interieure**
**MOA**
 Materiale : Acciaio 16CrNi4  
 Material : Steel 16CrNi4  
 Material : Stahl 16CrNi4  
 Matière : Acier 16CrNi4

**Barre scanalate / Spined bars**  
**Vielkeilwellen / Barre cannelée**
**B0A**
 Mat. acciaio 18NiCrMo5 UNI 5331 da cementare e  
 temprare 50-55 HRC  
 Case hardening steel 18NiCrMo5 UNI 5331 must be case  
 hardened to 50-55 HRC  
 Material: Einsatzstahl 18NiCrMo5 UNI 5331 muss einsatzgehärtet  
 werden 50-55 HRC  
 Acier 18 NiCrMo5 UNI 5331 doit être cémenté trempé 50-55 HRC

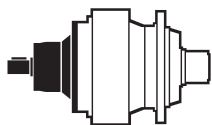
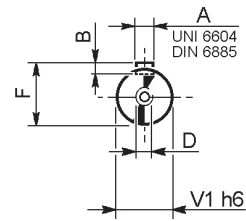
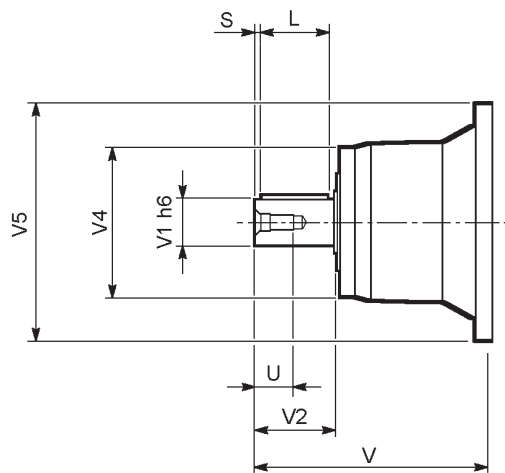
**Giunto ad attrito / Shrink disc**  
**Schrumpfscheibe / Frette de serrage**
**GOA**





**301 L**

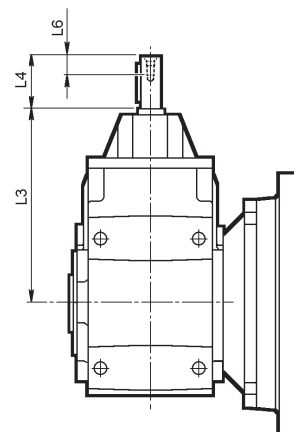
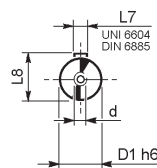
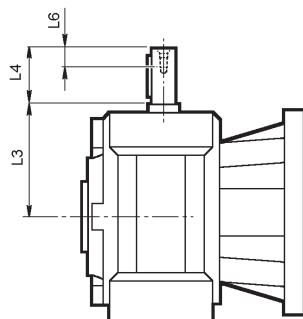
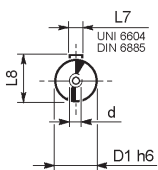
**301 R**



	input	V	V1	V2	V4	V5	A	B	F	L	S	D	U
301 L1	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28
301 L2	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28
301 L3	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28
301 L4	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28
301 R2-R3-R4	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28

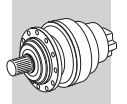
**3/V 01L3**

**3/A 01L2**



	D1 h6	L3	L4	L6	L7	L8	d
3/V 01L3 HS	16	65	40	16	5	18	M6

	D1 h6	L3	L4	L6	L7	L8	d
3/A 01L2 HS	19	235.5	40	16	6	21.5	M6

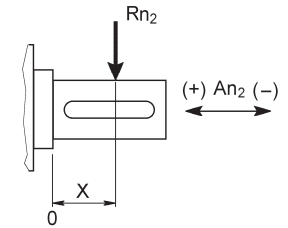
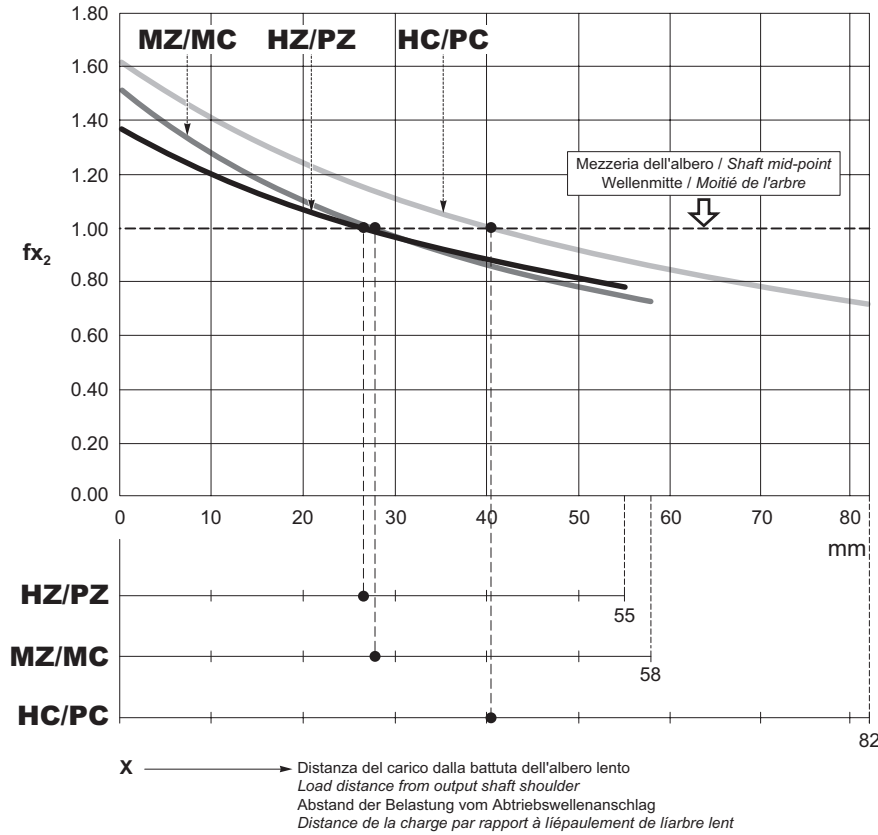


Fattore di posizione per carichi radiali sugli alberi in uscita.

Load location factor for radial loading on output shaft.

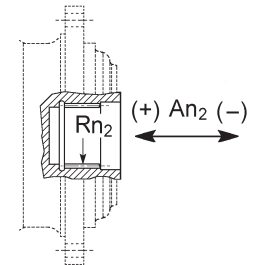
Positionsfaktor für Radialkräfte an der Abtriebswelle.

Facteur de position pour charges radiales sur les arbres en sortie.



$$R_{x2} = R_{n2} \cdot fx_2$$

$An_2 (\pm) = R_{n2} \cdot fa_2 (\pm)$		
	$fa_2 (+)$	$fa_2 (-)$
HZ/PZ	1.18	1.18
HC/PC	1.29	1.29
MC	2.20	2.20
MZ	2.04	2.04



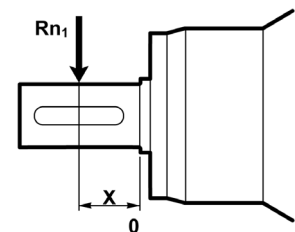
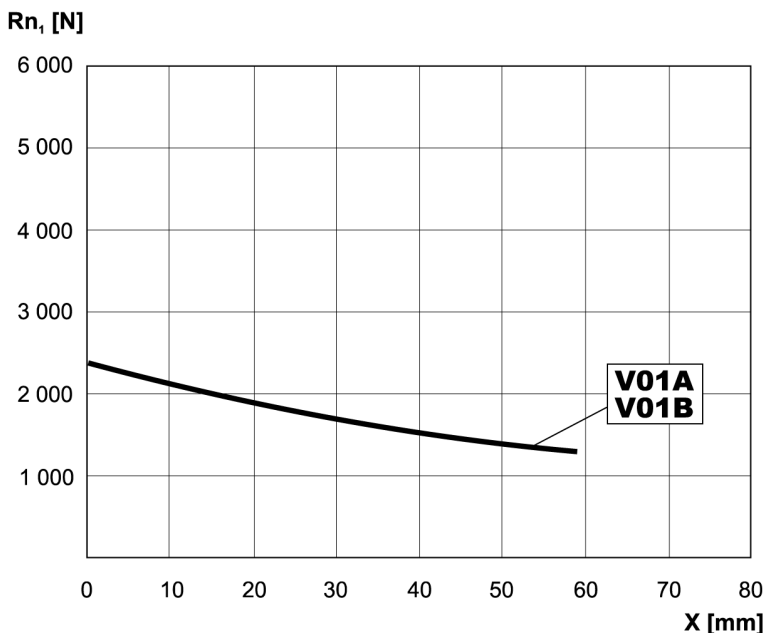
$An_2 (\pm) = R_{n2} \cdot fa_2 (\pm)$		
	$fa_2 (+)$	$fa_2 (-)$
FZ	1.00	1.00

Carichi radiali ammissibili sull'albero veloce per  $n_1 = 1000 \text{ min}^{-1}$  e 10000 h di vita teorica. Per velocità di comando e/o durate diverse vedi il capitolo: Verifiche.

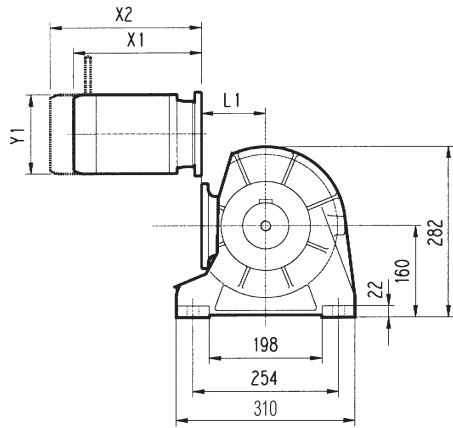
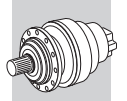
Permitted overhung loads on input shaft when  $n_1 = 1000 \text{ min}^{-1}$  and theoretical lifetime = 10000 h. For drive speed and/or lifetimes other than those specified here, see Chapter: Verifications.

Zulässige Radialkräfte an den Antriebswellen für  $n_1 = 1000 \text{ min}^{-1}$  und 10000 std. Im Hinblick auf Geschwindigkeit und/oder anderweitige Dauern verweisen wir auf Par: Prüfungen

Charges radiales admissibles sur les arbres d'entrée pour  $n_1 = 1000 \text{ min}^{-1}$  et 10000 h. Pour des vitesses et/ou durées différentes, voir par. Vérifications.

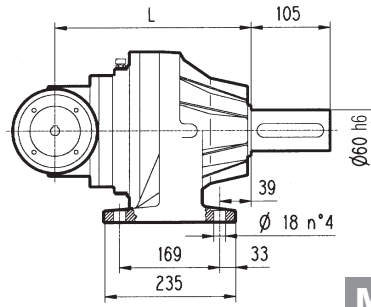






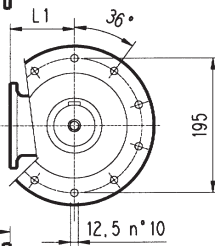
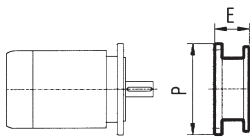
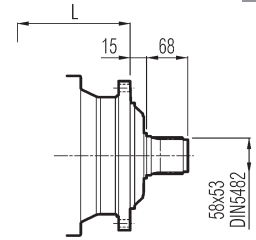
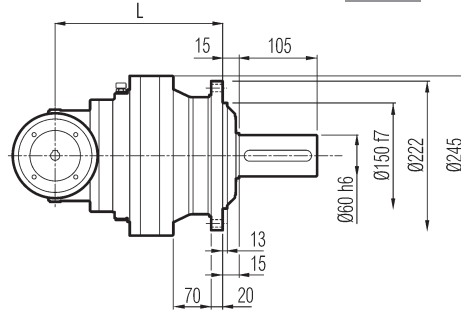
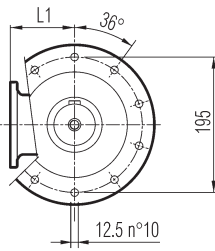
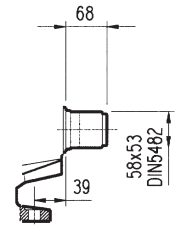
**PC**

**PZ**



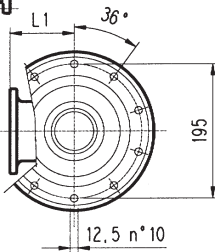
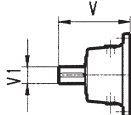
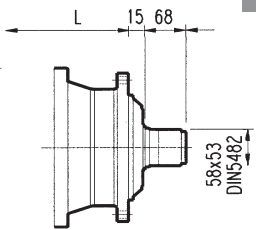
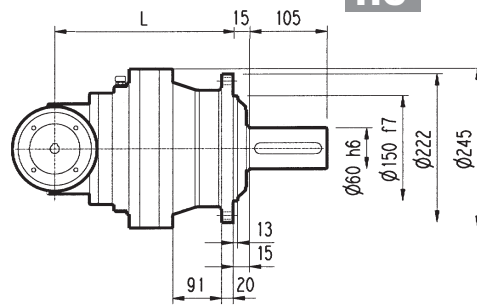
**MC**

**MZ**



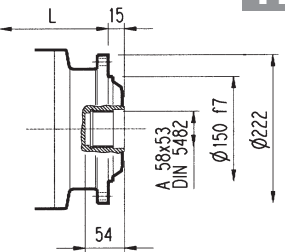
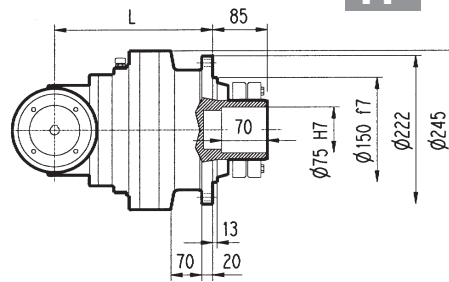
**HC**

**HZ**



**FP**

**FZ**



**FP**  $M_{2max} = 3500 \text{ Nm}$

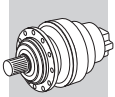
	L				L1	Kg				V	V1	Kg	V	V1	Kg
	MC - MZ	PC - PZ	HC - HZ	FP - FZ		MC - MZ	PC - PZ	HC - HZ	FP - FZ						
303 R2	217	257	242	217	140	51	60	55	51	137.5	24	6	158	38	7
303 R3	270	310	295	270	122	49	58	53	49	137.5	24	6	158	38	7
303 R4	323	363	348	323	122	53	62	57	53	137.5	24	6	158	38	7

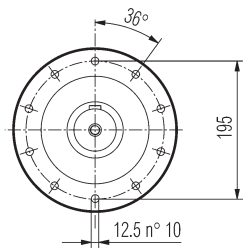
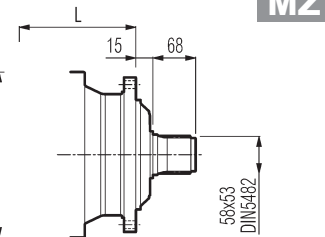
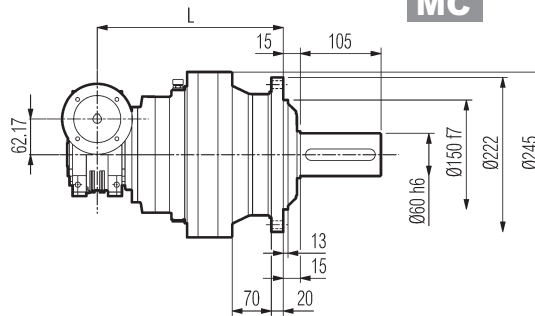
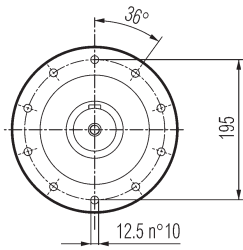
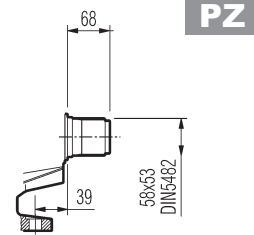
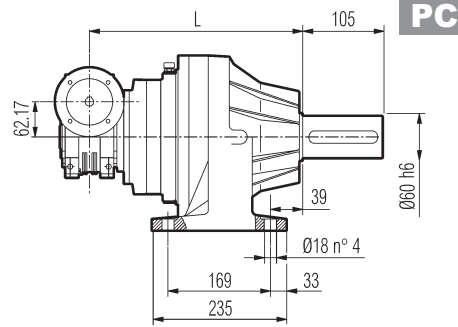
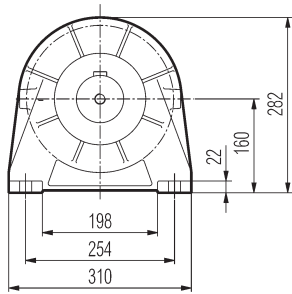
	P71		P80		P90		P100		P112		P132	
	E	P	E	P	E	P	E	P	E	P	E	P
303 R2	65	160	84	200	84	200	94	250	94	250	114	300
303 R3	65	160	84	200	84	200	94	250	94	250	114	300
303 R4	65	160	84	200	84	200	94	250	94	250	114	300

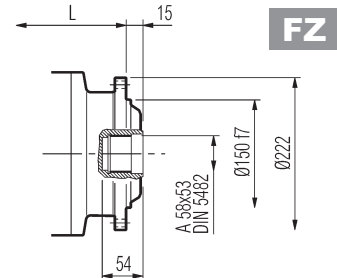
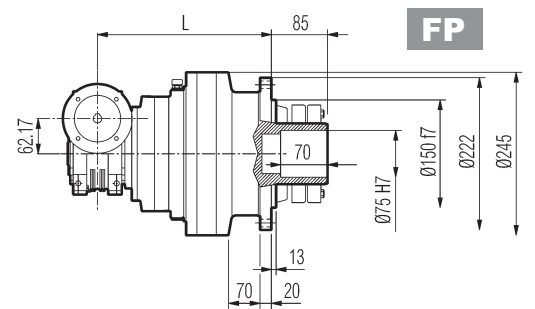
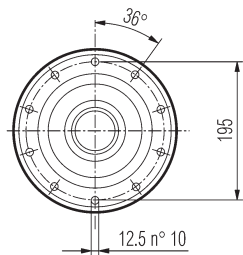
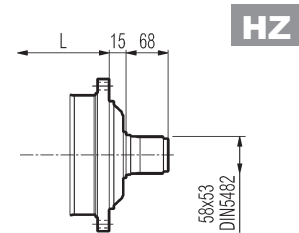
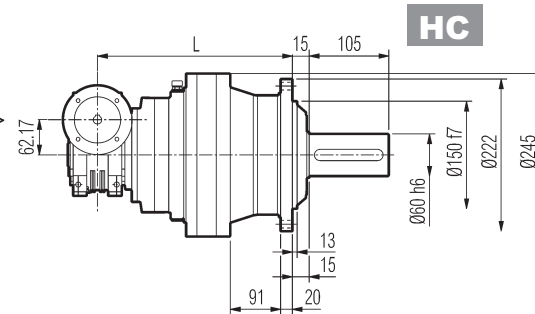
	S1 + M1S			S1 + M1L			S2 + M2S			S3 + M3S			S3 + M3L			S4 + M4		
	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1
303 R2	-	-	-	-	-	-	328	400	156	373	469	195	405	497	195	508	619	258
303 R3	229	292	138	253	314	138	328	400	156	373	469	195	405	497	195	-	-	-
303 R4	229	292	138	253	314	138	328	400	156	373	469	195	405	497	195	-	-	-



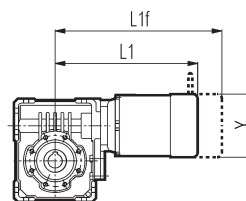
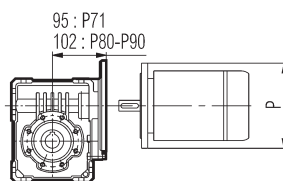
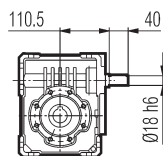
# 3/V 03L3



A →



Vista da A  
View from A

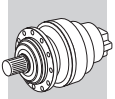


**FP**

**M<sub>2max</sub> = 3500 Nm**

3/V 03L3	L						Kg	MC - MZ			PC - PZ			HC - HZ			FP - FZ		
	P71 P	P80 P	P90 P	L1	S1 + M1S L1f	Y		L1	S1 + M1L L1f	Y	L1	S2 + M2S L1f	Y	L1	S2 + M2S L1f	Y			
3/V 03L3	160	200	200	265	328	138	289	350	138	317	393	156							





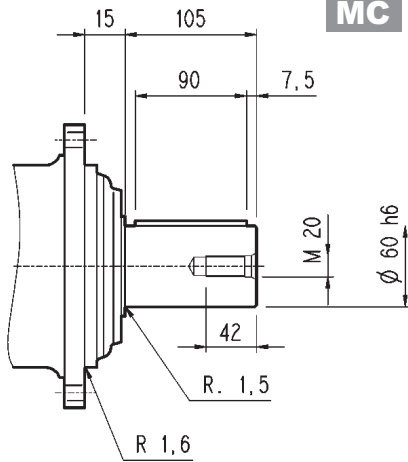
303 L

303 R

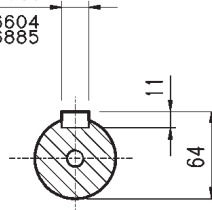
3/V 03L3

3/A 03L2

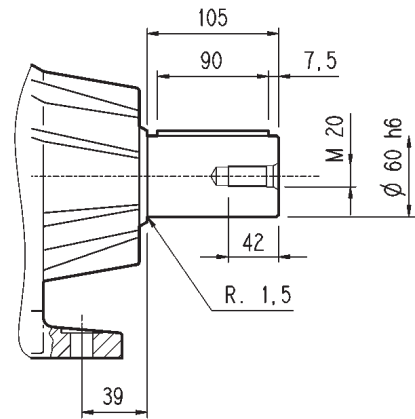
MC HC



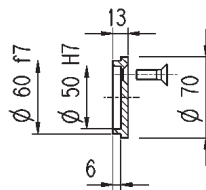
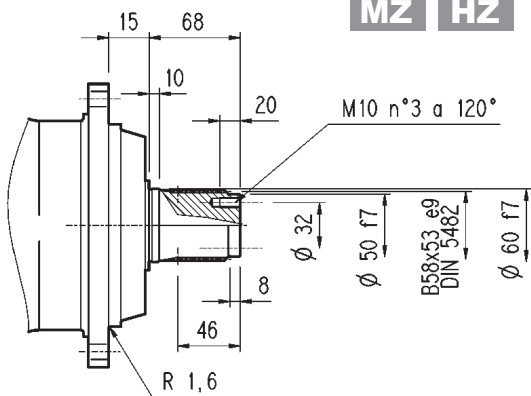
A 18x11x90  
UNI 6604  
DIN 6885



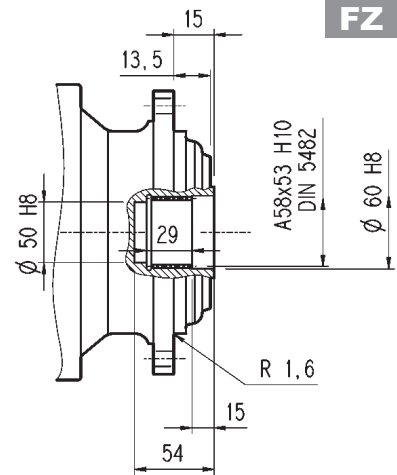
PC



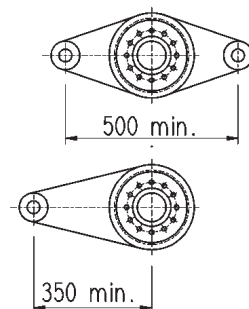
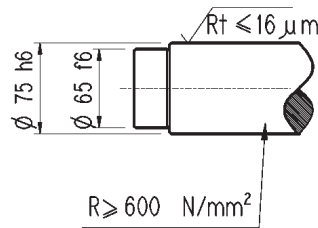
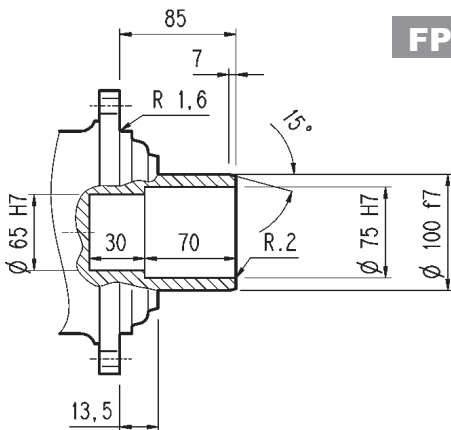
MZ HZ



FZ

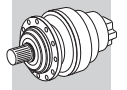
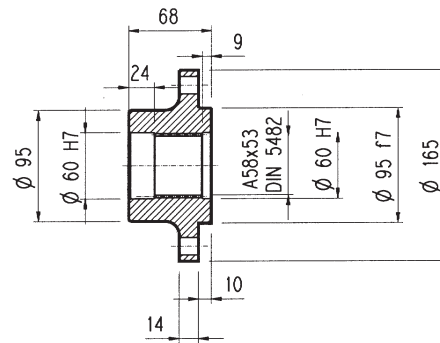
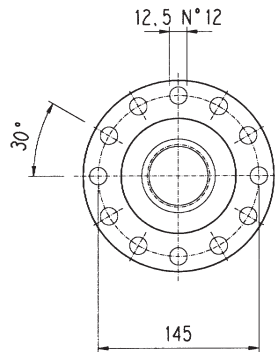
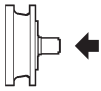


FP

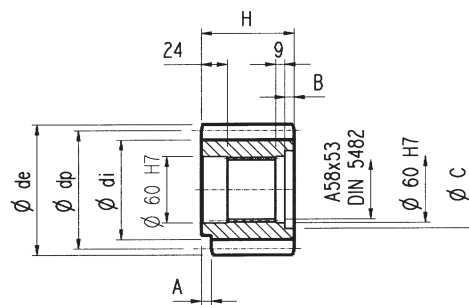
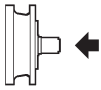


FP

$M_{2max} = 3500 Nm$

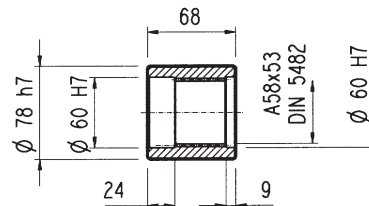
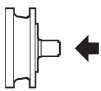
**303 L****303 R****3/V 03L3****3/A 03L2**
**Flangia / Flange**  
**Flansch / Brides**
**WOA**

Materiale : Acciaio C40  
 Material : Steel C40  
 Material : Stahl C40  
 Matière : Acier C40

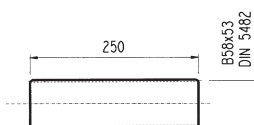
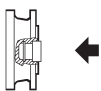
**Pignoni / Pinion gears**  
**Ritzel / Pignons**
**P...**

	m	z	x	dp	di	de	H	A	B	C	☆
<b>PCL1</b>	5	19	0	95	82	104	77	12	9	72	□
<b>PCL2</b>	5	19	0	95	82	104	68	0	0	0	□
<b>PCM</b>	5	20	0	100	87.5	110	68	18	0	0	■
<b>PCP</b>	5	22	0	110	97.5	120	68	18	0	0	■
<b>PDE</b>	6	14	0.500	84	75	99.6	68	0	0	0	□
<b>PDI</b>	6	18	0.500	108	99	123.6	68	0	0	0	□
<b>PDM</b>	6	20	0.833	120	115	140	68	0	0	0	□
<b>PFD</b>	8	13	0.675	104	95	127.6	68	0	0	0	■
<b>PFE1</b>	8	14	0	112	92	126	68	0	0	0	■
<b>PFE2</b>	8	14	0	112	92	126	80	0	12	72	■
<b>PF</b>	8	15	0	120	100	136	68	0	0	0	□
<b>PF</b>	8	22	0	176	156	190	77	12	10	71	□
<b>PHG</b>	10	16	0.500	160	145	188	75	0	7	72	□

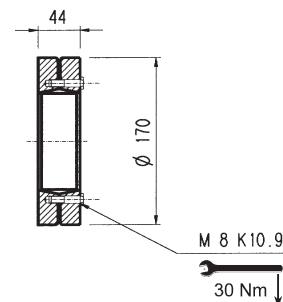
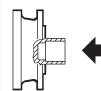
☆	Materiale / Material / Material / Matière
□	Acciaio 39NiCrMo3 Bonificato Steel 39NiCrMo3 hardened and tempered Vergüteter Stahl 39NiCrMo3 Acier bonifiée 39NiCrMo3
■	Acciaio 18NiCrMo5 Cementato e temprato Steel 18NiCrMo5 Case hardened Einsatzstahl 18NiCrMo5 Einsatzgehärtet Acier cimenté et tempré 18NiCrMo5

**Manicotti lisci / Sleeve couplings**  
**Naben / Manchons lisses a cannelure interieure**
**MOA**

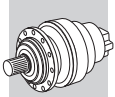
Materiale : Acciaio 16CrNi4  
 Material : Steel 16CrNi4  
 Material : Stahl 16CrNi4  
 Matière : Acier 16CrNi4

**Barre scanalate / Spined bars**  
**Vielkeilwellen / Barre cannelée**
**B0A**

Mat. acciaio 18NiCrMo5 UNI 5331 da cementare e temperare 50-55 HRC  
 Case hardening steel 18NiCrMo5 UNI 5331 must be case hardened to 50-55 HRC  
 Material: Einsatzstahl 18NiCrMo5 UNI 5331 muss einsatzgehärtet werden 50-55 HRC  
 Acier 18 NiCrMo5 UNI 5331 doit être cémenté trempé 50-55 HRC

**Giunto ad attrito / Shrink disc**  
**Schrumpfscheibe / Frette de serrage**
**GOA**

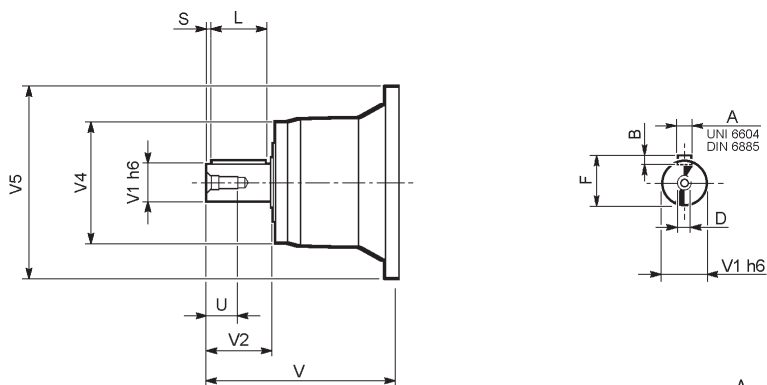




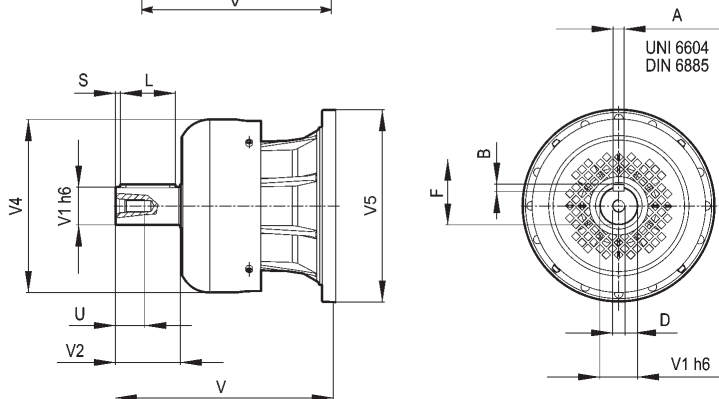
**303 L**

**303 R**

**V**



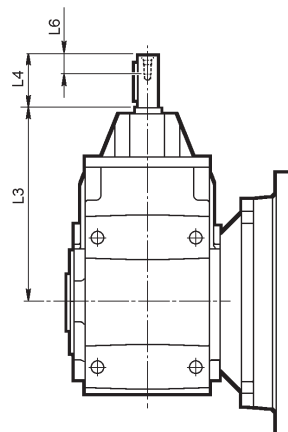
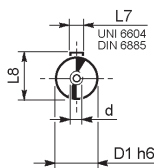
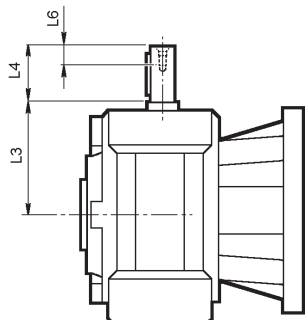
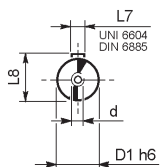
**FV**



	input	V	V1	V2	V4	V5	A	B	F	L	S	D	U
303 L1	V05B	239	48	82	155	245	14	9	51.5	70	6	M16	36
	FV05B	276	48	82	219.5	244	14	9	51.5	70	6	M16	36
303 L2	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28
303 L3	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28
303 L4	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28
303 R2-R3-R4	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28

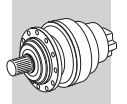
**3/V 03L3**

**3/A 03L2**



	D1 h6	L3	L4	L6	L7	L8	d
3/V 03L3_HS	18	110.5	40	16	6	20.5	M6

	D1 h6	L3	L4	L6	L7	L8	d
3/A 03L2_HS	19	252.5	40	16	6	21.5	M6

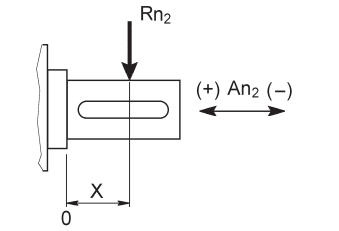
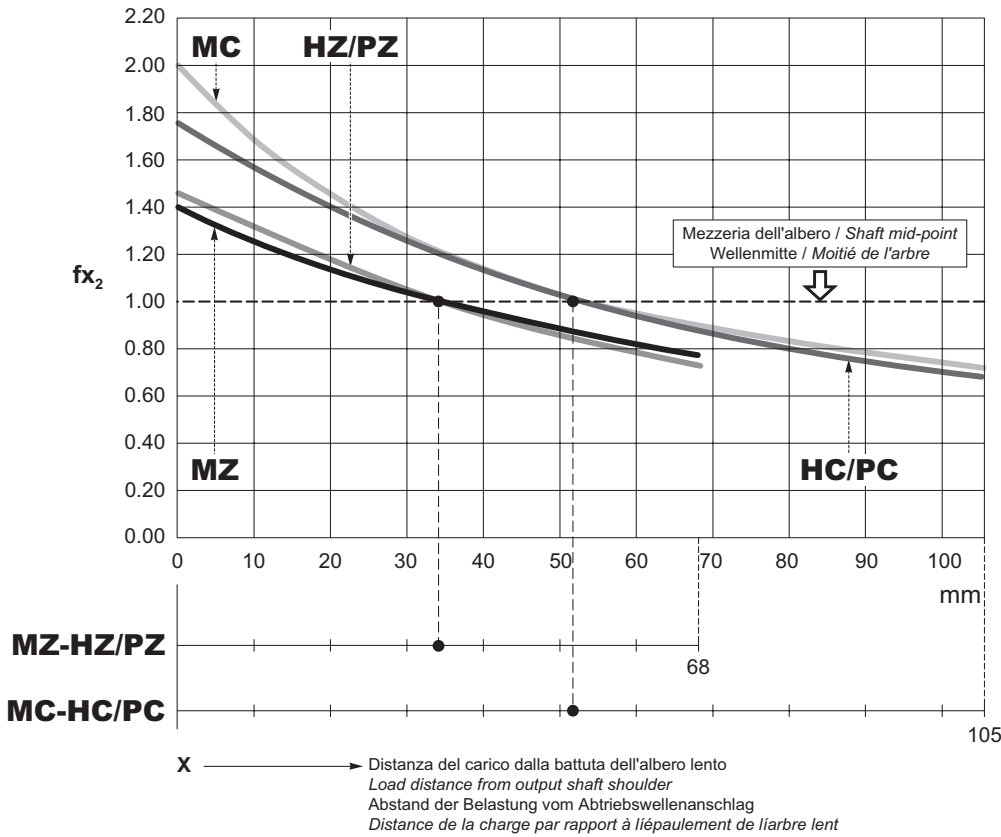


Fattore di posizione per carichi radiali sugli alberi in uscita.

Load location factor for radial loading on output shaft.

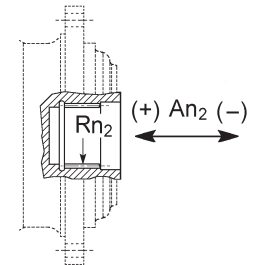
Positionsfaktor für Radialkräfte an der Abtriebswelle.

Facteur de position pour charges radiales sur les arbres en sortie.



$$R_{x2} = R_{n2} \cdot f_{x2}$$

$An_2(\pm) = R_{n2} \cdot fa_2(\pm)$		
	$fa_2(+)$	$fa_2(-)$
HZ/PZ	0.74	0.59
HC/PC	0.86	0.69
MC	2.04	2.04
MZ	1.74	1.74



$An_2(\pm) = R_{n2} \cdot fa_2(\pm)$		
	$fa_2(+)$	$fa_2(-)$
FZ	1.00	1.00

Carichi radiali ammissibili sull'albero veloce per  $n_1 = 1000 \text{ min}^{-1}$  e 10000 h di vita teorica.

Permitted overhung loads on input shaft when  $n_1 = 1000 \text{ min}^{-1}$  and theoretical lifetime = 10000 h.

Zulässige Radialkräfte an den Antriebswellen für  $n_1 = 1000 \text{ min}^{-1}$  und 10000 std.

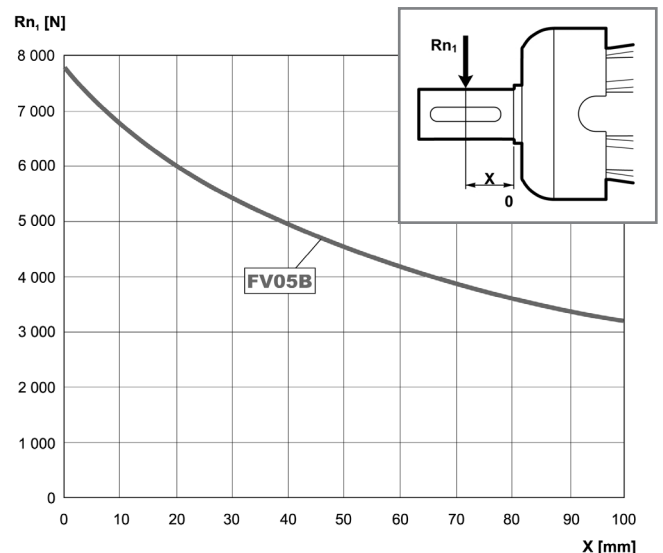
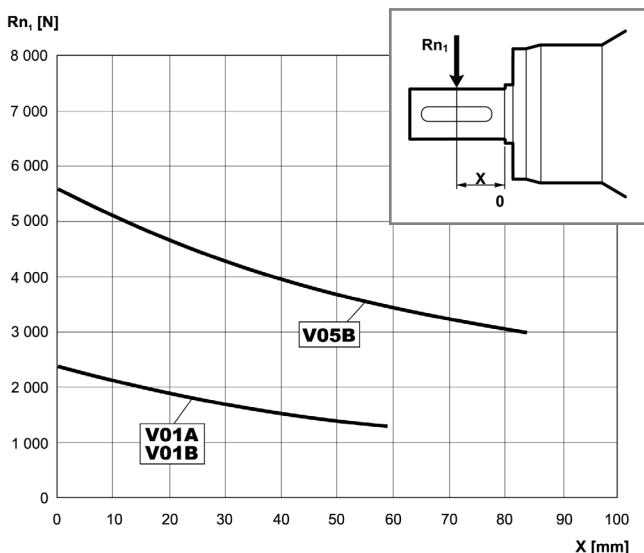
Charges radiales admissibles sur les arbres d'entrée pour  $n_1 = 1000 \text{ min}^{-1}$  et 10000 h.

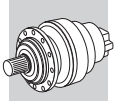
Per velocità di comando e/o durate diverse vedi il capitolo: Verifiche.

For drive speed and/or lifetimes other than those specified here, see Chapter: Verifications.

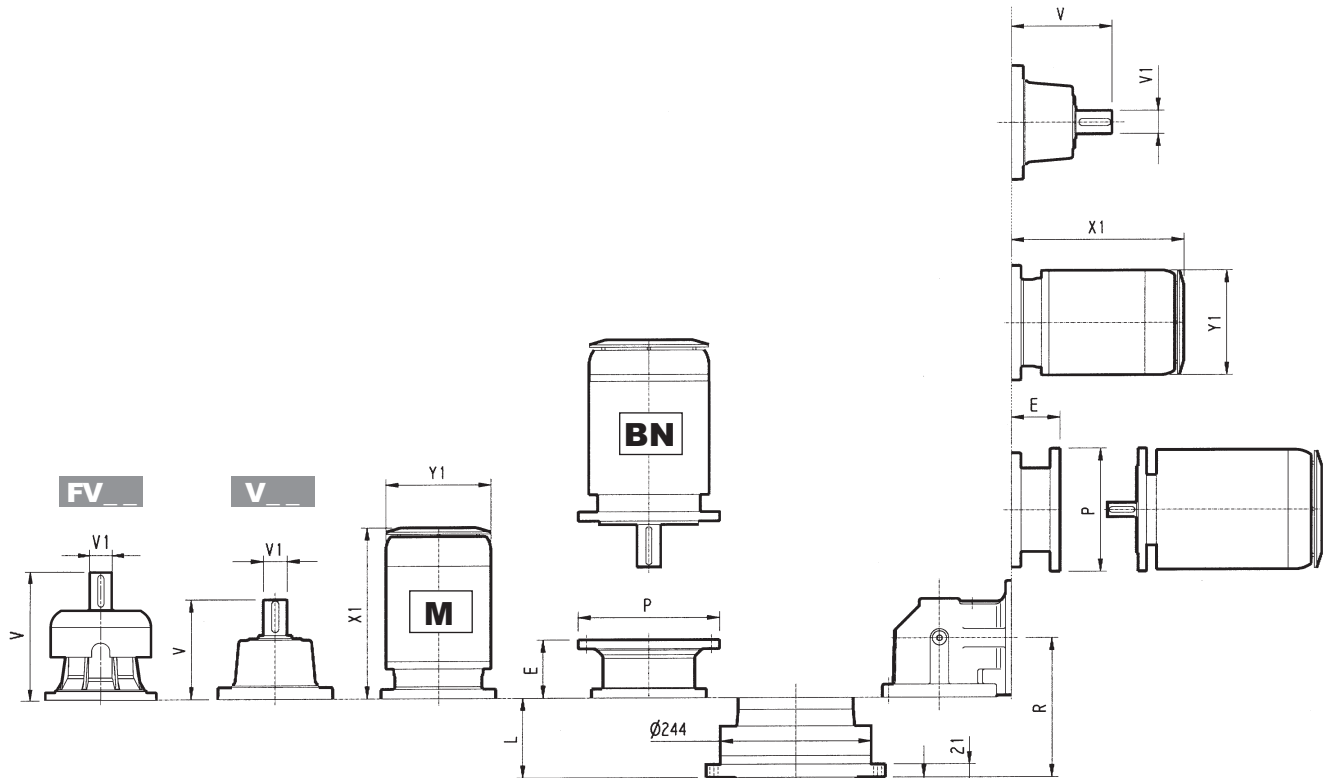
Im Hinblick auf Geschwindigkeit und/oder anderweitige Dauern verweisen wir auf Par: Prüfungen

Pour des vitesses et/ou durées différentes, voir par: Vérifications.





# 303\_VK



## 303 L\_VK

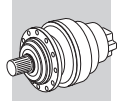
## 303 R\_VK

	L	Kg													P71		P80		P90		P100		P112		P132		P160		P180		P200	
			V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P		
303 L1	51	65	239	48	15	-	-	-	276	48	17	-	-	-	-	-	-	-	-	-	-	-	114	300	144	350	144	350	174	400		
303 L2	104	70	137.5	24	6	158	38	7	-	-	-	-	-	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-		
303 L3	157	73	137.5	24	6	158	38	7	-	-	-	-	-	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-		
303 L4	210	77	137.5	24	6	158	38	7	-	-	-	-	-	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-		

	R	R1	Kg							P71		P80		P90		P100		P112		P132	
				V	V1	Kg	V	V1	Kg	E	P	E	P	E	P	E	P	E	P	E	P
303 R2	143	140	85	137.5	24	6	158	38	7	65	160	84	200	84	200	94	250	94	250	114	300
303 R3	196	122	83	137.5	24	6	158	38	7	65	160	84	200	84	200	94	250	94	250	114	300
303 R4	249	122	87	137.5	24	6	158	38	7	65	160	84	200	84	200	94	250	94	250	114	300

	S1 + M1S			S1 + M1L			S2 + M2S			S3 + M3S			S3 + M3L			S4 + M4			S5 + M5S			S5 + M5L		
	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1
303 L1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	460	571	258	552	692	310	596	736	310
303 L2	229	292	138	253	314	138	280	352	156	325	421	195	357	449	195	460	571	258	-	-	-	-	-	-
303 L3	229	292	138	253	314	138	280	352	156	325	421	195	357	449	195	460	571	258	-	-	-	-	-	-
303 L4	229	292	138	253	314	138	280	352	156	325	421	195	357	449	195	460	571	258	-	-	-	-	-	-

	S1 + M1S			S1 + M1L			S2 + M2S			S3 + M3S			S3 + M3L			S4 + M4		
	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1
303 R2	-	-	-	-	-	-	328	400	156	373	469	195	405	497	195	508	619	258
303 R3	229	292	138	253	314	138	328	400	156	373	469	195	405	497	195	-	-	-
303 R4	229	292	138	253	314	138	328	400	156	373	469	195	405	497	195	-	-	-



Il diagramma seguente consente di ricavare il carico radiale ammissibile  $R_{x2}$  quando questo è applicato alla distanza  $x$  dallo spallamento dell'albero lento del riduttore 303\_VK.

Le curve si riferiscono al valore risultante dal rapporto fra il carico assiale  $A_{n2}$  e il carico radiale  $R_{n2}$ , entrambi riferiti a  $n_2 = 10 \text{ min}^{-1}$  e durata teorica di 10000 h.

The diagram below allows the calculation of permitted over-hung load  $R_{x2}$  on the output shaft of gearbox type 303\_VK, with radial force applying at a distance  $x$  from shaft shoulder.

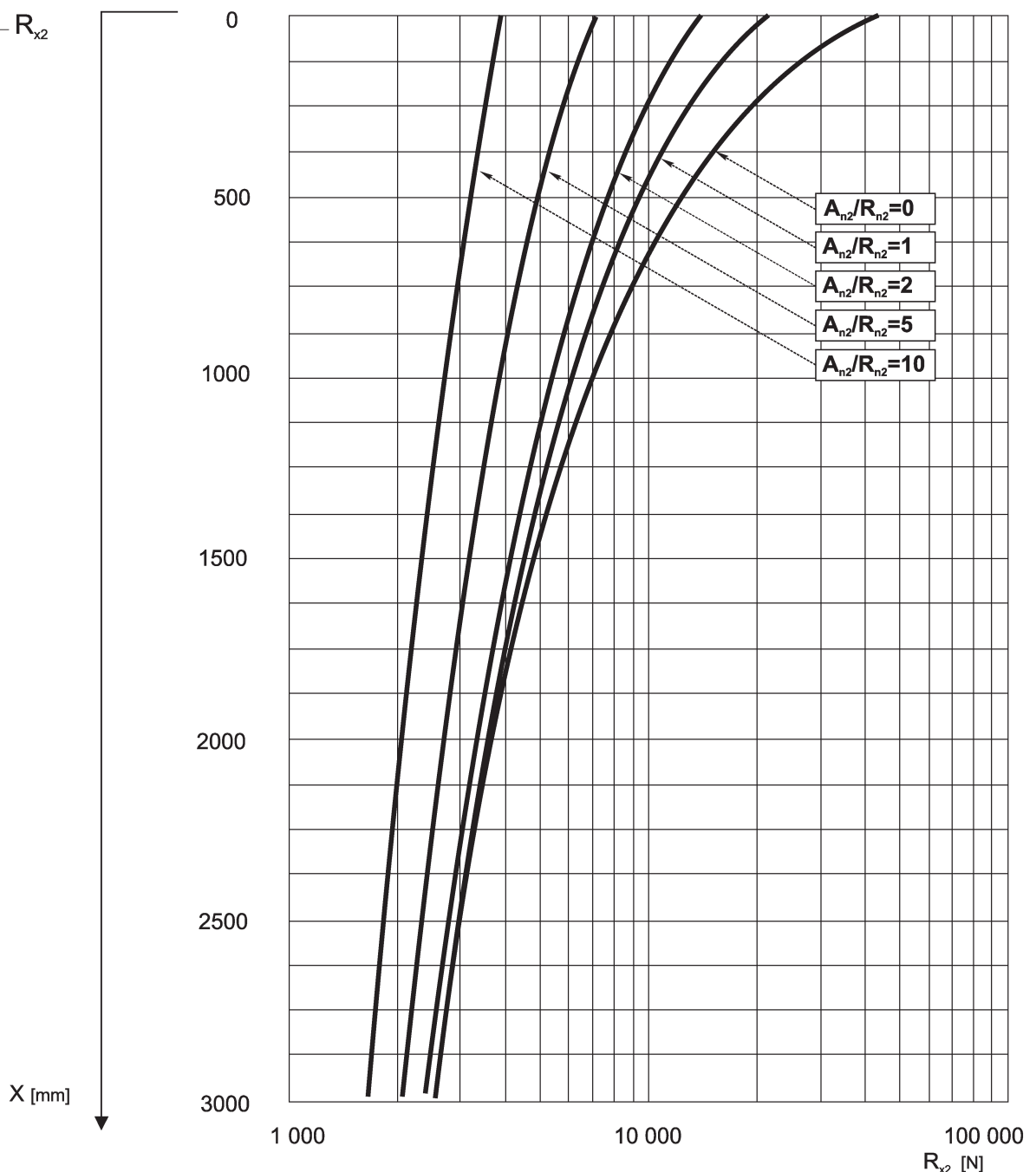
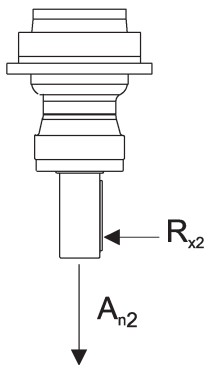
The curves are relevant to value resulting from the relationship of trust load  $A_{n2}$  to radial load  $R_{n2}$ , based on  $n_2 = 10 \text{ min}^{-1}$  and 10000 hrs theoretical lifetime.

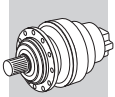
Das nachstehende Diagramm ermöglicht das Individuieren der zulässigen, auf die Welle des Getriebes 303\_VK einwirkenden Radialkraft, die auf der Distanz  $x$  vom Anschlag der Welle selbst appliziert wird.

Die Kurven beziehen sich auf den Wert, der sich aus dem Verhältnis zwischen der Axialkraft  $A_{n2}$  und der Radialkraft  $R_{n2}$  für  $n_2 = 10 \text{ min}^{-1}$  und einer Dauer von 10000 Std. ergibt.

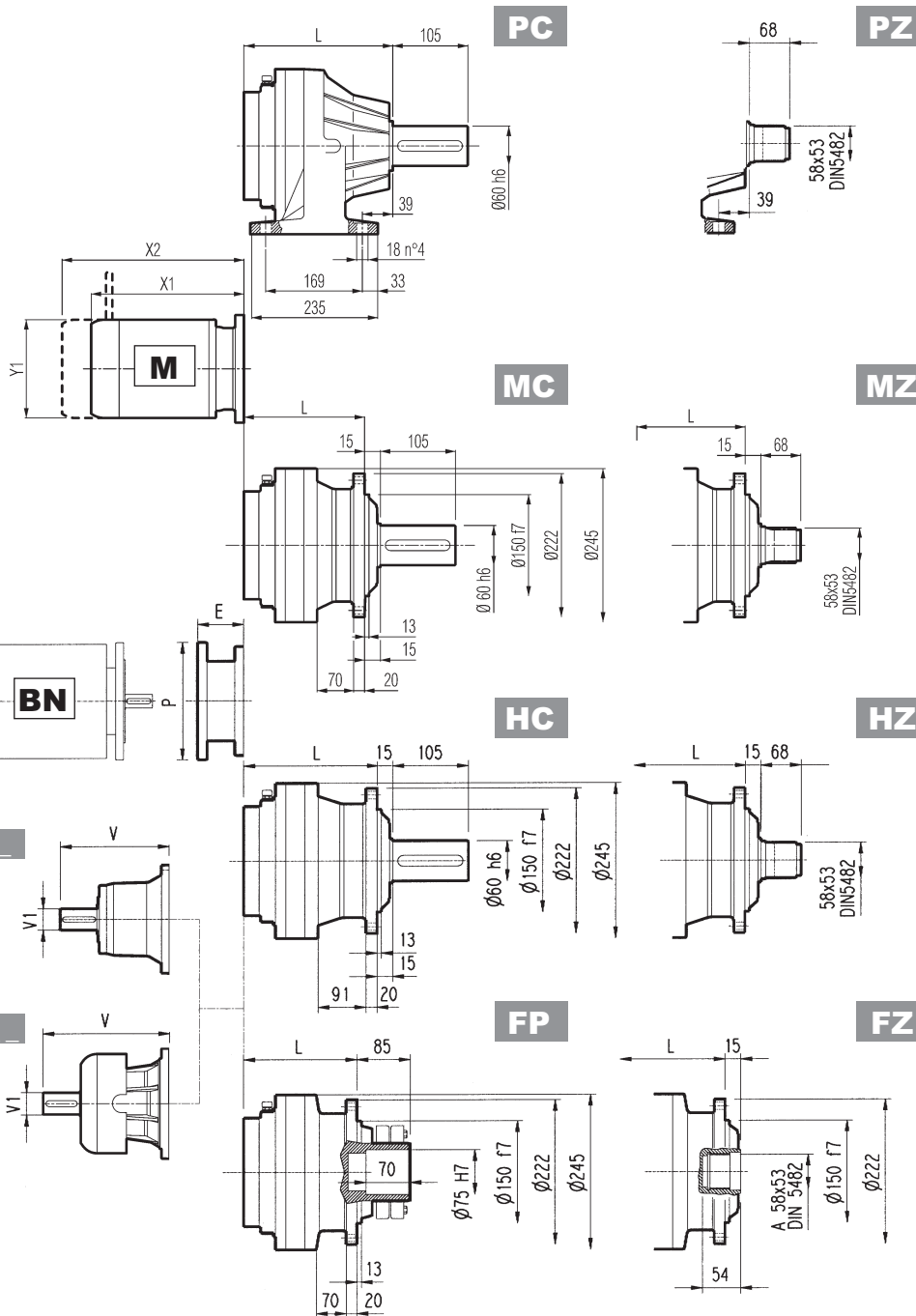
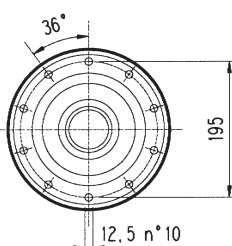
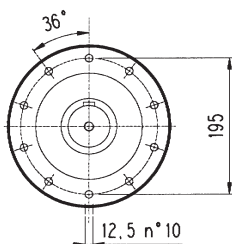
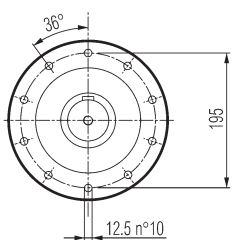
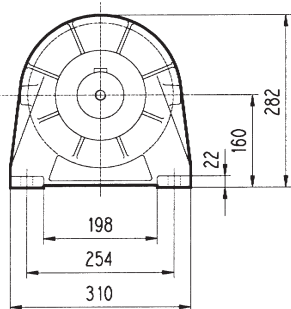
Le diagramme suivant permet de déterminer la charge radiale admissible  $R_{x2}$  sur l'arbre lent du réducteur 303\_VK appliqué à la distance  $x$  de l'épaulement de l'arbre.

Les courbes se réfèrent à la valeur résultant de l'équation entre la charge axiale  $A_{n2}$  et la charge radiale  $R_{n2}$  pour  $n_2 = 10 \text{ min}^{-1}$  et durée de 10000 h.





# 304 L



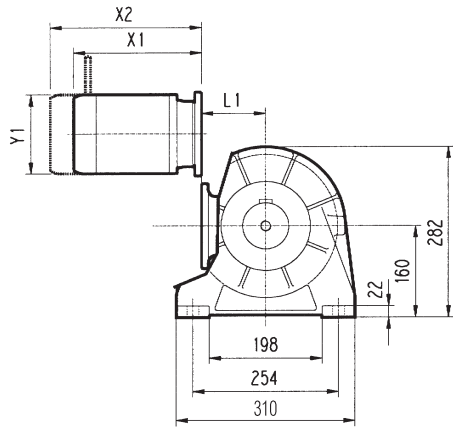
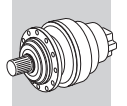
**FP**

$M_{2max} = 6000 \text{ Nm}$

	L				Kg				Kg				Kg							
	MC - MZ	PC - PZ	HC - HZ	FP - FZ	MC - MZ	PC - PZ	HC - HZ	FP - FZ	V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg
304 L1	125	165	150	125	31	40	35	31	239	48	15	-	-	-	276	48	17	-	-	-
304 L2	190	230	215	190	38	47	42	38	137.5	24	6	158	38	7	-	-	-	-	-	-
304 L3	243	283	268	243	42	51	46	42	137.5	24	6	158	38	7	-	-	-	-	-	-
304 L4	296	336	321	296	46	55	50	46	137.5	24	6	158	38	7	-	-	-	-	-	-

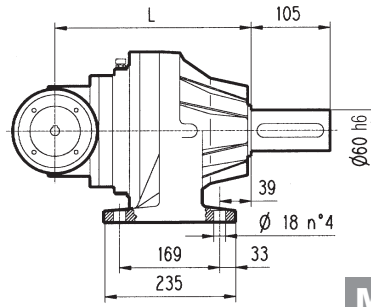
	P71		P80		P90		P100		P112		P132		P160		P180		P200	
	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P
304 L1	-	-	-	-	-	-	-	-	-	-	114	300	144	350	144	350	174	400
304 L2	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-
304 L3	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-
304 L4	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-

	S1 + M1S			S1 + M1L			S2 + M2S			S3 + M3S			S3 + M3L			S4 + M4			S5 + M5S			S5 + M5L		
	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y
304 L1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	460	571	258	552	692	310	596	736	310
304 L2	229	292	138	253	314	138	280	352	156	325	421	195	357	449	195	460	571	258	-	-	-	-	-	-
304 L3	229	292	138	253	314	138	280	352	156	325	421	195	357	449	195	460	571	258	-	-	-	-	-	-
304 L4	229	292	138	253	314	138	280	352	156	325	421	195	357	449	195	460	571	258	-	-	-	-	-	-



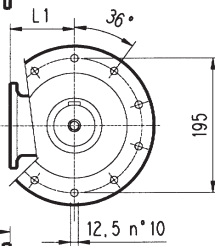
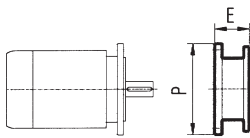
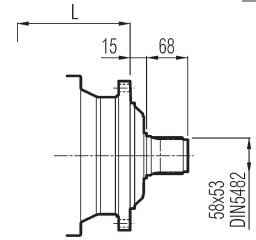
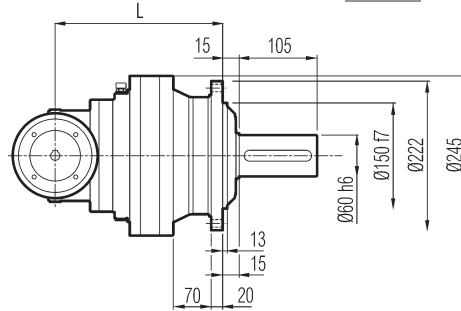
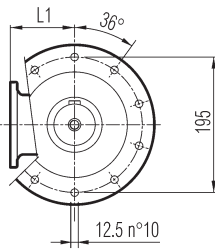
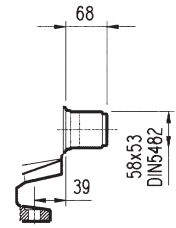
**PC**

**PZ**



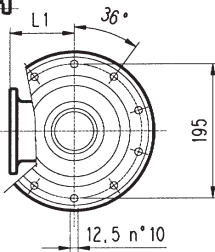
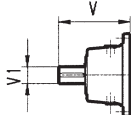
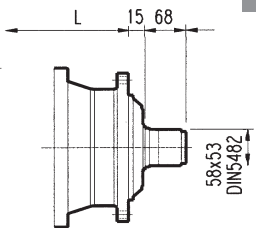
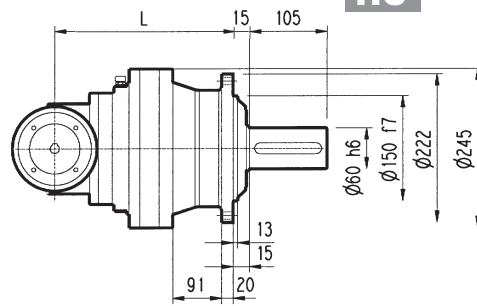
**MC**

**MZ**



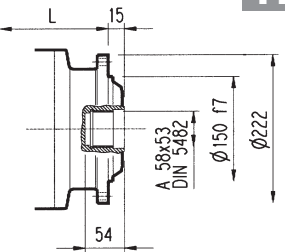
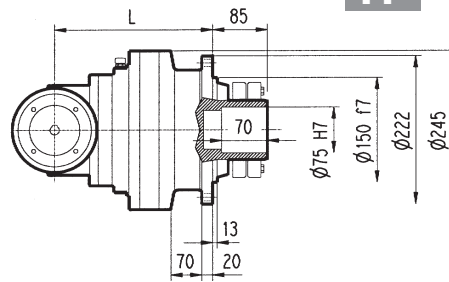
**HC**

**HZ**



**FP**

**FZ**



**FP**

**M<sub>2max</sub> = 6000 Nm**

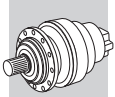
	L				L1	Kg				V	V1	Kg	V	V1	Kg
	MC - MZ	PC - PZ	HC - HZ	FP - FZ		MC - MZ	PC - PZ	HC - HZ	FP - FZ						
<b>304 R2</b>	217	257	242	217	140	51	60	55	51	137.5	24	6	158	38	7
<b>304 R3</b>	282	322	307	282	122	52	61	56	52	137.5	24	6	158	38	7
<b>304 R4</b>	335	375	360	335	122	56	65	60	56	137.5	24	6	158	38	7

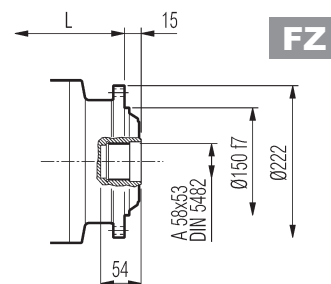
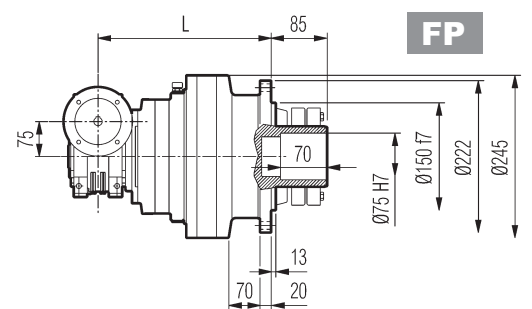
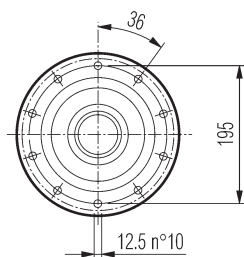
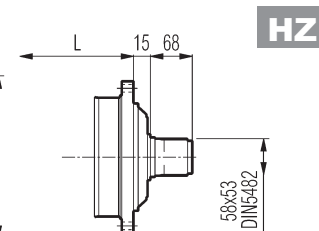
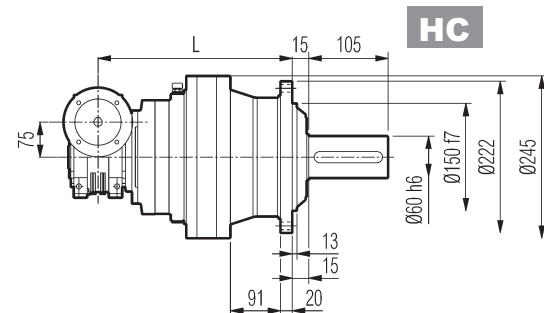
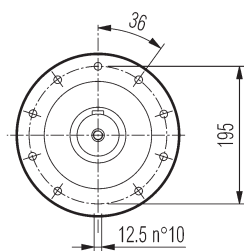
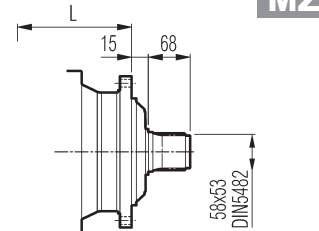
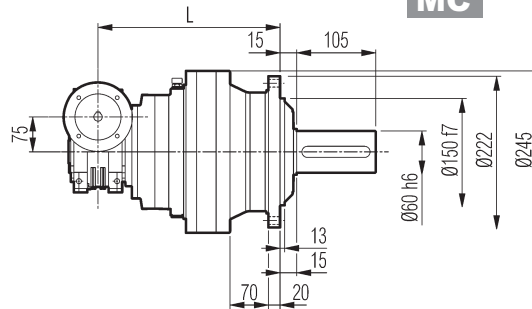
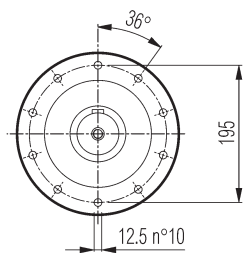
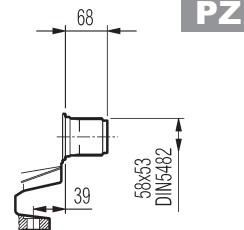
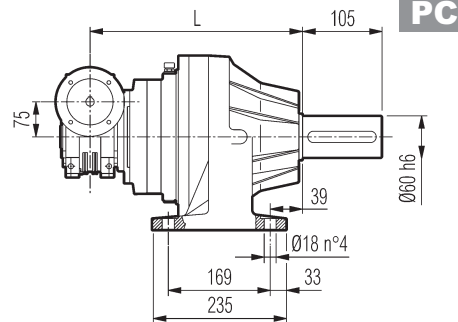
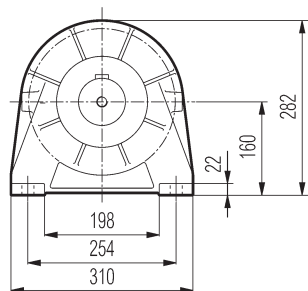
	P71		P80		P90		P100		P112		P132	
	E	P	E	P	E	P	E	P	E	P	E	P
<b>304 R2</b>	65	160	84	200	84	200	94	250	94	250	114	300
<b>304 R3</b>	65	160	84	200	84	200	94	250	94	250	114	300
<b>304 R4</b>	65	160	84	200	84	200	94	250	94	250	114	300

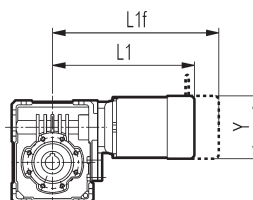
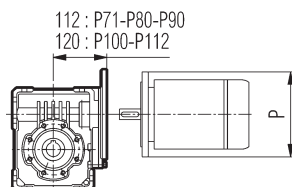
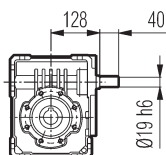
	S1 + M1S			S1 + M1L			S2 + M2S			S3 + M3S			S3 + M3L			S4 + M4		
	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1
<b>304 R2</b>	-	-	-	-	-	-	328	400	156	373	469	195	405	497	195	508	619	258
<b>304 R3</b>	229	292	138	253	314	138	328	400	156	373	469	195	405	497	195	-	-	-
<b>304 R4</b>	229	292	138	253	314	138	328	400	156	373	469	195	405	497	195	-	-	-



# 3/V 04L3



Vista da  
View from **A**



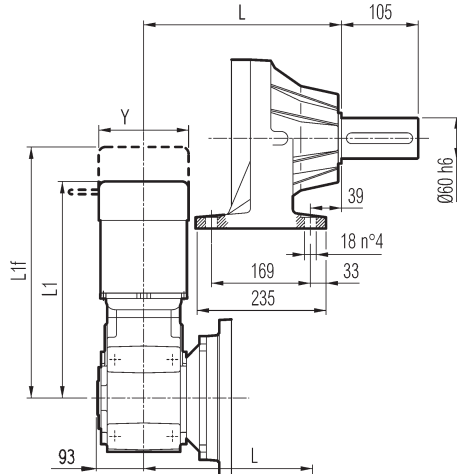
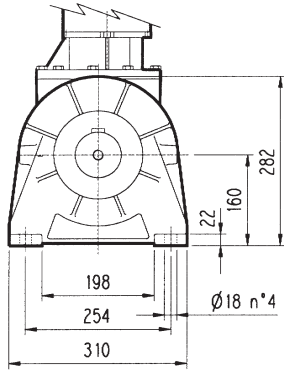
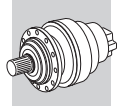
**FP**

**M<sub>2max</sub> = 6000 Nm**

	L				Kg				P71	P80	P90	P100
	MC - MZ	PC - PZ	HC - HZ	FP - FZ	MC - MZ	PC - PZ	HC - HZ	FP - FZ	P	P	P	P
3/V 04L3	305	345	330	305	47	56	51	47	160	200	200	250

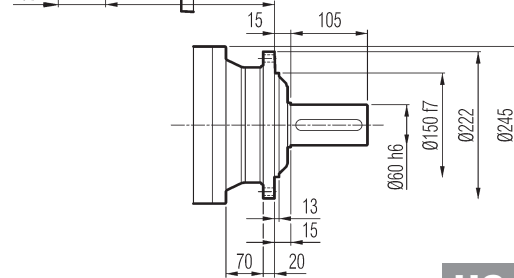
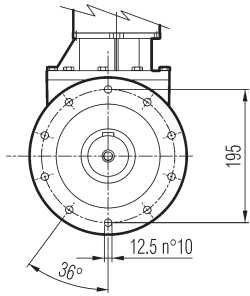
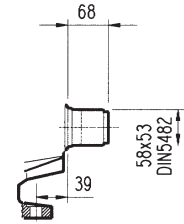
  

	S1 + M1S			S1 + M1L			S2 + M2S			S3 + M3S			S3 + M3L		
	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y
3/V 04L3	284	347	138	308	369	138	333	409	156	376	472	193	408	499	193



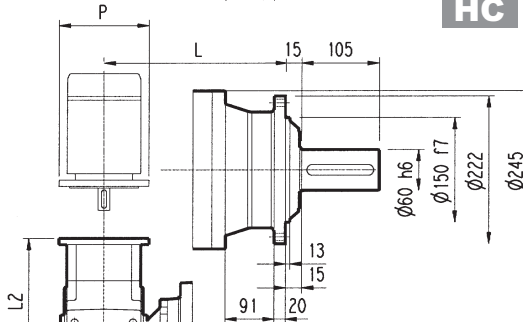
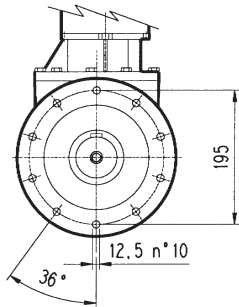
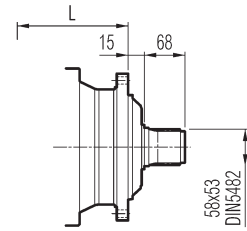
**PC**

**PZ**



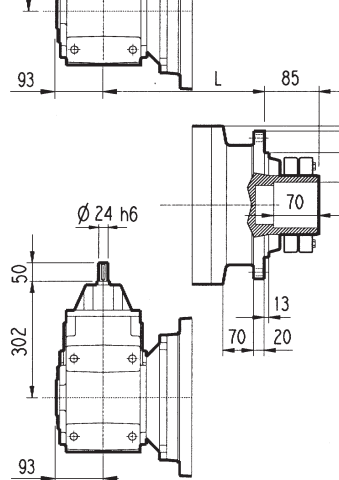
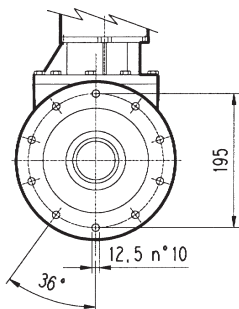
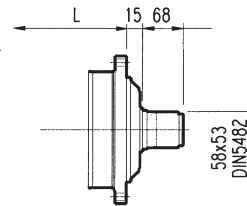
**MC**

**MZ**



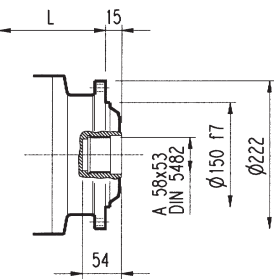
**HC**

**HZ**



**FP**

**FZ**



**FP**

$M_{2max} = 6000 \text{ Nm}$

	L								D1	L3	L4
	MC - MZ	PC - PZ	HC - HZ	FP - FZ	MC - MZ	PC - PZ	HC - HZ	FP - FZ			
3/A 04L2	258	298	283	258	80	95	90	80	24	302	50

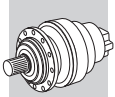
  

	P63		P71		P80		P90		P100		P112		P132	
	L2	P	L2	P	L2	P	L2	P	L2	P	L2	P	L2	P
3/A 04L2	263	140	263	160	282.5	200	282.5	200	292.5	250	292.5	250	329	457

	S1 + M1S			S1 + M1L			S2 + M2S			S3 + M3SA			S3 + M3LA			S4 + M4		
	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y
3/A 04L2	394	457	138	418	439	138	447	517	156	490	487	195	522	538	195	630	738	258



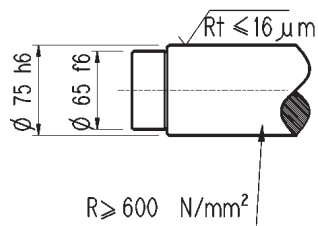
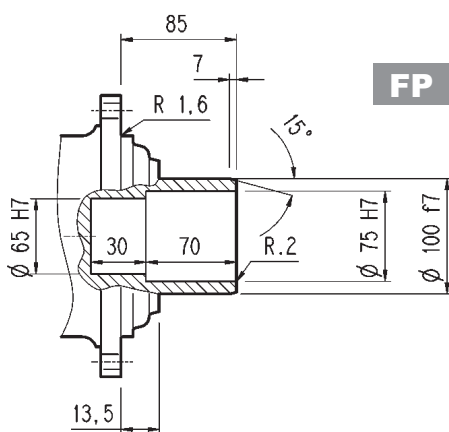
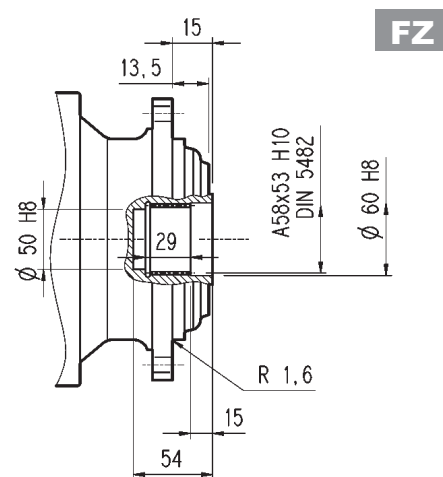
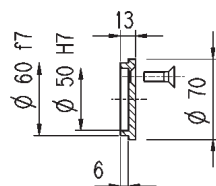
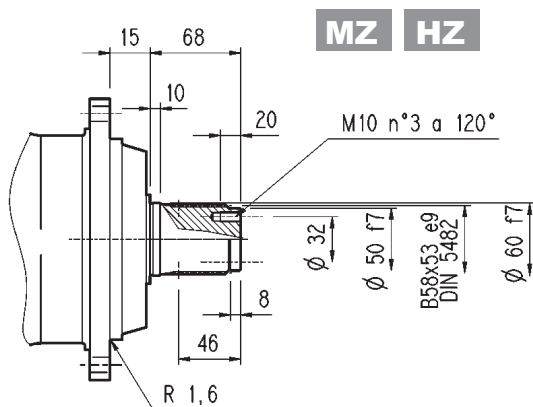
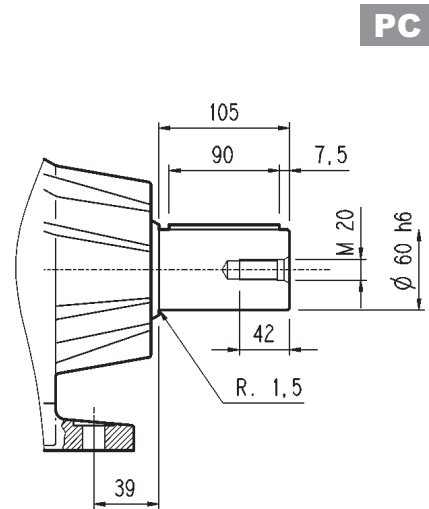
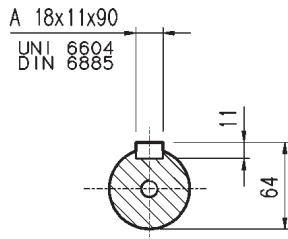
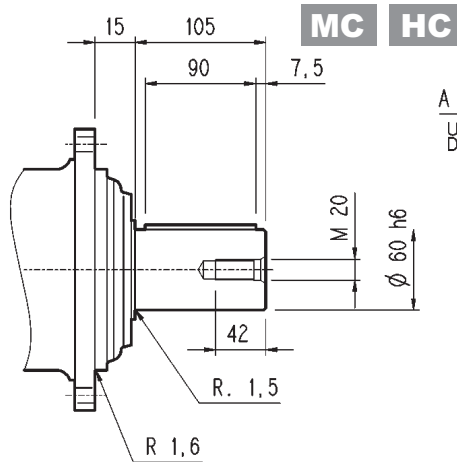


304 L

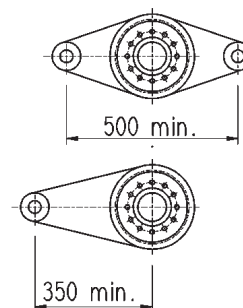
304 R

3/V 04L3

3/A 04L2

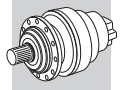
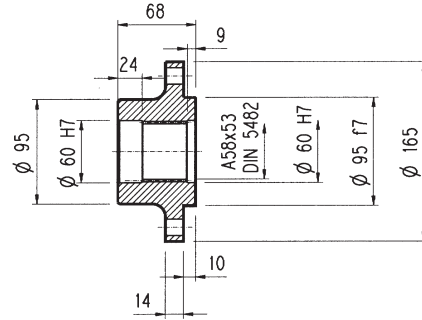
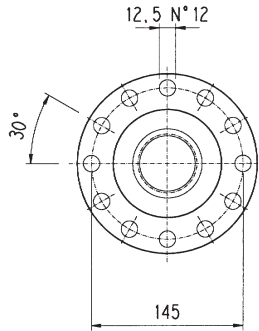
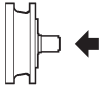


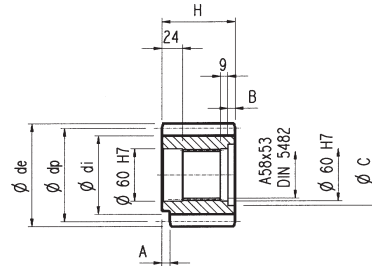
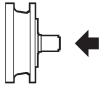
$R \geq 600 \text{ N/mm}^2$



**FP**

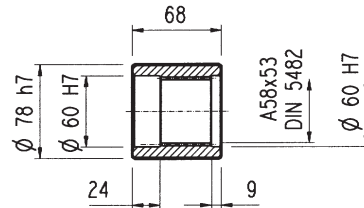
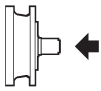
$M_{2max} = 6000 \text{ Nm}$

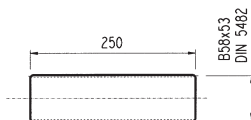
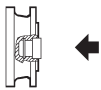
**304 L****304 R****3/V 04L3****3/A 04L2**
**Flangia / Flange**  
**Flansch / Brides**
**WOA**
 Materiale : Acciaio C40  
 Material : Steel C40  
 Material : Stahl C40  
 Matière : Acier C40

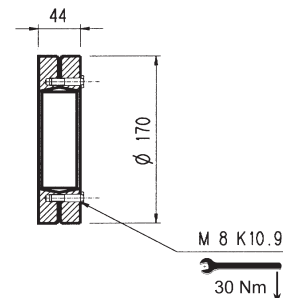
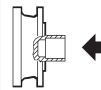
**Pignoni / Pinion gears**  
**Ritzel / Pignons**
**P...**

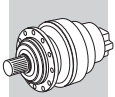
	m	z	x	dp	di	de	H	A	B	C	☆
PCL1	5	19	0	95	82	104	77	12	9	72	□
PCL2	5	19	0	95	82	104	68	0	0	0	□
PCM	5	20	0	100	87.5	110	68	18	0	0	■
PCP	5	22	0	110	97.5	120	68	18	0	0	■
PDE	6	14	0.500	84	75	99.6	68	0	0	0	□
PDI	6	18	0.500	108	99	123.6	68	0	0	0	□
PDM	6	20	0.833	120	115	140	68	0	0	0	□
PFD	8	13	0.675	104	95	127.6	68	0	0	0	■
PFE1	8	14	0	112	92	126	68	0	0	0	■
PFE2	8	14	0	112	92	126	80	0	12	72	■
PFF	8	15	0	120	100	136	68	0	0	0	□
PFP	8	22	0	176	156	190	77	12	10	71	□
PHG	10	16	0.500	160	145	188	75	0	7	72	□

☆	Materiale / Material / Material / Matière
□	Acciaio 39NiCrMo3 Bonificato Steel 39NiCrMo3 hardened and tempered Vergüteter Stahl 39NiCrMo3 Acier bonifié 39NiCrMo3
■	Acciaio 18NiCrMo5 Cementato e temprato Steel 18NiCrMo5 Case hardened Einsatzstahl 18NiCrMo5 Einsatzgehärtet Acier cimenté et tempré 18NiCrMo5

**Manicotti lisci / Sleeve couplings**  
**Naben / Manchons lisses a cannelure interieure**
**MOA**
 Materiale : Acciaio 16CrNi4  
 Material : Steel 16CrNi4  
 Material : Stahl 16CrNi4  
 Matière : Acier 16CrNi4

**Barre scanalate / Spined bars**  
**Vielkeilwellen / Barre cannelée**
**B0A**
 Mat. acciaio 18NiCrMo5 UNI 5331 da cementare e  
 temprare 50-55 HRC  
 Case hardening steel 18NiCrMo5 UNI 5331 must be case  
 hardened to 50-55 HRC  
 Material: Einsatzstahl 18NiCrMo5 UNI 5331 muss einsatzgehärtet  
 werden 50-55 HRC  
 Acier 18 NiCrMo5 UNI 5331 doit être cémenté trempé 50-55 HRC

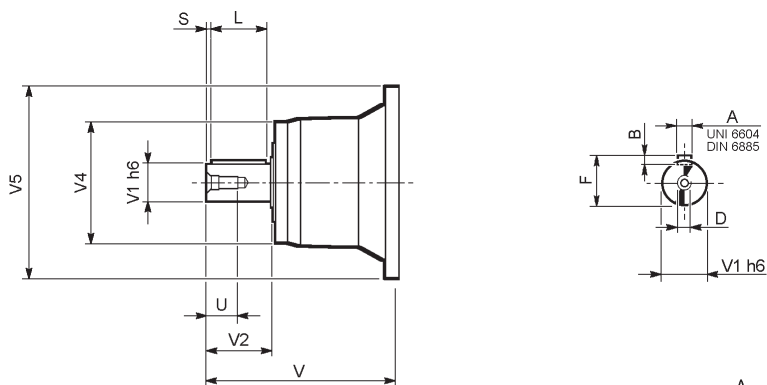
**Giunto ad attrito / Shrink disc**  
**Schrumpfscheibe / Frette de serrage**
**GOA**



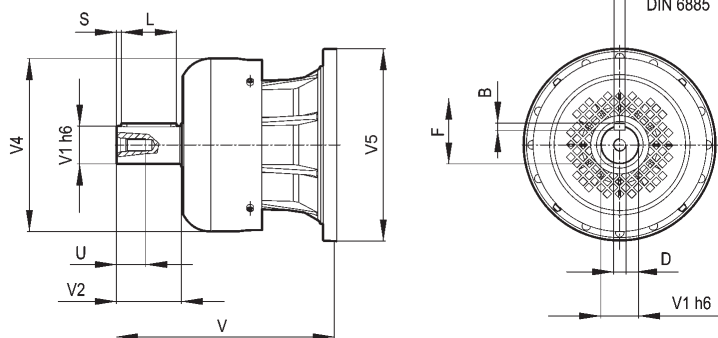
**304 L**

**304 R**

**V**



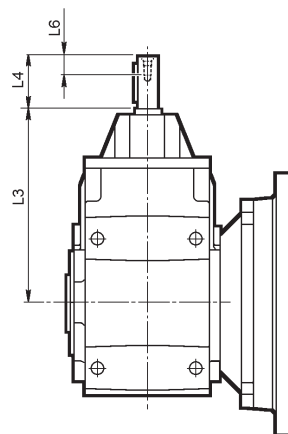
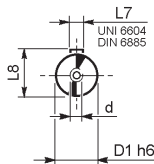
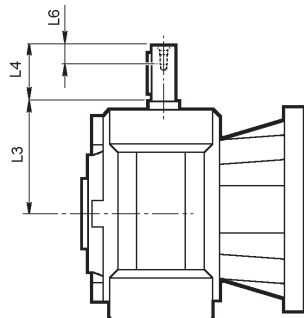
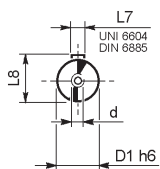
**FV**



	input	V	V1	V2	V4	V5	A	B	F	L	S	D	U
304 L1	V05B	239	48	82	155	245	14	9	51.5	70	6	M16	36
	FV05B	276	48	82	219.5	244	14	9	51.5	70	6	M16	36
304 L2	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28
304 L3	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28
304 L4	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28
304 R2-R3-R4	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28

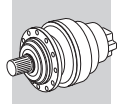
**3/V 04L3**

**3/A 04L2**



	D1 h6	L3	L4	L6	L7	L8	d
3/V 04L3 HS	19	128	40	16	6	21.5	M6

	D1 h6	L3	L4	L6	L7	L8	d
3/A 04L2 HS	24	302	50	19	8	27	M8

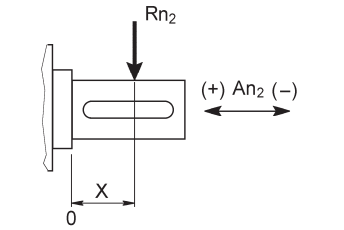
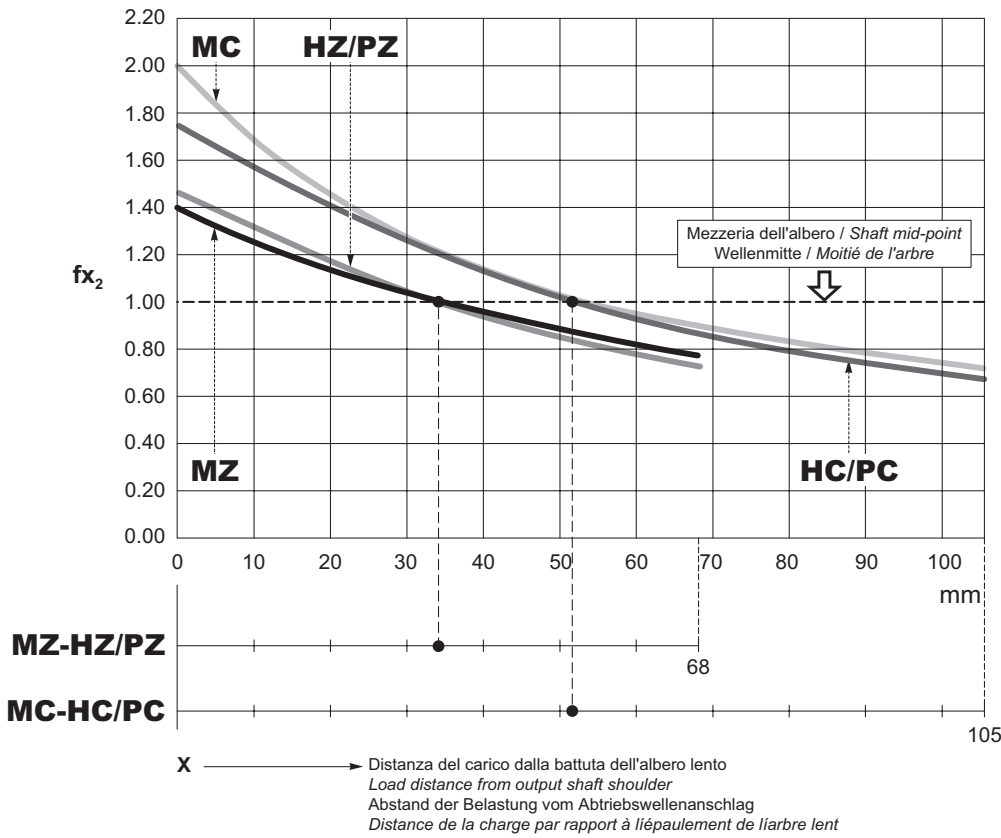


Fattore di posizione per carichi radiali sugli alberi in uscita.

Load location factor for radial loading on output shaft.

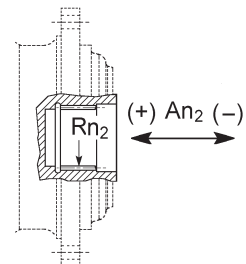
Positionsfaktor für Radialkräfte an der Abtriebswelle.

Facteur de position pour charges radiales sur les arbres en sortie.



$$R_{x2} = R_{n2} \cdot f_{x2}$$

$An_2 (\pm) = R_{n2} \cdot fa_2 (\pm)$		
	$fa_2 (+)$	$fa_2 (-)$
HZ/PZ	0.74	0.59
HC/PC	0.86	0.69
MC	2.04	2.04
MZ	1.74	1.74



$$An_2 (\pm) = R_{n2} \cdot fa_2 (\pm)$$

$An_2 (\pm) = R_{n2} \cdot fa_2 (\pm)$		
	$fa_2 (+)$	$fa_2 (-)$
FZ	1.04	1.04

Carichi radiali ammissibili sull'albero veloce per  $n_1 = 1000 \text{ min}^{-1}$  e 10000 h di vita teorica.

Permitted overhung loads on input shaft when  $n_1 = 1000 \text{ min}^{-1}$  and theoretical lifetime = 10000 h.

Zulässige Radialkräfte an den Antriebswellen für  $n_1 = 1000 \text{ min}^{-1}$  und 10000 std.

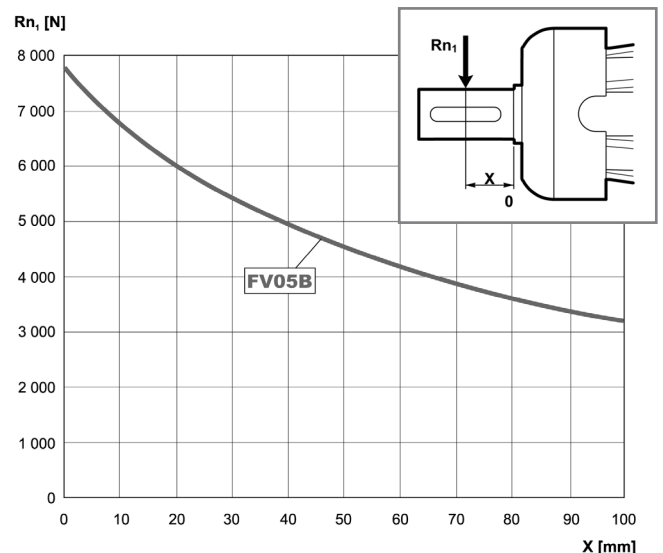
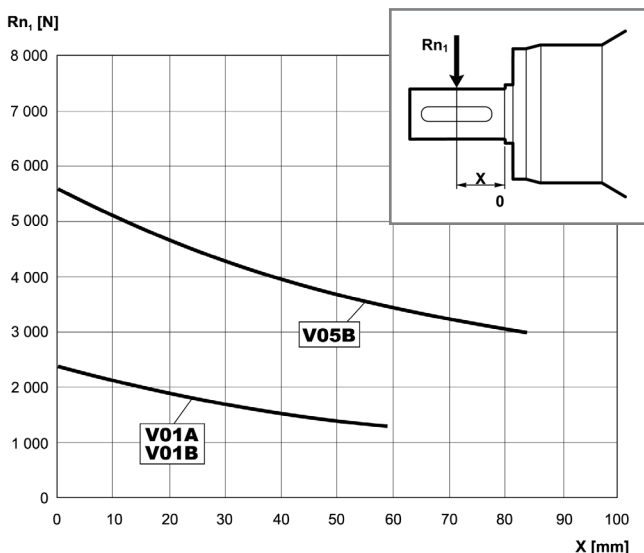
Charges radiales admissibles sur les arbres d'entrée pour  $n_1 = 1000 \text{ min}^{-1}$  et 10000 h.

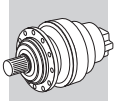
Per velocità di comando e/o durate diverse vedi il capitolo: Verifiche.

For drive speed and/or lifetimes other than those specified here, see Chapter: Verifications.

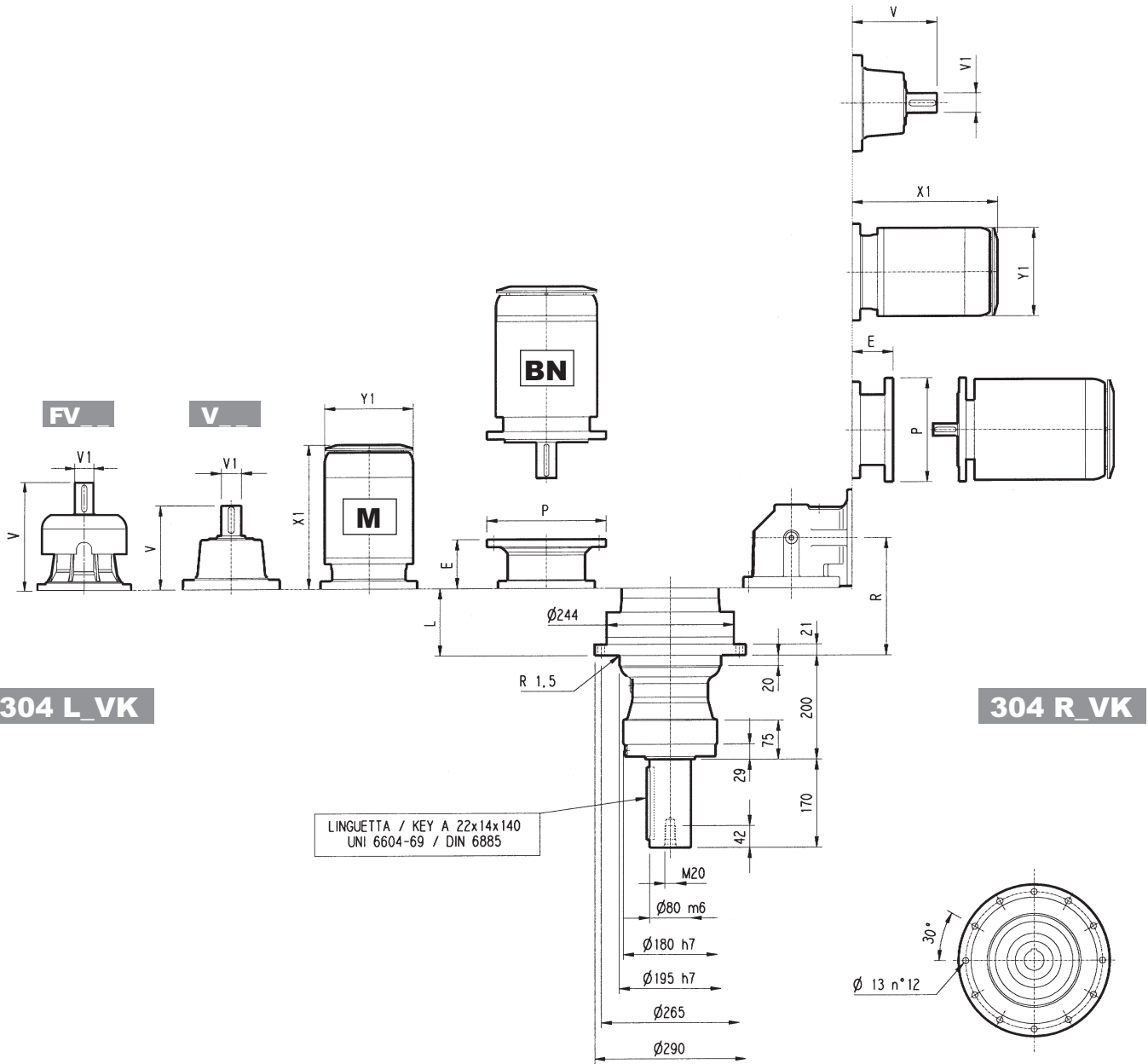
Im Hinblick auf Geschwindigkeit und/oder anderweitige Dauern verweisen wir auf Par: Prüfungen

Pour des vitesses et/ou durées différentes, voir par. Vérifications.





# 304\_VK



## 304 L\_VK

## 304 R\_VK

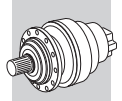
LINGUETTA / KEY A 22x14x140  
UNI 6604-69 / DIN 6885

	L		V						V1						P71		P80		P90		P100		P112		P132		P160		P180		P200	
	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	
304 L1	51	65	239	48	15	-	-	-	276	48	17	-	-	-	-	-	-	-	-	-	-	-	-	114	300	144	350	144	350	174	400	
304 L2	116	73	137.5	24	6	158	38	7	-	-	-	-	-	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-	
304 L3	169	76	137.5	24	6	158	38	7	-	-	-	-	-	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-	
304 L4	222	80	137.5	24	6	158	38	7	-	-	-	-	-	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-	

	R		R1		V						P71		P80		P90		P100		P112		P132	
	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg	kg
304 R2	143	140	85	137.5	24	6	158	38	7	65	160	84	200	84	200	94	250	94	250	114	300	
304 R3	208	122	86	137.5	24	6	158	38	7	65	160	84	200	84	200	94	250	94	250	114	300	
304 R4	261	122	90	137.5	24	6	158	38	7	65	160	84	200	84	200	94	250	94	250	114	300	

	S1 + M1S			S1 + M1L			S2 + M2S			S3 + M3S			S3 + M3L			S4 + M4			S5 + M5S			S5 + M5L		
	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y
304 L1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	460	571	258	552	692	310	596	736	310
304 L2	229	292	138	253	314	138	280	352	156	325	421	195	357	449	195	460	571	258	-	-	-	-	-	-
304 L3	229	292	138	253	314	138	280	352	156	325	421	195	357	449	195	460	571	258	-	-	-	-	-	-
304 L4	229	292	138	253	314	138	280	352	156	325	421	195	357	449	195	460	571	258	-	-	-	-	-	-

	S1 + M1S			S1 + M1L			S2 + M2S			S3 + M3S			S3 + M3L			S4 + M4		
	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1
304 R2	-	-	-	-	-	-	328	400	156	373	469	195	405	497	195	508	619	258
304 R3	229	292	138	253	314	138	328	400	156	373	469	195	405	497	195	-	-	-
304 R4	229	292	138	253	314	138	328	400	156	373	469	195	405	497	195	-	-	-



Il diagramma seguente consente di ricavare il carico radiale ammissibile  $R_{x2}$  quando questo è applicato alla distanza  $x$  dallo spallamento dell'albero lento del riduttore 304\_VK.

Le curve si riferiscono al valore risultante dal rapporto fra il carico assiale  $A_{n2}$  e il carico radiale  $R_{n2}$ , entrambi riferiti a  $n_2 = 10 \text{ min}^{-1}$  e durata teorica di 10000 h.

The diagram below allows the calculation of permitted over-hung load  $R_{x2}$  on the output shaft of gearbox type 304\_VK, with radial force applying at a distance  $x$  from shaft shoulder.

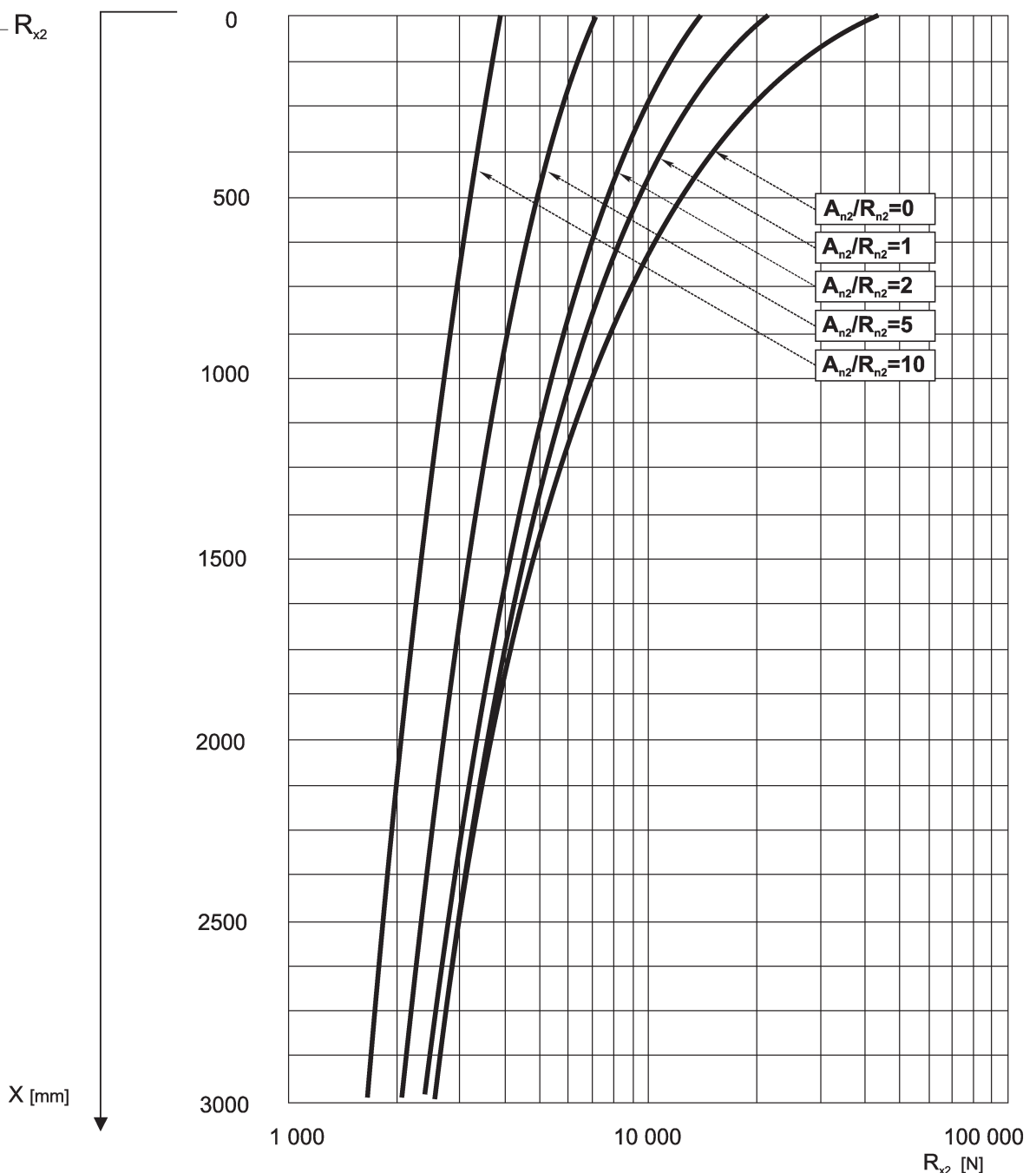
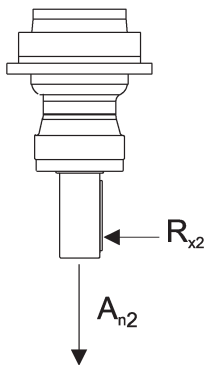
The curves are relevant to value resulting from the relationship of trust load  $A_{n2}$  to radial load  $R_{n2}$ , based on  $n_2 = 10 \text{ min}^{-1}$  and 10000 hrs theoretical lifetime.

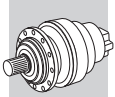
Das nachstehende Diagramm ermöglicht das Individuieren der zulässigen, auf die Welle des Getriebes 304\_VK einwirkenden Radialkraft, die auf der Distanz  $x$  vom Anschlag der Welle selbst appliziert wird.

Die Kurven beziehen sich auf den Wert, der sich aus dem Verhältnis zwischen der Axialkraft  $A_{n2}$  und der Radialkraft  $R_{n2}$  für  $n_2 = 10 \text{ min}^{-1}$  und einer Dauer von 10000 Std. ergibt.

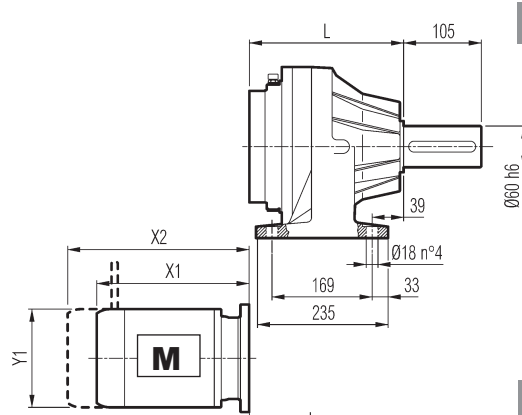
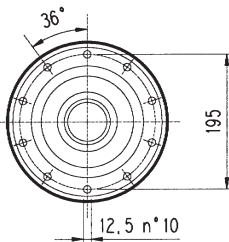
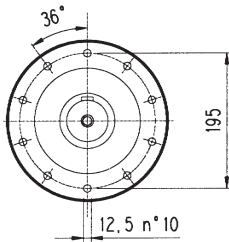
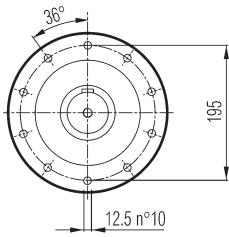
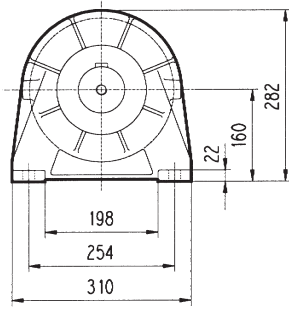
Le diagramme suivant permet de déterminer la charge radiale admissible  $R_{x2}$  sur l'arbre lent du réducteur 304\_VK appliqué à la distance  $x$  de l'épaulement de l'arbre.

Les courbes se réfèrent à la valeur résultant de l'équation entre la charge axiale  $A_{n2}$  et la charge radiale  $R_{n2}$  pour  $n_2 = 10 \text{ min}^{-1}$  et durée de 10000 h.

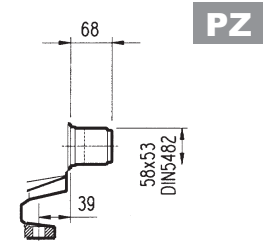




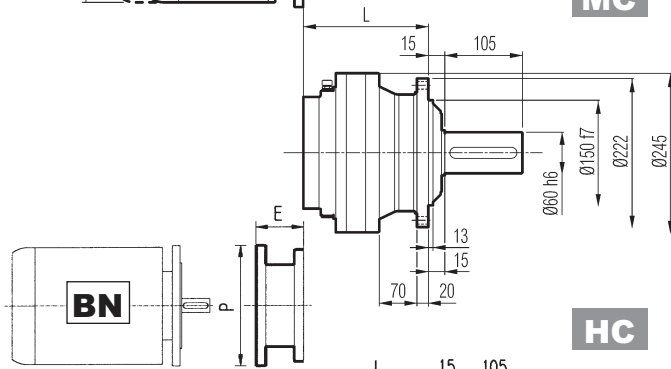
# 305 L



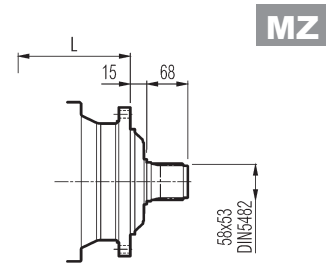
**PC**



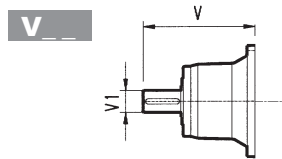
**PZ**



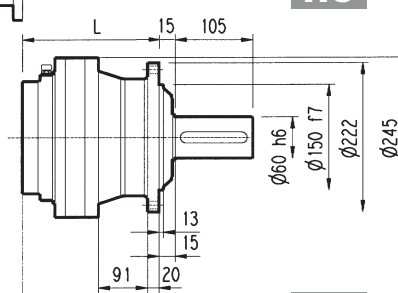
**MC**



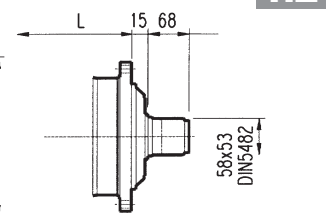
**MZ**



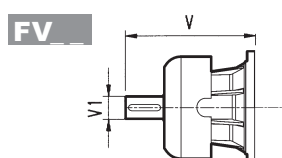
**V**



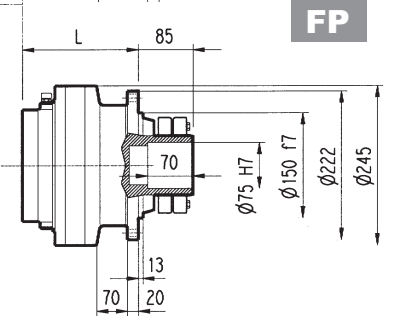
**HC**



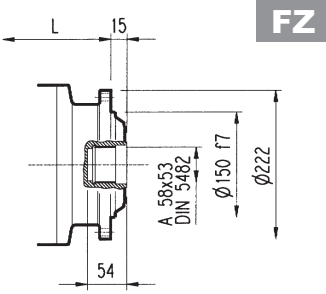
**HZ**



**FV**



**FP**



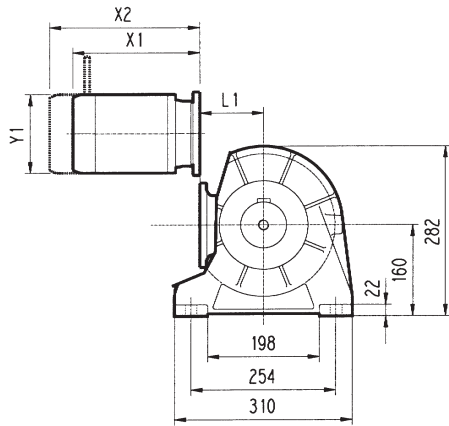
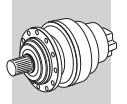
**FZ**

**FP**  $M_{2max} = 7000 \text{ Nm}$

	L				Kg				Kg				Kg							
	MC - MZ	PC - PZ	HC - HZ	FP - FZ	MC - MZ	PC - PZ	HC - HZ	FP - FZ	V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg
305 L1	143	183	168	143	36	45	40	36	239	48	15	-	-	-	276	48	17	-	-	-
305 L2	208	248	233	208	43	52	47	43	137.5	24	6	158	38	7	-	-	-	-	-	-
305 L3	261	301	286	261	47	56	51	47	137.5	24	6	158	38	7	-	-	-	-	-	-
305 L4	314	354	339	314	51	60	55	51	137.5	24	6	158	38	7	-	-	-	-	-	-

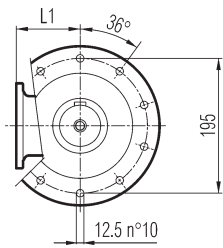
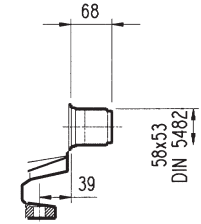
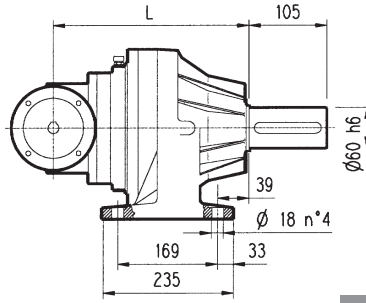
	P71		P80		P90		P100		P112		P132		P160		P180		P200	
	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P
305 L1	-	-	-	-	-	-	-	-	-	-	114	300	144	350	144	350	174	400
305 L2	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-
305 L3	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-
305 L4	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-

	S1 + M1S			S1 + M1L			S2 + M2S			S3 + M3S			S3 + M3L			S4 + M4			S5 + M5S			S5 + M5L		
	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y
305 L1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	460	571	258	552	692	310	596	736	310
305 L2	-	-	-	-	-	-	280	352	156	325	421	195	357	449	195	460	571	258	-	-	-	-	-	-
305 L3	229	292	138	253	314	138	280	352	156	325	421	195	357	449	195	460	571	258	-	-	-	-	-	-
305 L4	229	292	138	253	314	138	280	352	156	325	421	195	357	449	195	460	571	258	-	-	-	-	-	-



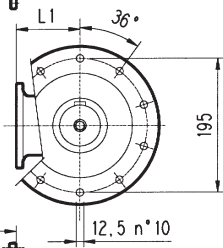
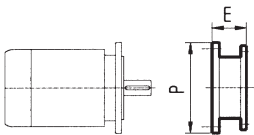
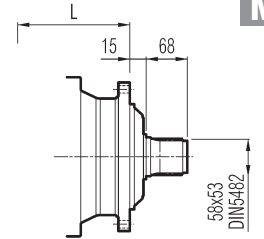
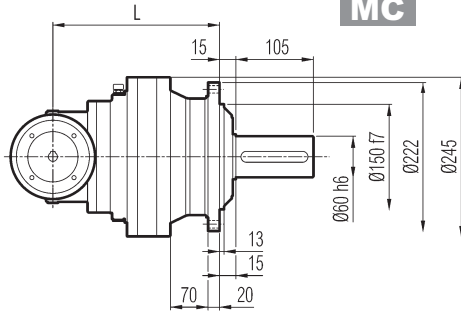
**PC**

**PZ**



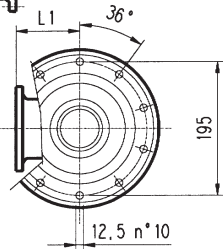
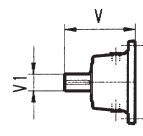
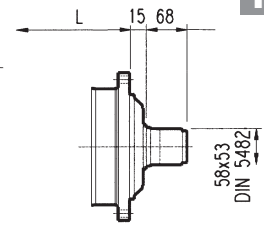
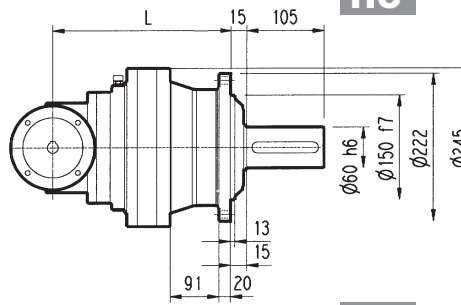
**MC**

**MZ**



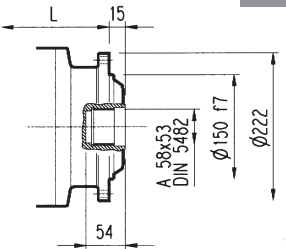
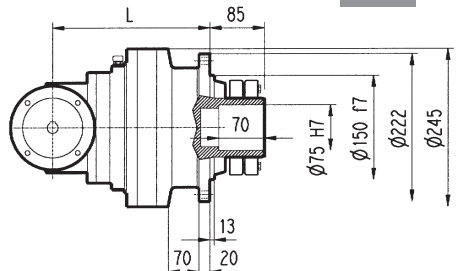
**HC**

**HZ**



**FP**

**FZ**



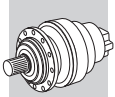
**FP**  $M_{2max} = 7000 \text{ Nm}$

	L				L1	Kg				Kg					
	MC - MZ	PC - PZ	HC - HZ	FP - FZ		MC - MZ	PC - PZ	HC - HZ	FP - FZ	V	V1	Kg	V	V1	Kg
305 R2	235	375	260	235	140	56	65	60	56	137.5	24	6	158	38	7
305 R3	300	340	325	300	122	57	66	61	57	137.5	24	6	158	38	7
305 R4	353	393	378	353	122	61	70	65	61	137.5	24	6	158	38	7

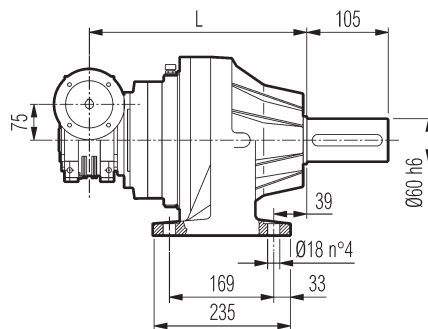
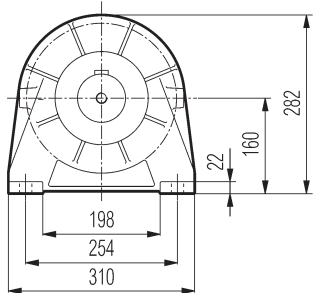
	P71		P80		P90		P100		P112		P132	
	E	P	E	P	E	P	E	P	E	P	E	P
305 R2	65	160	84	200	84	200	94	250	94	250	114	300
305 R3	65	160	84	200	84	200	94	250	94	250	114	300
305 R4	65	160	84	200	84	200	94	250	94	250	114	300

	S1 + M1S			S1 + M1L			S2 + M2S			S3 + M3S			S3 + M3L			S4 + M4		
	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1
305 R2	-	-	-	-	-	-	328	400	156	373	469	195	405	497	195	508	619	258
305 R3	229	292	138	253	314	138	328	400	156	373	469	195	405	497	195	508	619	258
305 R4	229	292	138	253	314	138	328	400	156	373	469	195	405	497	195	508	619	258

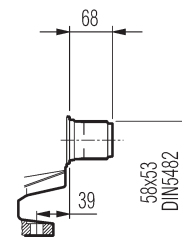




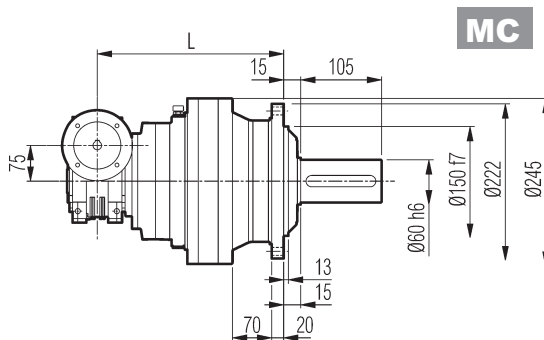
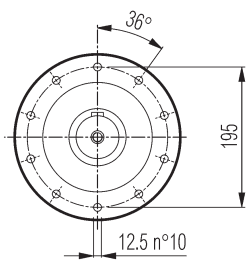
# 3/V 05L3



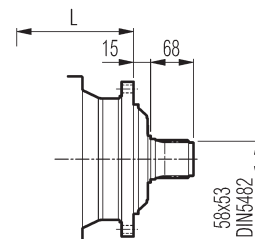
**PC**



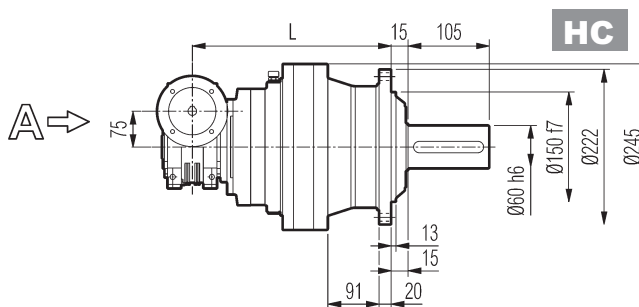
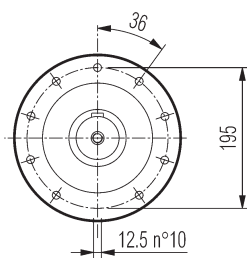
**PZ**



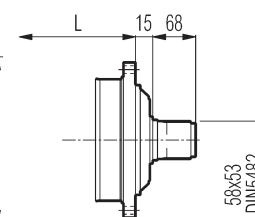
**MC**



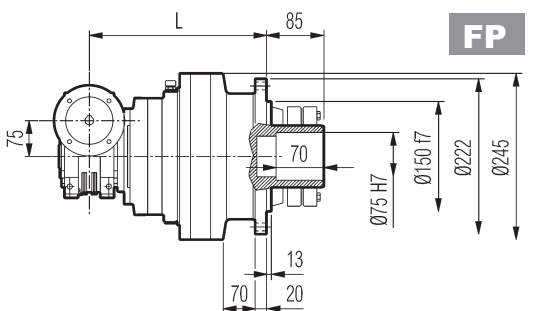
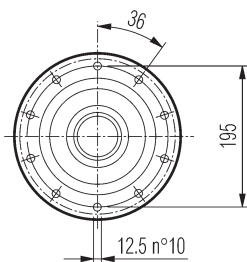
**MZ**



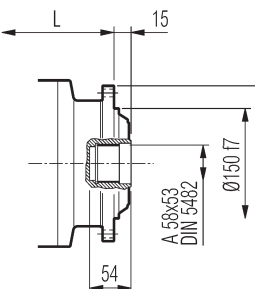
**HC**



**HZ**

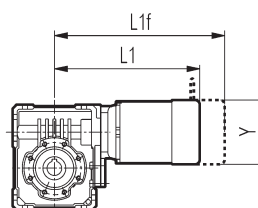
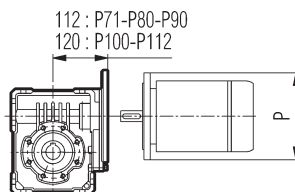
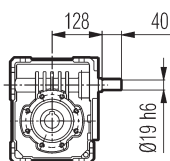


**FP**



**FZ**

Vista da View from **A**



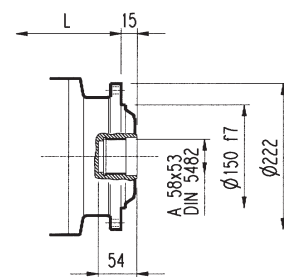
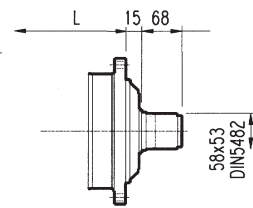
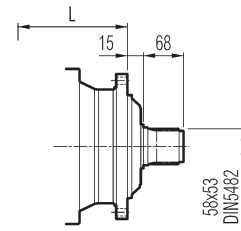
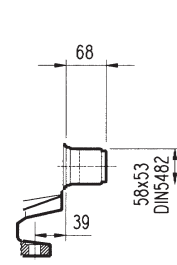
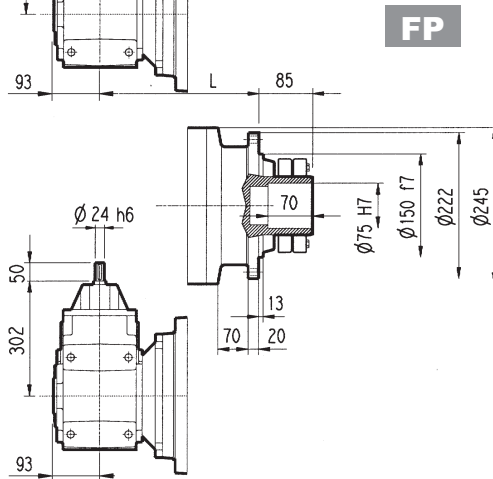
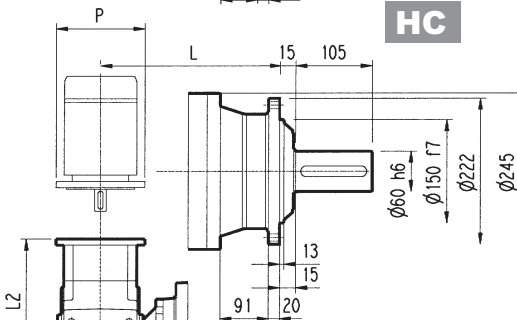
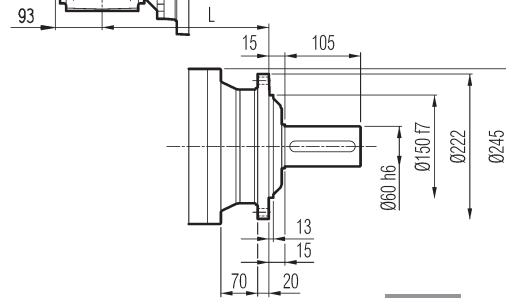
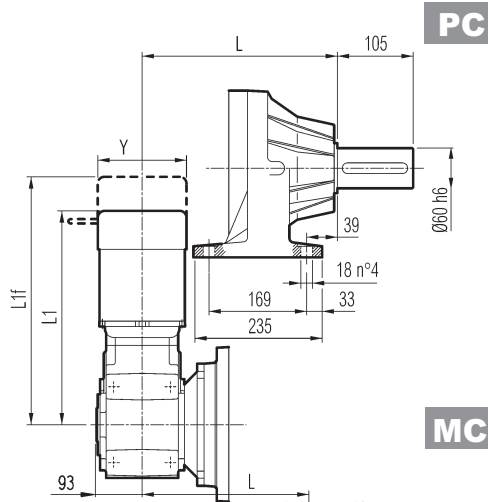
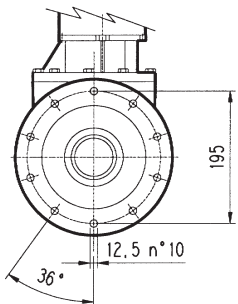
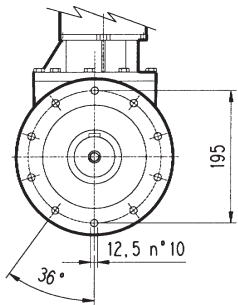
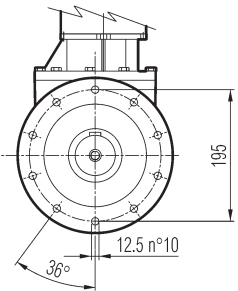
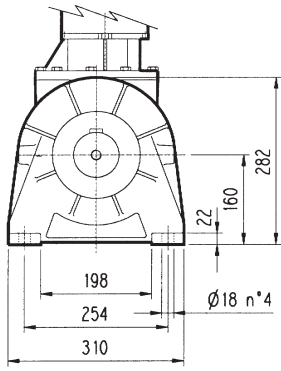
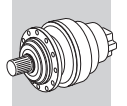
**FP**

$M_{2max} = 7000 \text{ Nm}$

3/V 05L3	L			Kg				P71	P80	P90	P100	
	MC - MZ	PC - PZ	HC - HZ	FP - FZ	MC - MZ	PC - PZ	HC - HZ	FP - FZ	P	P	P	P
3/V 05L3	323	363	348	323	51	60	55	51	160	200	200	250

3/V 05L3	S1 + M1S			S1 + M1L			S2 + M2S			S3 + M3S			S3 + M3L		
	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y
3/V 05L3	284	347	138	308	369	138	333	409	156	376	472	193	408	499	193



**FP**  $M_{2max} = 7000 \text{ Nm}$

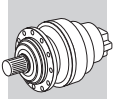
	L								D1	L3	L4
	MC - MZ	PC - PZ	HC - HZ	FP - FZ	MC - MZ	PC - PZ	HC - HZ	FP - FZ			
3/A 05L2	276	316	301	276	90	105	100	90	24	302	50

	P63		P71		P80		P90		P100		P112		P132	
	L2	P	L2	P	L2	P	L2	P	L2	P	L2	P	L2	P
3/A 05L2	263	140	263	160	282.5	200	282.5	200	292.5	250	292.5	250	329	457

	S1 + M1S			S1 + M1L			S2 + M2S			S3 + M3SA			S3 + M3LA			S4 + M4		
	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y
3/A 05L2	394	457	138	418	439	138	447	517	156	490	487	195	522	538	195	630	738	258

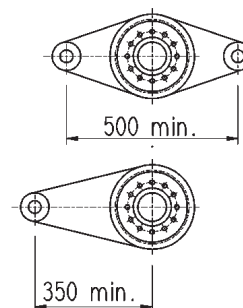
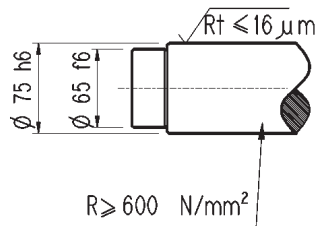
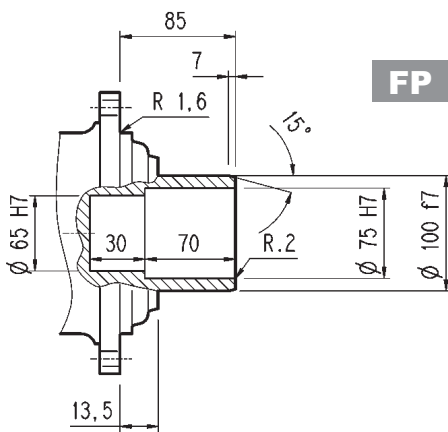
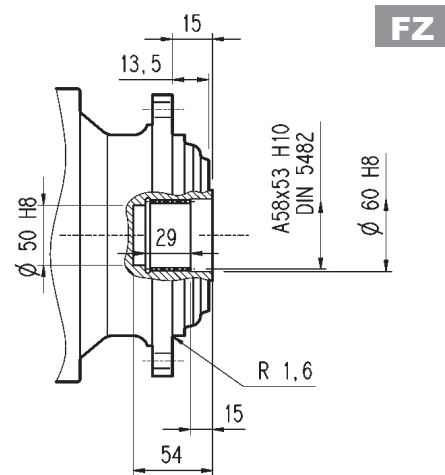
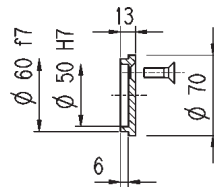
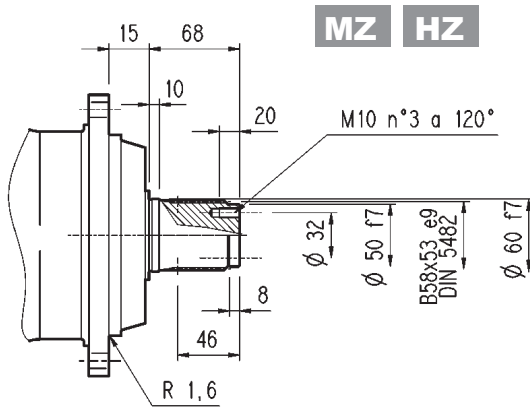
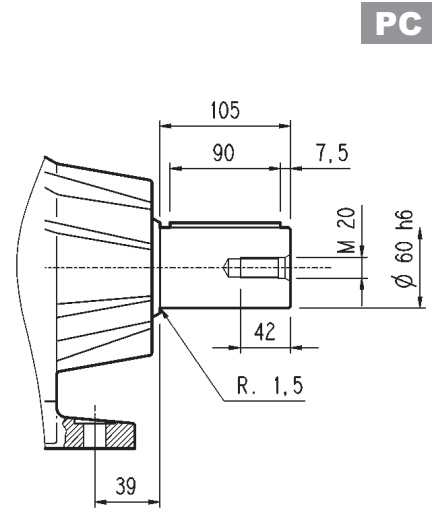
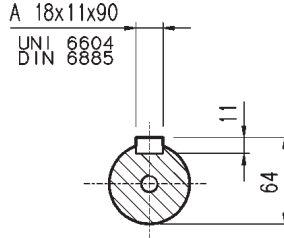
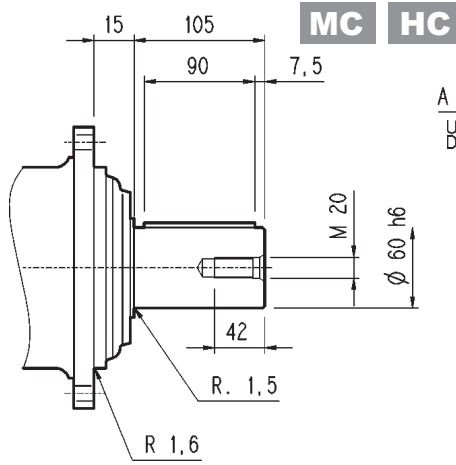


**305 L**

**305 R**

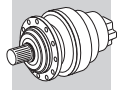
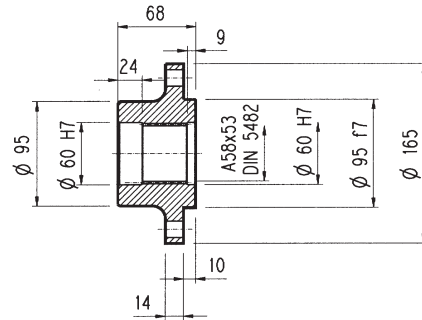
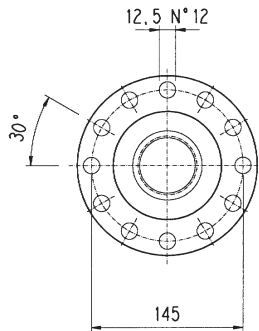
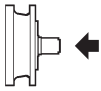
**3/V 05L3**

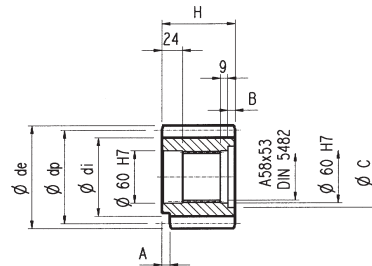
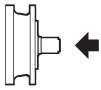
**3/A 05L2**



**FP**

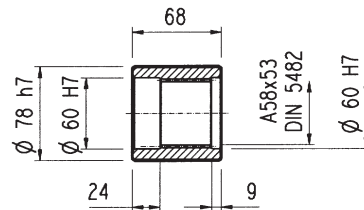
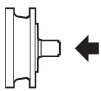
**M<sub>2max</sub> = 7000 Nm**

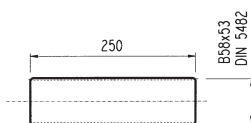
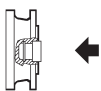
**305 L****305 R****3/V 05L3****3/A 05L2**
**Flangia / Flange**  
**Flansch / Brides**
**WOA**
 Materiale : Acciaio C40  
 Material : Steel C40  
 Material : Stahl C40  
 Matière : Acier C40

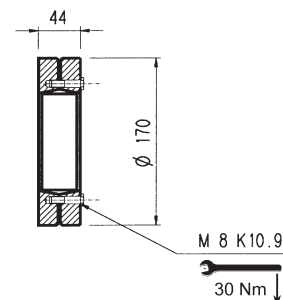
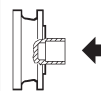
**Pignoni / Pinion gears**  
**Ritzel / Pignons**
**P...**

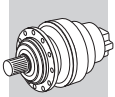
	m	z	x	dp	di	de	H	A	B	C	☆
PCL1	5	19	0	95	82	104	77	12	9	72	□
PCL2	5	19	0	95	82	104	68	0	0	0	□
PCM	5	20	0	100	87.5	110	68	18	0	0	■
PCP	5	22	0	110	97.5	120	68	18	0	0	■
PDE	6	14	0.500	84	75	99.6	68	0	0	0	□
PDI	6	18	0.500	108	99	123.6	68	0	0	0	□
PDM	6	20	0.833	120	115	140	68	0	0	0	□
PFD	8	13	0.675	104	95	127.6	68	0	0	0	■
PFE1	8	14	0	112	92	126	68	0	0	0	■
PFE2	8	14	0	112	92	126	80	0	12	72	■
PFF	8	15	0	120	100	136	68	0	0	0	□
PFP	8	22	0	176	156	190	77	12	10	71	□
PHG	10	16	0.500	160	145	188	75	0	7	72	□

☆	Materiale / Material / Material / Matière
□	Acciaio 39NiCrMo3 Bonificato Steel 39NiCrMo3 hardened and tempered Vergüteter Stahl 39NiCrMo3 Acier bonifié 39NiCrMo3
■	Acciaio 18NiCrMo5 Cementato e temprato Steel 18NiCrMo5 Case hardened Einsatzstahl 18NiCrMo5 Einsatzgehärtet Acier cimenté et tempré 18NiCrMo5

**Manicotti lisci / Sleeve couplings**  
**Naben / Manchons lisses a cannelure interieure**
**MOA**
 Materiale : Acciaio 16CrNi4  
 Material : Steel 16CrNi4  
 Material : Stahl 16CrNi4  
 Matière : Acier 16CrNi4

**Barre scanalate / Spined bars**  
**Vielkeilwellen / Barre cannelée**
**B0A**
 Mat. acciaio 18NiCrMo5 UNI 5331 da cementare e  
 temprare 50-55 HRC  
 Case hardening steel 18NiCrMo5 UNI 5331 must be case  
 hardened to 50-55 HRC  
 Material: Einsatzstahl 18NiCrMo5 UNI 5331 muss einsatzgehärtet  
 werden 50-55 HRC  
 Acier 18 NiCrMo5 UNI 5331 doit être cémenté trempé 50-55 HRC

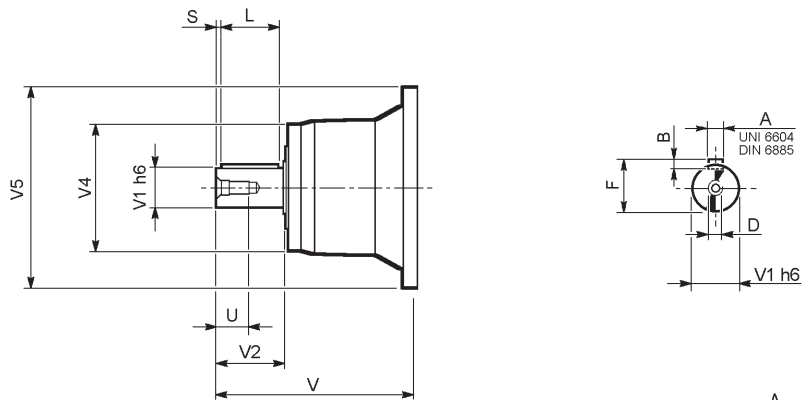
**Giunto ad attrito / Shrink disc**  
**Schrumpfscheibe / Frette de serrage**
**GOA**



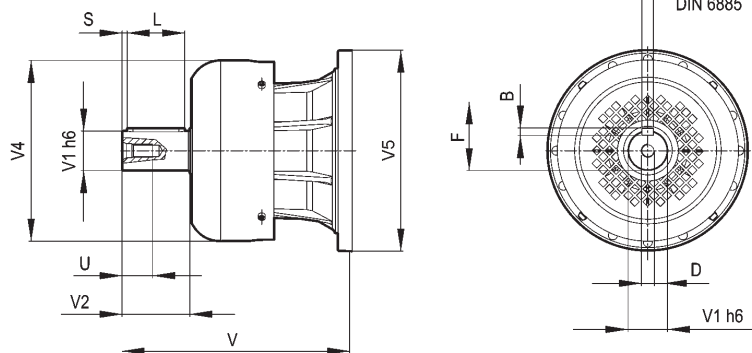
**305 L**

**305 R**

**V**



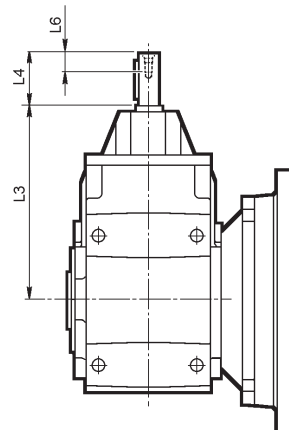
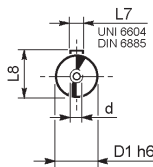
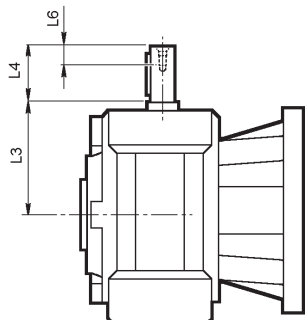
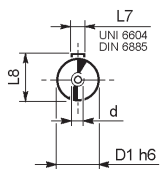
**FV**



	input	V	V1	V2	V4	V5	A	B	F	L	S	D	U
305 L1	V05B	239	48	82	155	245	14	9	51.5	70	6	M16	36
	FV05B	276	48	82	219.5	244	14	9	51.5	70	6	M16	36
305 L2	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28
305 L3	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28
305 L4	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28
305 R2-R3-R4	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28

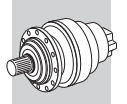
**3/V 05L3**

**3/A 05L2**



	D1 h6	L3	L4	L6	L7	L8	d
3/V 05L3 HS	19	128	40	16	6	21.5	M6

	D1 h6	L3	L4	L6	L7	L8	d
3/A 05L2 HS	24	302	50	19	8	27	M8

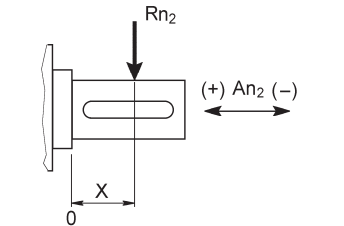
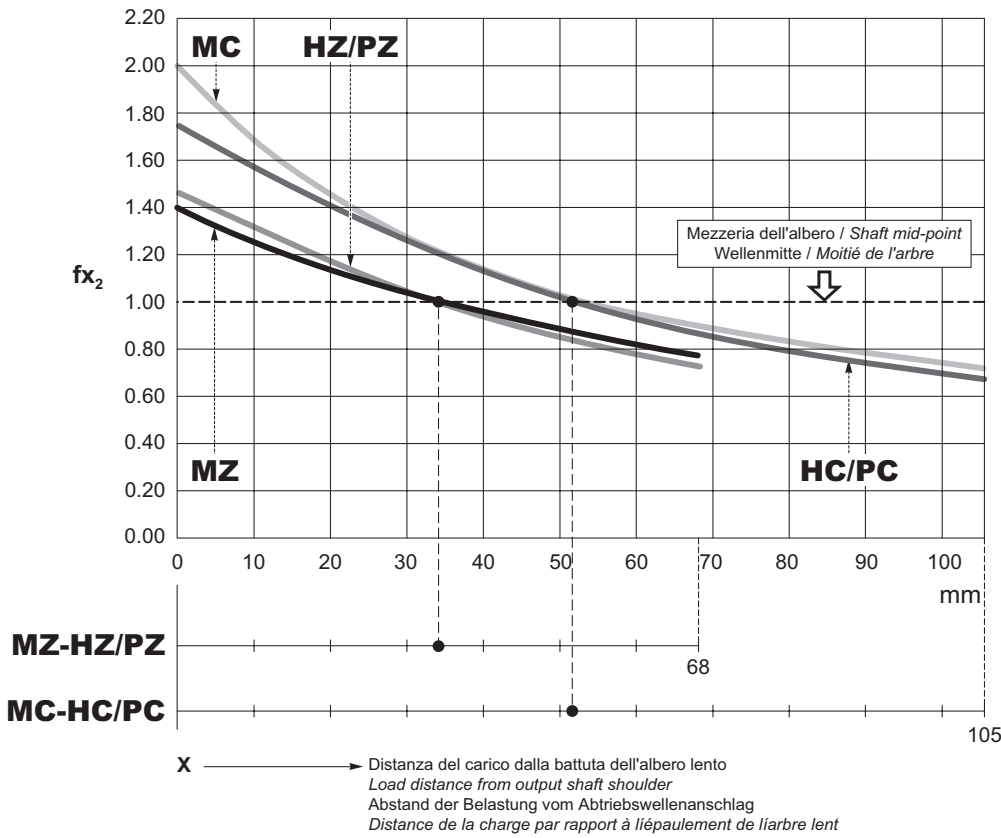


Fattore di posizione per carichi radiali sugli alberi in uscita.

Load location factor for radial loading on output shaft.

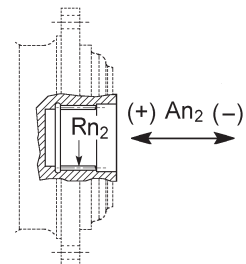
Positionsfaktor für Radialkräfte an der Abtriebswelle.

Facteur de position pour charges radiales sur les arbres en sortie.



$R_{x_2} = R_{n_2} \cdot f_{x_2}$

$An_2 (\pm) = R_{n_2} \cdot fa_2 (\pm)$		
	$fa_2 (+)$	$fa_2 (-)$
HZ/PZ	0.74	0.59
HC/PC	0.86	0.69
MC	2.04	2.04
MZ	1.74	1.74



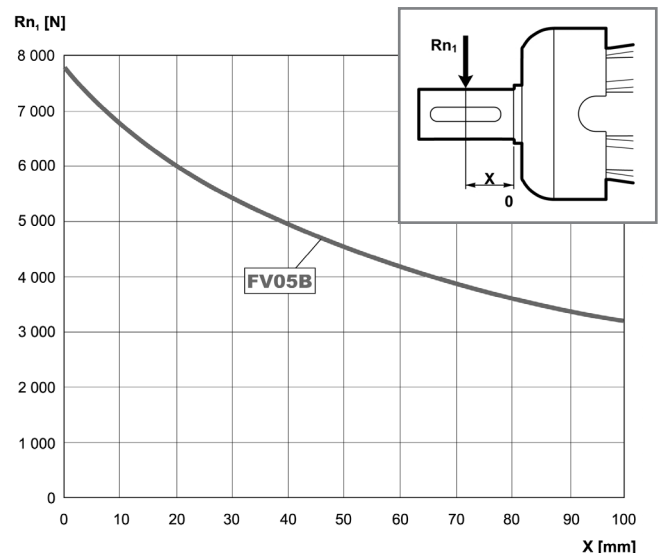
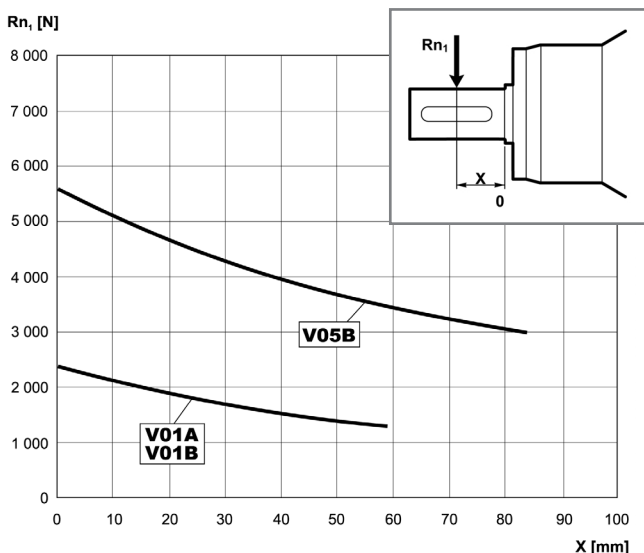
$An_2 (\pm) = R_{n_2} \cdot fa_2 (\pm)$		
	$fa_2 (+)$	$fa_2 (-)$
FZ	1.04	1.04

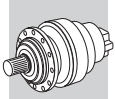
Carichi radiali ammissibili sull'albero veloce per  $n_1 = 1000 \text{ min}^{-1}$  e 10000 h di vita teorica. Per velocità di comando e/o durate diverse vedi il capitolo: Verifiche.

Permitted overhung loads on input shaft when  $n_1 = 1000 \text{ min}^{-1}$  and theoretical lifetime = 10000 h. For drive speed and/or lifetimes other than those specified here, see Chapter: Verifications.

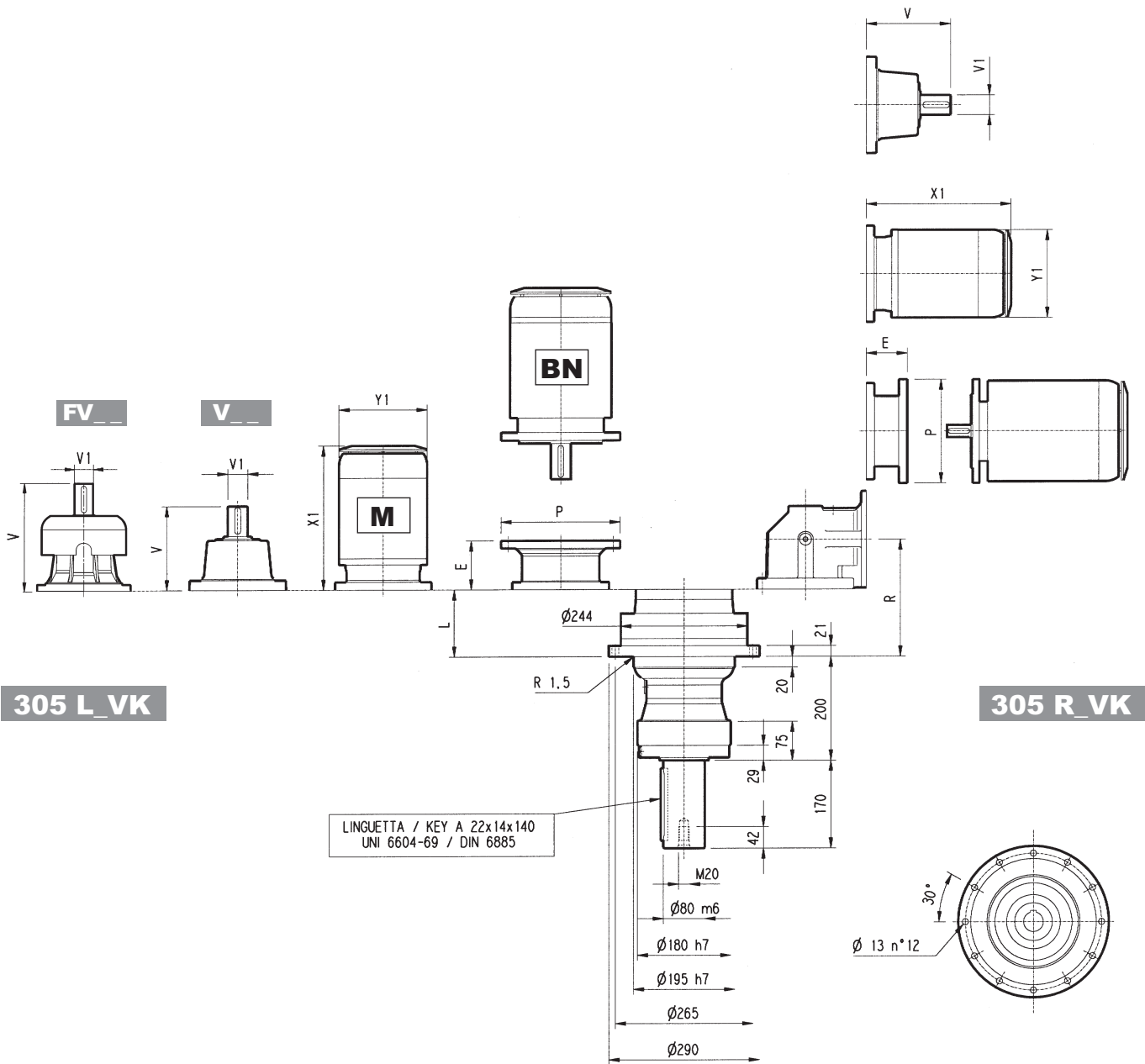
Zulässige Radialkräfte an den Antriebswellen für  $n_1 = 1000 \text{ min}^{-1}$  und 10000 std. Im Hinblick auf Geschwindigkeit und/oder anderweitige Dauern verweisen wir auf Par: Prüfungen

Charges radiales admissibles sur les arbres d'entrée pour  $n_1 = 1000 \text{ min}^{-1}$  et 10000 h. Pour des vitesses et/ou durées différentes, voir par. Vérifications.





# 305\_VK



## 305 L\_VK

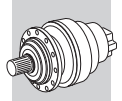
## 305 R\_VK

	L		V						V						P71		P80		P90		P100		P112		P132		P160		P180		P200		
	Kg		V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg	V
305 L1	69	70	239	48	15	-	-	-	276	48	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	114	300	144	350	144	350	174	400
305 L2	134	77	137.5	24	6	158	38	7	-	-	-	-	-	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-		
305 L3	187	81	137.5	24	6	158	38	7	-	-	-	-	-	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-		
305 L4	240	85	137.5	24	6	158	38	7	-	-	-	-	-	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-		

	R		V						P71		P80		P90		P100		P112		P132		
	R1	Kg	V	V1	Kg	V	V1	Kg	E	P	E	P	E	P	E	P	E	P	E	P	
305 R2	161	140	90	137.5	24	6	158	38	7	65	160	84	200	84	200	94	250	94	250	114	300
305 R3	226	122	92	137.5	24	6	158	38	7	65	160	84	200	84	200	94	250	94	250	114	300
305 R4	279	122	95	137.5	24	6	158	38	7	65	160	84	200	84	200	94	250	94	250	114	300

	S1 + M1S			S1 + M1L			S2 + M2S			S3 + M3S			S3 + M3L			S4 + M4			S5 + M5S			S5 + M5L		
	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1
305 L1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	460	571	258	552	692	310	596	736	310
305 L2	229	292	138	253	314	138	280	352	156	325	421	195	357	449	195	460	571	258	-	-	-	-	-	-
305 L3	229	292	138	253	314	138	280	352	156	325	421	195	357	449	195	460	571	258	-	-	-	-	-	-
305 L4	229	292	138	253	314	138	280	352	156	325	421	195	357	449	195	460	571	258	-	-	-	-	-	-

	S1 + M1S			S1 + M1L			S2 + M2S			S3 + M3S			S3 + M3L			S4 + M4		
	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1
305 R2	-	-	-	-	-	-	328	400	156	373	469	195	405	497	195	508	619	258
305 R3	229	292	138	253	314	138	328	400	156	373	469	195	405	497	195	508	619	258
305 R4	229	292	138	253	314	138	328	400	156	373	469	195	405	497	195	508	619	258



Il diagramma seguente consente di ricavare il carico radiale ammissibile  $R_{x2}$  quando questo è applicato alla distanza  $x$  dallo spallamento dell'albero lento del riduttore 305\_VK.

Le curve si riferiscono al valore risultante dal rapporto fra il carico assiale  $A_{n2}$  e il carico radiale  $R_{n2}$ , entrambi riferiti a  $n_2 = 10 \text{ min}^{-1}$  e durata teorica di 10000 h.

The diagram below allows the calculation of permitted over-hung load  $R_{x2}$  on the output shaft of gearbox type 305\_VK, with radial force applying at a distance  $x$  from shaft shoulder.

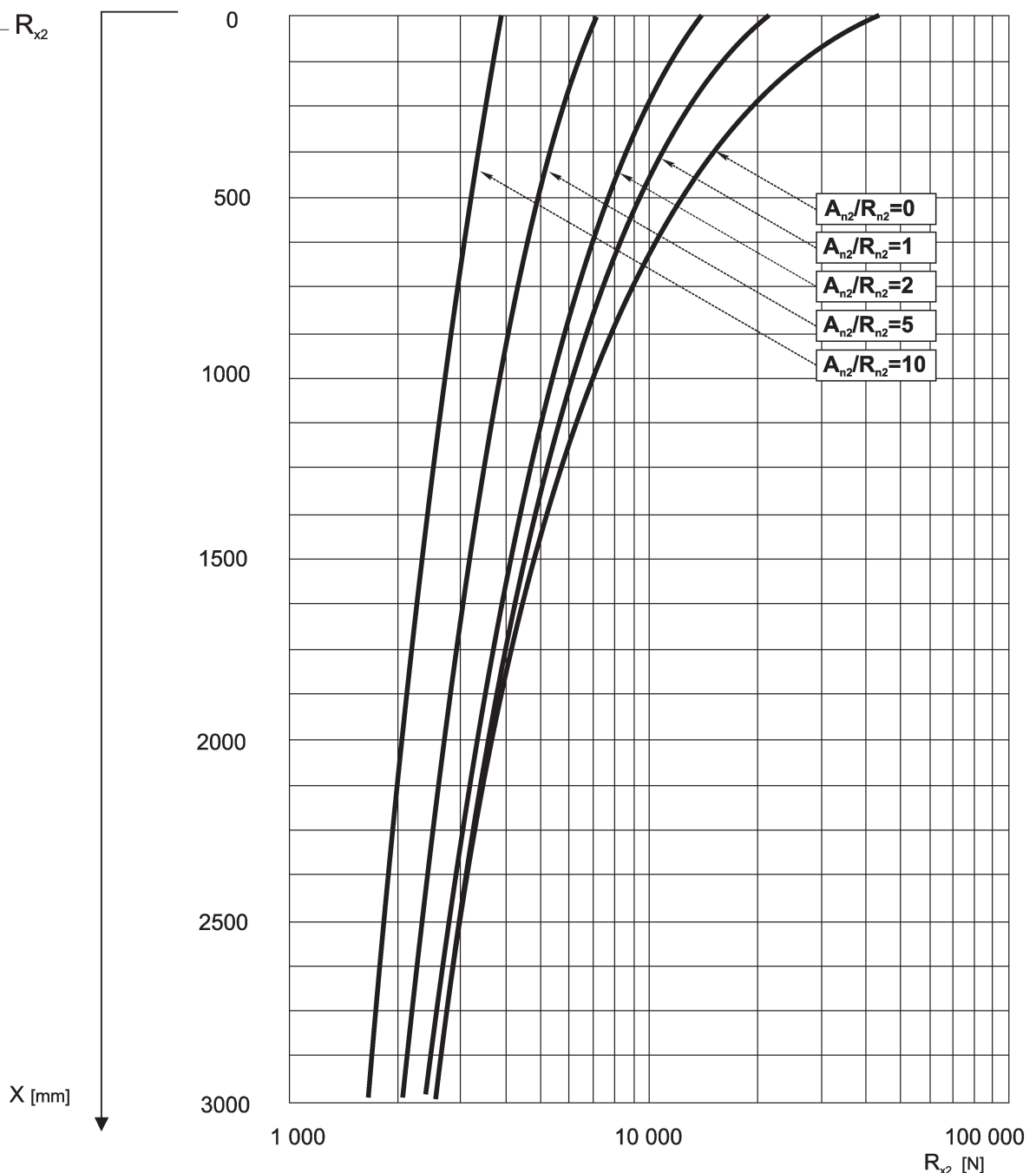
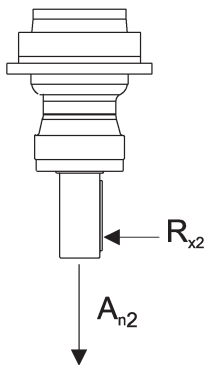
The curves are relevant to value resulting from the relationship of trust load  $A_{n2}$  to radial load  $R_{n2}$ , based on  $n_2 = 10 \text{ min}^{-1}$  and 10000 hrs theoretical lifetime.

Das nachstehende Diagramm ermöglicht das Individuieren der zulässigen, auf die Welle des Getriebes 305\_VK einwirkenden Radialkraft, die auf der Distanz  $x$  vom Anschlag der Welle selbst appliziert wird.

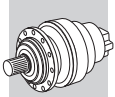
Die Kurven beziehen sich auf den Wert, der sich aus dem Verhältnis zwischen der Axialkraft  $A_{n2}$  und der Radialkraft  $R_{n2}$  für  $n_2 = 10 \text{ min}^{-1}$  und einer Dauer von 10000 Std. ergibt.

Le diagramme suivant permet de déterminer la charge radiale admissible  $R_{x2}$  sur l'arbre lent du réducteur 305\_VK appliqué à la distance  $x$  de l'épaulement de l'arbre.

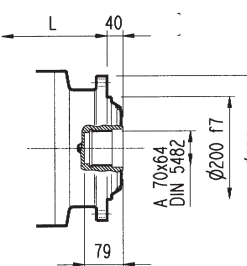
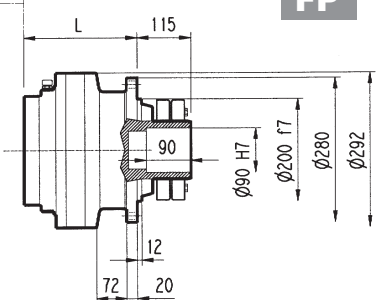
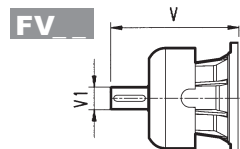
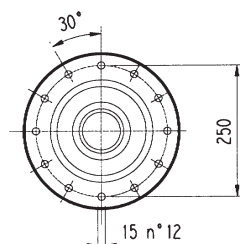
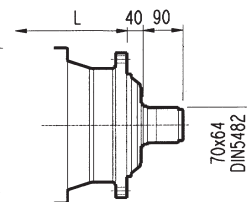
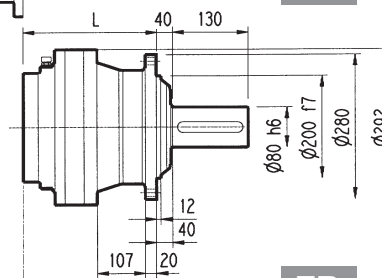
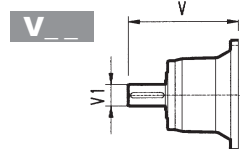
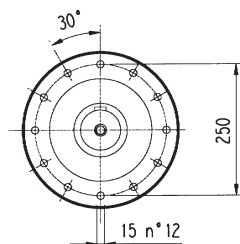
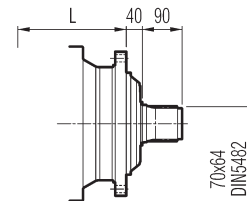
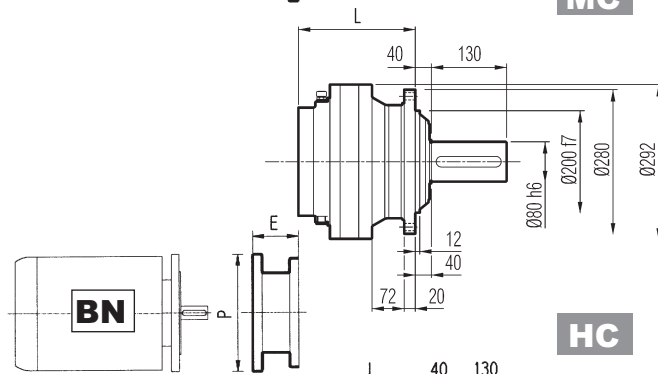
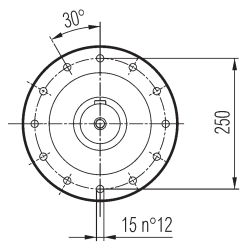
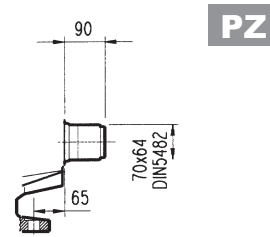
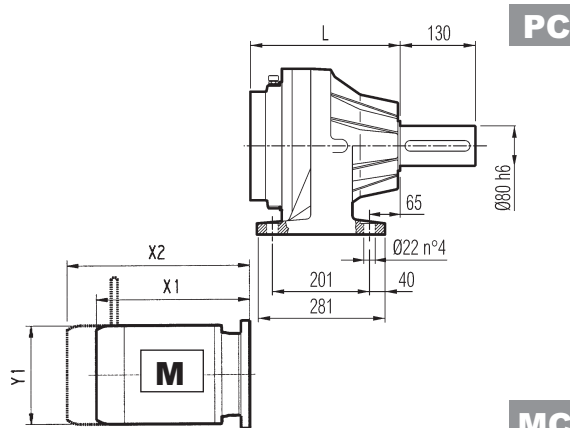
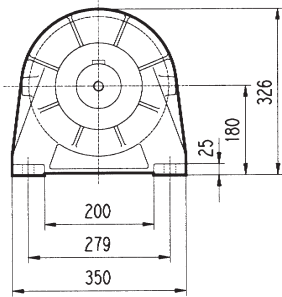
Les courbes se réfèrent à la valeur résultant de l'équation entre la charge axiale  $A_{n2}$  et la charge radiale  $R_{n2}$  pour  $n_2 = 10 \text{ min}^{-1}$  et durée de 10000 h.







# 306 L



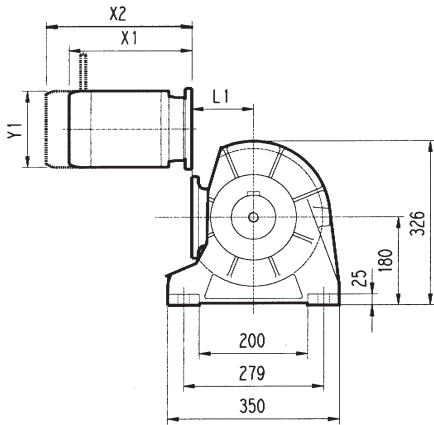
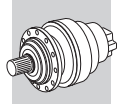
**FP**

$M_{2max} = 12000 \text{ Nm}$

	L				Kg				Kg				Kg							
	MC - MZ	PC - PZ	HC - HZ	FP - FZ	MC - MZ	PC - PZ	HC - HZ	FP - FZ	V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg
306 L1	160	235	195	160	65	85	70	65	307	60	23	-	-	-	357	60	28	-	-	-
306 L2	225	300	260	225	74	95	79	74	239	48	15	-	-	-	276	48	17	-	-	-
306 L3	278	353	313	278	78	98	83	78	137.5	24	6	158	38	7	-	-	-	-	-	-
306 L4	331	406	366	331	82	103	87	82	137.5	24	6	158	38	7	-	-	-	-	-	-

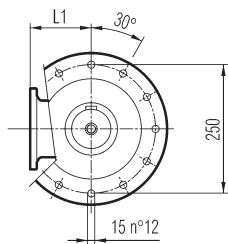
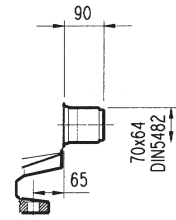
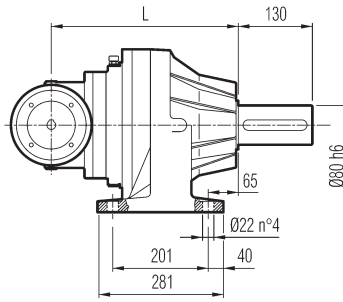
	P71		P80		P90		P100		P112		P132		P160		P180		P200		P225		P250	
	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P
306 L1	-	-	-	-	-	-	-	-	-	-	-	-	144	350	153	350	183	400	212	450	193	550
306 L2	-	-	-	-	-	-	-	-	-	-	114	300	144	350	144	350	174	400	-	-	-	-
306 L3	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-	-	-	-	-
306 L4	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-	-	-	-	-

	S1 + M1S			S1 + M1L			S2 + M2S			S3 + M3S			S3 + M3L			S4 + M4			S5 + M5S			S5 + M5L		
	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y
306 L1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
306 L2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	460	571	258	552	692	310	596	736	310
306 L3	229	292	138	253	314	138	280	352	156	325	421	195	357	449	195	460	571	258	-	-	-	-	-	-
306 L4	229	292	138	253	314	138	280	352	156	325	421	195	357	449	195	460	571	258	-	-	-	-	-	-



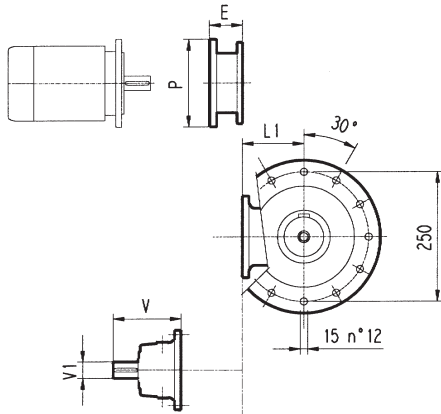
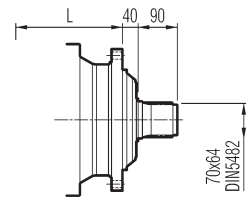
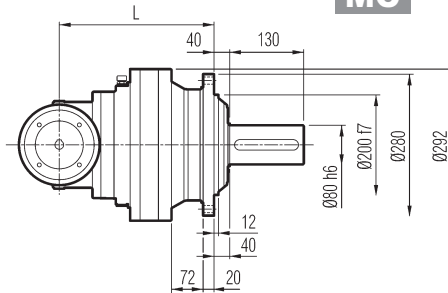
**PC**

**PZ**



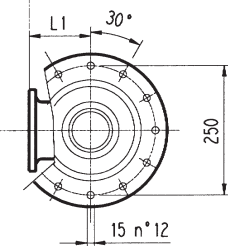
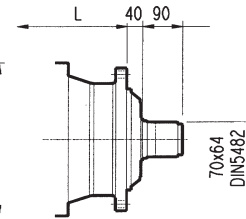
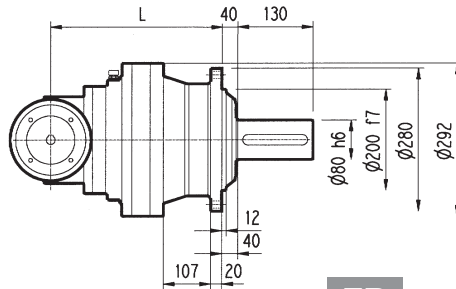
**MC**

**MZ**



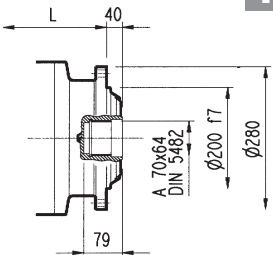
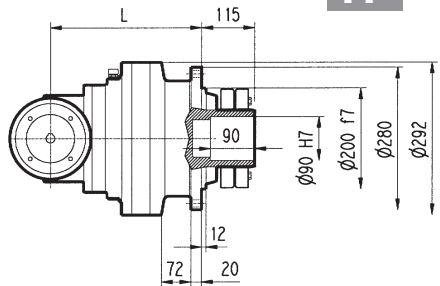
**HC**

**HZ**



**FP**

**FZ**



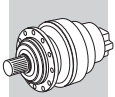
**FP**

$M_{2max} = 12000 \text{ Nm}$

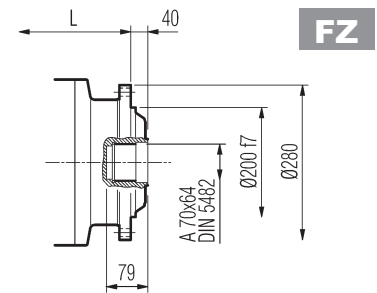
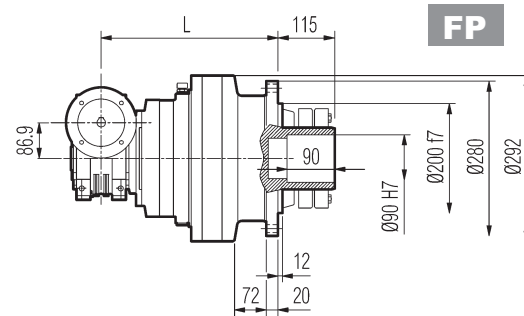
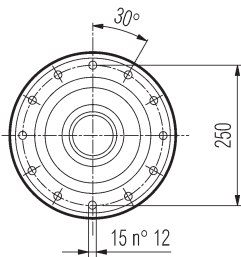
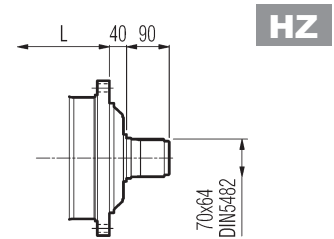
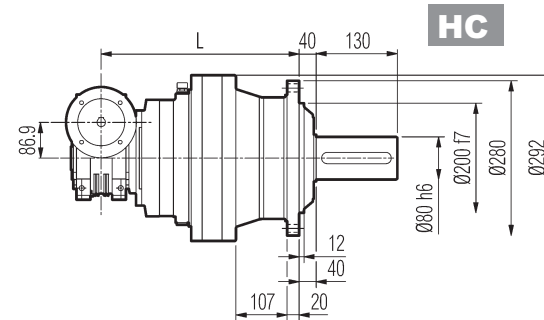
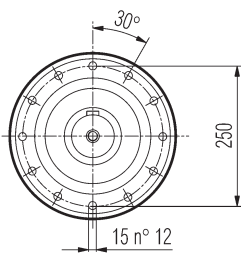
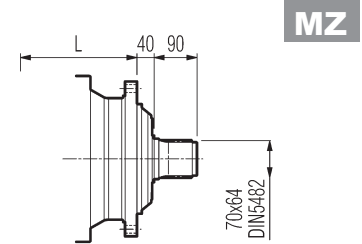
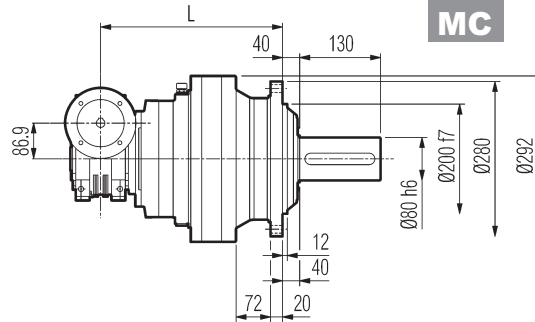
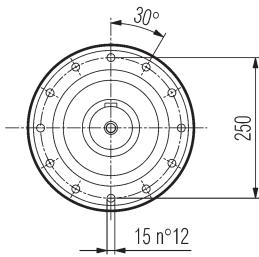
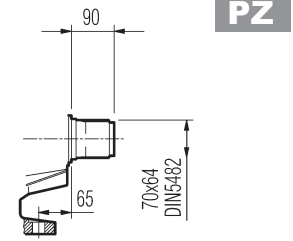
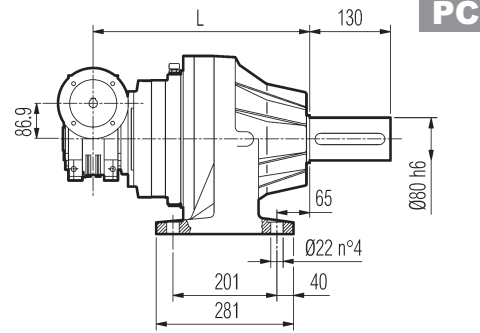
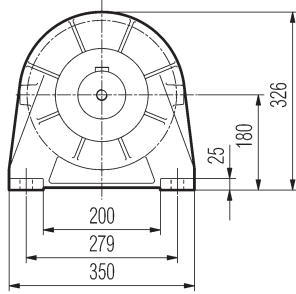
	L				L1	Kg				V		Kg		V		Kg
	MC - MZ	PC - PZ	HC - HZ	FP - FZ		MC - MZ	PC - PZ	HC - HZ	FP - FZ	V	V1	Kg	V	V1		
306 R2	297	372	332	297	140	89	105	94	89	137.5	24	6	158	38	7	
306 R3	317	392	352	317	140	85	100	90	85	137.5	24	6	158	38	7	
306 R4	370	445	405	370	122	79	95	84	79	137.5	24	6	158	38	7	

	P71		P80		P90		P100		P112		P132		P160	
	E	P	E	P	E	P	E	P	E	P	E	P	E	P
306 R2	65	160	84	200	84	200	94	250	94	250	114	300	144	350
306 R3	65	160	84	200	84	200	94	250	94	250	114	300	144	350
306 R4	65	160	84	200	84	200	94	250	94	250	114	300	144	350

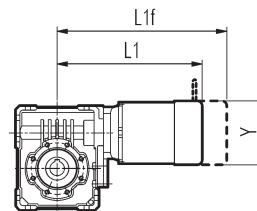
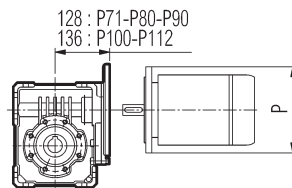
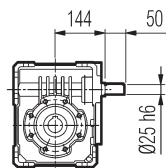
	S1 + M1S			S1 + M1L			S2 + M2S			S3 + M3S			S3 + M3L			S4 + M4		
	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1
306 R2	-	-	-	-	-	-	328	400	156	373	469	195	405	497	195	508	619	258
306 R3	229	292	138	253	314	138	328	400	156	373	469	195	405	497	195	508	619	258
306 R4	229	292	138	253	314	138	328	400	156	373	469	195	405	497	195	508	619	258



# 3/V 06L3



Vista da View from A

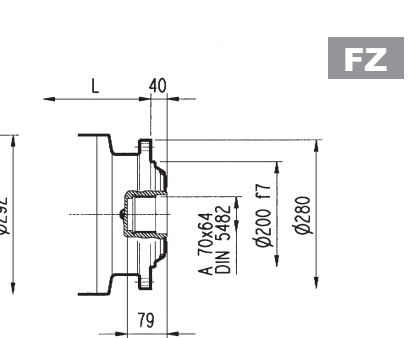
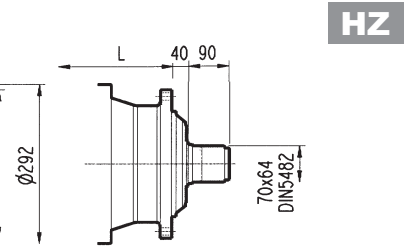
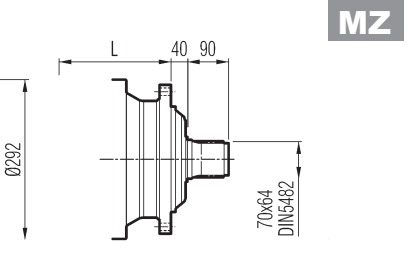
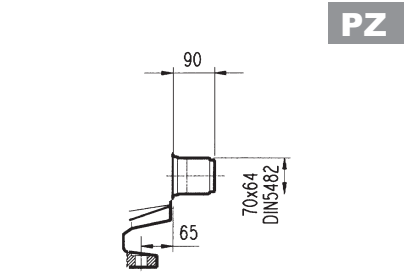
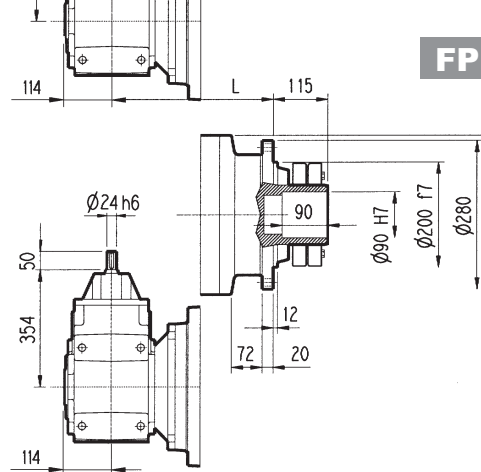
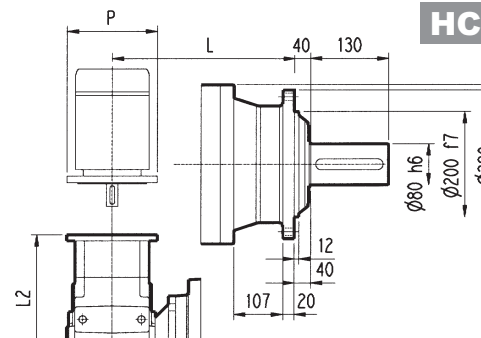
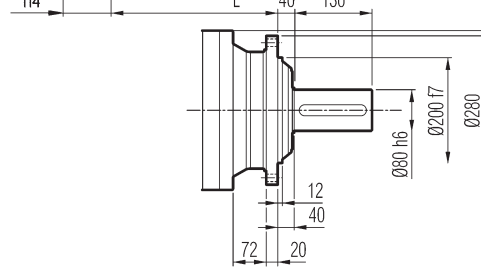
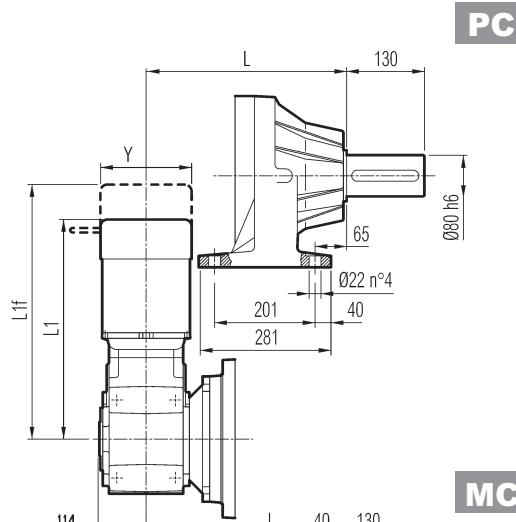
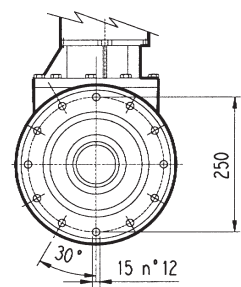
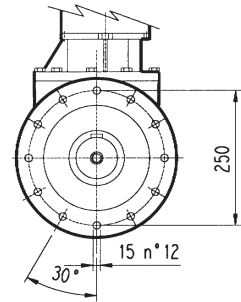
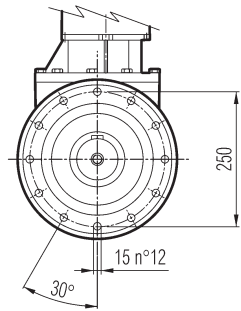
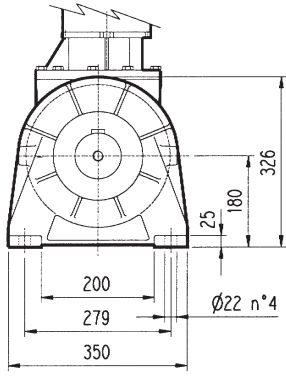
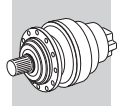


**FP**

**M<sub>2max</sub> = 12000 Nm**

	L				Kg				P71	P80	P90	P100	P112
	MC - MZ	PC - PZ	HC - HZ	FP - FZ	MC - MZ	PC - PZ	HC - HZ	FP - FZ	P	P	P	P	P
3/V 06L3	370	445	405	370	80	111	95	80	160	200	200	250	250

	S1 + M1S			S1 + M1L			S2 + M2S			S3 + M3S			S3 + M3L		
	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y
3/V 06L3	300	363	138	324	385	138	349	425	156	392	477	193	424	515	193

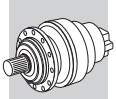


**FP**  $M_{2max} = 12000 \text{ Nm}$

3/A 06L2	L				Kg	D1	L3	L4			
	MC - MZ	PC - PZ	HC - HZ	FP - FZ							
3/A 06L2	340	415	375	340	140	170	150	140	24	354	50

3/A 06L2	P63		P71		P80		P90		P100		P112		P132		P160		P180	
	L2	P	L2	P	L2	P	L2	P	L2	P	L2	P	L2	P	L2	P	L2	P
3/A 06L2	314.5	140	314.5	160	334	200	334	200	344	250	344	250	380.5	300	431	350	431	350

3/A 06L2	S1 + M1			S2 + M2S			S3 + M3SA			S3 + M3LA			S4 + M4		
	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y
3/A 06L2	445	508	138	568	517	156	541	637	195	572	665	195	678	789	258



**306 L**

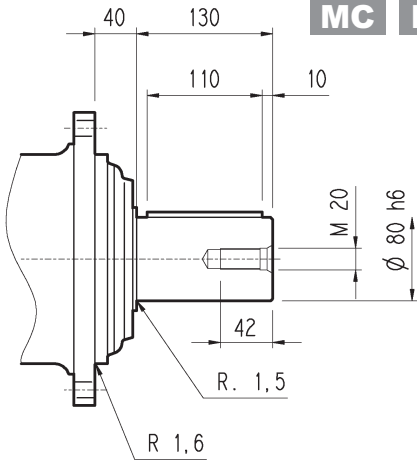
**306 R**

**3/V 06L3**

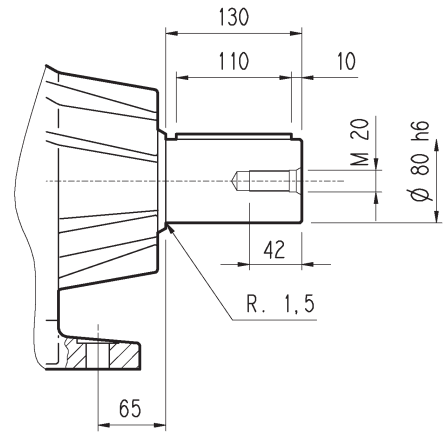
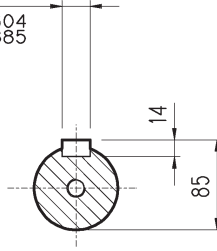
**3/A 06L2**

**MC HC**

**PC**

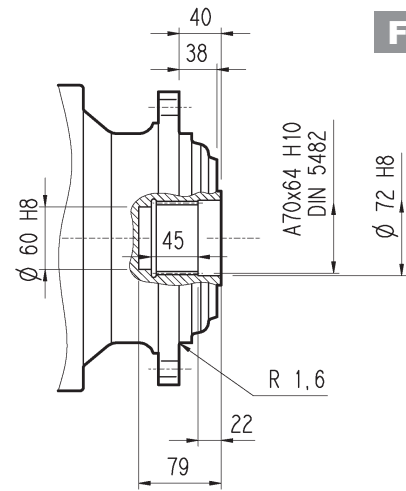
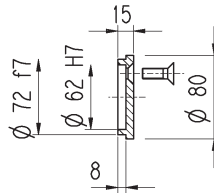
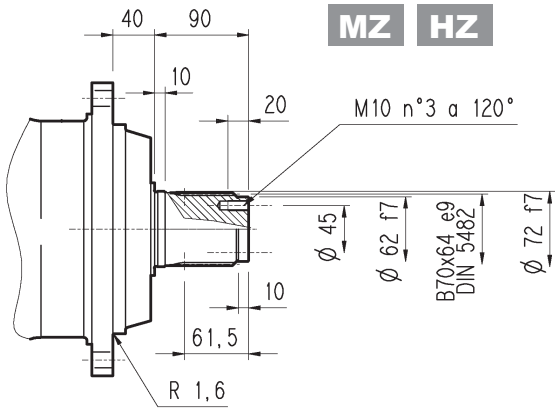


A 22x14x110  
UNI 6604  
DIN 6885

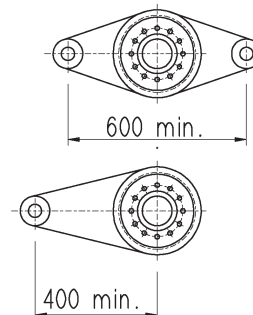
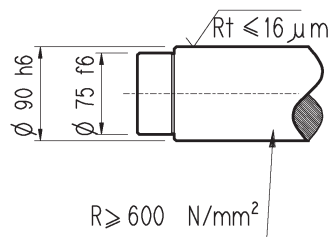
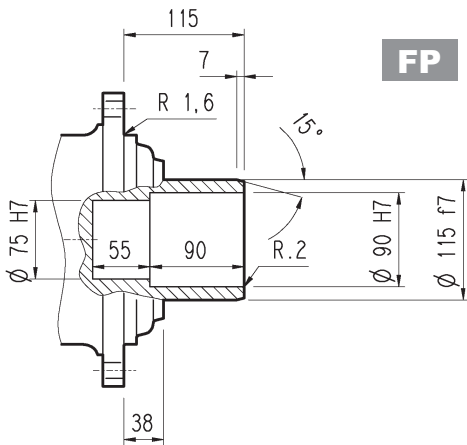


**MZ HZ**

**FZ**

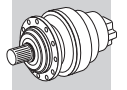
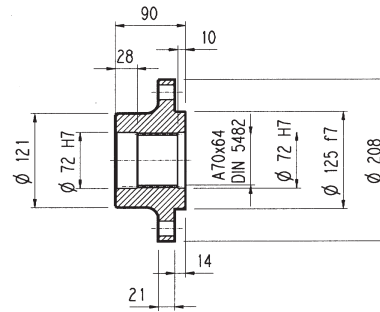
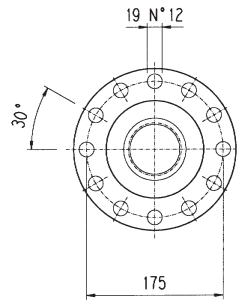
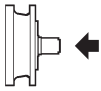


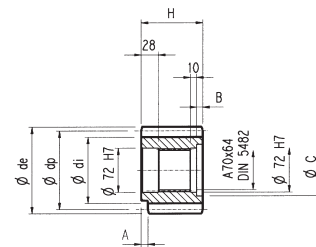
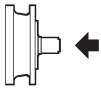
**FP**



**FP**

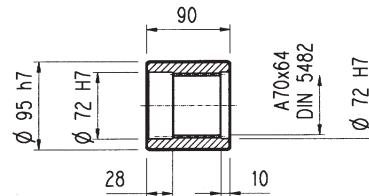
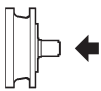
$M_{2max} = 12000 \text{ Nm}$

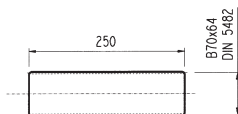
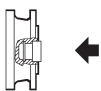
**306 L****306 R****3/V 06L3****3/A 06L2**
**Flangia / Flange**  
**Flansch / Brides**
**WOA**
 Materiale : Acciaio C40  
 Material : Steel C40  
 Material : Stahl C40  
 Matière : Acier C40

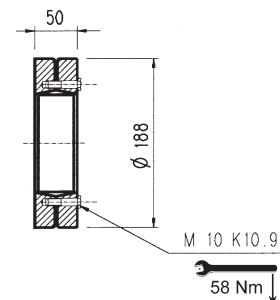
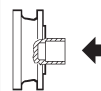
**Pignoni / Pinion gears**  
**Ritzel / Pignons**
**P...**

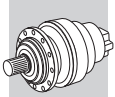
	m	z	x	dp	di	de	H	A	B	C	☆
<b>PFF1</b>	8	15	0	120	100	134	90	0	0	0	□
<b>PFF2</b>	8	15	0.500	120	108	141	90	0	0	0	□
<b>PHB</b>	10	11	0.500	110	95	136	90	10	0	0	□
<b>PHC1</b>	10	12	0.450	120	104	145	90	0	0	0	□
<b>PHC2</b>	10	12	0.320	120	100	144.2	90	0	0	0	□
<b>PHC3</b>	10	12	0.350	120	101	144	90	0	0	0	□
<b>PHD1</b>	10	13	0.950	130	124	165	90	0	0	0	□
<b>PHD2</b>	10	13	0.500	130	115	159	90	0	0	0	□
<b>PHE1</b>	10	14	0	140	115	160	90	0	0	0	□
<b>PHE2</b>	10	14	0.500	140	125	166	90	0	0	0	■
<b>PHF</b>	10	15	0	150	127	167	90	24	0	0	□
<b>PHH</b>	10	17	0.480	170	154	197.5	90	10	0	0	□

☆	Materiale / Material / Material / Matière
□	Acciaio 39NiCrMo3 Bonificato Steel 39NiCrMo3 hardened and tempered Vergüteter Stahl 39NiCrMo3 Acier bonifié 39NiCrMo3
■	Acciaio 18NiCrMo5 Cementato e temprato Steel 18NiCrMo5 Case hardened Einsatzstahl 18NiCrMo5 Einsatzgehärtet Acier cimenté et tempré 18NiCrMo5

**Manicotti lisci / Sleeve couplings**  
**Naben / Manchons lisses a cannelure interieure**
**MOA**
 Materiale : Acciaio 16CrNi4  
 Material : Steel 16CrNi4  
 Material : Stahl 16CrNi4  
 Matière : Acier 16CrNi4

**Barre scanalate / Spined bars**  
**Vielkeilwellen / Barre cannelée**
**B0A**
 Mat. acciaio 18NiCrMo5 UNI 5331 da cementare e  
 temperare 50-55 HRC  
 Case hardening steel 18NiCrMo5 UNI 5331 must be case  
 hardened to 50-55 HRC  
 Material: Einsatzstahl 18NiCrMo5 UNI 5331 muss einsatzgehärtet  
 werden 50-55 HRC  
 Acier 18 NiCrMo5 UNI 5331 doit être cémenté trempé 50-55 HRC

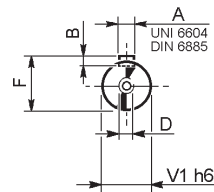
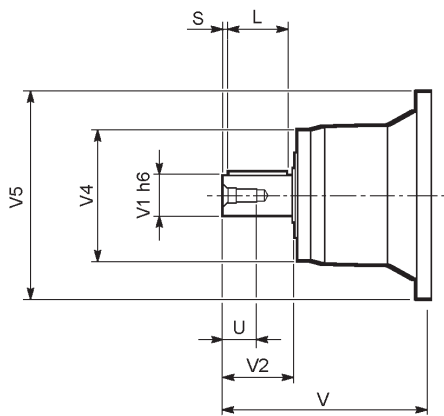
**Giunto ad attrito / Shrink disc**  
**Schrumpfscheibe / Frette de serrage**
**GOA**



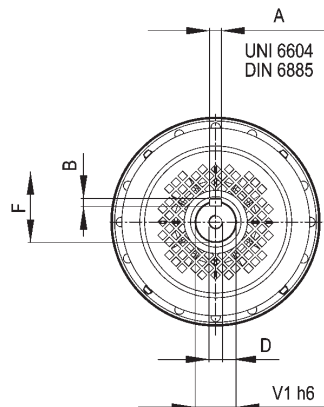
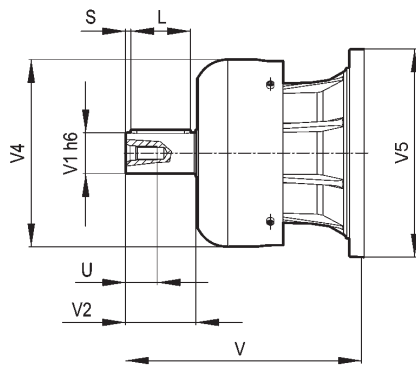
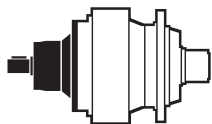
**306 L**

**306 R**

**V**



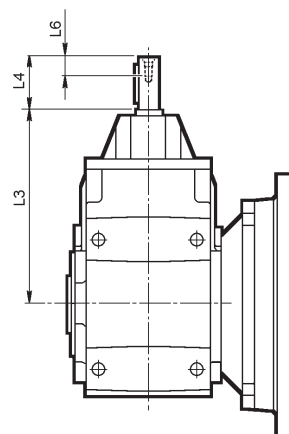
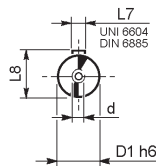
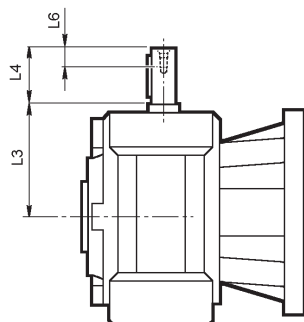
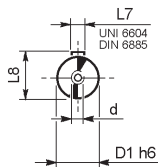
**FV**



	input	V	V1	V2	V4	V5	A	B	F	L	S	D	U
306 L1	V06B	307	60	105	155	292	18	11	64	90	7.5	M16	36
	FV06B	357	60	105	309	292	18	11	64	90	7.5	M16	36
306 L2	V05B	239	48	82	155	245	14	9	51.5	70	6	M16	36
	FV05B	276	48	82	219.5	244	14	9	51.5	70	6	M16	36
306 L3	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28
306 L4	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28
306 R2-R3-R4	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28

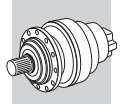
**3/V 06L3**

**3/A 06L2**



	D1 h6	L3	L4	L6	L7	L8	d
3/V 06L3_HS	25	144	50	19	8	28	M8

	D1 h6	L3	L4	L6	L7	L8	d
3/A 06L2_HS	24	354	50	19	8	27	M8

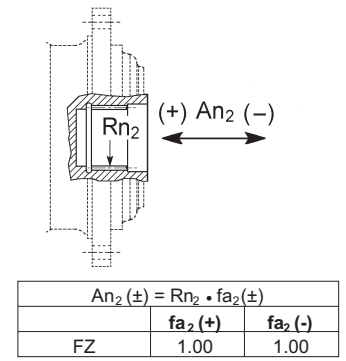
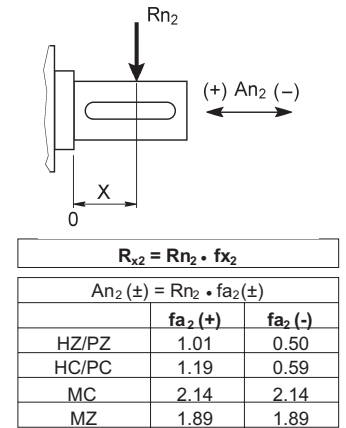
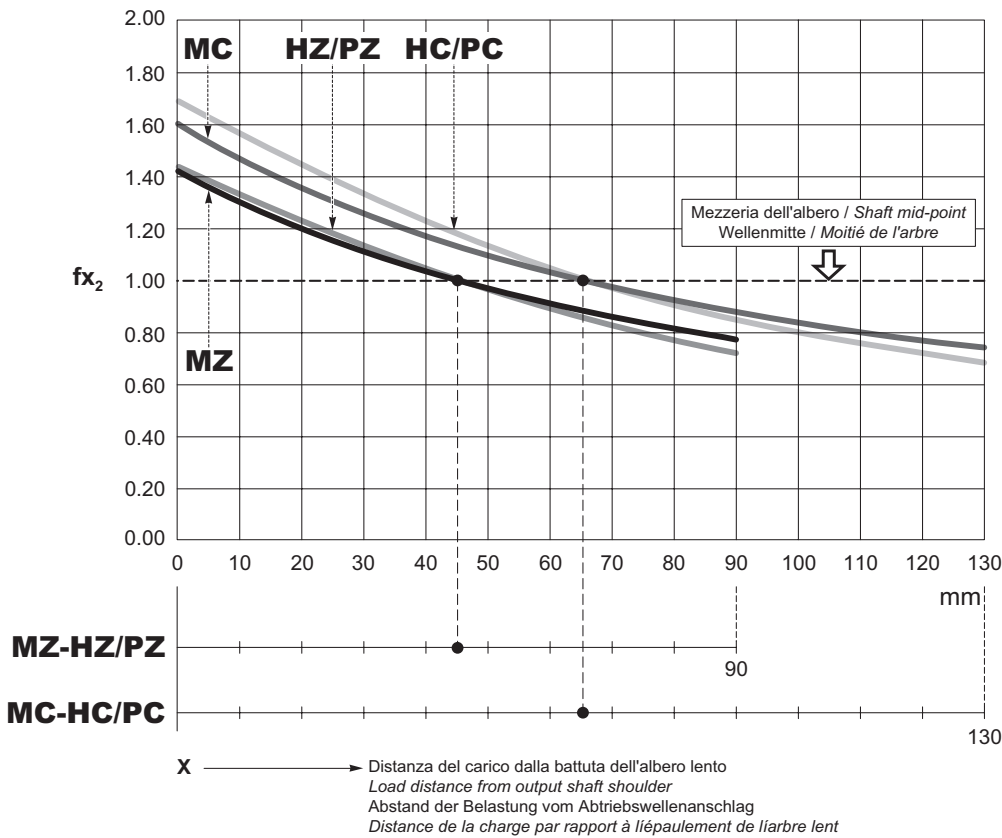


Fattore di posizione per carichi radiali sugli alberi in uscita.

Load location factor for radial loading on output shaft.

Positionsfaktor für Radialkräfte an der Abtriebswelle.

Facteur de position pour charges radiales sur les arbres en sortie.

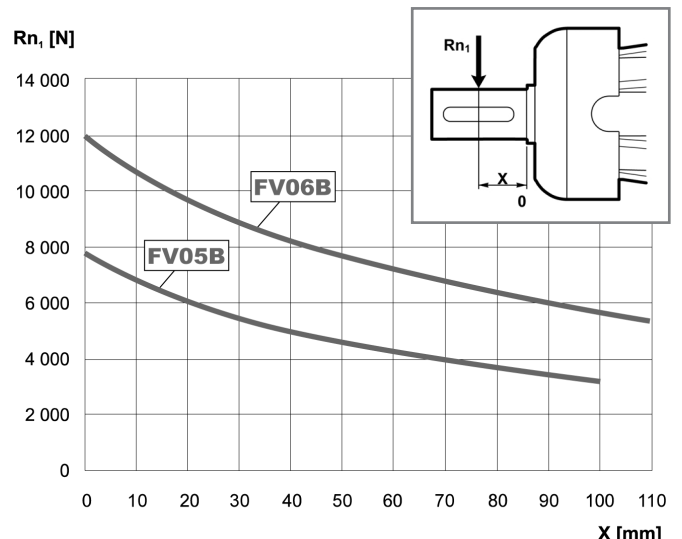
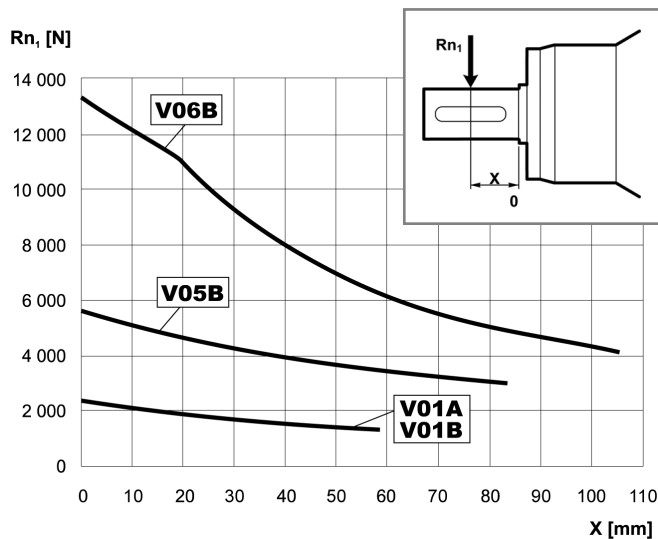


Carichi radiali ammissibili sull'albero veloce per  $n_1 = 1000 \text{ min}^{-1}$  e 10000 h di vita teorica.  
Per velocità di comando e/o durate diverse vedi il capitolo: Verifiche.

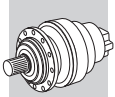
Permitted overhung loads on input shaft when  $n_1 = 1000 \text{ min}^{-1}$  and theoretical lifetime = 10000 h.  
For drive speed and/or lifetimes other than those specified here, see Chapter: Verifications.

Zulässige Radialkräfte an den Antriebswellen für  $n_1 = 1000 \text{ min}^{-1}$  und 10000 std.  
Im Hinblick auf Geschwindigkeit und/oder anderweitige Dauern verweisen wir auf Par: Prüfungen

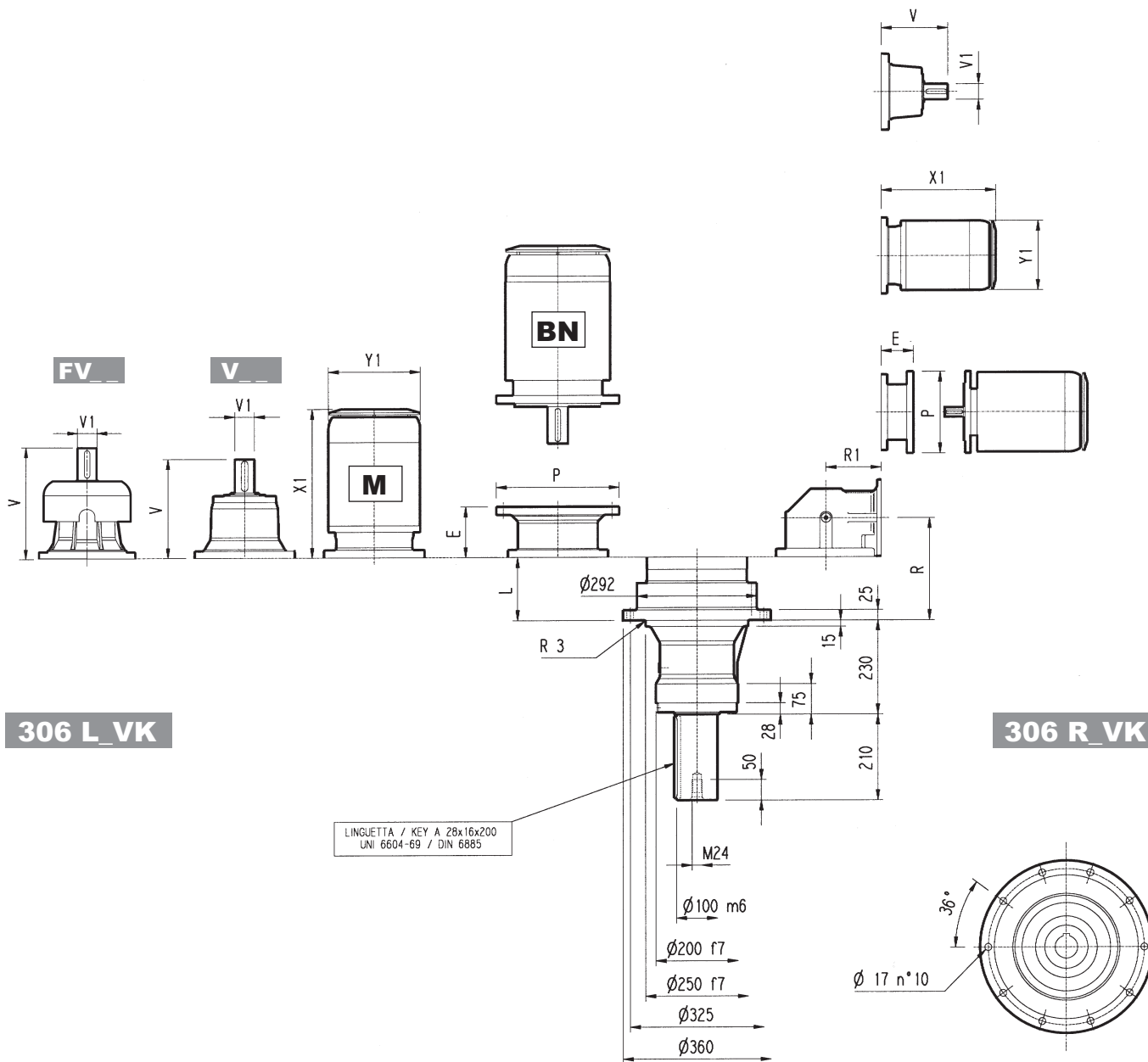
Charges radiales admissibles sur les arbres d'entrée pour  $n_1 = 1000 \text{ min}^{-1}$  et 10000 h.  
Pour des vitesses et/ou durées différentes, voir par. Vérifications.







# 306\_VK



## 306 L\_VK

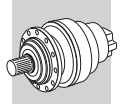
## 306 R\_VK

	L		V						V1						P71		P80		P90		P100		P112		P132		P160		P180		P200		P225		P250	
	kg	mm	kg	mm	kg	mm	kg	mm	kg	mm	kg	mm	kg	mm	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P				
306 L1	75	110	307	60	23	-	-	-	357	60	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	144	350	153	350	183	400	212	450	193	550
306 L2	140	120	239	48	15	-	-	-	276	48	17	-	-	-	-	-	-	-	-	-	-	-	-	-	114	300	144	350	144	350	174	400	-	-	-	-
306 L3	193	125	137.5	24	6	158	38	7	-	-	-	-	-	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-	-	-	-	-	
306 L4	246	130	137.5	24	6	158	38	7	-	-	-	-	-	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-	-	-	-	-	

	R		R1		V						P71		P80		P90		P100		P112		P132		P160		
	kg	mm	kg	mm	kg	mm	kg	mm	kg	mm	E	P	E	P	E	P	E	P	E	P	E	P	E	P	
306 R2	212	140	130	137.5	24	6	158	38	7	65	160	84	200	84	200	94	250	94	250	114	300	144	350	144	350
306 R3	232	140	125	137.5	24	6	158	38	7	65	160	84	200	84	200	94	250	94	250	114	300	144	350	144	350
306 R4	285	122	120	137.5	24	6	158	38	7	65	160	84	200	84	200	94	250	94	250	114	300	144	350	144	350

	S1 + M1S			S1 + M1L			S2 + M2S			S3 + M3S			S3 + M3L			S4 + M4			S5 + M5S			S5 + M5L		
	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y
306 L1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
306 L2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	460	571	258	552	692	310	596	736	310
306 L3	229	292	138	253	314	138	280	352	156	325	421	195	357	449	195	460	571	258	-	-	-	-	-	-
306 L4	229	292	138	253	314	138	280	352	156	325	421	195	357	449	195	460	571	258	-	-	-	-	-	-

	S1 + M1S			S1 + M1L			S2 + M2S			S3 + M3S			S3 + M3L			S4 + M4					
	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1			
306 R2	-	-	-	-	-	-	-	-	-	328	400	156	373	469	195	405	497	195	508	619	258
306 R3	229	292	138	253	314	138	328	400	156	373	469	195	405	497	195	405	497	195	508	619	258
306 R4	229	292	138	253	314	138	328	400	156	373	469	195	405	497	195	405	497	195	508	619	258



Il diagramma seguente consente di ricavare il carico radiale ammissibile  $R_{x2}$  quando questo è applicato alla distanza  $x$  dallo spallamento dell'albero lento del riduttore 306\_VK.

Le curve si riferiscono al valore risultante dal rapporto fra il carico assiale  $A_{n2}$  e il carico radiale  $R_{n2}$ , entrambi riferiti a  $n_2 = 10 \text{ min}^{-1}$  e durata teorica di 10000 h.

The diagram below allows the calculation of permitted over-hung load  $R_{x2}$  on the output shaft of gearbox type 306\_VK, with radial force applying at a distance  $x$  from shaft shoulder.

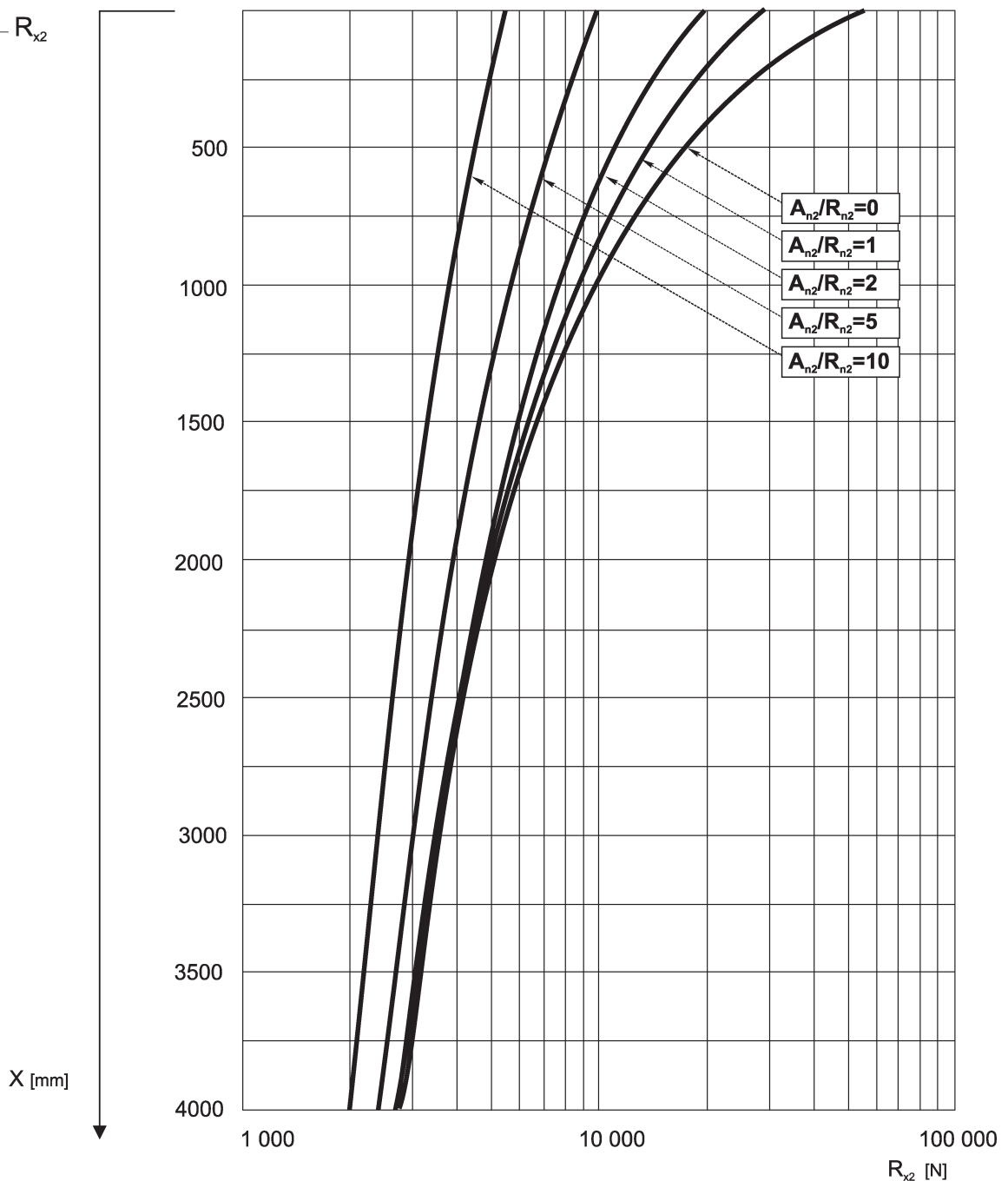
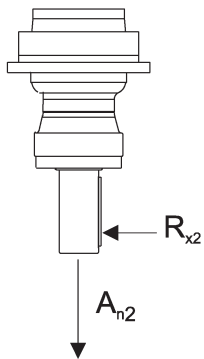
The curves are relevant to value resulting from the relationship of trust load  $A_{n2}$  to radial load  $R_{n2}$ , based on  $n_2 = 10 \text{ min}^{-1}$  and 10000 hrs theoretical lifetime.

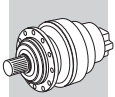
Das nachstehende Diagram ermöglicht das Individuieren der zulässigen, auf die Welle des Getriebes 306\_VK einwirkenden Radialkraft, die auf der Distanz  $x$  vom Anschlag der Welle selbst appliziert wird.

Die Kurven beziehen sich auf den Wert, der sich aus dem Verhältnis zwischen der Axialkraft  $A_{n2}$  und der Radialkraft  $R_{n2}$  für  $n_2 = 10 \text{ min}^{-1}$  und einer Dauer von 10000 Std. ergibt.

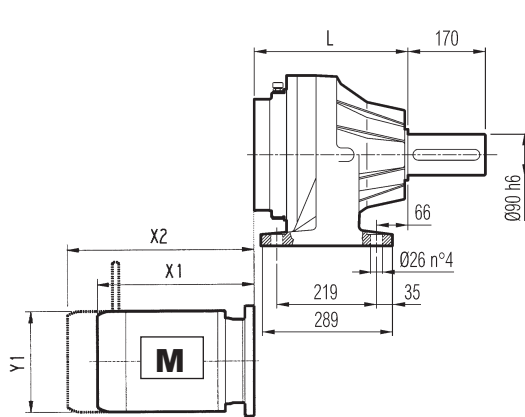
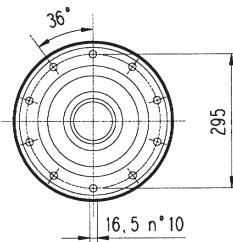
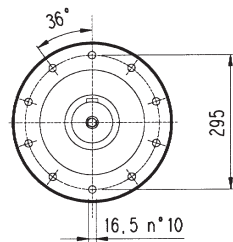
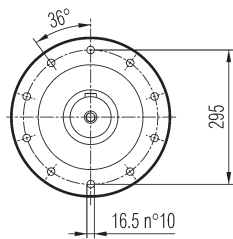
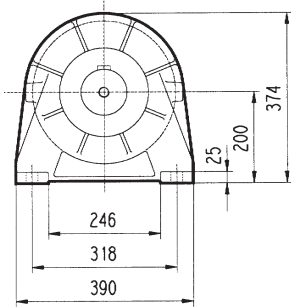
Le diagramme suivant permet de déterminer la charge radiale admissible  $R_{x2}$  sur l'arbre lent du réducteur 306\_VK appliqué à la distance  $x$  de l'épaule de l'arbre.

Les courbes se réfèrent à la valeur résultant de l'équation entre la charge axiale  $A_{n2}$  et la charge radiale  $R_{n2}$  pour  $n_2 = 10 \text{ min}^{-1}$  et durée de 10000 h.

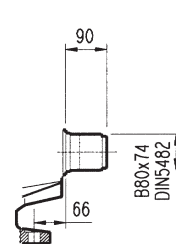




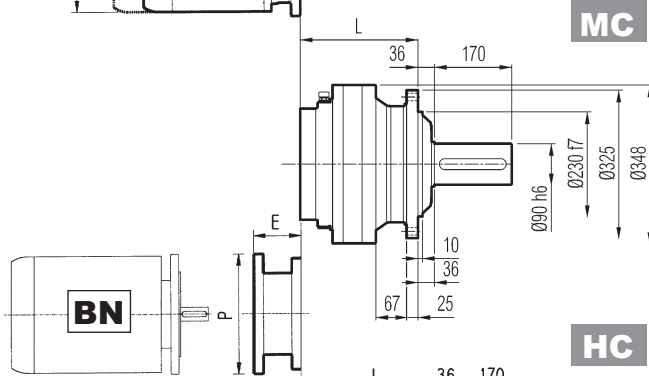
# 307 L



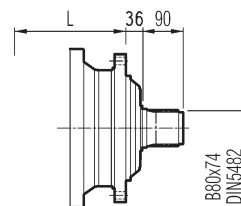
**PC**



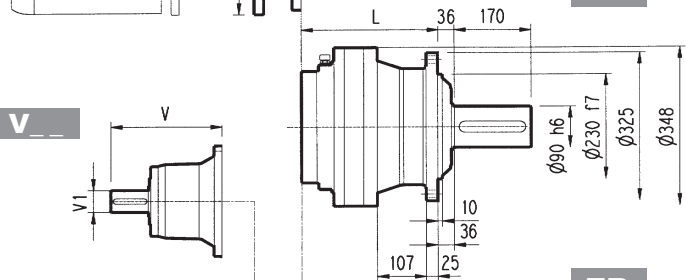
**PZ**



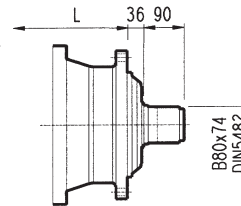
**MC**



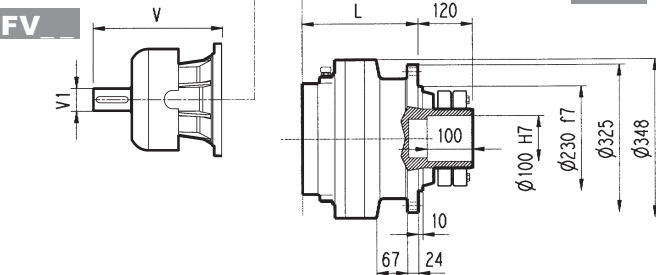
**MZ**



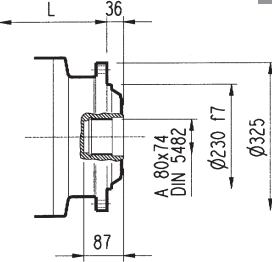
**HC**



**HZ**



**FP**



**FZ**

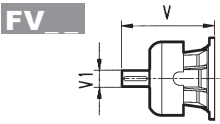
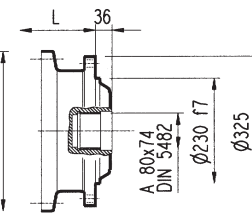
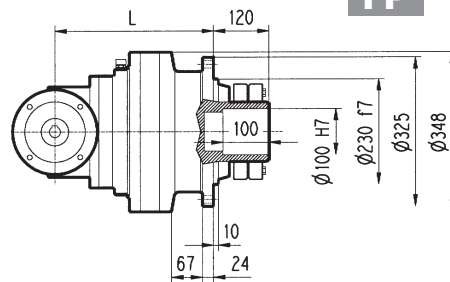
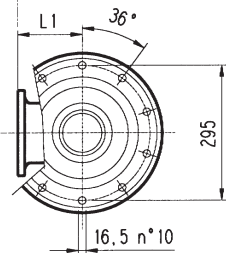
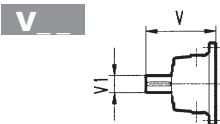
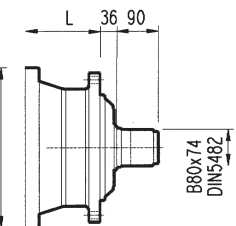
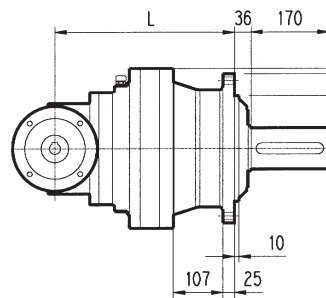
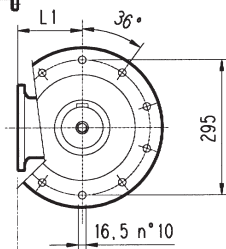
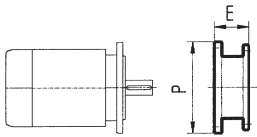
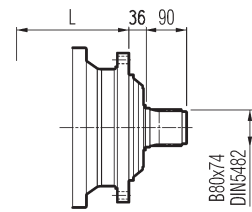
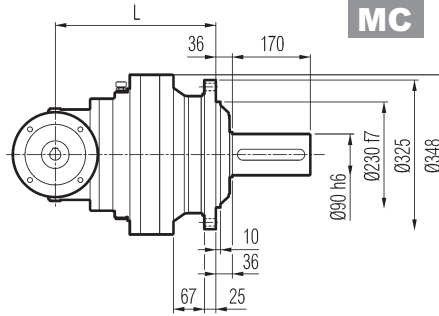
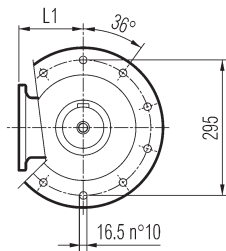
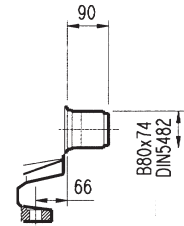
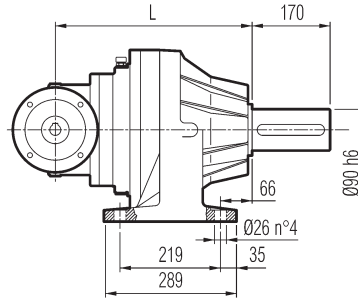
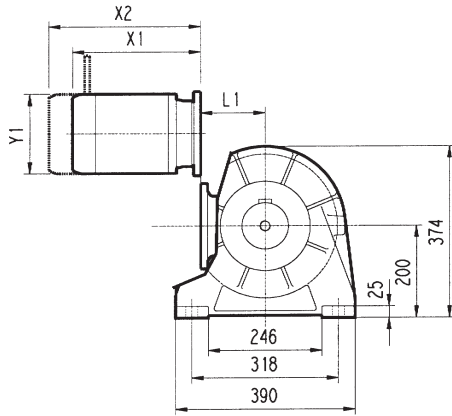
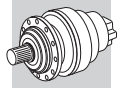
**FP**

$M_{2max} = 18000 \text{ Nm}$

	L				Kg				Kg				Kg							
	MC - MZ	PC - PZ	HC - HZ	FP - FZ	MC - MZ	PC - PZ	HC - HZ	FP - FZ	V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg
307 L1	165	246	210	165	85	120	105	85	315	80	35	313	60	28	375	80	48	363	60	34
307 L2	254	335	299	254	97	132	117	97	239	48	15	-	-	-	276	48	17	-	-	-
307 L3	319	400	364	319	104	139	124	104	137.5	24	6	158	38	7	-	-	-	-	-	-
307 L4	372	453	417	372	108	143	128	108	137.5	24	6	158	38	7	-	-	-	-	-	-

	P71		P80		P90		P100		P112		P132		P160		P180		P200		P225		P250	
	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P
307 L1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	195	350	186	400	216	450	215	550
307 L2	-	-	-	-	-	-	-	-	-	-	114	300	144	350	144	350	174	400	-	-	-	-
307 L3	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-	-	-	-	-
307 L4	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-	-	-	-	-

	S1 + M1S			S1 + M1L			S2 + M2S			S3 + M3S			S3 + M3L			S4 + M4			S5 + M5S			S5 + M5L		
	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y
307 L1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
307 L2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	460	571	258	552	692	310	596	736	310
307 L3	-	-	-	-	-	-	280	352	156	325	421	195	357	449	195	460	571	258	-	-	-	-	-	-
307 L4	229	292	138	253	314	138	280	352	156	325	421	195	357	449	195	460	571	258	-	-	-	-	-	-

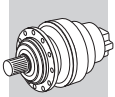


**FP**  $M_{2max} = 18000 \text{ Nm}$

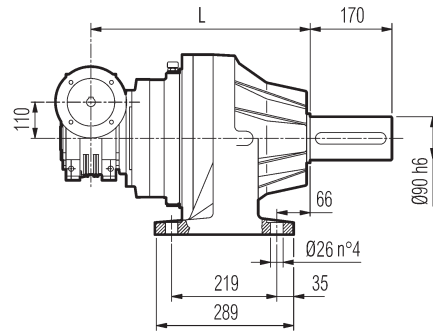
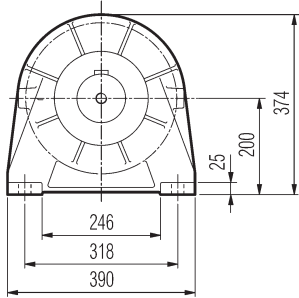
	L				L1	Kg				Kg				Kg							
	MC - MZ	PC - PZ	HC - HZ	FP - FZ		MC - MZ	PC - PZ	HC - HZ	FP - FZ	V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg
307 R2	284	365	329	284	225	135	170	155	135	239	48	15	-	-	-	276	48	17	-	-	-
307 R3	346	427	391	346	140	117	152	137	117	137.5	24	6	158	38	7	-	-	-	-	-	-
307 R4	411	492	456	411	122	118	153	138	118	137.5	24	6	158	38	7	-	-	-	-	-	-

	P71		P80		P90		P100		P112		P132		P160		P180		P200	
	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P
307 R2	-	-	-	-	-	-	-	-	-	-	114	300	144	350	144	350	174	400
307 R3	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-
307 R4	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-

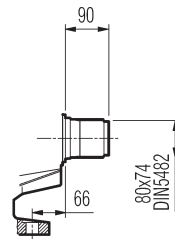
	S1 + M1S			S1 + M1L			S2 + M2S			S3 + M3S			S3 + M3L			S4 + M4			S5 + M5S			S5 + M5L		
	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1	X1	X2	Y1
307 R2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	508	619	258	552	692	310	596	736	310
307 R3	229	292	138	253	314	138	328	400	156	373	469	195	405	497	195	508	619	258	-	-	-	-	-	-
307 R4	229	292	138	253	314	138	328	400	156	373	469	195	405	497	195	508	619	258	-	-	-	-	-	-



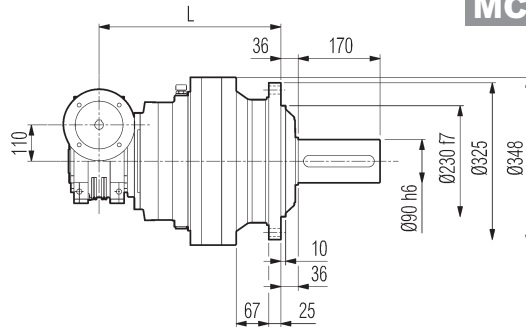
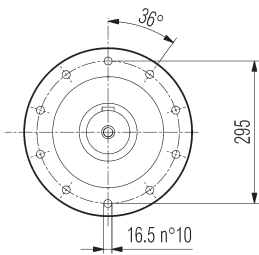
# 3/V 07L3



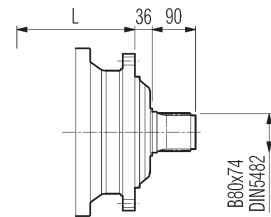
**PC**



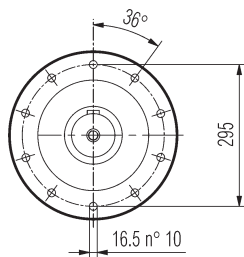
**PZ**



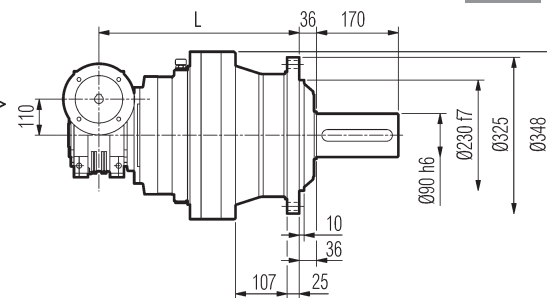
**MC**



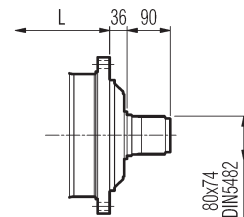
**MZ**



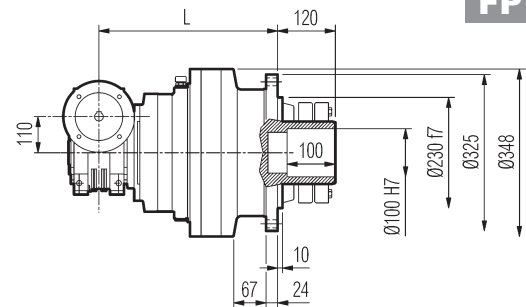
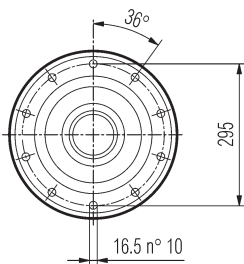
A →



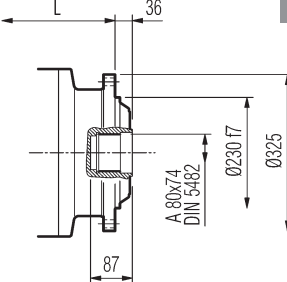
**HC**



**HZ**

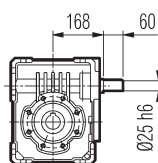


**FP**

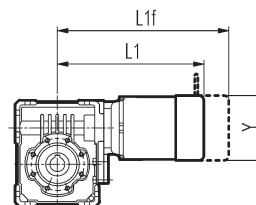
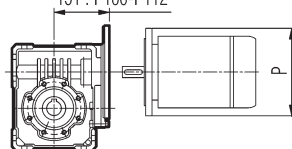


**FZ**

Vista da  
View from **A**



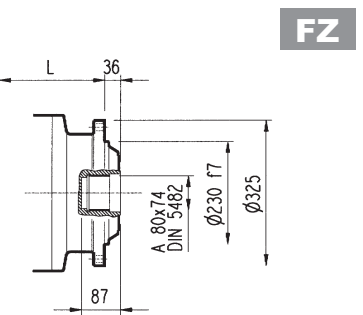
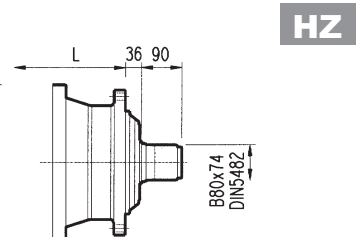
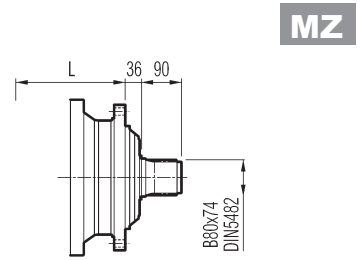
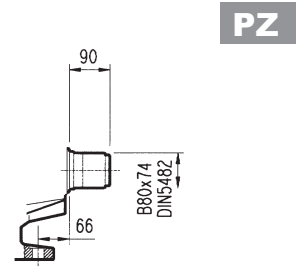
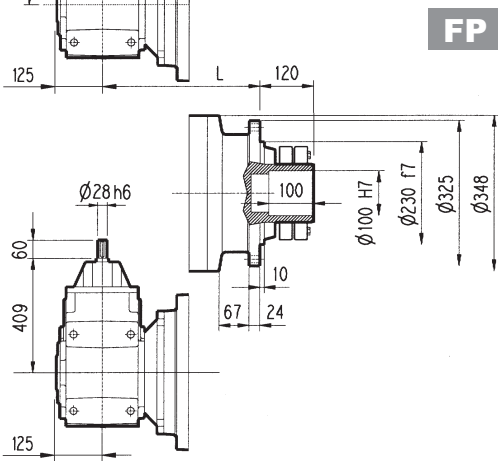
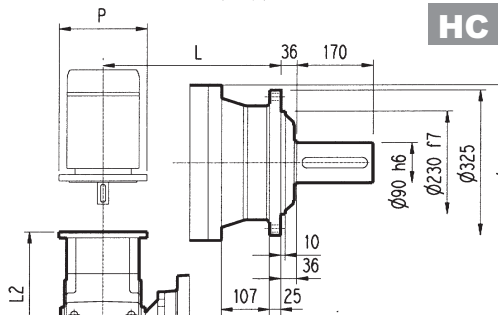
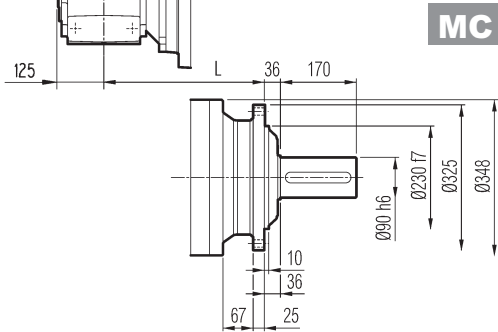
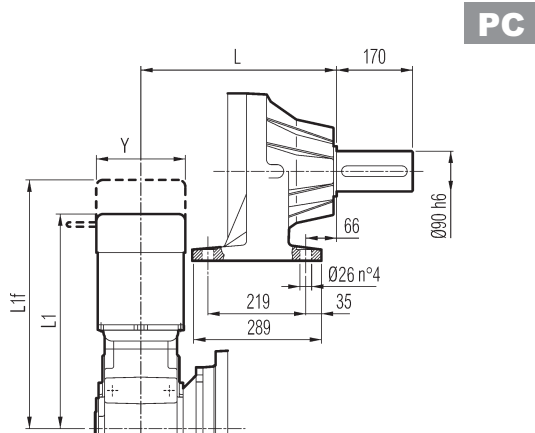
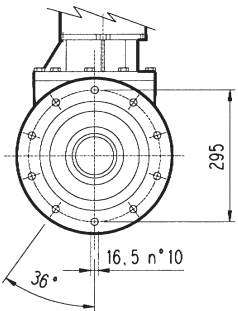
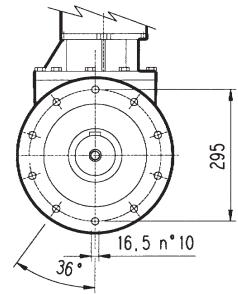
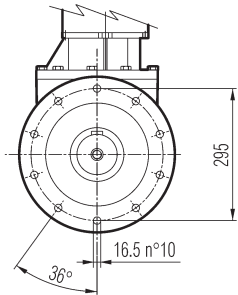
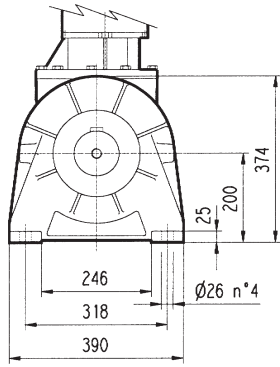
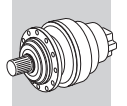
143 : P80-P90  
151 : P100-P112



**FP**

$M_{2max} = 18000 \text{ Nm}$

3/V 07L3	L				Kg				P80	P90	P100	P112
	MC - MZ	PC - PZ	HC - HZ	FP - FZ	MC - MZ	PC - PZ	HC - HZ	FP - FZ	P	P	P	P
	414	495	459	414	130	165	150	130	200	200	250	250
3/V 07L3	S2 + M2S			Y	S3 + M3S			S3 + M3L				
	L1	L1f			L1	L1f	Y	L1	L1f	Y		
	364	440		156	407	503	193	439	530	193		



**PC**

**PZ**

**MC**

**MZ**

**HC**

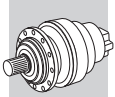
**HZ**

**FP**

**FZ**

**FP**  $M_{2max} = 18000 \text{ Nm}$

3/A 07L2	L						Kg											
	MC - MZ	PC - PZ	HC - HZ	FP - FZ	MC - MZ	PC - PZ		HC - HZ	FP - FZ									
	P80		P90		P100		P112		P132		P160		P180					
	L2	P	L2	P	L2	P	L2	P	L2	P	L2	P	L2	P				
3/A 07L2	371	200	371	200	381	250	381	250	416.5	300	468	350	468	350				
3/A 07L2	S2 + M2			S3 + M3SA			S3 + M3LA			S4 + M4			S5 + M5S			S5 + M5L		
	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y
3/A 07L2	535	605	156	578.5	674.5	195	610.5	701.5	195	718.5	827.5	258	970	1110	-	1014	1154	-

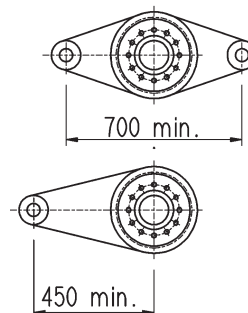
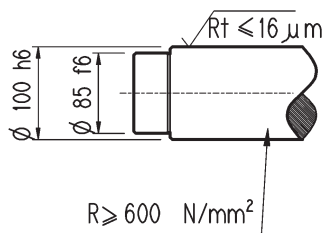
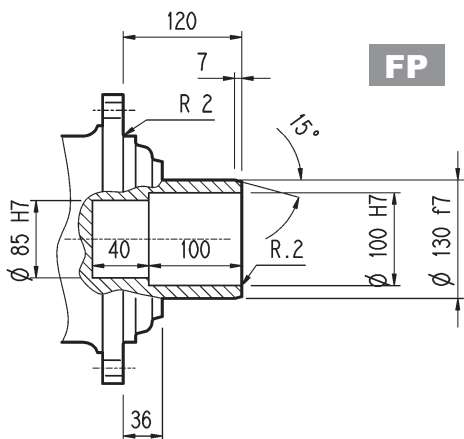
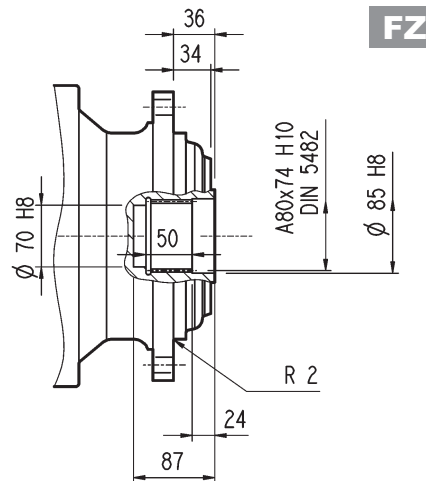
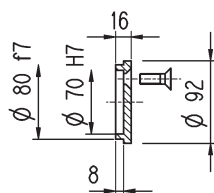
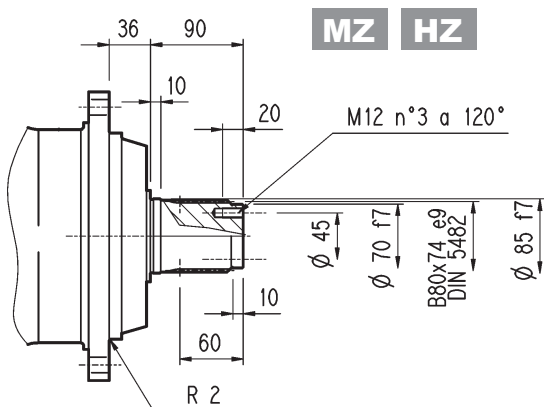
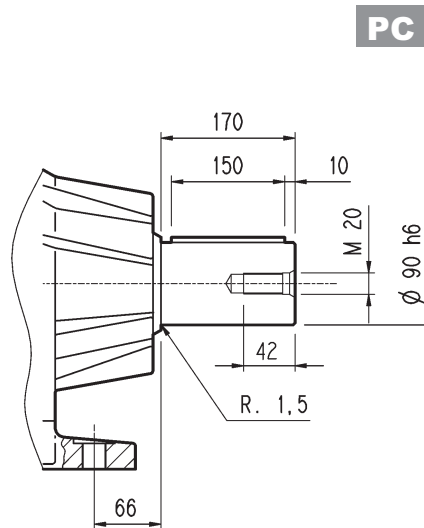
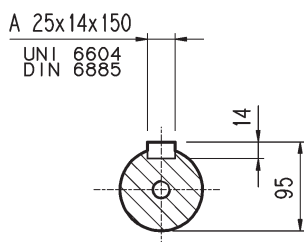
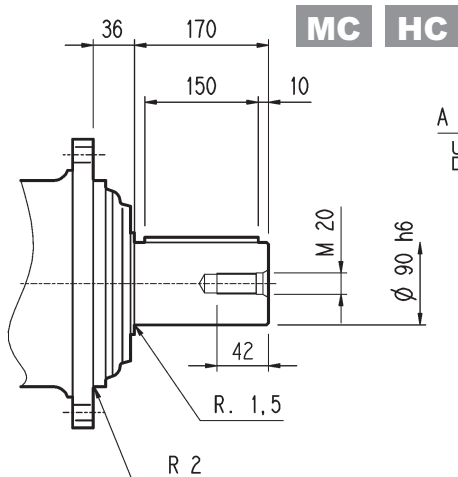


307 L

307 R

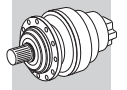
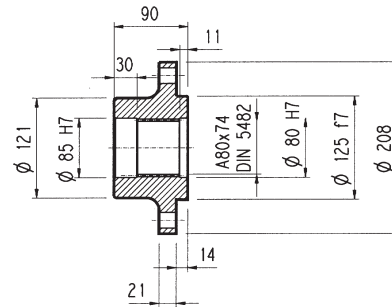
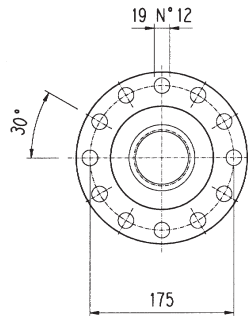
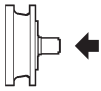
3/V 07L3

3/A 07L2

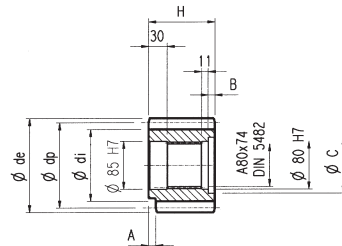
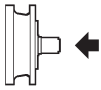


**FP**

$M_{2max} = 18000 \text{ Nm}$

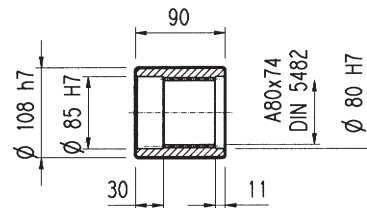
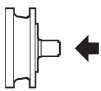
**307 L****307 R****3/V 07L3****3/A 07L2**
**Flangia / Flange**  
**Flansch / Brides**
**WOA**

Materiale : Acciaio C40  
 Material : Steel C40  
 Material : Stahl C40  
 Matière : Acier C40

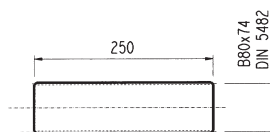
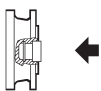
**Pignoni / Pinion gears**  
**Ritzel / Pignons**
**P...**

	m	z	x	dp	di	de	H	A	B	C	☆
PFG	8	16	0.500	128	117	149.5	90	0	0	0	□
PHC	10	12	0.450	120	104	145	90	0	0	0	□
PHE	10	14	0.320	140	121	165	116	13	26	95	□
PHF	10	15	0.150	150	130	171.5	107	20	17	100	□
PHG	10	16	0.500	160	145	186	90	0	0	0	■
PHH1	10	17	0	170	145	190	90	0	0	0	■
PHH2	10	17	0.500	170	154	198	90	0	0	0	■
PLD	12	13	0.500	156	138	192	102	0	12	95	□
PLE	12	14	0.500	168	150	199.2	90	0	0	0	□
PLI	12	18	0.500	216	198	249.6	107	7	17	95	□
PLT	12	26	0	312	282	336	90	10	0	0	■

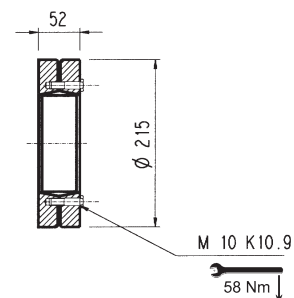
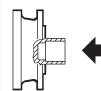
☆	Materiale / Material / Material / Matière
□	Acciaio 39NiCrMo3 Bonificato Steel 39NiCrMo3 hardened and tempered Vergüteter Stahl 39NiCrMo3 Acier bonifiée 39NiCrMo3
■	Acciaio 18NiCrMo5 Cementato e temprato Steel 18NiCrMo5 Case hardened Einsatzstahl 18NiCrMo5 Einsatzgehärtet Acier cimenté et tempré 18NiCrMo5

**Manicotti lisci / Sleeve couplings**  
**Naben / Manchons lisses a cannelure interieure**
**MOA**

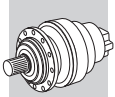
Materiale : Acciaio 16CrNi4  
 Material : Steel 16CrNi4  
 Material : Stahl 16CrNi4  
 Matière : Acier 16CrNi4

**Barre scanalate / Spined bars**  
**Vielkeilwellen / Barre cannelée**
**B0A**

Mat. acciaio 18NiCrMo5 UNI 5331 da cementare e temperare 50-55 HRC  
 Case hardening steel 18NiCrMo5 UNI 5331 must be case hardened to 50-55 HRC  
 Material: Einsatzstahl 18NiCrMo5 UNI 5331 muss einsatzgehärtet werden 50-55 HRC  
 Acier 18 NiCrMo5 UNI 5331 doit être cémenté trempé 50-55 HRC

**Giunto ad attrito / Shrink disc**  
**Schrumpfscheibe / Frette de serrage**
**GOA**

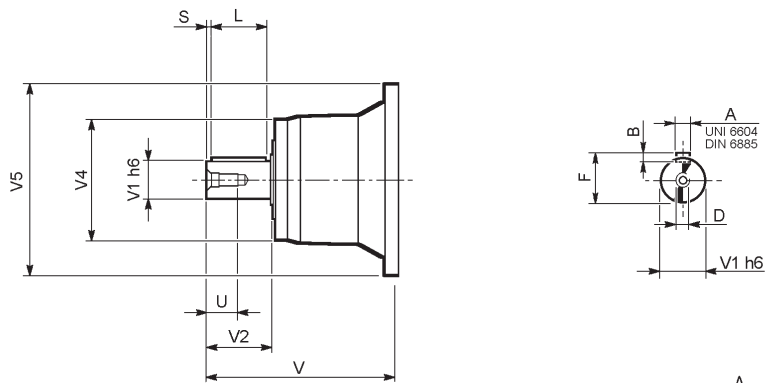




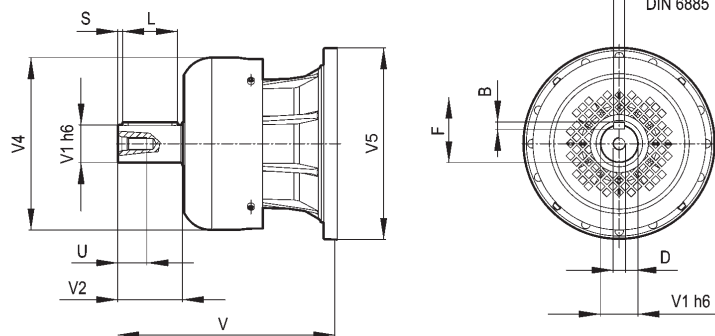
**307 L**

**307 R**

**V**



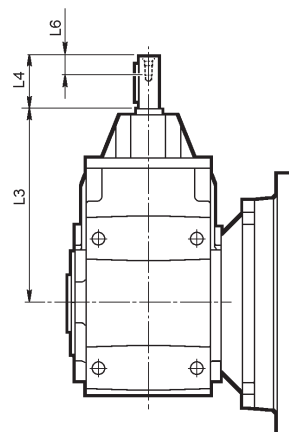
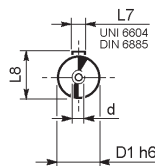
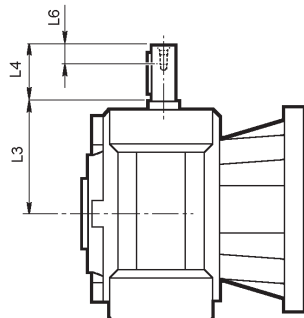
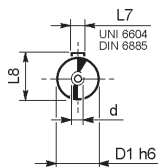
**FV**



	input	V	V1	V2	V4	V5	A	B	F	L	S	D	U
307 L1	V07B	315	80	130	200	345	22	14	85	110	10	M16	36
	FV07B	375	80	130	347.5	348	22	14	85	110	10	M16	36
	V07A	313	60	105	155	345	18	11	64	90	7.5	M16	36
	FV07A	363	60	105	309	348	18	11	64	90	7.5	M16	36
307 L2	V05B	239	48	82	155	245	14	9	51.5	70	6	M16	36
	FV05B	276	48	82	219.5	244	14	9	51.5	70	6	M16	36
307 L3	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28
307 L4	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28
307 R2	V05B	239	48	82	155	245	14	9	51.5	70	6	M16	36
	FV05B	276	48	82	219.5	244	14	9	51.5	70	6	M16	36
307 R3-R4	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28

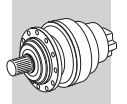
**3/V 07L3**

**3/A 07L2**



	D1 h6	L3	L4	L6	L7	L8	d
3/V 07L3 HS	25	168	60	19	8	28	M8

	D1 h6	L3	L4	L6	L7	L8	d
3/A 07L2 HS	28	409	60	22	8	31	M10

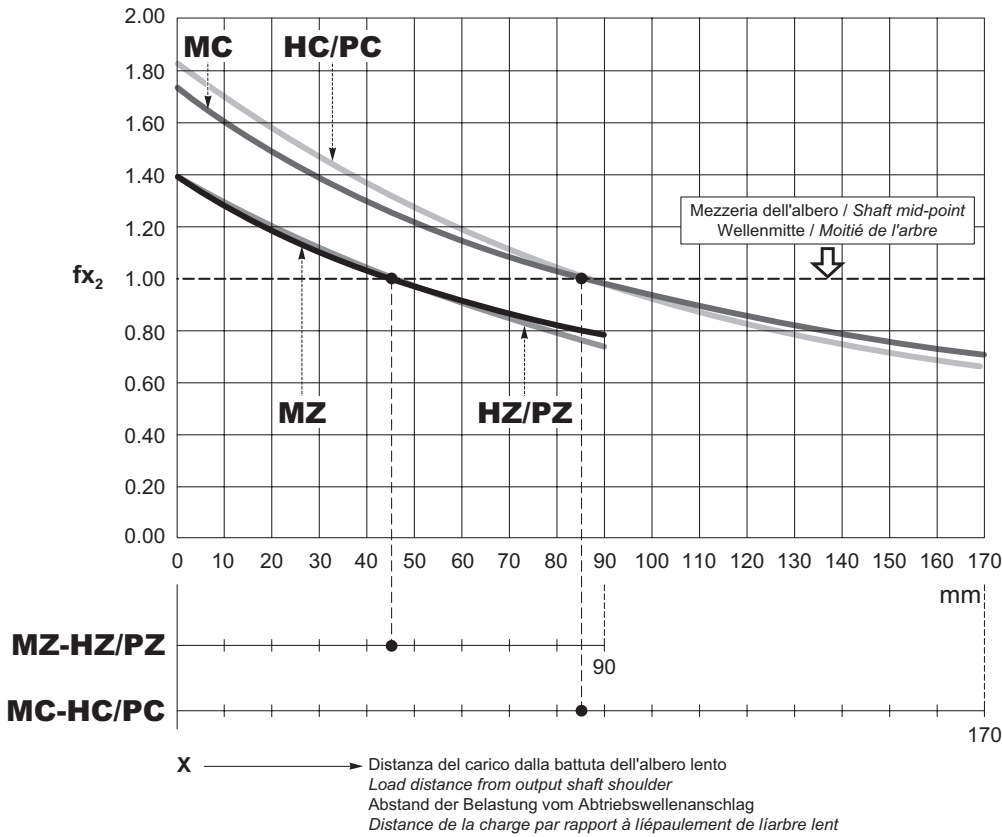


Fattore di posizione per carichi radiali sugli alberi in uscita.

Load location factor for radial loading on output shaft.

Positionsfaktor für Radialkräfte an der Abtriebswelle.

Facteur de position pour charges radiales sur les arbres en sortie.



Carichi radiali ammissibili sull'albero veloce per  $n_1 = 1000 \text{ min}^{-1}$  e 10000 h di vita teorica.

Permitted overhung loads on input shaft when  $n_1 = 1000 \text{ min}^{-1}$  and theoretical lifetime = 10000 h.

Zulässige Radialkräfte an den Antriebswellen für  $n_1 = 1000 \text{ min}^{-1}$  und 10000 std.

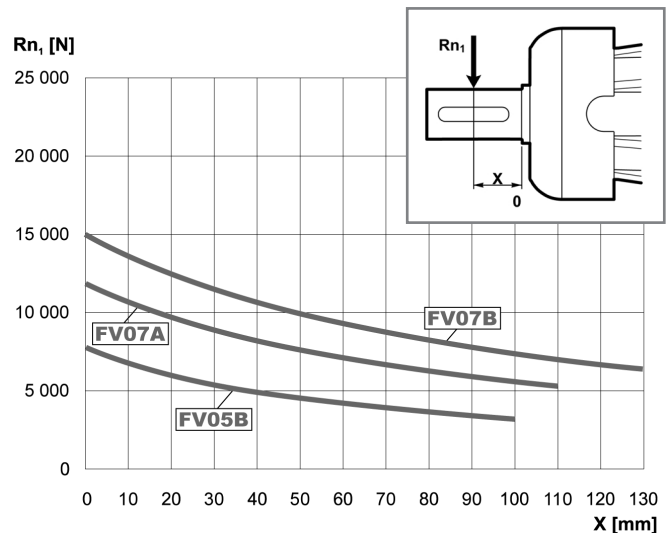
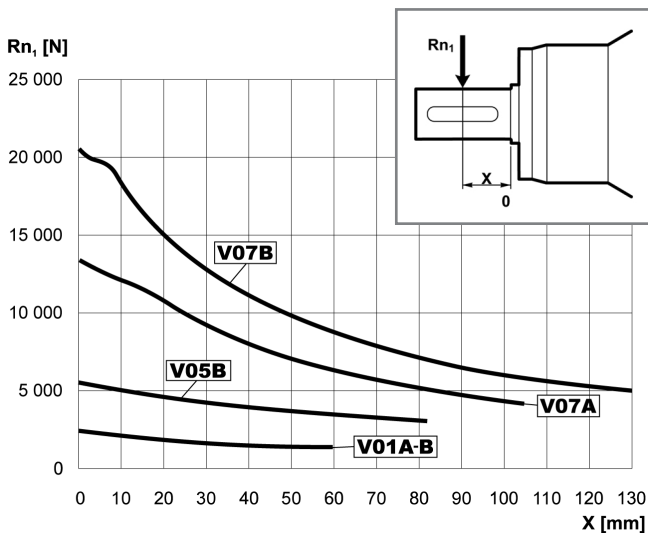
Charges radiales admissibles sur les arbres d'entrée pour  $n_1 = 1000 \text{ min}^{-1}$  et 10000 h.

Per velocità di comando e/o durate diverse vedi il capitolo: Verifiche.

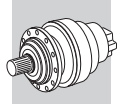
For drive speed and/or lifetimes other than those specified here, see Chapter: Verifications.

Im Hinblick auf Geschwindigkeit und/oder anderweitige Dauerverweisen wir auf Par: Prüfungen

Pour des vitesses et/ou durées différentes, voir par. Vérifications.







Il diagramma seguente consente di ricavare il carico radiale ammissibile  $R_{x2}$  quando questo è applicato alla distanza  $x$  dallo spallamento dell'albero lento del riduttore 307\_VK.

Le curve si riferiscono al valore risultante dal rapporto fra il carico assiale  $A_{n2}$  e il carico radiale  $R_{n2}$ , entrambi riferiti a  $n_2 = 10 \text{ min}^{-1}$  e durata teorica di 10000 h.

The diagram below allows the calculation of permitted overhung load  $R_{x2}$  on the output shaft of gearbox type 307\_VK, with radial force applying at a distance  $x$  from shaft shoulder.

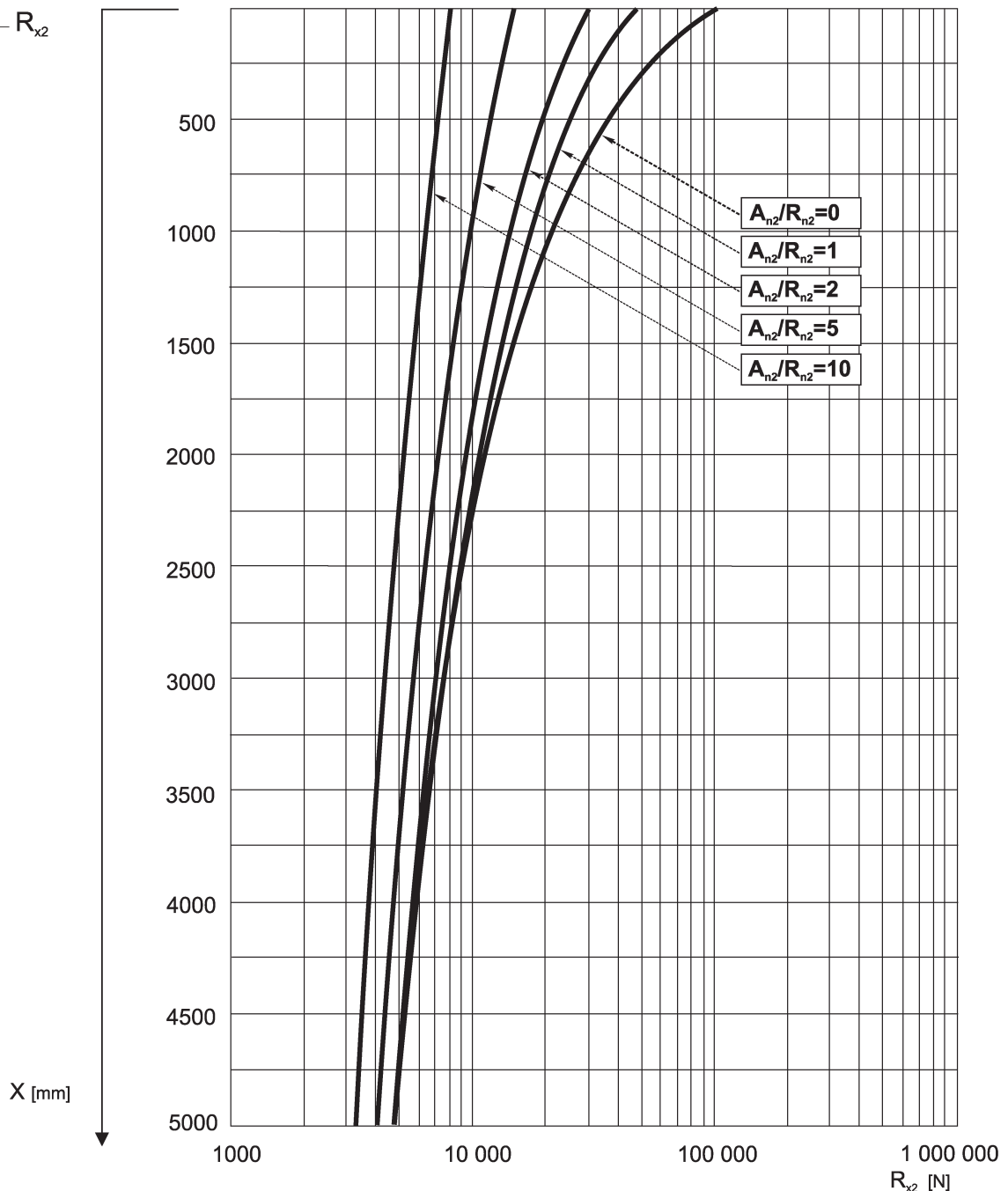
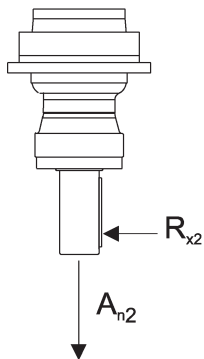
The curves are relevant to value resulting from the relationship of trust load  $A_{n2}$  to radial load  $R_{n2}$ , based on  $n_2 = 10 \text{ min}^{-1}$  and 10000 hrs theoretical lifetime.

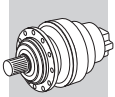
Das nachstehende Diagram ermöglicht das Individuieren der zulässigen, auf die Welle des Getriebes 307\_VK einwirkenden Radialkraft, die auf der Distanz  $x$  vom Anschlag der Welle selbst appliziert wird.

Die Kurven beziehen sich auf den Wert, der sich aus dem Verhältnis zwischen der Axialkraft  $A_{n2}$  und der Radialkraft  $R_{n2}$  für  $n_2 = 10 \text{ min}^{-1}$  und einer Dauer von 10000 Std. ergibt.

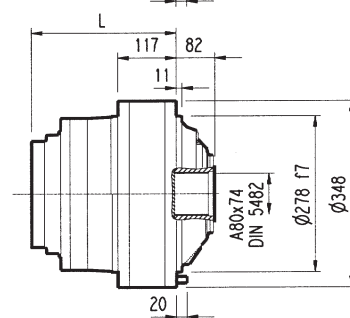
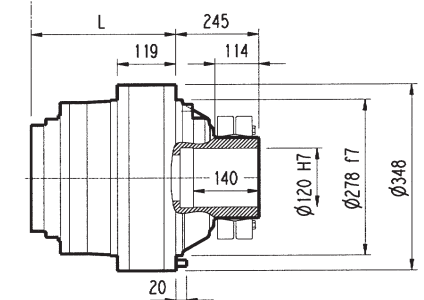
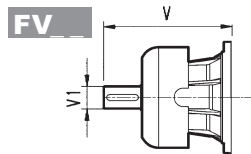
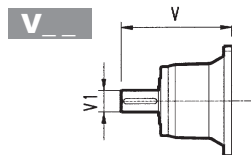
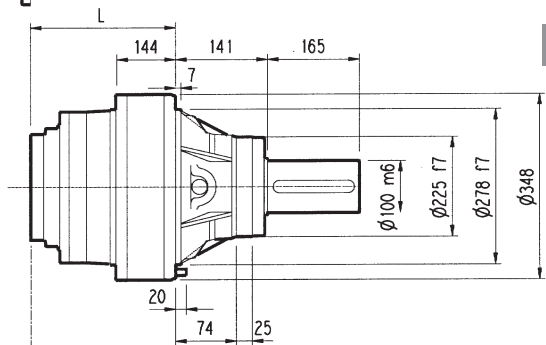
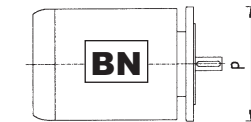
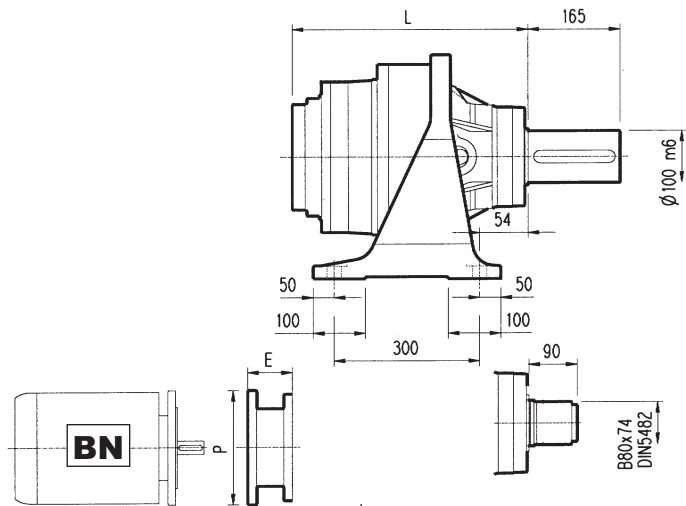
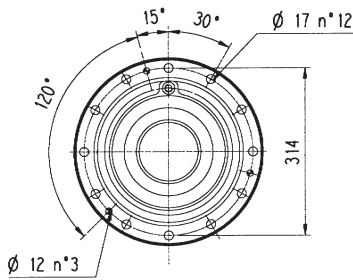
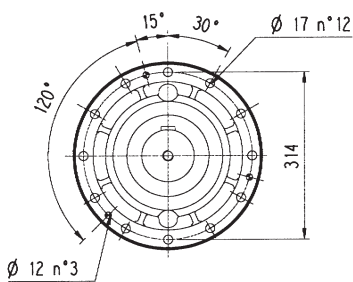
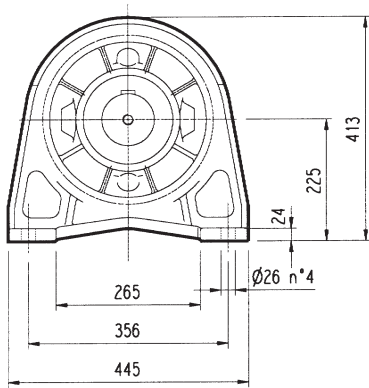
Le diagramme suivant permet de déterminer la charge radiale admissible  $R_{x2}$  sur l'arbre lent du réducteur 307\_VK appliqué à la distance  $x$  de l'épaulement de l'arbre.

Les courbes se réfèrent à la valeur résultant de l'équation entre la charge axiale  $A_{n2}$  et la charge radiale  $R_{n2}$  pour  $n_2 = 10 \text{ min}^{-1}$  et durée de 10000 h.





# 309 L



PC

HZ PZ

HC

FP

FZ

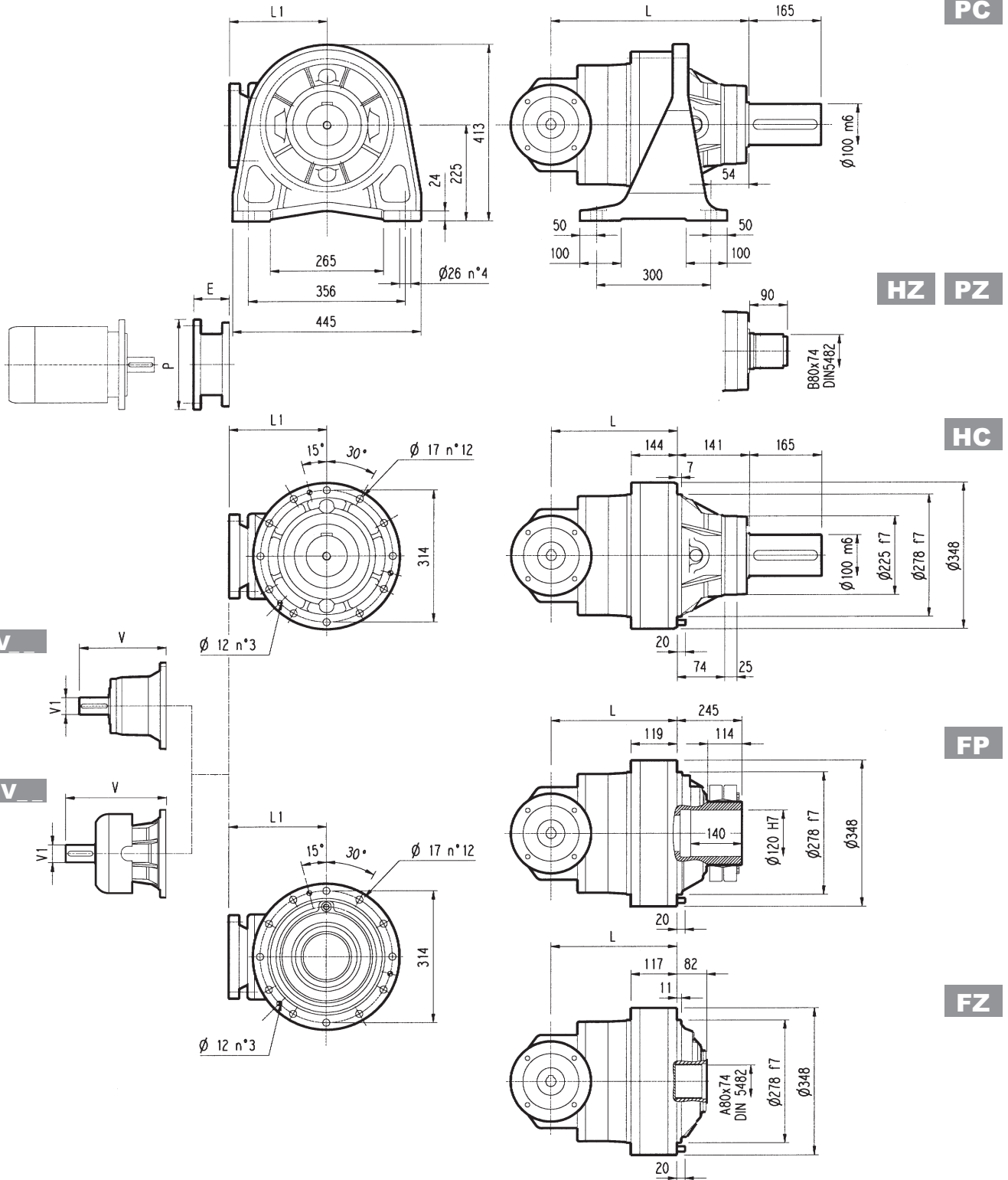
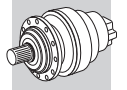
FP

$M_{2max} = 25000 \text{ Nm}$

	L				Kg				Kg				Kg							
	PC - PZ	HC - HZ	FZ	FP	PC - PZ	HC - HZ	FZ	FP	V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg
309 L1	267	126	99	101	130	115	95	100	315	80	35	313	60	28	375	80	48	363	60	34
309 L2	356	215	188	190	142	127	107	112	239	48	15	-	-	-	276	48	17	-	-	-
309 L3	421	280	253	255	149	134	114	119	137.5	24	6	158	38	7	-	-	-	-	-	-
309 L4	474	333	306	308	153	138	118	123	137.5	24	6	158	38	7	-	-	-	-	-	-

	P71		P80		P90		P100		P112		P132		P160		P180		P200		P225		P250	
	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P
309 L1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	195	350	186	400	216	450	216	550
309 L2	-	-	-	-	-	-	-	-	-	-	114	300	144	350	144	350	174	400	-	-	-	-
309 L3	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-	-	-	-	-
309 L4	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-	-	-	-	-

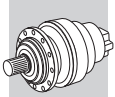


**FP**  $M_{2max} = 25000 \text{ Nm}$

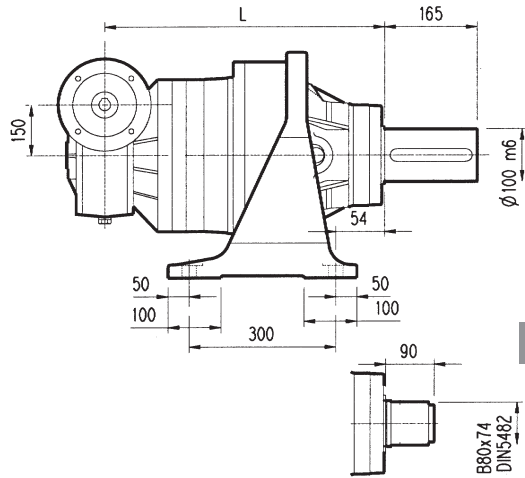
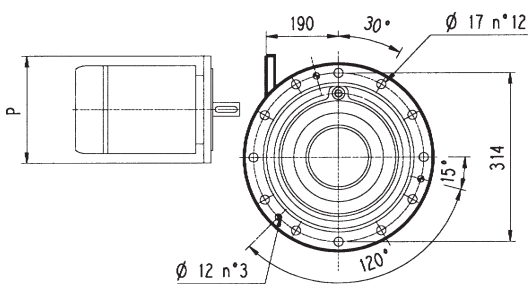
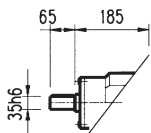
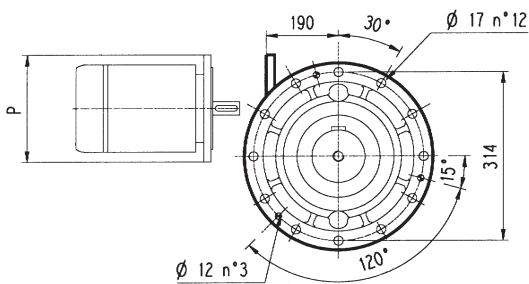
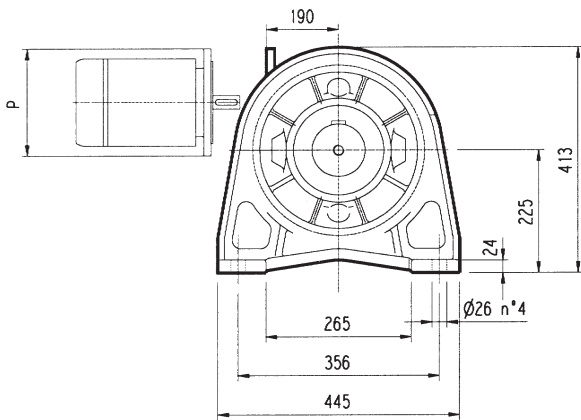
	L				L1	Kg				Kg				Kg							
	PC - PZ	HC - HZ	FZ	FP		PC - PZ	HC - HZ	FZ	FP	V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg
309 R2	386	245	218	220	225	180	165	145	150	239	48	15	-	-	-	276	48	17	-	-	-
309 R3	448	307	280	282	140	162	147	127	132	137.5	24	6	158	38	7	-	-	-	-	-	-
309 R4	513	372	345	347	122	163	148	128	133	137.5	24	6	158	38	7	-	-	-	-	-	-

	P71		P80		P90		P100		P112		P132		P160		P180		P200	
	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P
309 R2	-	-	-	-	-	-	-	-	-	-	114	300	144	350	144	350	174	400
309 R3	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-
309 R4	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-

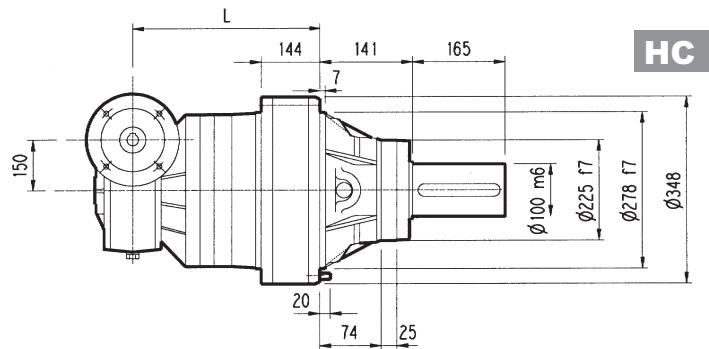


# 3/V 09L3

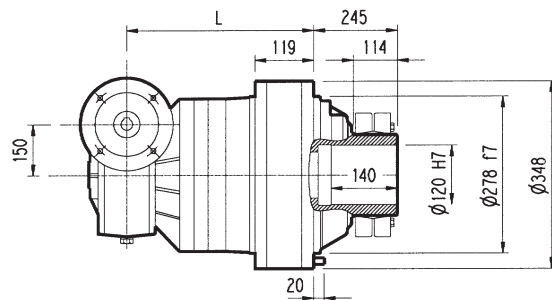


PC

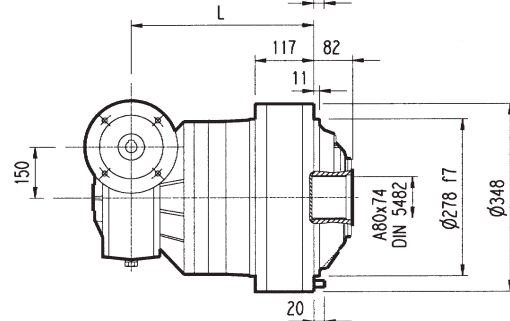
HZ PZ



HC



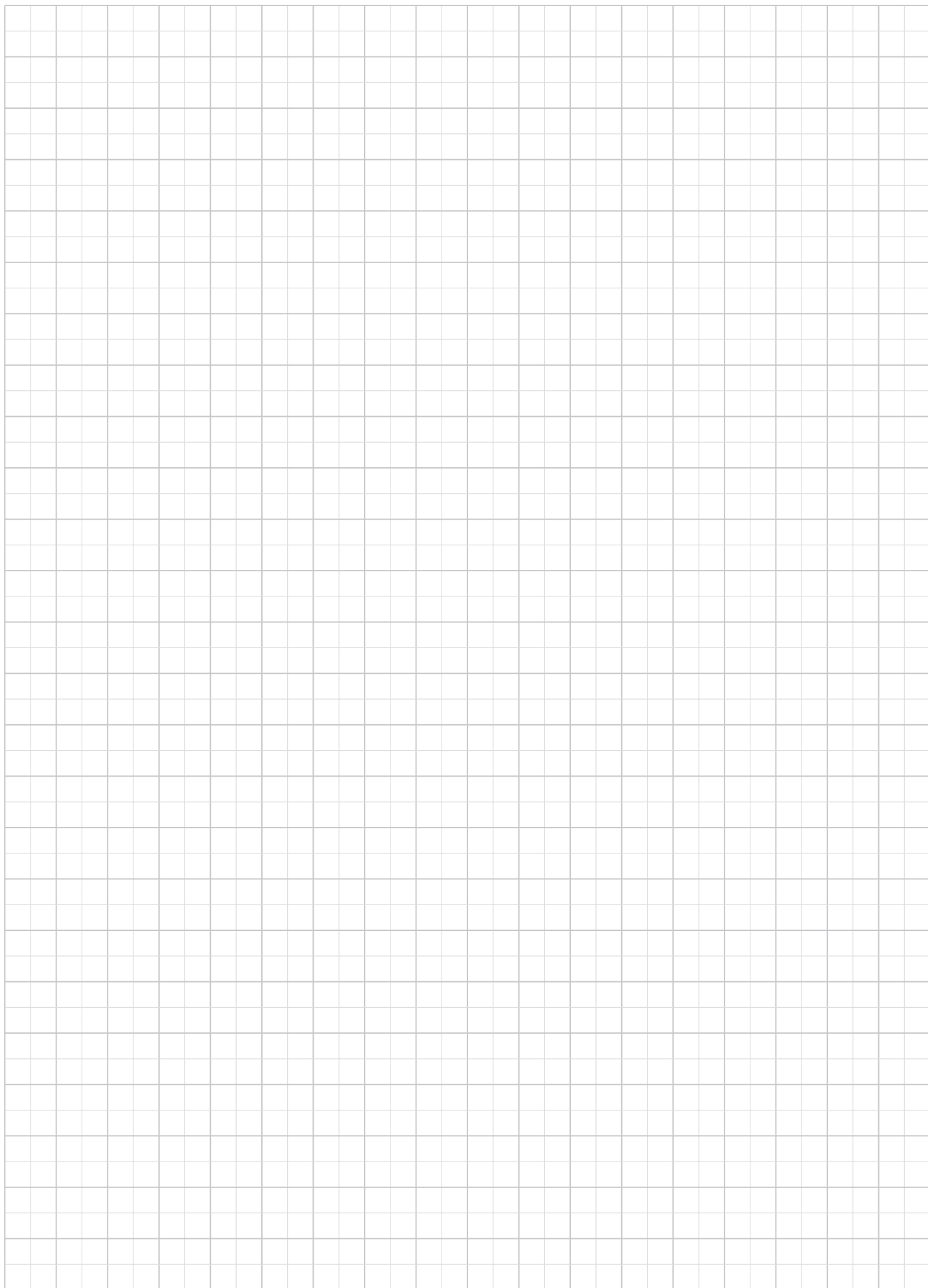
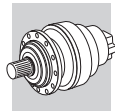
FP



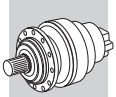
FZ

**FP**  $M_{2max} = 25000 \text{ Nm}$

3/V 09L3	L				Kg				P100	P112	P132	P160
	PC - PZ	HC - HZ	FZ	FP	PC - PZ	HC - HZ	FZ	FP	P	P	P	P
	530	389	362	364	202	187	167	172	250	250	300	350



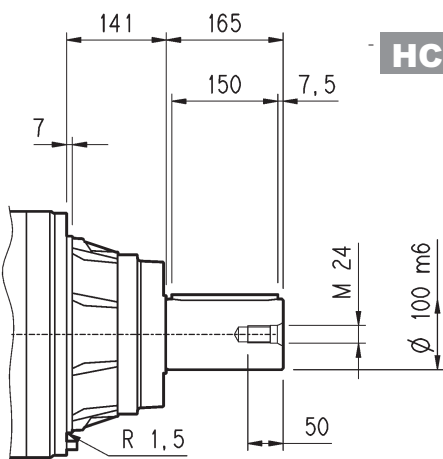




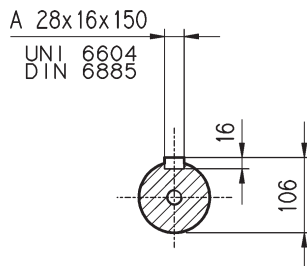
**309 L**

**309 R**

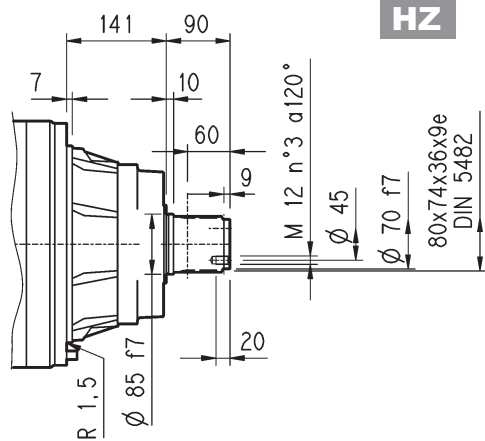
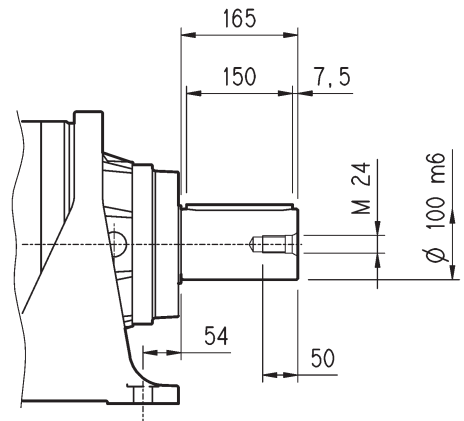
**3/V 09L3**



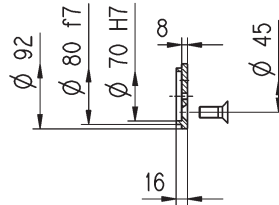
**HC**



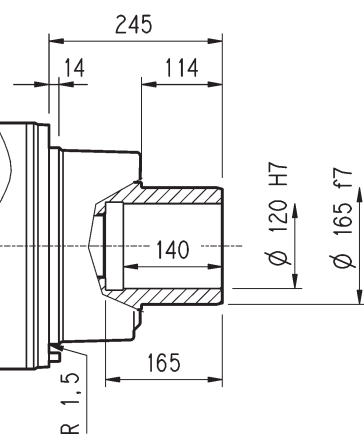
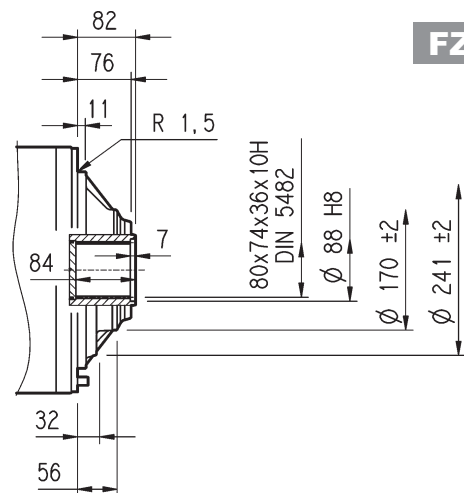
**PC**



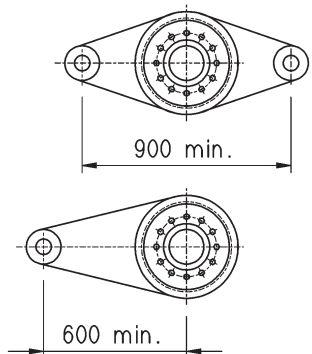
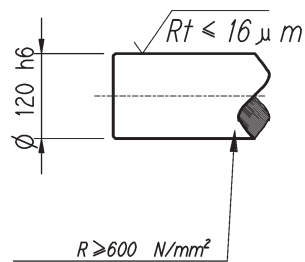
**HZ**



**FZ**



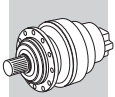
**FP**



**FP**

$M_{2max} = 25000\ Nm$

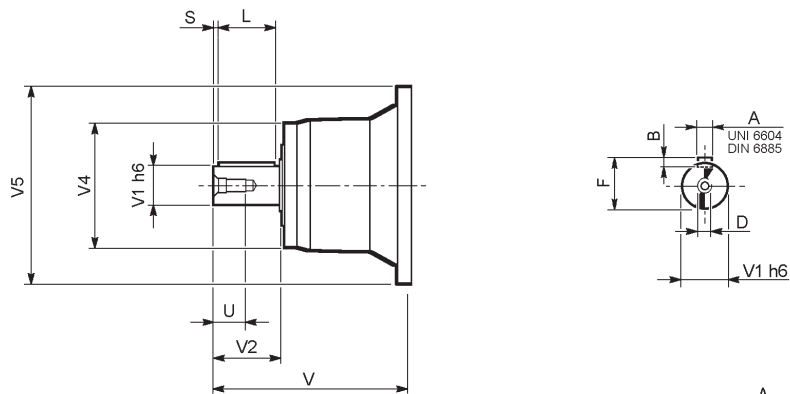




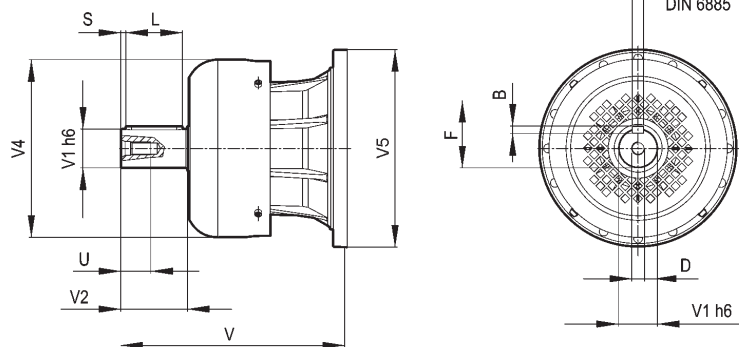
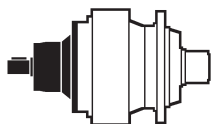
**309 L**

**309 R**

**V**

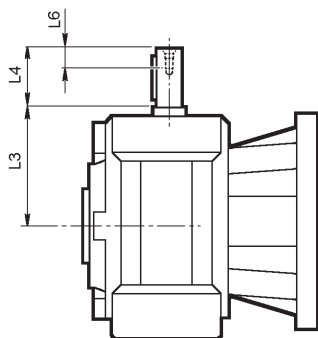
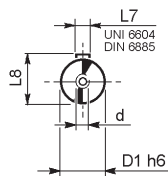


**FV**

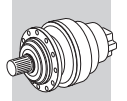


	input	V	V1	V2	V4	V5	A	B	F	L	S	D	U
309 L1	V07B	315	80	130	200	345	22	14	85	110	10	M16	36
	FV07B	375	80	130	347.5	348	22	14	85	110	10	M16	36
	V07A	313	60	105	155	345	18	11	64	90	7.5	M16	36
	FV07A	363	60	105	309	348	18	11	64	90	7.5	M16	36
309 L2	V05B	239	48	82	155	245	14	9	51.5	70	6	M16	36
	FV05B	276	48	82	219.5	244	14	9	51.5	70	6	M16	36
309 L3	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28
309 L4	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28
309 R2	V05B	239	48	82	155	245	14	9	51.5	70	6	M16	36
	FV05B	276	48	82	219.5	244	14	9	51.5	70	6	M16	36
309 R3-R4	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28

**3/V 09L3**



	D1 h6	L3	L4	L6	L7	L8	d
3/V 09L3_HS	35	185	65	20	10	38	M8

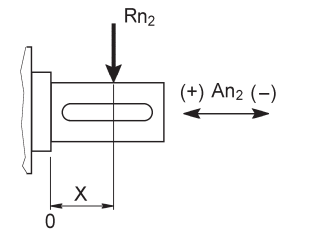
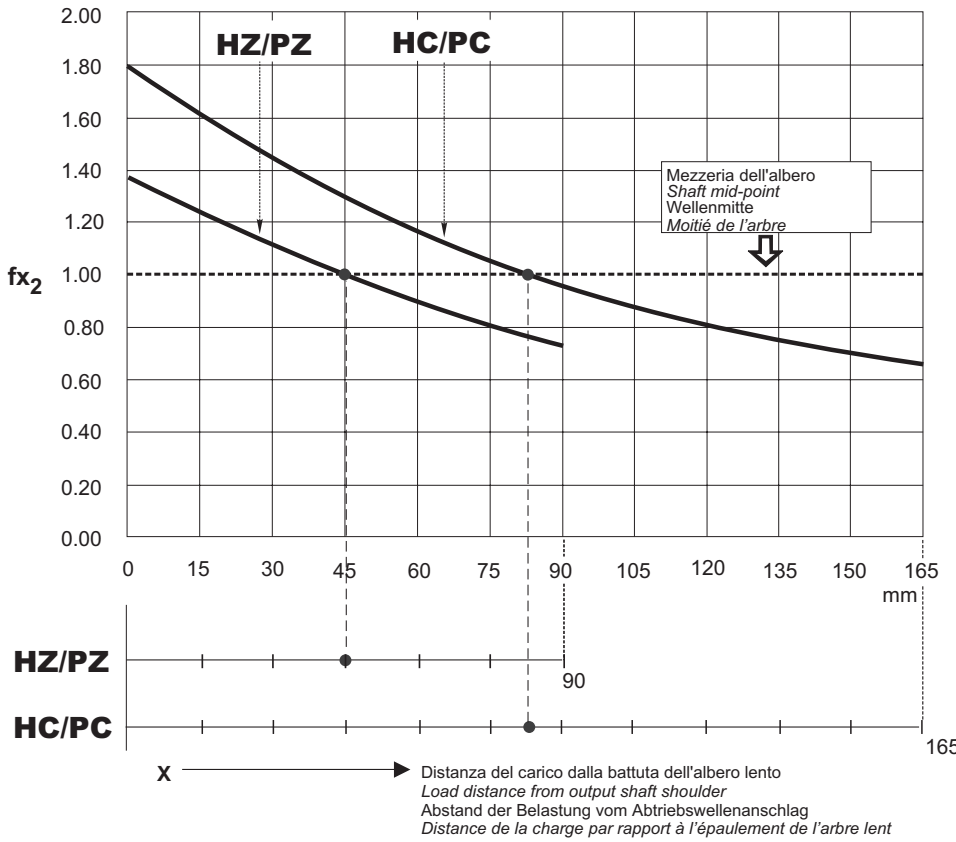


Fattore di posizione per carichi radiali sugli alberi in uscita.

Load location factor for radial loading on output shaft.

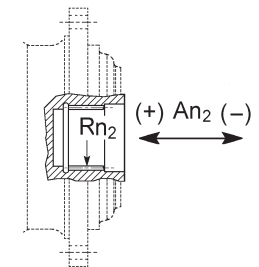
Positionsfaktor für Radialkräfte an der Abtriebswelle.

Facteur de position pour charges radiales sur les arbres en sortie.



$$R_{x2} = R_{n2} \cdot f_{x2}$$

$A_{n2} (\pm) = R_{n2} \cdot f_{a2} (\pm)$		
	$f_{a2} (+)$	$f_{a2} (-)$
HZ/PZ	1.10	0.55
HC/PC	1.45	0.73



$A_{n2} (\pm) = R_{n2} \cdot f_{a2} (\pm)$		
	$f_{a2} (+)$	$f_{a2} (-)$
FZ	1.03	1.03

Carichi radiali ammissibili sull'albero veloce per  $n_1 = 1000 \text{ min}^{-1}$  e 10000 h di vita teorica.

Permitted overhung loads on input shaft when  $n_1 = 1000 \text{ min}^{-1}$  and theoretical lifetime = 10000 h.

Zulässige Radialkräfte an den Antriebswellen für  $n_1 = 1000 \text{ min}^{-1}$  und 10000 std.

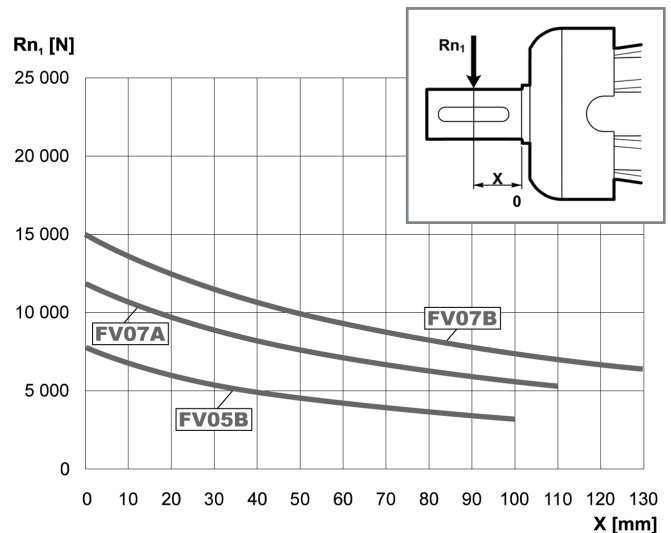
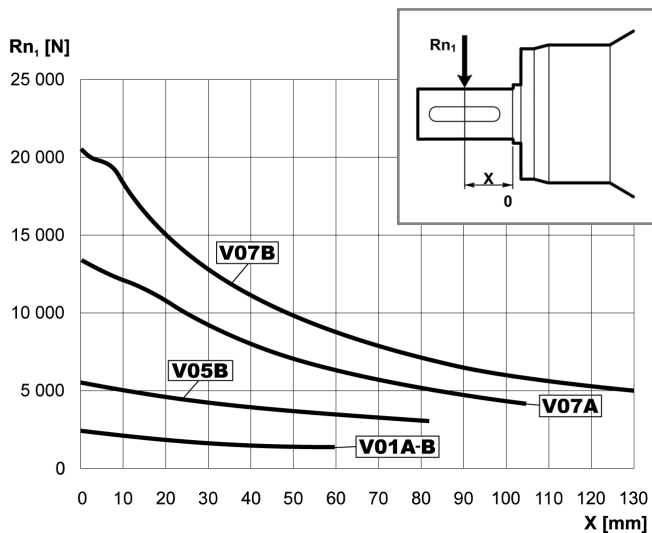
Charges radiales admissibles sur les arbres d'entrée pour  $n_1 = 1000 \text{ min}^{-1}$  et 10000 h.

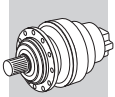
Per velocità di comando e/o durate diverse vedi il capitolo: Verifiche.

For drive speed and/or lifetimes other than those specified here, see Chapter: Verifications.

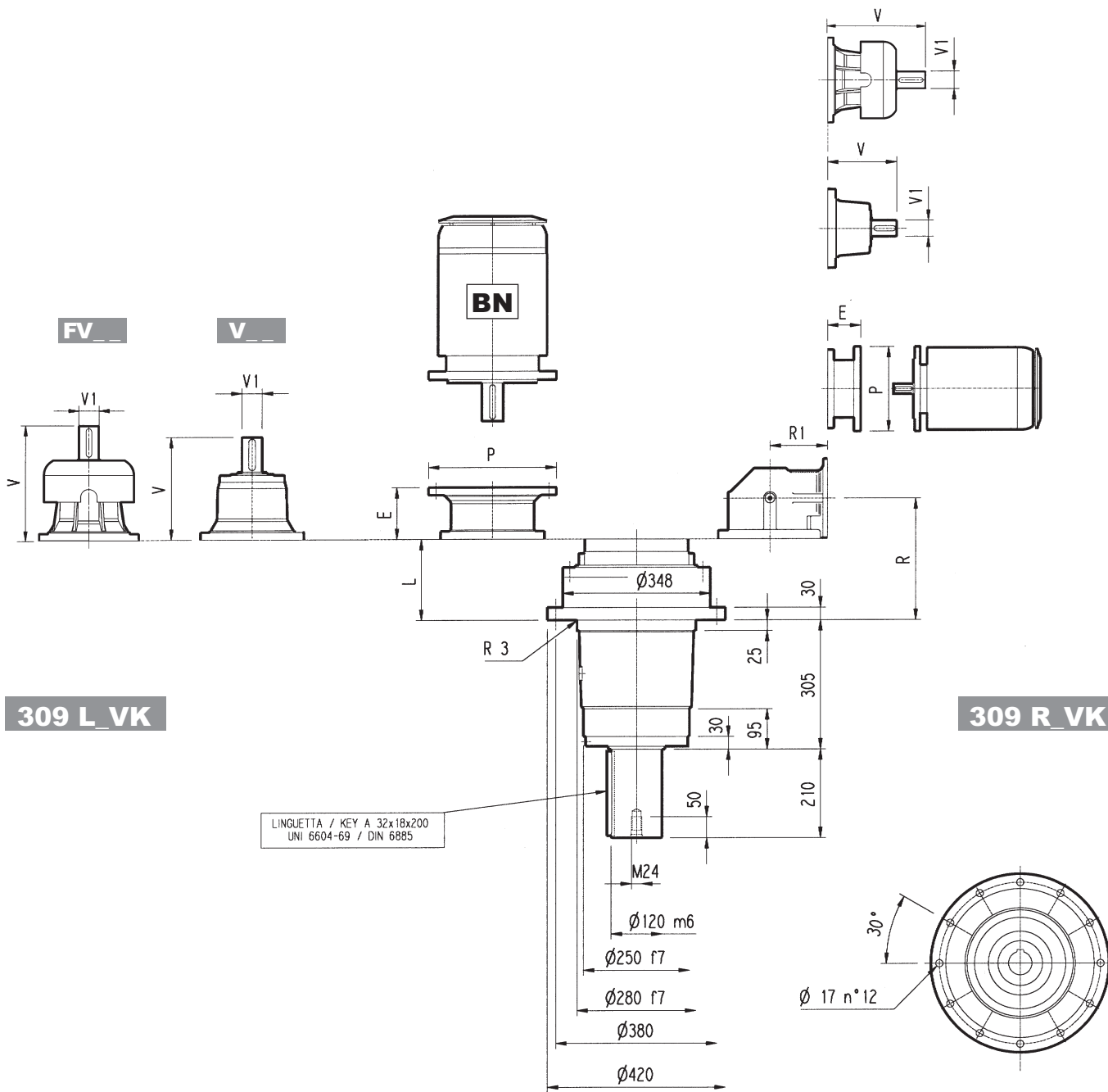
Im Hinblick auf Geschwindigkeit und/oder anderweitige Dauern verweisen wir auf Par: Prüfungen

Pour des vitesses et/ou durées différentes, voir par. Vérifications.





# 309\_VK



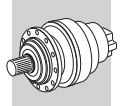
## 309 L\_VK

## 309 R\_VK

	L	Kg												
			V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg
309 L1	102	165	315	80	35	313	60	28	375	80	48	363	60	34
309 L2	191	180	239	48	15	-	-	-	276	48	17	-	-	-
309 L3	256	190	137.5	24	6	158	38	7	-	-	-	-	-	
309 L4	309	195	137.5	24	6	158	38	7	-	-	-	-	-	

	P71		P80		P90		P100		P112		P132		P160		P180		P200		P225		P250			
	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P		
309 L1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	195	350	186	400	216	450	216	450	216	450
309 L2	-	-	-	-	-	-	-	-	-	-	114	300	144	350	144	350	174	400	-	-	-	-	-	-
309 L3	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-	-	-	-	-	-	-
309 L4	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-	-	-	-	-	-	-

	R	R1	Kg													P71		P80		P90		P100		P112		P132		P160		P180		P200		
				V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg	E	P	E	P	E	P	E	P	E	P	E	P	E	P		
309 R2	221	225	200	239	48	15	-	-	-	276	48	17	-	-	-	-	-	-	-	-	-	-	-	-	-	114	300	144	350	144	350	174	400	
309 R3	283	140	190	137.5	24	6	158	38	7	-	-	-	-	-	-	-	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-
309 R4	348	122	195	137.5	24	6	158	38	7	-	-	-	-	-	-	-	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-



Il diagramma seguente consente di ricavare il carico radiale ammissibile  $R_{x2}$  quando questo è applicato alla distanza  $x$  dallo spallamento dell'albero lento del riduttore 309\_VK.

Le curve si riferiscono al valore risultante dal rapporto fra il carico assiale  $A_{n2}$  e il carico radiale  $R_{n2}$ , entrambi riferiti a  $n_2 = 10 \text{ min}^{-1}$  e durata teorica di 10000 h.

The diagram below allows the calculation of permitted overhung load  $R_{x2}$  on the output shaft of gearbox type 309\_VK, with radial force applying at a distance  $x$  from shaft shoulder.

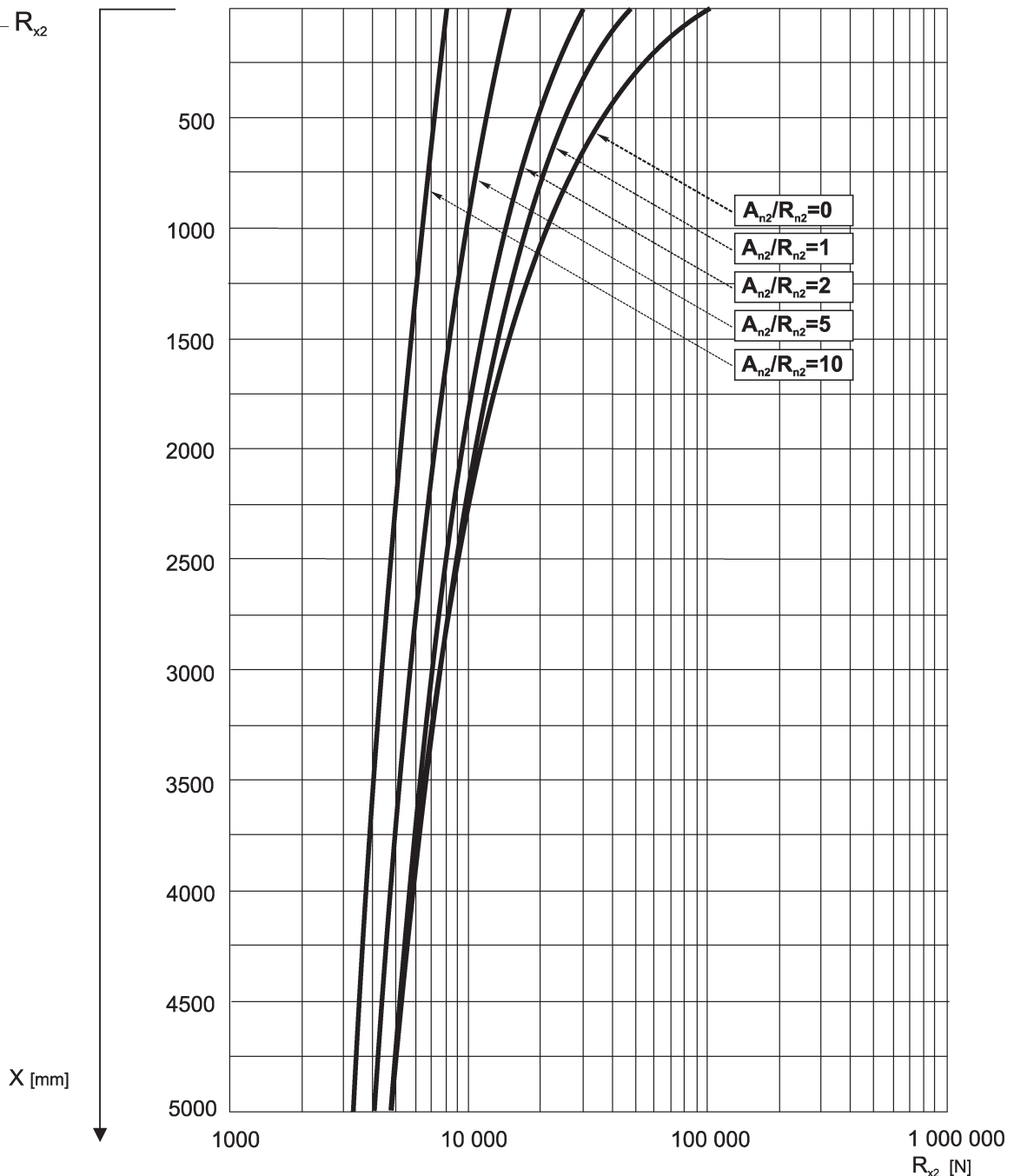
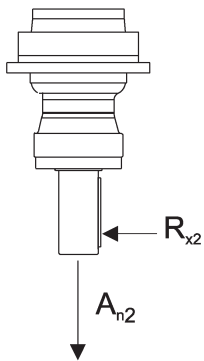
The curves are relevant to value resulting from the relationship of trust load  $A_{n2}$  to radial load  $R_{n2}$ , based on  $n_2 = 10 \text{ min}^{-1}$  and 10000 hrs theoretical lifetime.

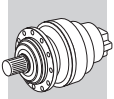
Das nachstehende Diagramm ermöglicht das Individuieren der zulässigen, auf die Welle des Getriebes 309\_VK einwirkenden Radialkraft, die auf der Distanz  $x$  vom Anschlag der Welle selbst appliziert wird.

Die Kurven beziehen sich auf den Wert, der sich aus dem Verhältnis zwischen der Axialkraft  $A_{n2}$  und der Radialkraft  $R_{n2}$  für  $n_2 = 10 \text{ min}^{-1}$  und einer Dauer von 10000 Std. ergibt.

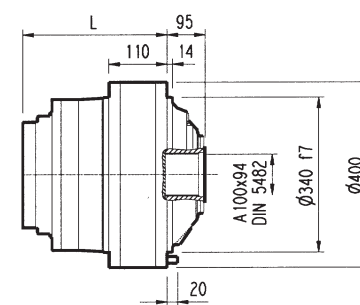
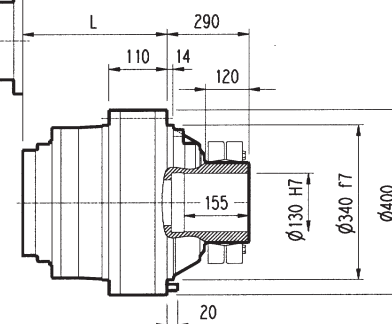
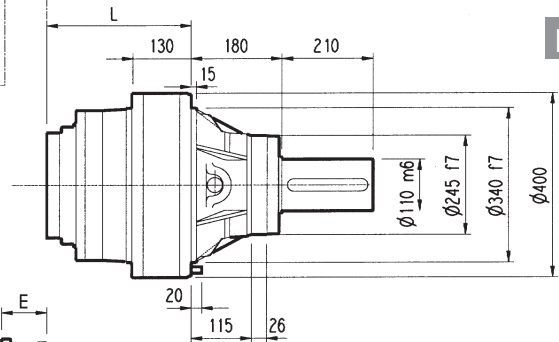
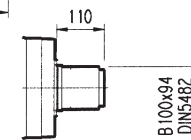
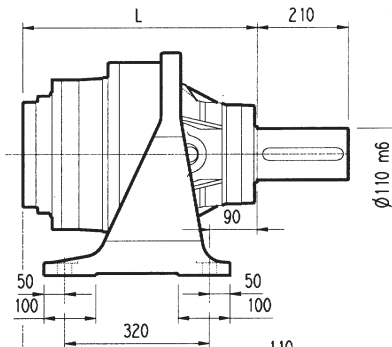
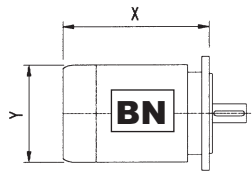
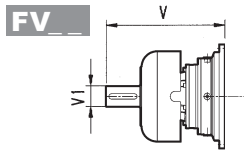
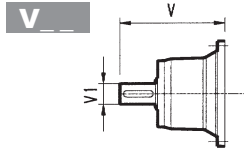
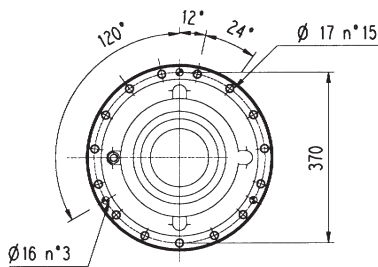
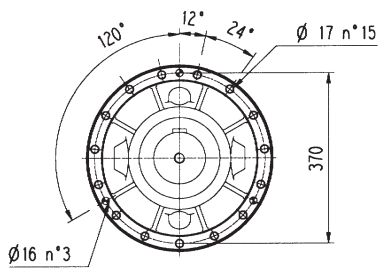
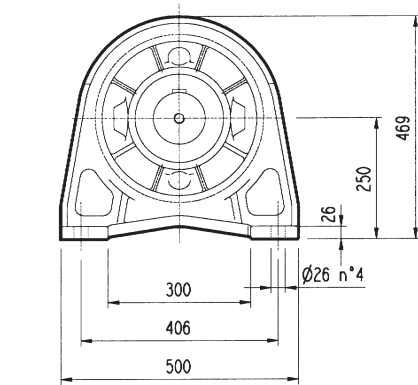
Le diagramme suivant permet de déterminer la charge radiale admissible  $R_{x2}$  sur l'arbre lent du réducteur 309\_VK appliqué à la distance  $x$  de l'épaulement de l'arbre.

Les courbes se réfèrent à la valeur résultant de l'équation entre la charge axiale  $A_{n2}$  et la charge radiale  $R_{n2}$  pour  $n_2 = 10 \text{ min}^{-1}$  et durée de 10000 h.





# 310 L



PC

HZ PZ

HC

FP

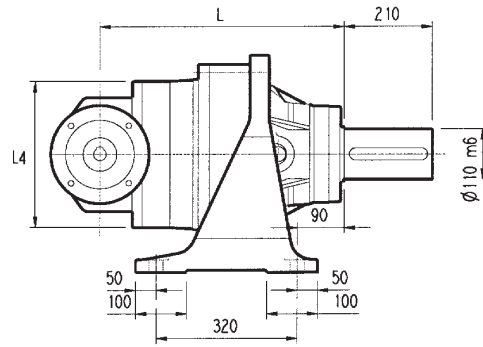
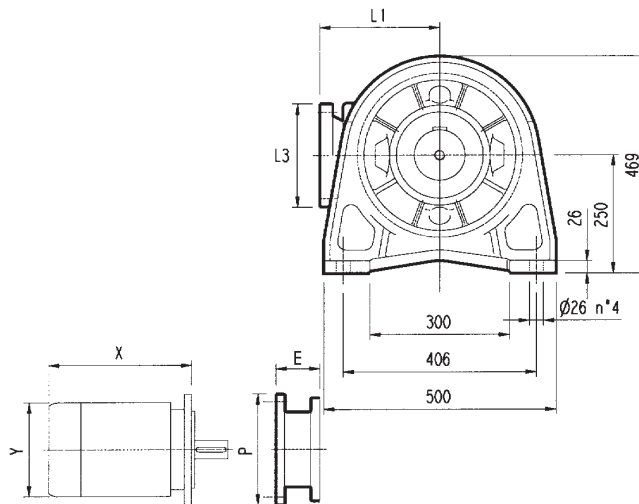
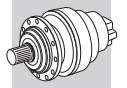
FZ

FP

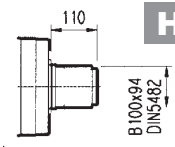
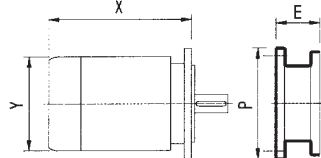
$M_{2max} = 36000 \text{ Nm}$

	L				Kg				Kg				Kg							
	PC - PZ	HC - HZ	FZ	FP	PC - PZ	HC - HZ	FZ	FP	V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg
310 L1	288	108	88	88	155	135	110	115	377	80	50	-	-	-	457	80	63	-	-	-
310 L2	424	244	224	224	185	165	140	145	307	60	23	-	-	-	357	60	28	-	-	-
310 L3	489	309	289	289	194	174	149	154	239	48	15	-	-	-	276	48	17	-	-	-
310 L4	542	362	342	342	198	178	153	158	137.5	24	6	158	38	7	-	-	-	-	-	-

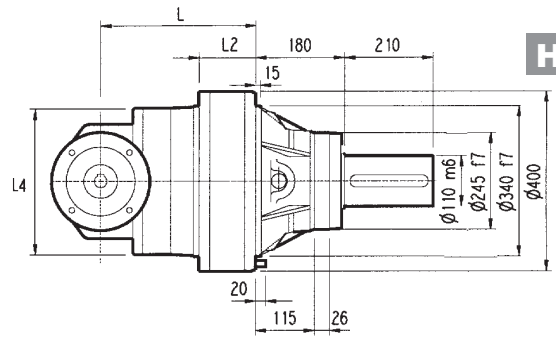
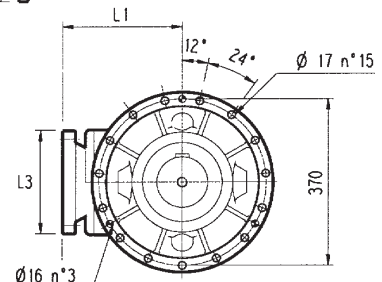
	P71		P80		P90		P100		P112		P132		P160		P180		P200		P225		P250	
	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P
310 L1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	271	400	301	450	281	550
310 L2	-	-	-	-	-	-	-	-	-	-	-	-	152	350	153	350	183	400	212	450	193	550
310 L3	-	-	-	-	-	-	-	-	-	114	300	144	350	144	350	174	400	-	-	-	-	-
310 L4	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-	-	-	-	-



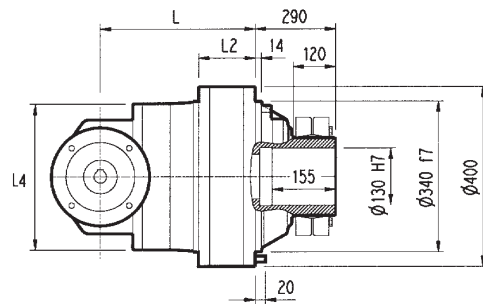
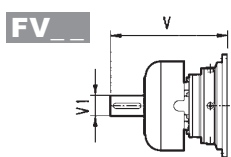
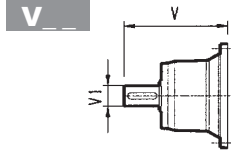
**PC**



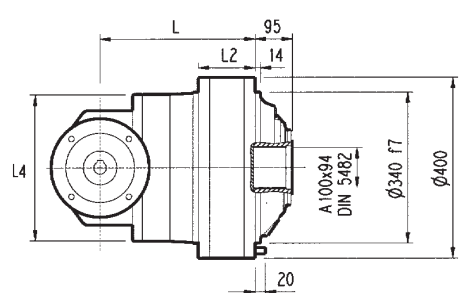
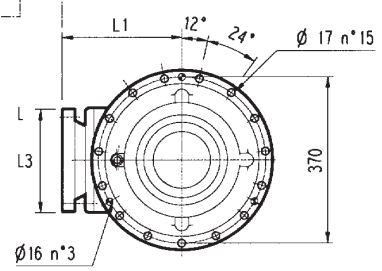
**HZ PZ**



**HC**

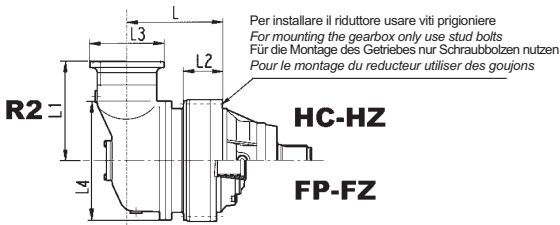


**FP**



**FZ**

Solo per esecuzione:  
Only for configuration:  
Nur für die Konfiguration:  
Uniquement pour la configuration:

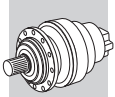


**FP**  $M_{2max} = 36000 \text{ Nm}$

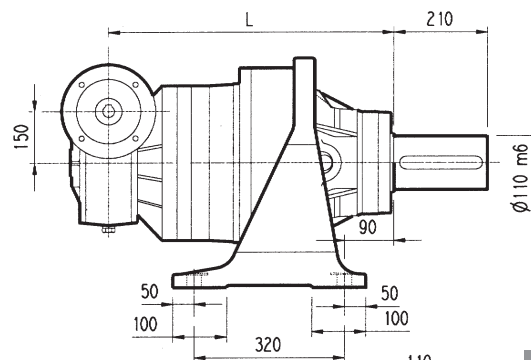
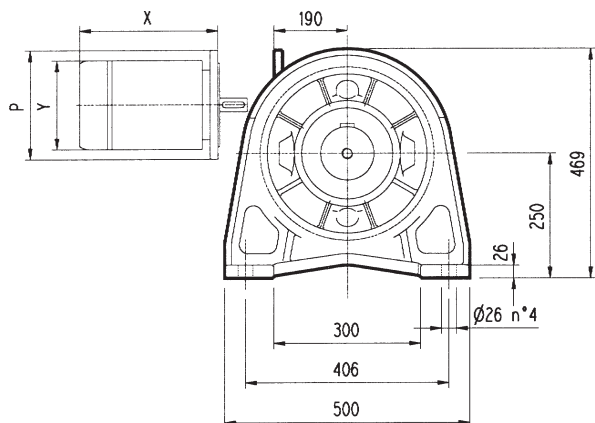
	L				L1	L2				L3	L4	Kg	V				V1										
	PC-PZ	HC-HZ	FZ	FP		PC-PZ	HZ-HC	FZ	FP				PC-PZ	HC-HZ	FZ	FP	Kg	V	V1	Kg	V	V1	Kg				
310 R2 (B)	485	305	285	285	345	-	198	178	178	292	400	280	260	240	250	307	60	23	-	-	-	357	60	28	-	-	-
310 R2 (C)	513	333	313	313	390	-	127	107	107	292	480	300	280	260	270	307	60	23	-	-	-	357	60	28	-	-	-
310 R3	561	381	361	361	140	-	130	110	110	186	244	209	189	164	169	137.5	24	6	158	38	7	-	-	-	-	-	-
310 R4	581	401	381	381	140	-	130	110	110	186	244	214	194	169	174	137.5	24	6	158	38	7	-	-	-	-	-	-

	P71		P80		P90		P100		P112		P132		P160		P180		P200		P225	
	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P
310 R2 (B)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	152	350	182	400	212	450
310 R2 (C)	-	-	-	-	-	-	-	-	-	-	114	300	152	350	152	350	182	400	212	450
310 R3	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-	-	-
310 R4	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-	-	-

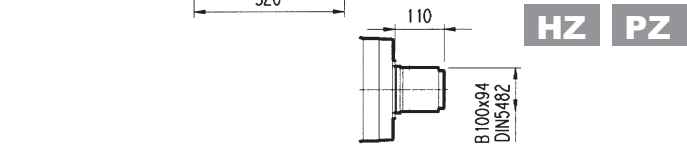
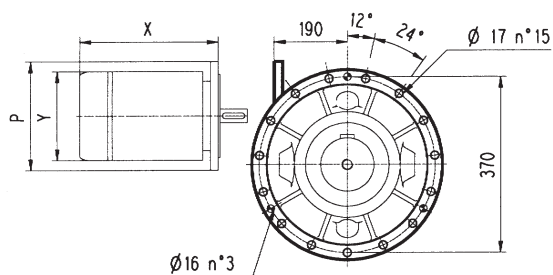




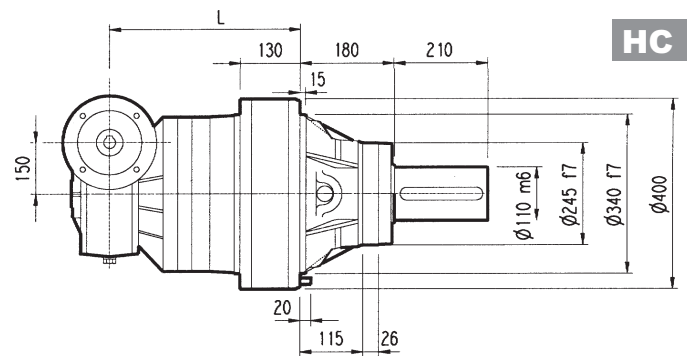
# 3/V 10L3



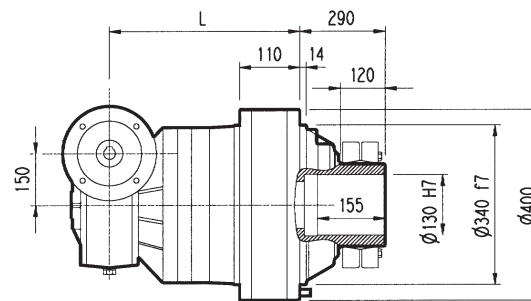
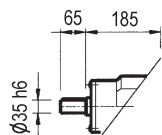
**PC**



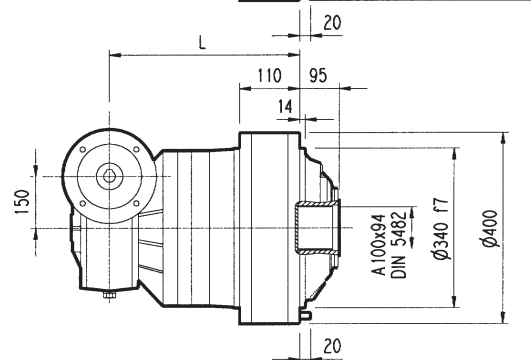
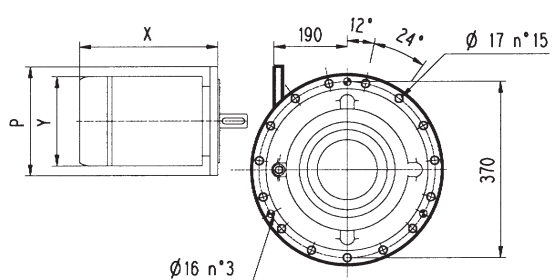
**HZ PZ**



**HC**



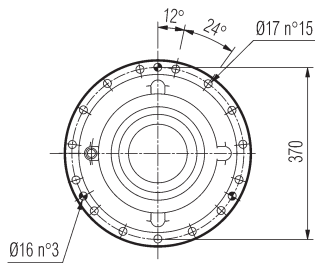
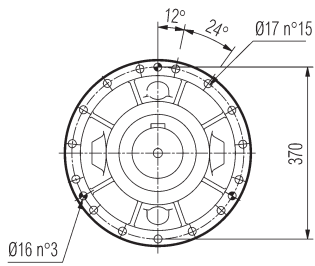
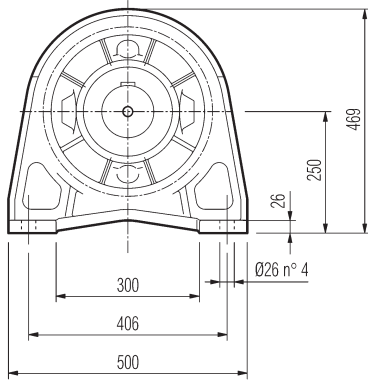
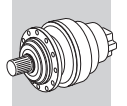
**FP**



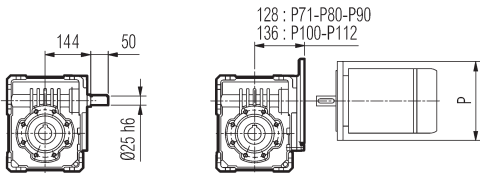
**FZ**

**FP**  $M_{2max} = 36000 \text{ Nm}$

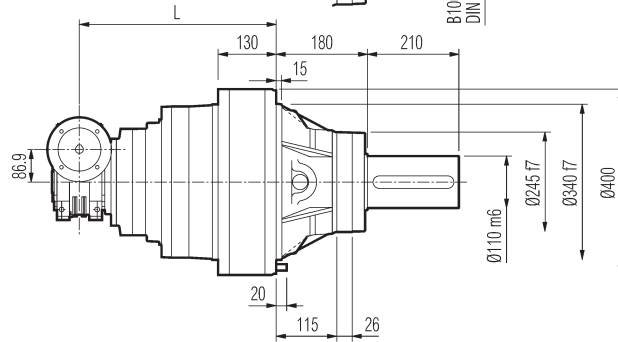
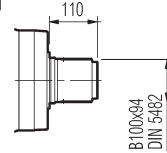
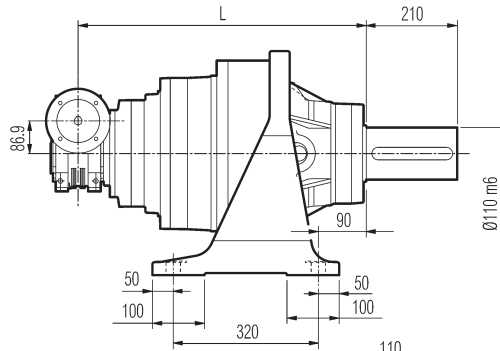
	L				Kg	P71	P80	P90	P100	P112	P132	P160			
	PC - PZ	HC - HZ	FZ	FP									PC - PZ	HC - HZ	FZ
3/V 10L3	608	428	408	408	245	225	200	205	-	-	-	250	250	300	300



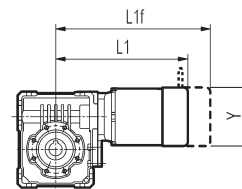
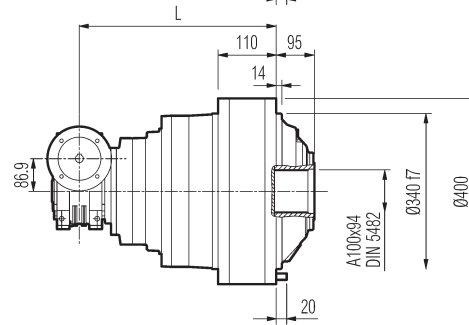
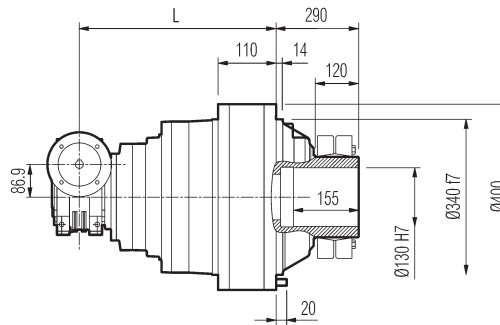
Vista da **A**  
View from **A**



128 : P71-P80-P90  
136 : P100-P112



**A** →



**PC**

**HZ PZ**

**HC**

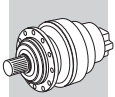
**FP**

**FZ**

**FP**

$M_{2max} = 36000 \text{ Nm}$

3/V 10L4	L								Kg											
	PC - PZ		HC - HZ		FZ		FP		PC - PZ		HC - HZ		FZ		FP					
	634		454		434		434		210		190		165		170					
	P71	P80	P90	P100	P112	S1 + M1S			S1 + M1L			S2 + M2S			S3 + M3S			S3 + M3L		
	P	P	P	P	P	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y
3/V 10L4	160	200	200	250	250	300	363	138	324	385	138	349	425	156	392	477	193	424	515	193



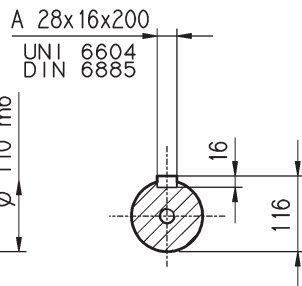
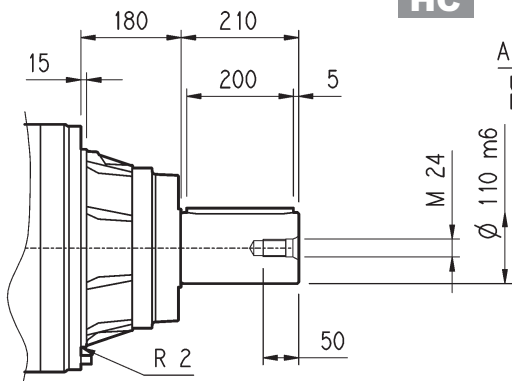
**310 L**

**310 R**

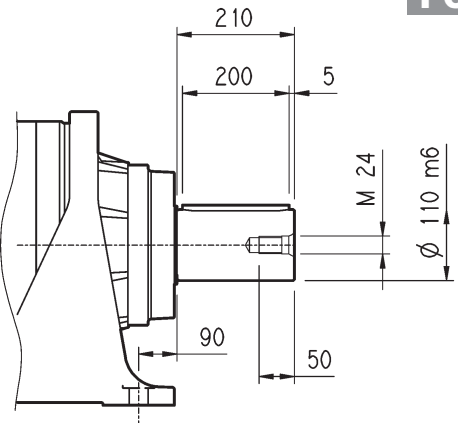
**3/V 10L3**

**3/V 10L4**

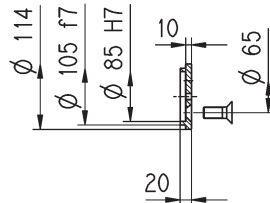
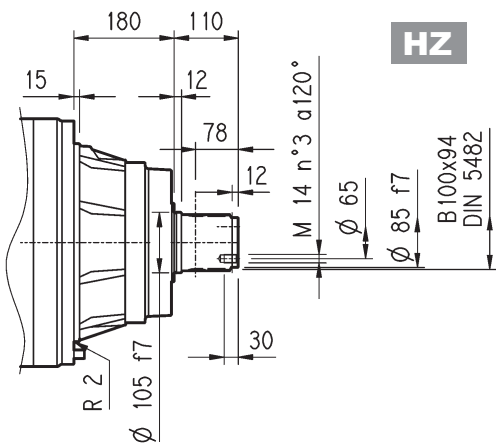
**HC**



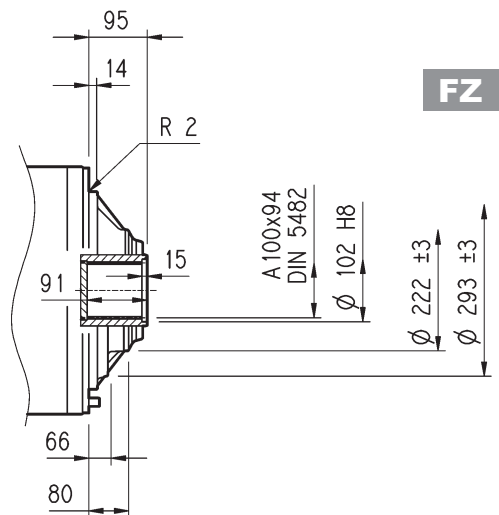
**PC**



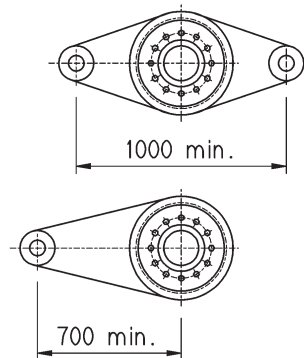
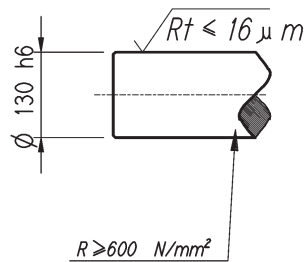
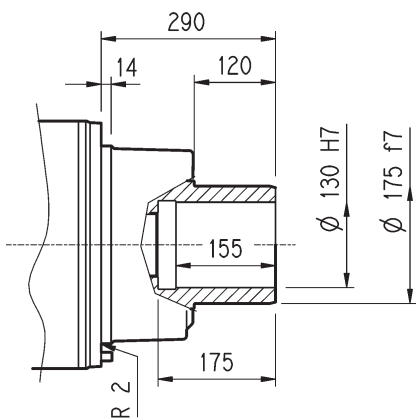
**HZ**



**FZ**

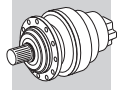
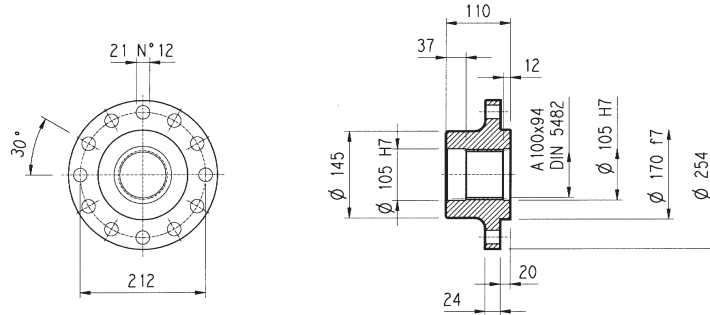
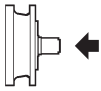


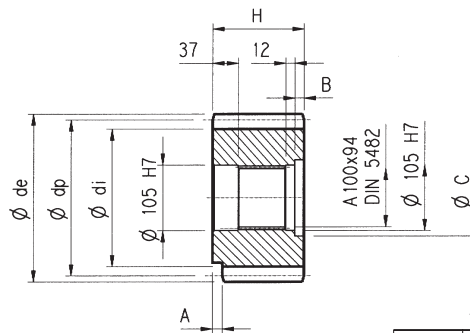
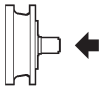
**FP**



**FP**

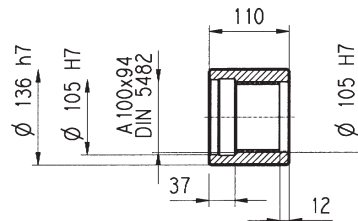
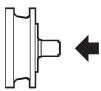
$M_{2max} = 36000\ Nm$

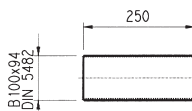
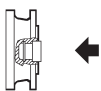
**310 L****310 R****3/V 10L3****3/V 10L4**
**Flangia / Flange**  
**Flansch / Brides**
**WOA**
 Materiale : Acciaio C40  
 Material : Steel C40  
 Material : Stahl C40  
 Matière : Acier C40

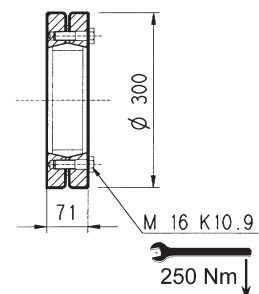
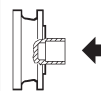
**Pignone / Pinion gears**  
**Ritzel / Pignons**
**P...**

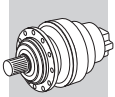
	m	z	x	dp	di	de	H	A	B	C	☆
PLQ	12	23	0	276	246	300	110	0	0	0	■
PPD	16	13	0.500	208	184	252.5	145	0	35	116	□
PPF	16	15	0.450	240	215	280	125	0	15	120	■

☆	Materiale / Material / Material / Matière
□	Acciaio 39NiCrMo3 Bonificato Steel 39NiCrMo3 hardened and tempered Vergüteter Stahl 39NiCrMo3 Acier bonifiée 39NiCrMo3
■	Acciaio 18NiCrMo5 Cementato e temprato Steel 18NiCrMo5 Case hardened Einsatzstahl 18NiCrMo5 Einsatzgehärtet Acier cementé et tempré 18NiCrMo5

**Manicotti lisci / Sleeve couplings**  
**Naben / Manchons lisses a cannelure interieure**
**MOA**
 Materiale : Acciaio 16CrNi4  
 Material : Steel 16CrNi4  
 Material : Stahl 16CrNi4  
 Matière : Acier 16CrNi4

**Barre scanalate / Spined bars**  
**Vielkeilwellen / Barre cannelée**
**B0A**
 Mat. acciaio 18NiCrMo5 UNI 5331 da cementare e  
 temprare 50-55 HRC  
 Case hardening steel 18NiCrMo5 UNI 5331 must be case  
 hardened to 50-55 HRC  
 Material: Einsatzstahl 18NiCrMo5 UNI 5331 muss einsatzgehärtet  
 werden 50-55 HRC  
 Acier 18 NiCrMo5 UNI 5331 doit être cémenté trempé 50-55 HRC

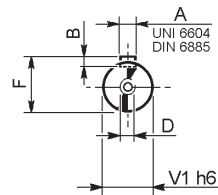
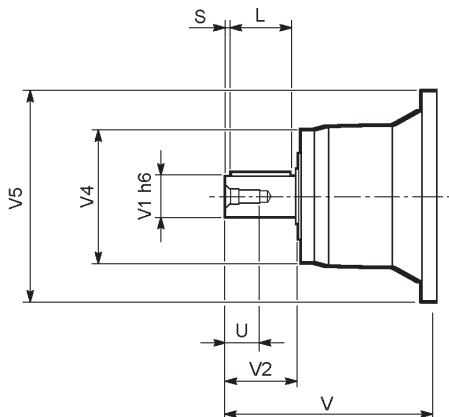
**Giunto ad attrito / Shrink disc**  
**Schrumpfscheibe / Frette de serrage**
**GOA**



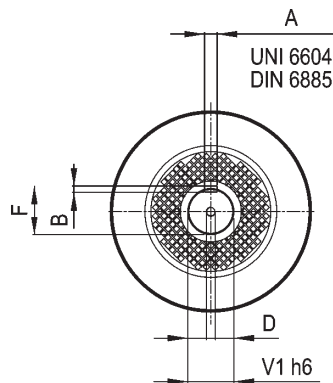
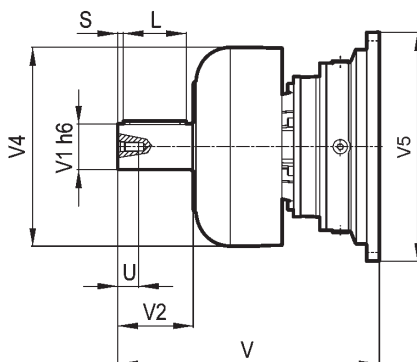
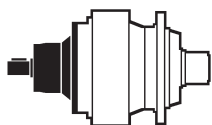
# 310 L

# 310 R

## V



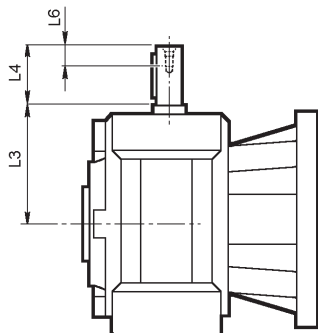
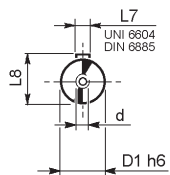
## FV



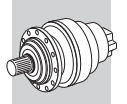
	input	V	V1	V2	V4	V5	A	B	F	L	S	D	U
310 L1	V10B	377	80	130	200	400	22	14	85	110	10	M16	36
	FV10B	457	80	130	347.5	400	22	14	85	110	10	M16	36
310 L2	V06B	307	60	105	155	292	18	11	64	90	7.5	M16	36
	FV06B	357	60	105	309	292	18	11	64	90	7.5	M16	36
310 L3	V05B	239	48	82	155	245	14	9	51.5	70	6	M16	36
	FV05B	276	48	82	219.5	244	14	9	51.5	70	6	M16	36
310 L4	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28
310 R2 (B) (C)	V06B	307	60	105	155	292	18	11	64	90	7.5	M16	36
	FV06B	357	60	105	309	292	18	11	64	90	7.5	M16	36
310 R3-R4	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28

# 3/V 10L3

# 3/V 10L4



	D1 h6	L3	L4	L6	L7	L8	d
3/V 10L3 HS	35	185	65	20	10	38	M8
3/V 10L4 HS	25	144	50	19	8	28	M8

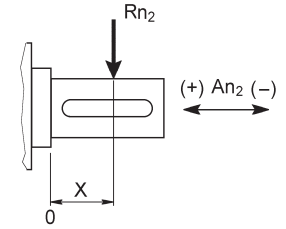
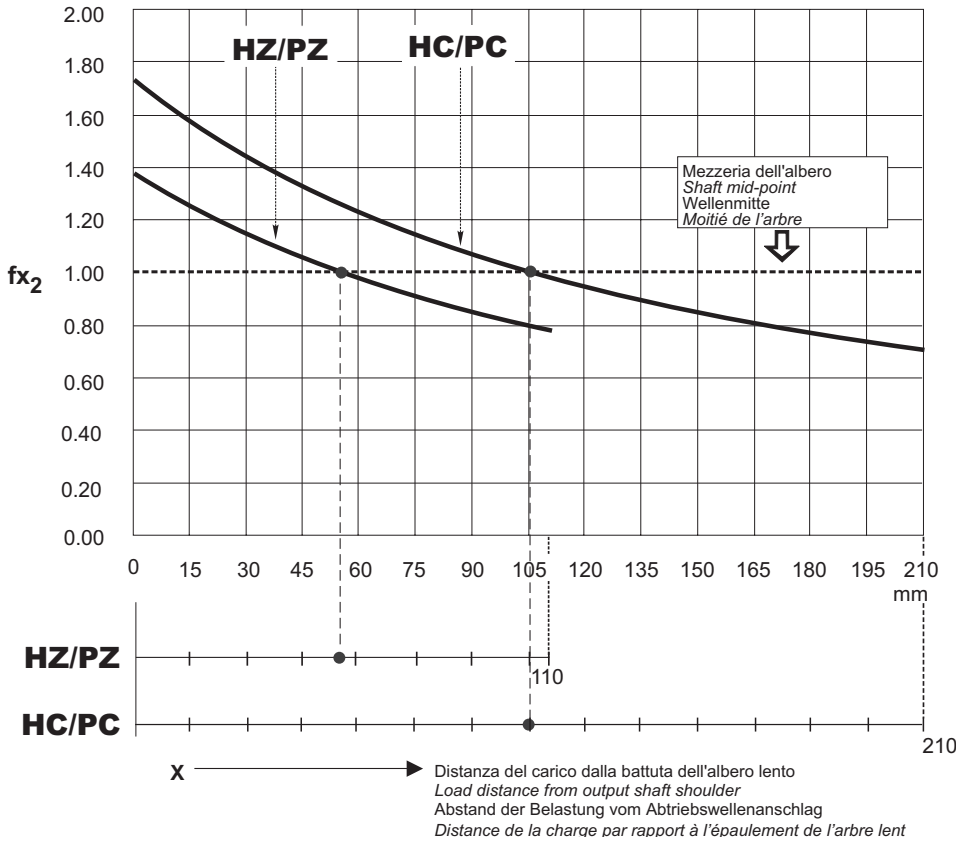


Fattore di posizione per carichi radiali sugli alberi in uscita.

Load location factor for radial loading on output shaft.

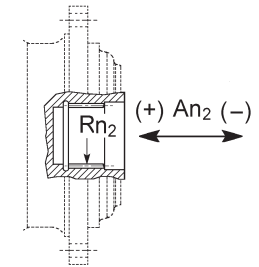
Positionsfaktor für Radialkräfte an der Abtriebswelle.

Facteur de position pour charges radiales sur les arbres en sortie.



$$R_{x2} = R_{n2} \cdot f_{x2}$$

$A_{n2} (\pm) = R_{n2} \cdot f_{a2} (\pm)$		
	$f_{a2} (+)$	$f_{a2} (-)$
HZ/PZ	1.02	0.60
HC/PC	1.28	0.75



$A_{n2} (\pm) = R_{n2} \cdot f_{a2} (\pm)$		
	$f_{a2} (+)$	$f_{a2} (-)$
FZ	0.80	0.80

Carichi radiali ammissibili sull'albero veloce per  $n_1 = 1000 \text{ min}^{-1}$  e 10000 h di vita teorica.

Permitted overhung loads on input shaft when  $n_1 = 1000 \text{ min}^{-1}$  and theoretical lifetime = 10000 h.

Zulässige Radialkräfte an den Antriebswellen für  $n_1 = 1000 \text{ min}^{-1}$  und 10000 std.

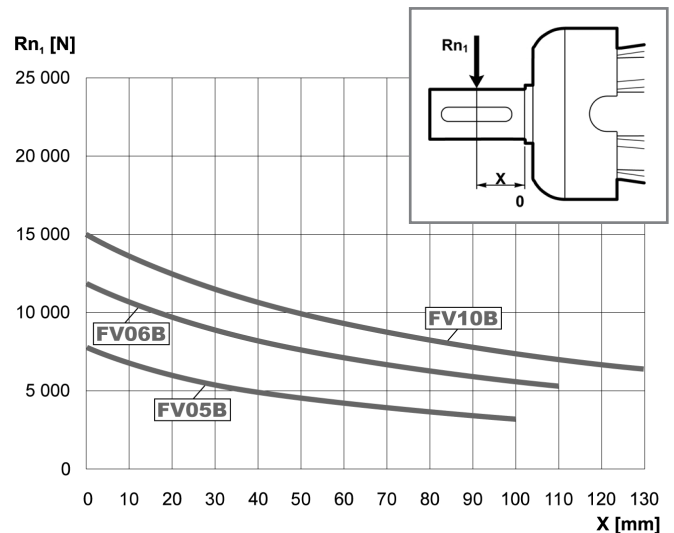
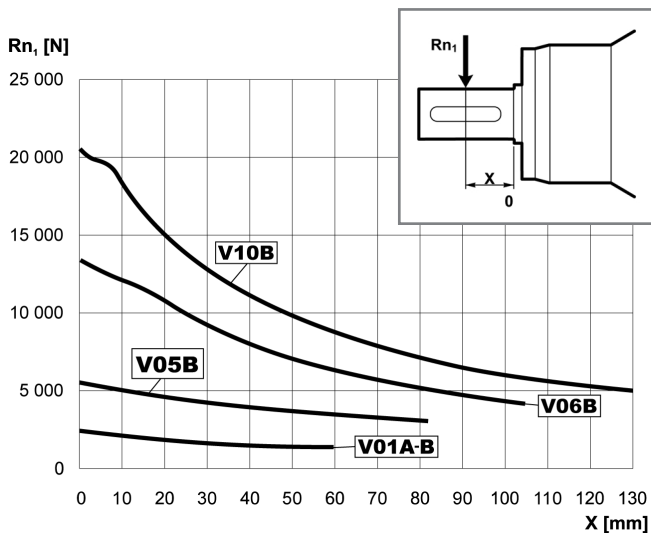
Charges radiales admissibles sur les arbres d'entrée pour  $n_1 = 1000 \text{ min}^{-1}$  et 10000 h.

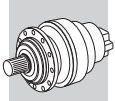
Per velocità di comando e/o durate diverse vedi il capitolo: Verifiche.

For drive speed and/or lifetimes other than those specified here, see Chapter: Verifications.

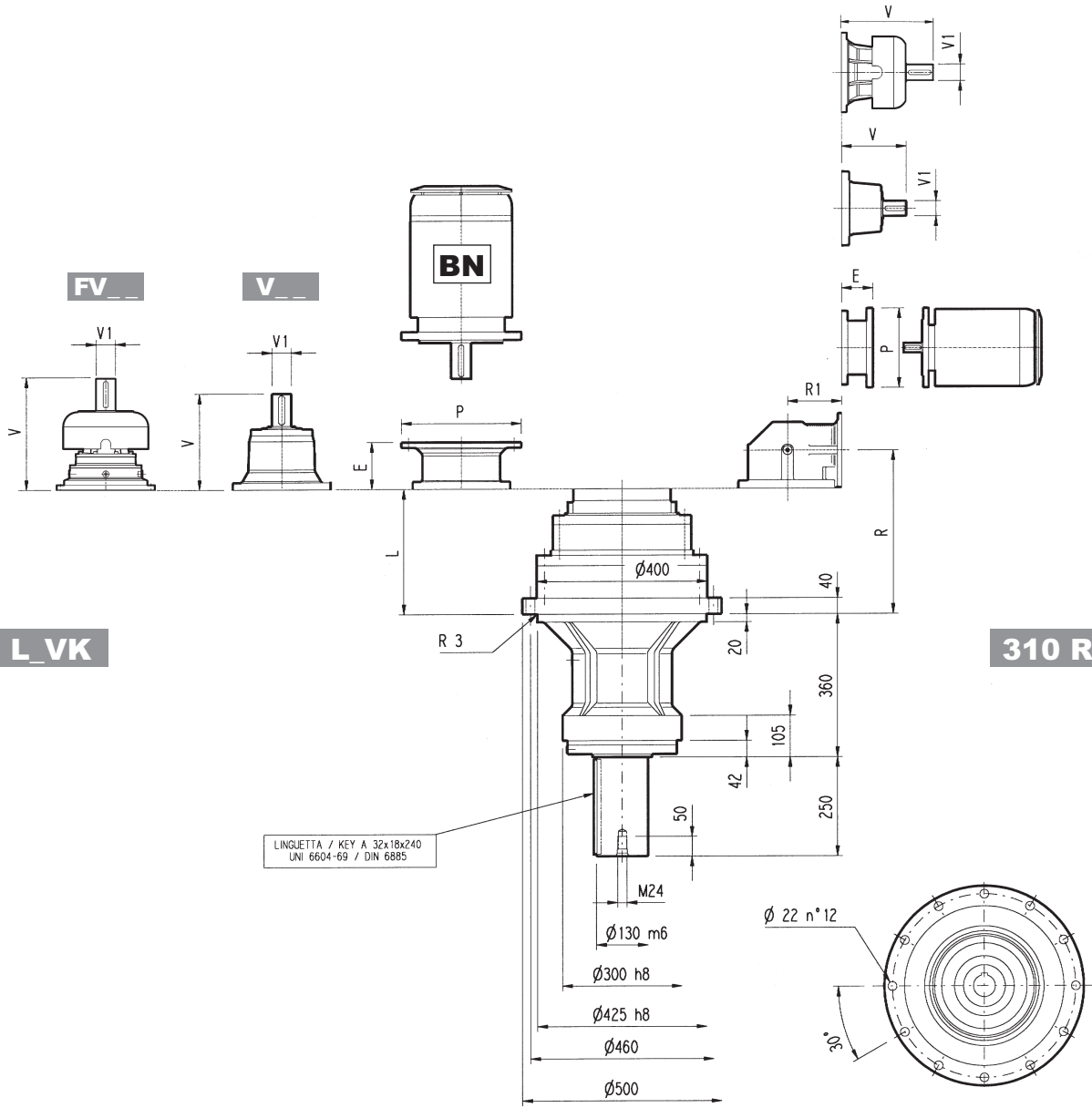
Im Hinblick auf Geschwindigkeit und/oder anderweitige Dauern verweisen wir auf Par: Prüfungen

Pour des vitesses et/ou durées différentes, voir par: Vérifications.





# 310\_VK



## 310 L\_VK

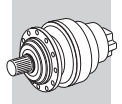
## 310 R\_VK

	L	Kg	L						R					
			V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg
310 L1	107	200	377	80	50	-	-	-	457	80	63	-	-	-
310 L2	243	230	307	60	23	-	-	-	357	60	28	-	-	-
310 L3	308	240	239	48	15	-	-	-	276	48	17	-	-	-
310 L4	361	245	137.5	24	6	158	38	7	-	-	-	-	-	-

	P71		P80		P90		P100		P112		P132		P160		P180		P200		P225		P250	
	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P
310 L1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	271	400	301	450	281	550
310 L2	-	-	-	-	-	-	-	-	-	-	-	152	350	153	350	183	400	212	450	193	550	
310 L3	-	-	-	-	-	-	-	-	-	-	114	300	144	350	144	350	174	400	-	-	-	-
310 L4	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-	-	-	-	-

	R	R1	Kg	L						R					
				V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg
310 R2 (B)	315	345	320	307	60	23	-	-	-	357	60	28	-	-	-
310 R2 (C)	333	390	340	307	60	23	-	-	-	357	60	28	-	-	-
310 R3	380	140	250	137.5	24	6	158	38	7	-	-	-	-	-	-
310 R4	400	140	260	137.5	24	6	158	38	7	-	-	-	-	-	-

	P71		P80		P90		P100		P112		P132		P160		P180		P200		P225	
	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P
310 R2 (B)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	152	350	182	400	212	450
310 R2 (C)	-	-	-	-	-	-	-	-	-	-	114	300	152	350	152	350	182	400	212	450
310 R3	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-	-	-
310 R4	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-	-	-



Il diagramma seguente consente di ricavare il carico radiale ammissibile  $R_{x2}$  quando questo è applicato alla distanza  $x$  dallo spallamento dell'albero lento del riduttore 310\_VK.

Le curve si riferiscono al valore risultante dal rapporto fra il carico assiale  $A_{n2}$  e il carico radiale  $R_{n2}$ , entrambi riferiti a  $n_2 = 10 \text{ min}^{-1}$  e durata teorica di 10000 h.

The diagram below allows the calculation of permitted overhung load  $R_{x2}$  on the output shaft of gearbox type 310\_VK, with radial force applying at a distance  $x$  from shaft shoulder.

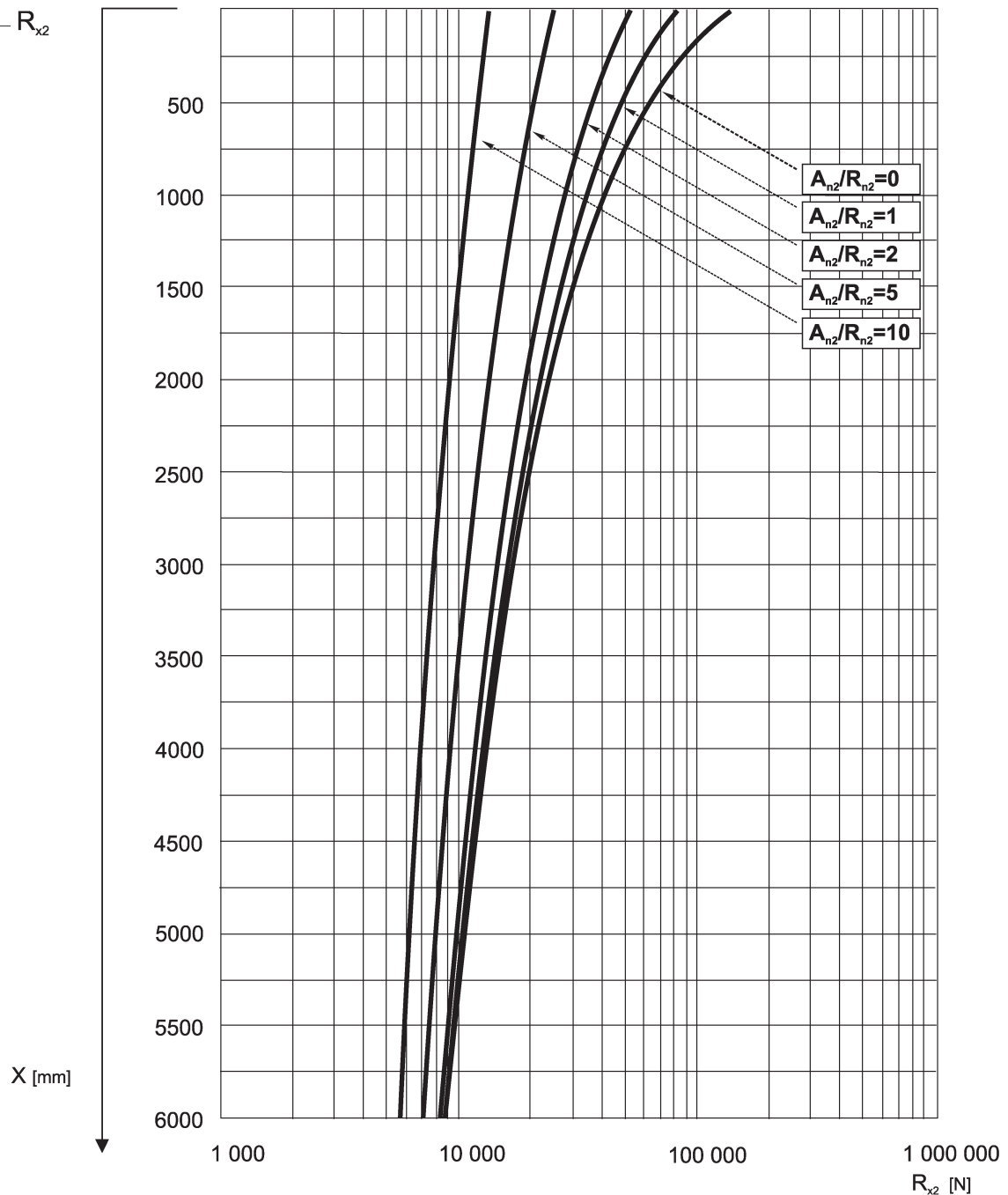
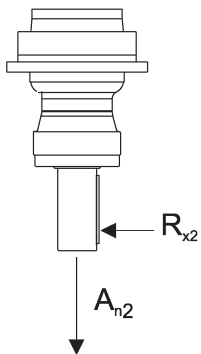
The curves are relevant to value resulting from the relationship of trust load  $A_{n2}$  to radial load  $R_{n2}$ , based on  $n_2 = 10 \text{ min}^{-1}$  and 10000 hrs theoretical lifetime.

Das nachstehende Diagramm ermöglicht das Individuieren der zulässigen, auf die Welle des Getriebes 310\_VK einwirkenden Radialkraft, die auf der Distanz  $x$  vom Anschlag der Welle selbst appliziert wird.

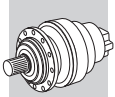
Die Kurven beziehen sich auf den Wert, der sich aus dem Verhältnis zwischen der Axialkraft  $A_{n2}$  und der Radialkraft  $R_{n2}$  für  $n_2 = 10 \text{ min}^{-1}$  und einer Dauer von 10000 Std. ergibt.

Le diagramme suivant permet de déterminer la charge radiale admissible  $R_{x2}$  sur l'arbre lent du réducteur 310\_VK appliqué à la distance  $x$  de l'épaule de l'arbre.

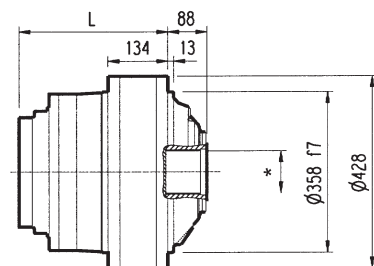
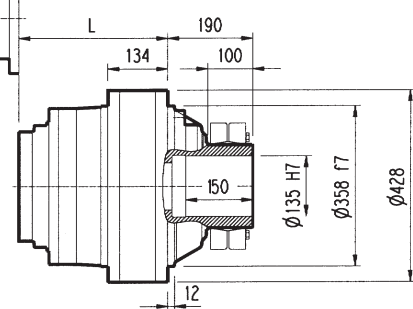
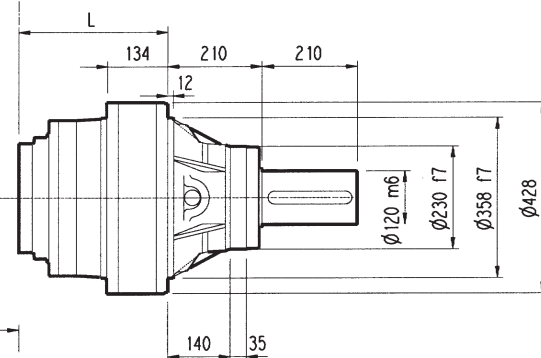
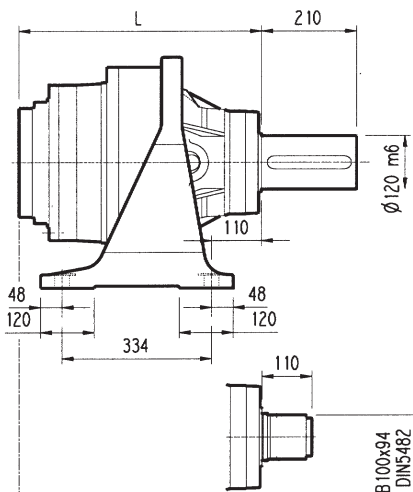
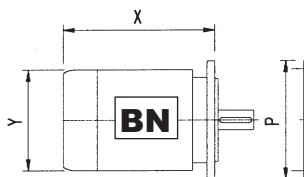
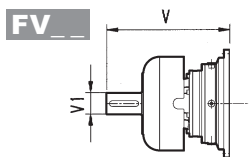
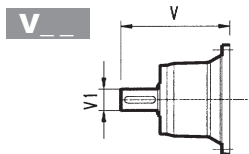
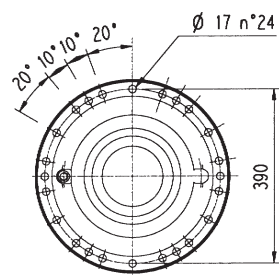
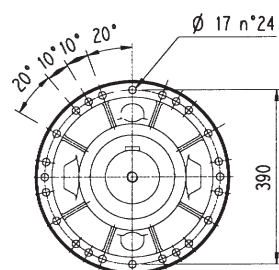
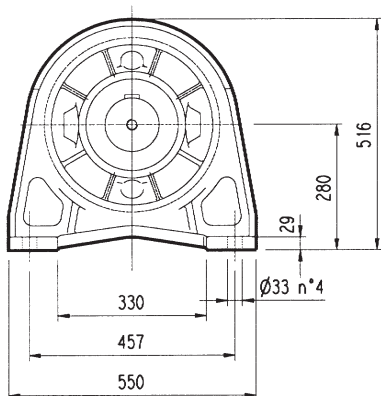
Les courbes se réfèrent à la valeur résultant de l'équation entre la charge axiale  $A_{n2}$  et la charge radiale  $R_{n2}$  pour  $n_2 = 10 \text{ min}^{-1}$  et durée de 10000 h.







# 311 L



PC

HZ PZ

HC

FP

FZ

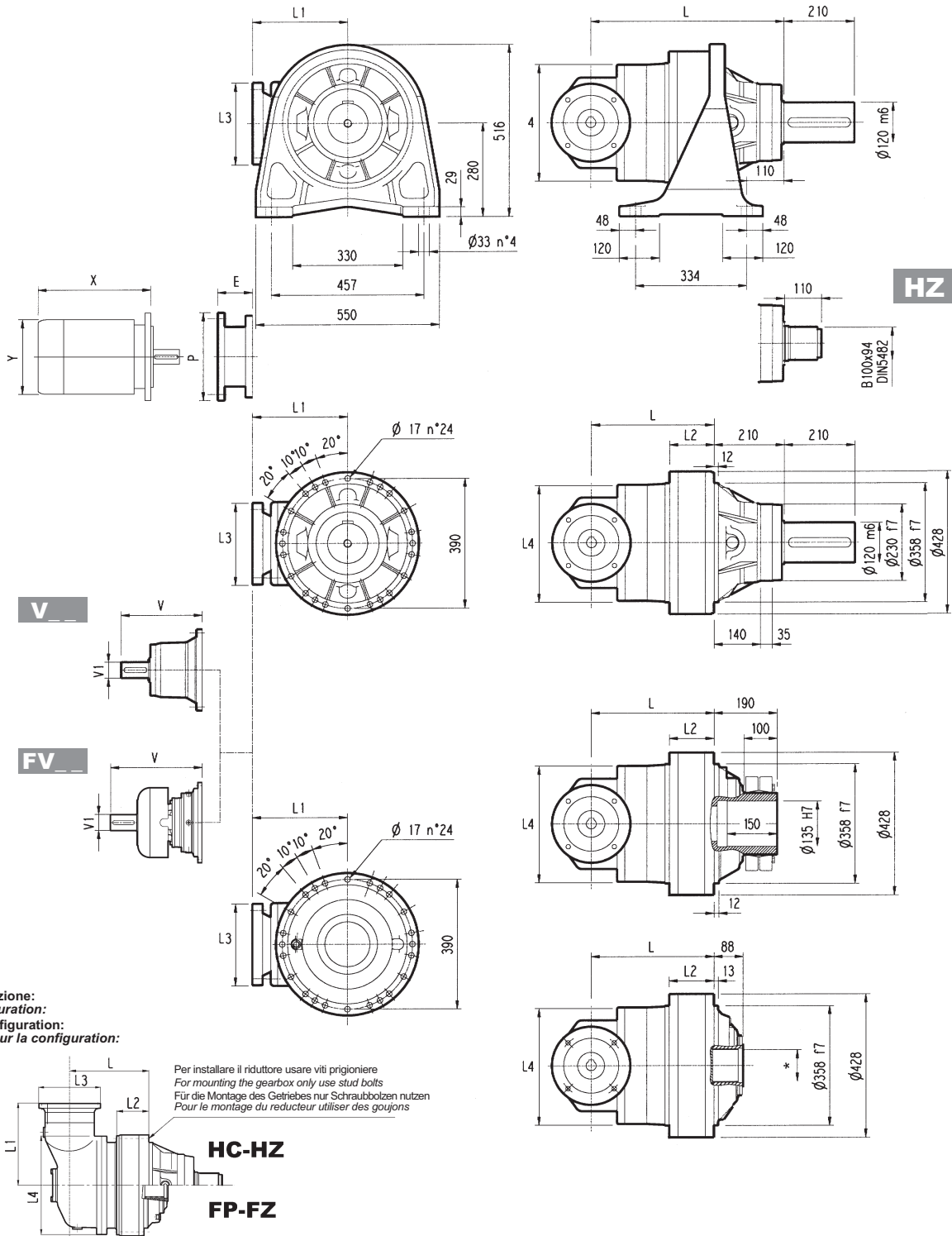
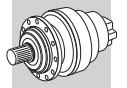
FZB

**FP**  $M_{2max} = 54000 \text{ Nm}$

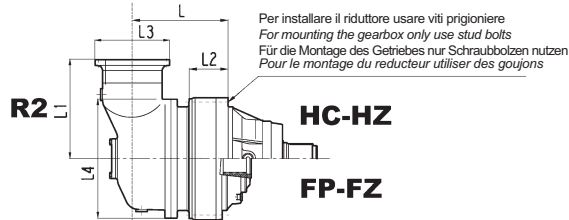
\* Per dimensioni vedere pag. 318  
For dimensions, refer to page 318  
Für Abmessungen finden Sie auf Seite 318  
Pour les dimensions, se référer à la page 318

	L				Kg															
	PC - PZ	HC - HZ	FZ	FP	PC - PZ	HC - HZ	FZ	FP	V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg
311 L1	325	115	115	115	250	180	160	170	348	80	55	-	-	-	456	80	85	-	-	-
311 L2	458	248	248	248	295	225	205	215	315	80	35	313	60	28	375	80	48	363	60	34
311 L3	547	337	337	337	307	237	217	227	239	48	15	-	-	-	276	48	17	-	-	-
311 L4	612	402	402	402	314	244	224	234	137.5	24	6	158	38	7	-	-	-	-	-	-

	P71		P80		P90		P100		P112		P132		P160		P180		P200		P225		P250	
	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P
311 L2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	195	350	186	400	216	450	216	550
311 L3	-	-	-	-	-	-	-	-	-	-	114	300	144	350	144	350	174	400	-	-	-	-
311 L4	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-	-	-	-	-



Solo per esecuzione:  
Only for configuration:  
Nur für die Konfiguration:  
Uniquement pour la configuration:



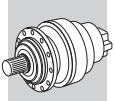
Per installare il riduttore usare viti prigioniere  
For mounting the gearbox only use stud bolts  
Für die Montage des Getriebes nur Schraubbolzen nutzen  
Pour le montage du reducteur utiliser des goujons

\* Per dimensioni vedere pag. 318  
For dimensions, refer to page 318  
Für Abmessungen finden Sie auf Seite 318  
Pour les dimensions, se référer à la page 318

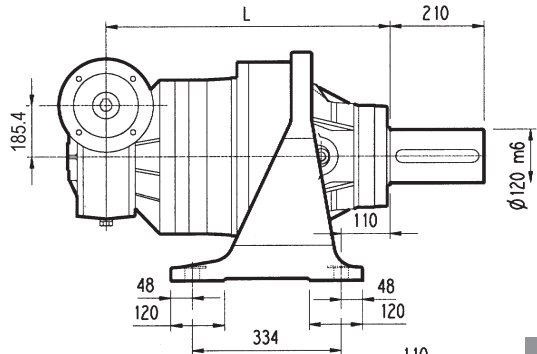
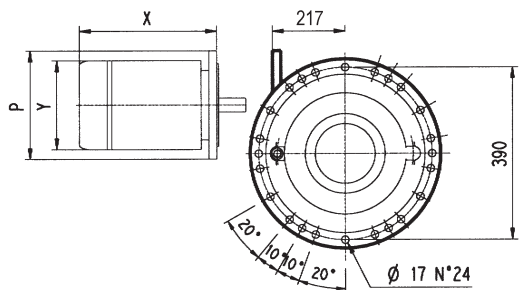
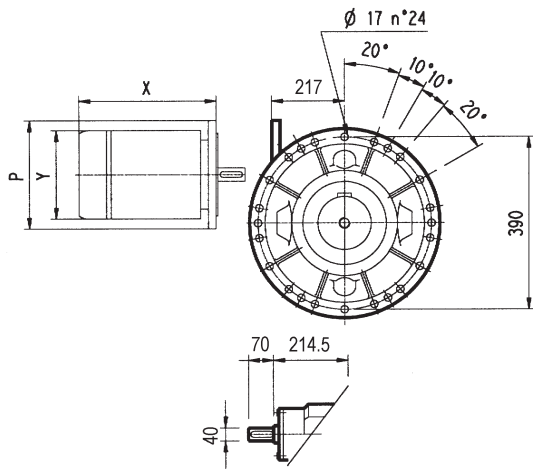
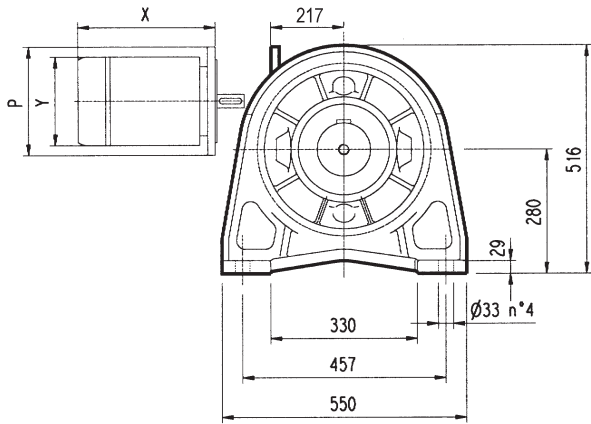
<b>FP</b>	<b>M<sub>2max</sub> = 54000 Nm</b>
-----------	------------------------------------

	L				L1	L2			L3	L4	Kg				Kg											
	PC-PZ	HC-HZ	FZ	FP		HZ-HC	FZ	FP			PC-PZ	HC-HZ	FZ	FP	V	V1	V	V1	V	V1						
<b>311 R2 (B)</b>	550	340	340	340	345	154	154	154	292	400	380	310	290	300	307	60	23	-	-	-	357	60	28	-	-	-
<b>311 R2 (C)</b>	550	340	340	340	390	154	154	154	292	480	390	320	300	310	307	60	23	-	-	-	357	60	28	-	-	-
<b>311 R3</b>	577	367	367	367	225	134	134	134	245	375	345	275	255	265	239	48	15	-	-	-	-	-	-	-	-	-
<b>311 R4</b>	639	429	429	429	140	134	134	134	186	244	327	257	237	247	137.5	24	6	158	38	7	-	-	-	-	-	-

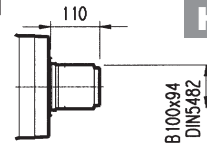
	P71		P80		P90		P100		P112		P132		P160		P180		P200		P225		P250	
	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P
<b>311 R2 (B)</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	152	350	182	400	212	450	193	550
<b>311 R2 (C)</b>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	152	350	182	400	212	450	193	550
<b>311 R3</b>	-	-	-	-	-	-	-	-	-	-	114	300	144	350	144	350	174	400	-	-	-	-
<b>311 R4</b>	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-	-	-	-	-



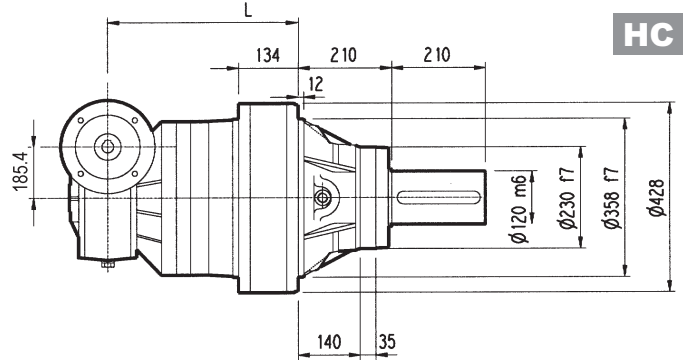
# 3/V 11L3



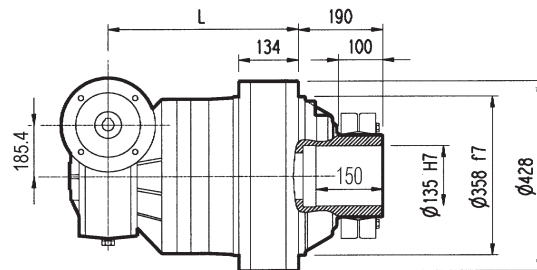
**PC**



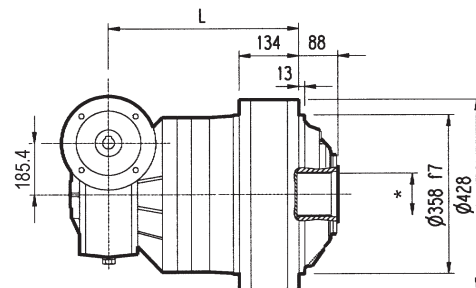
**HZ PZ**



**HC**



**FP**

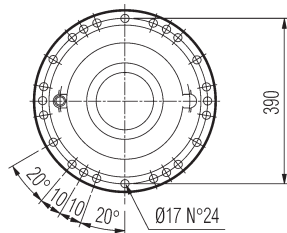
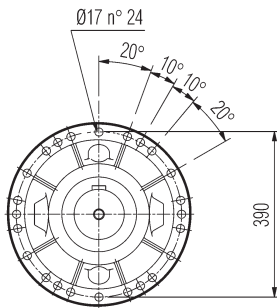
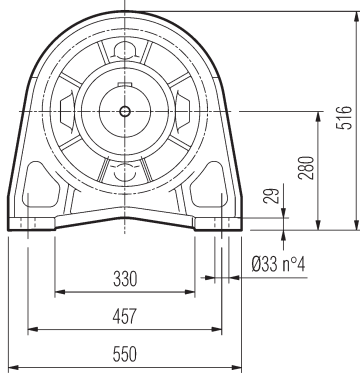
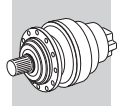


**FZ FZB**

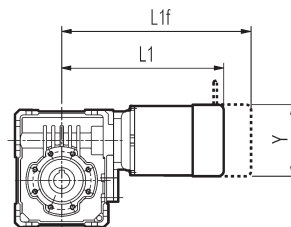
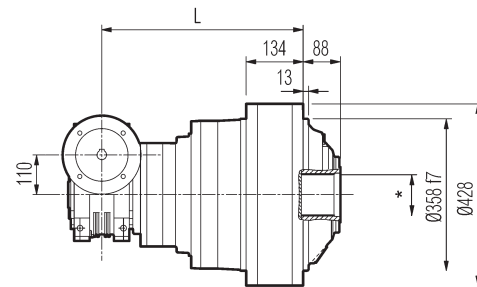
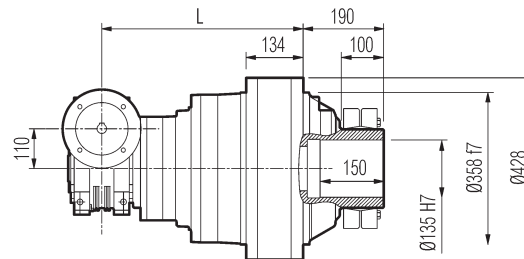
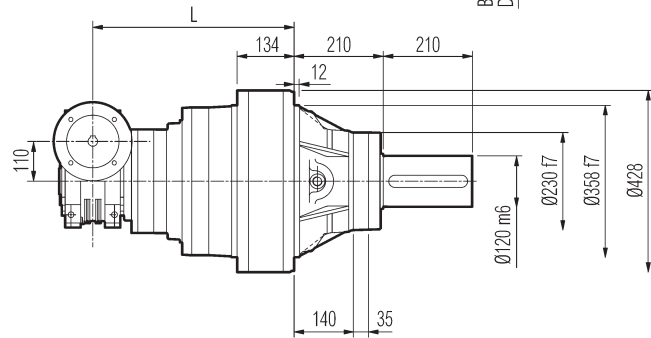
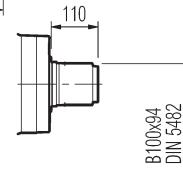
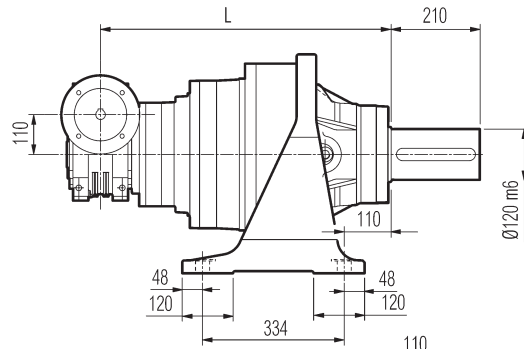
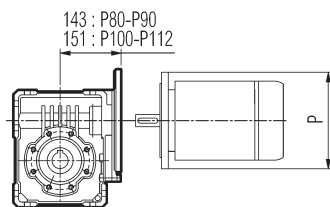
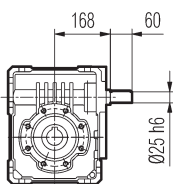
**FP**  $M_{2max} = 54000 \text{ Nm}$

\* Per dimensioni vedere pag. 318  
 For dimensions, refer to page 318  
 Für Abmessungen finden Sie auf Seite 318  
 Pour les dimensions, se référer à la page 318

	L				Kg				P80	P90	P100	P112	P132	P160	P180
	PC - PZ	HC - HZ	FZ	FP	PC - PZ	HC - HZ	FZ	FP	P	P	P	P	P	P	P
3/V 11L3	659	449	449	449	390	320	300	310	-	-	250	250	300	350	350



Vista da A  
View from A



PC

HZ PZ

HC

FP

FZ

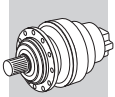
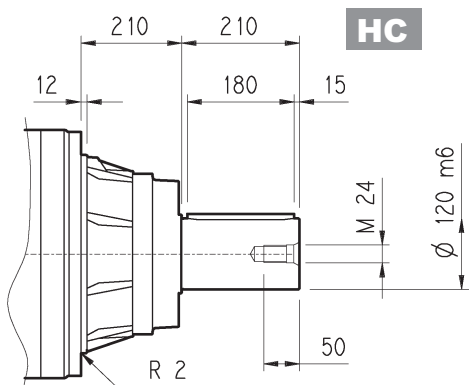
FZB

\* Per dimensioni vedere pag. 318  
For dimensions, refer to page 318  
Für Abmessungen finden Sie auf Seite 318  
Pour les dimensions, se référer à la page 318

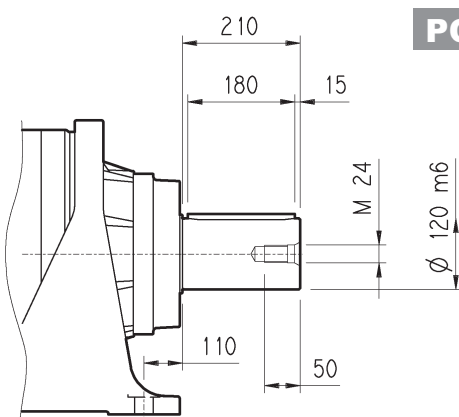
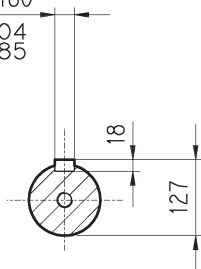
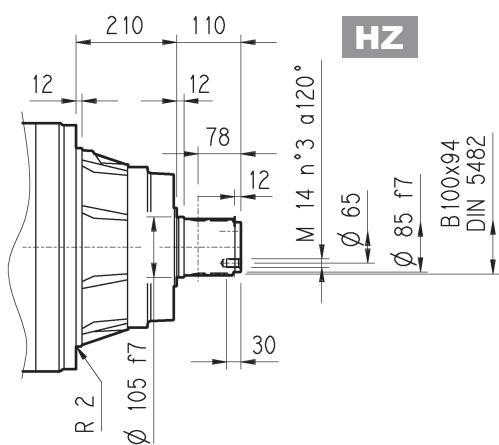
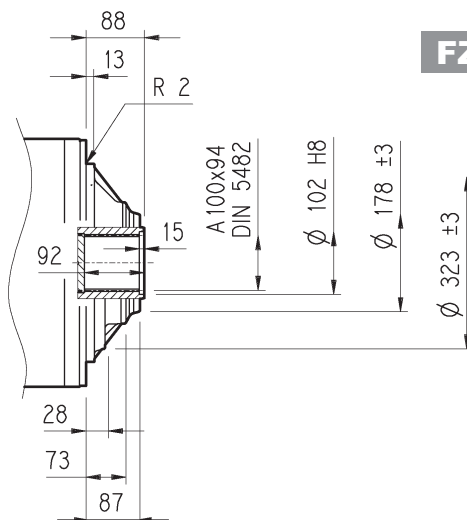
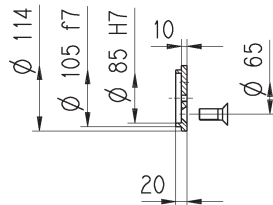
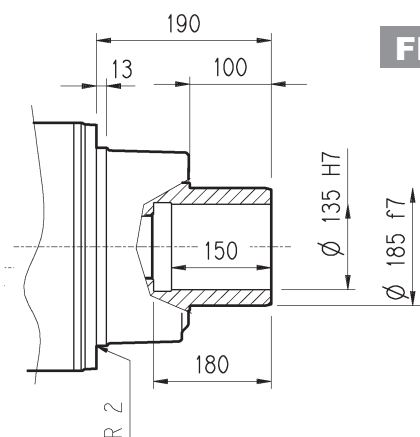
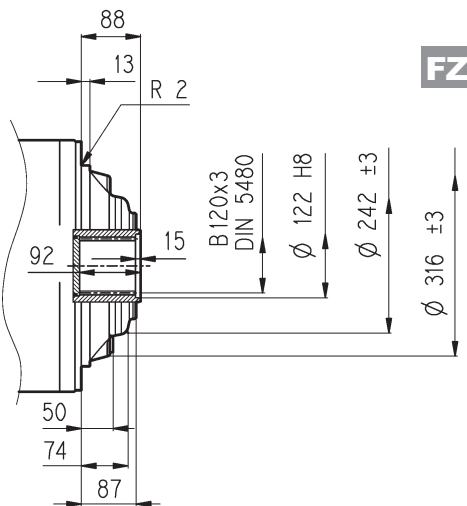
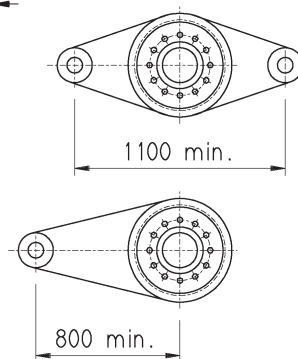
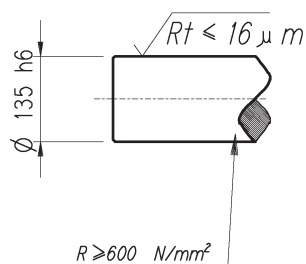
<b>FP</b>	<b>M<sub>2max</sub> = 54000 Nm</b>
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3/V 11L4	L				Kg	L			
	PC - PZ	HC - HZ	FZ	FP		PC - PZ	HC - HZ	FZ	FP
	707	497	497	497		340	270	250	260

3/V 11L4	P80	P90	P100	P112	S2 + M2S			S3 + M3S			S3 + M3L		
	P	P	P	P	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y
	200	200	250	250	364	440	156	407	503	193	439	530	193

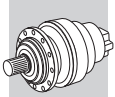
**311 L****311 R****3/V 11L3****3/V 11L4****HC**

A 32x18x180  
 UNI 6604  
 DIN 6885

**PC****HZ****FZ****FP****FZB**

<b>FP</b>	$M_{2max} = 54000\ Nm$
-----------	------------------------

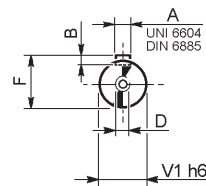
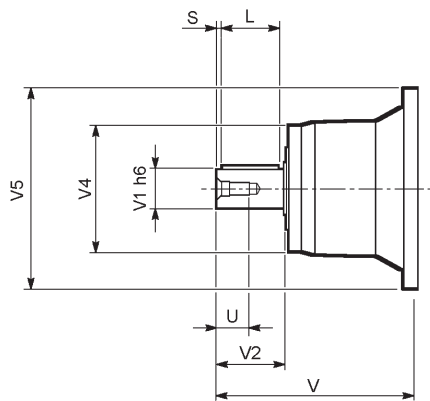




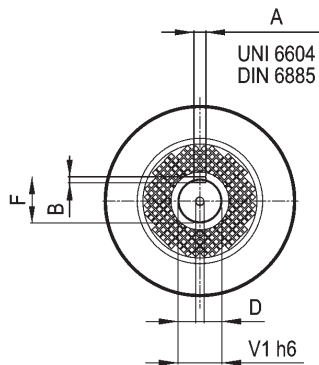
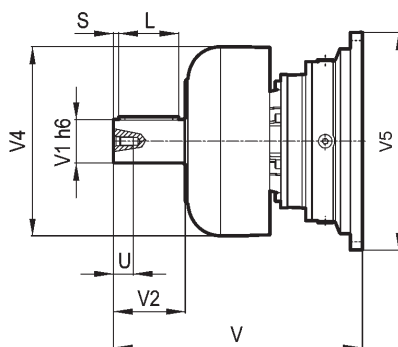
**311 L**

**311 R**

**V**



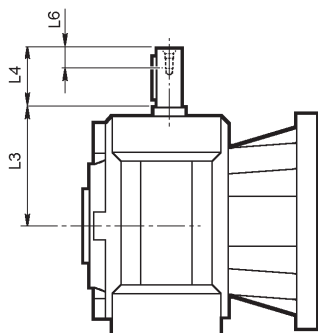
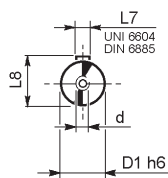
**FV**



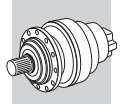
	input	V	V1	V2	V4	V5	A	B	F	L	S	D	U
311 L1	V11B	348	80	130	200	428	22	14	85	110	10	M16	36
	FV11B	456	80	130	347.5	428	22	14	85	110	10	M16	36
311 L2	V07B	315	80	130	200	345	22	14	85	110	10	M16	36
	FV07B	375	80	130	347.5	348	22	14	85	110	10	M16	36
	V07A	313	60	105	155	345	18	11	64	90	7.5	M16	36
311 L3	FV07A	363	60	105	309	348	18	11	64	90	7.5	M16	36
	V05B	239	48	82	155	245	14	9	51.5	70	6	M16	36
311 L4	FV05B	276	48	82	219.5	244	14	9	51.5	70	6	M16	36
	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
311 R2 (B)(C)	V01B	158	38	58	120	186	10	8	41	50	4	M12	28
	FV06B	307	60	105	155	292	18	11	64	90	7.5	M16	36
311 R3	FV06B	357	60	105	309	292	18	11	64	90	7.5	M16	36
	V05B	239	48	82	155	245	14	9	51.5	70	6	M16	36
311 R4	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28

**3/V 11L3**

**3/V 11L4**



	D1 h6	L3	L4	L6	L7	L8	d
3/V 11L3 HS	40	214.5	70	20	12	43	M8
3/V 11L4 HS	25	168	60	19	8	28	M8

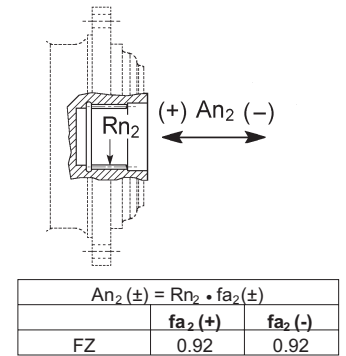
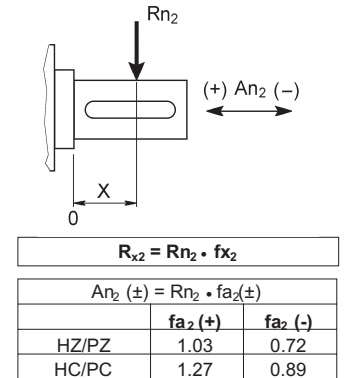
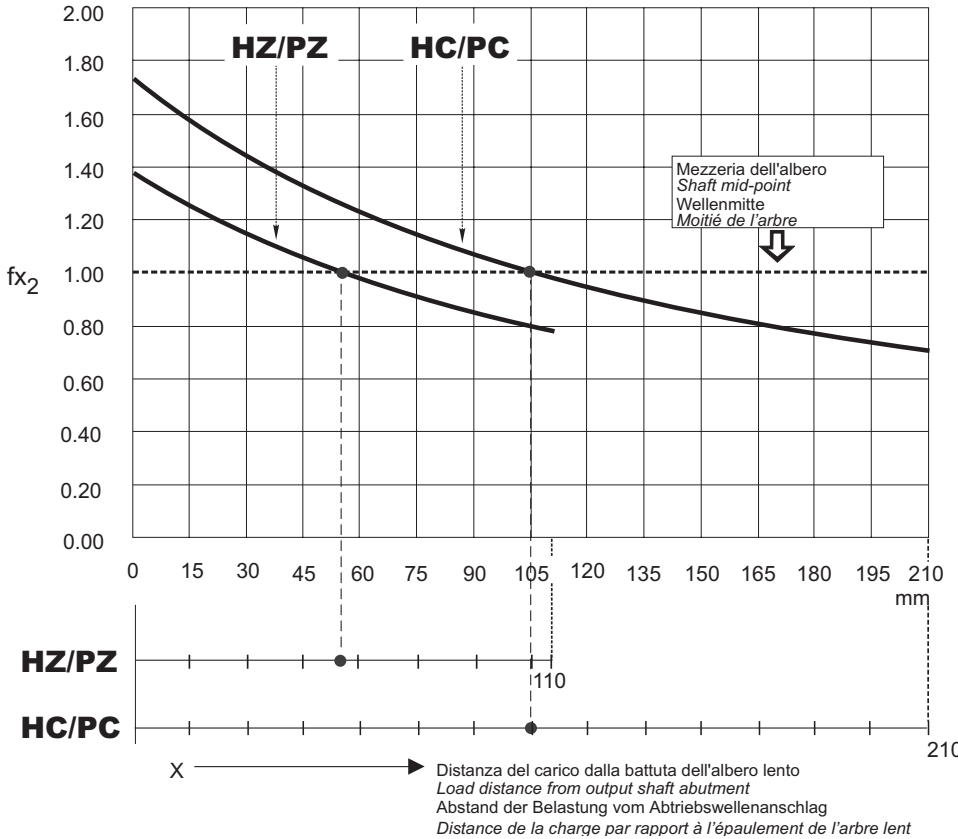


Fattore di posizione per carichi radiali sugli alberi in uscita.

Load location factor for radial loading on output shaft.

Positionsfaktor für Radialkräfte an der Abtriebswelle.

Facteur de position pour charges radiales sur les arbres en sortie.



Carichi radiali ammissibili sull'albero veloce per  $n_1 = 1000 \text{ min}^{-1}$  e 10000 h di vita teorica.

Permitted overhung loads on input shaft when  $n_1 = 1000 \text{ min}^{-1}$  and theoretical lifetime = 10000 h.

Zulässige Radialkräfte an den Antriebswellen für  $n_1 = 1000 \text{ min}^{-1}$  und 10000 std.

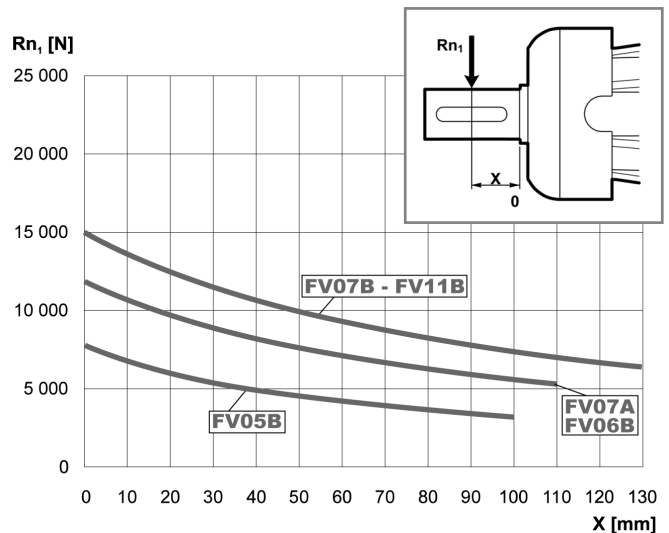
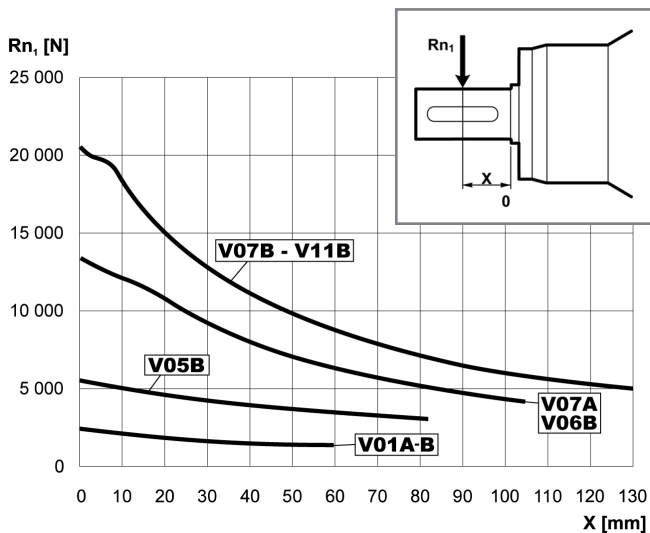
Charges radiales admissibles sur les arbres d'entrée pour  $n_1 = 1000 \text{ min}^{-1}$  et 10000 h.

Per velocità di comando e/o durate diverse vedi il capitolo: Verifiche.

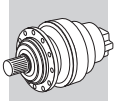
For drive speed and/or lifetimes other than those specified here, see Chapter: Verifications.

Im Hinblick auf Geschwindigkeit und/oder anderweitige Dauern verweisen wir auf Par: Prüfungen

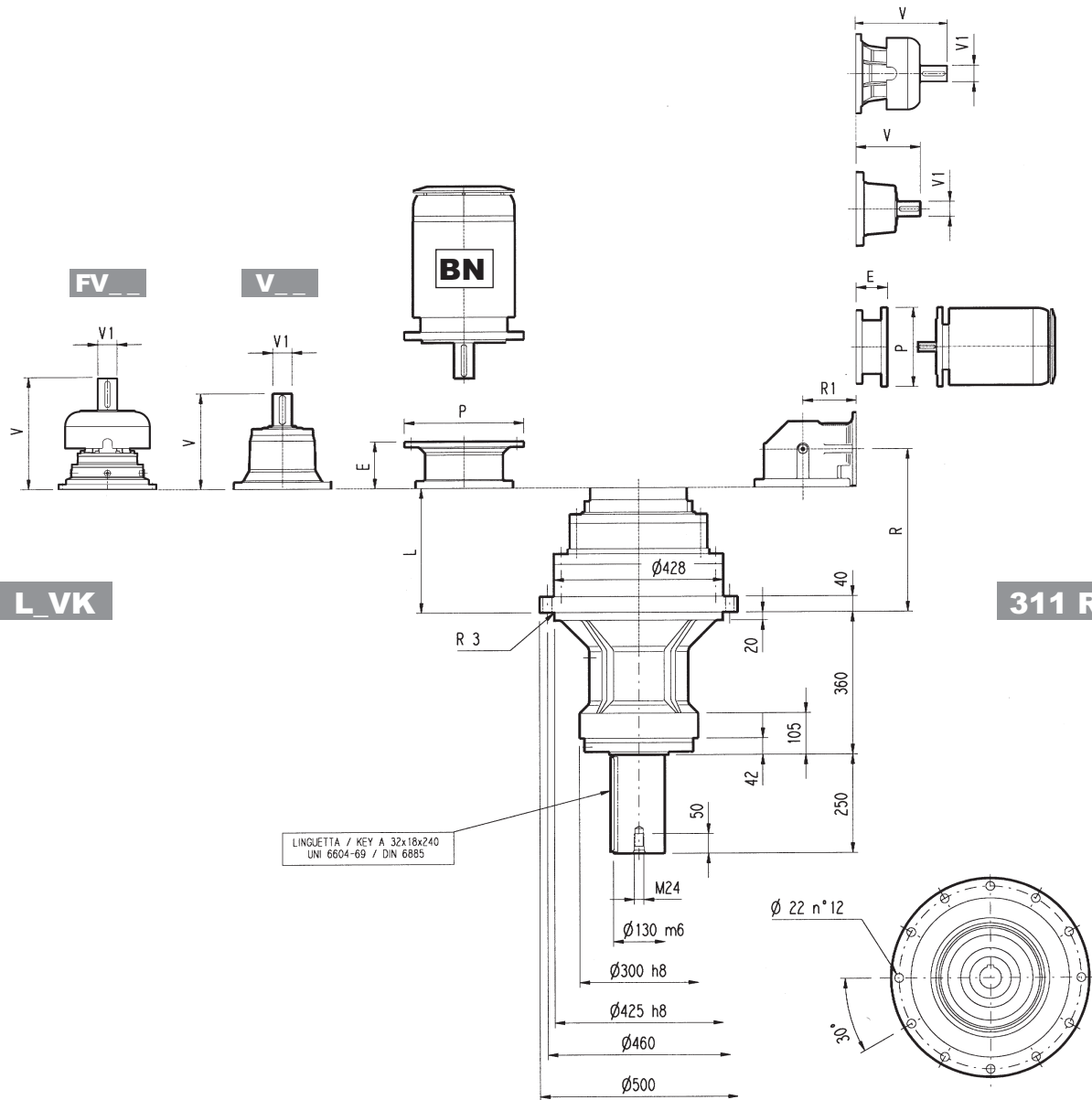
Pour des vitesses et/ou durées différentes, voir par: Vérifications.







# 311\_VK



## 311 L\_VK

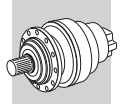
## 311 R\_VK

	L		L						R					
	V	V1	V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg
311 L1	129	295	348	80	55	-	-	-	456	80	85	-	-	-
311 L2	262	340	315	80	35	313	60	28	375	80	48	363	60	34
311 L3	351	350	239	48	15	-	-	-	276	48	17	-	-	-
311 L4	416	360	137.5	24	6	158	38	7	-	-	-	-	-	-

	P71		P80		P90		P100		P112		P132		P160		P180		P200		P225		P250	
	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P
311 L2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	195	350	186	400	216	450	216	550
311 L3	-	-	-	-	-	-	-	-	-	-	114	300	144	350	144	350	174	400	-	-	-	-
311 L4	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-	-	-	-	-

	R		R1		L						R					
	V	V1	V	V1	V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg
311 R2 (B)	354	345	420	307	60	23	-	-	-	-	357	60	28	-	-	-
311 R2 (C)	354	390	430	307	60	23	-	-	-	-	357	60	28	-	-	-
311 R3	381	225	385	239	48	15	-	-	-	-	-	-	-	-	-	-
311 R4	443	140	360	137.5	24	6	158	38	7	-	-	-	-	-	-	-

	P71		P80		P90		P100		P112		P132		P160		P180		P200		P225		P250	
	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P
311 R2 (B)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	152	350	182	400	212	450	193	550
311 R2 (C)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	152	350	182	400	212	450	193	550
311 R3	-	-	-	-	-	-	-	-	-	-	114	300	144	350	144	350	174	400	-	-	-	-
311 R4	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-	-	-	-	-



Il diagramma seguente consente di ricavare il carico radiale ammissibile  $R_{x2}$  quando questo è applicato alla distanza  $x$  dallo spallamento dell'albero lento del riduttore 311\_VK.

Le curve si riferiscono al valore risultante dal rapporto fra il carico assiale  $A_{n2}$  e il carico radiale  $R_{n2}$ , entrambi riferiti a  $n_2 = 10 \text{ min}^{-1}$  e durata teorica di 10000 h.

The diagram below allows the calculation of permitted over-hung load  $R_{x2}$  on the output shaft of gearbox type 311\_VK, with radial force applying at a distance  $x$  from shaft shoulder.

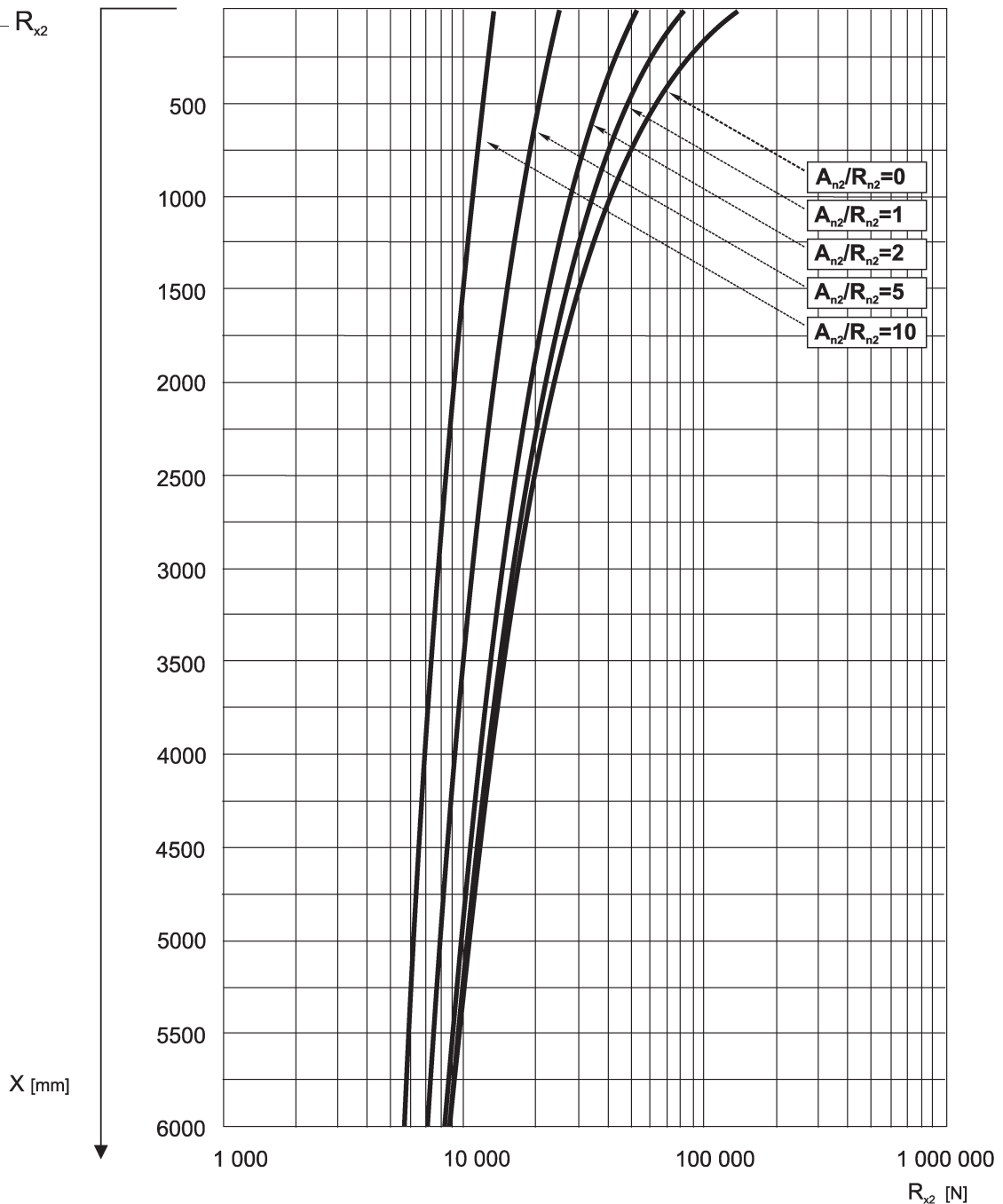
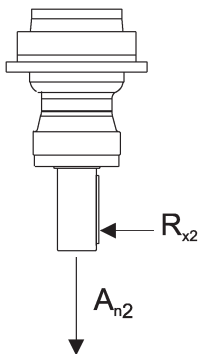
The curves are relevant to value resulting from the relationship of trust load  $A_{n2}$  to radial load  $R_{n2}$ , based on  $n_2 = 10 \text{ min}^{-1}$  and 10000 hrs theoretical lifetime.

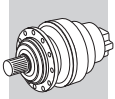
Das nachstehende Diagram ermöglicht das Individuieren der zulässigen, auf die Welle des Getriebes 311\_VK einwirkenden Radialkraft, die auf der Distanz  $x$  vom Anschlag der Welle selbst appliziert wird.

Die Kurven beziehen sich auf den Wert, der sich aus dem Verhältnis zwischen der Axialkraft  $A_{n2}$  und der Radialkraft  $R_{n2}$  für  $n_2 = 10 \text{ min}^{-1}$  und einer Dauer von 10000 Std. ergibt.

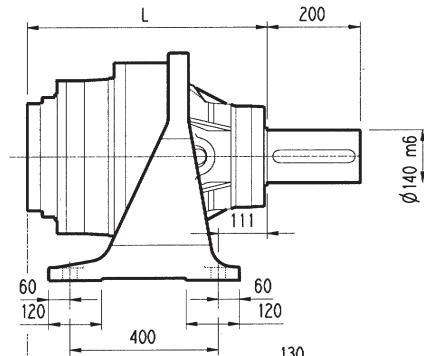
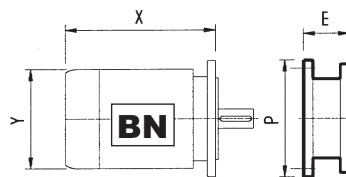
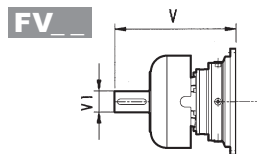
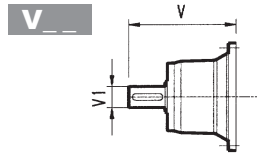
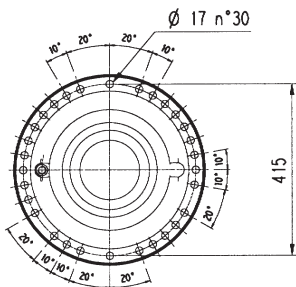
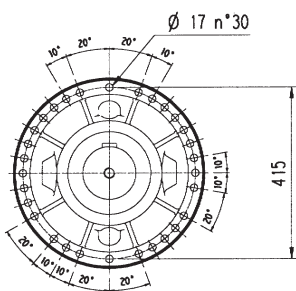
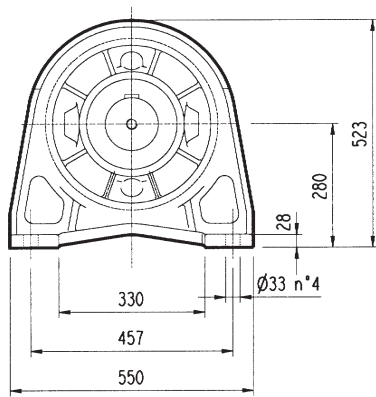
Le diagramme suivant permet de déterminer la charge radiale admissible  $R_{x2}$  sur l'arbre lent du réducteur 311\_VK appliqué à la distance  $x$  de l'épaule de l'arbre.

Les courbes se réfèrent à la valeur résultant de l'équation entre la charge axiale  $A_{n2}$  et la charge radiale  $R_{n2}$  pour  $n_2 = 10 \text{ min}^{-1}$  et durée de 10000 h.



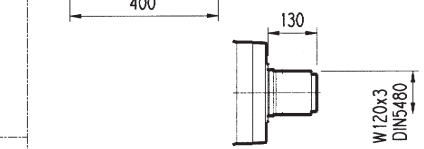


# 313 L

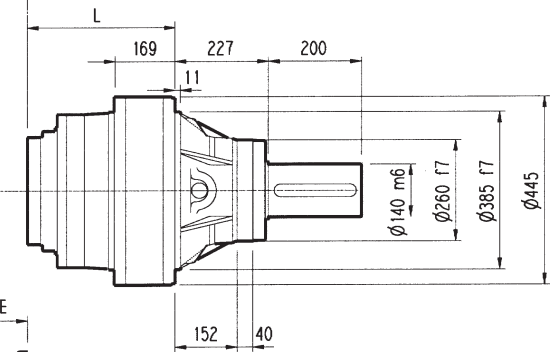


**PC**

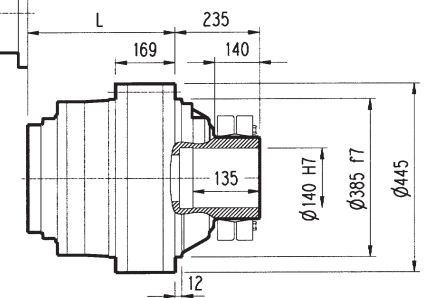
**HZ PZ**



**HC**

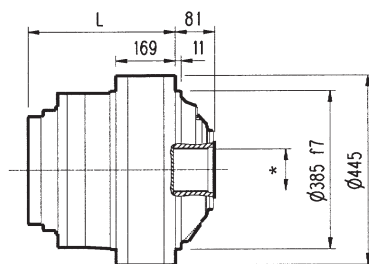


**FP**



**FZ**

**FZB**



**FP**  $M_{2max} = 66000 \text{ Nm}$

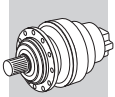
\* Per dimensioni vedere pag. 328  
For dimensions, refer to page 328  
Für Abmessungen finden Sie auf Seite 328  
Pour les dimensions, se référer à la page 328

	L				Kg				Kg				Kg							
	PC - PZ	HC - HZ	FZ	FP	PC - PZ	HC - HZ	FZ	FP	V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg
313 L1	381	154	154	154	320	230	200	200	343	80	55	-	-	-	451	80	71	-	-	-
313 L2	531	304	304	304	380	290	260	280	315	80	35	313	60	28	375	80	48	363	60	34
313 L3	620	393	393	393	392	302	272	292	239	48	15	-	-	-	276	48	17	-	-	-
313 L4	685	458	458	458	399	309	279	299	137.5	24	6	158	38	7	-	-	-	-	-	-

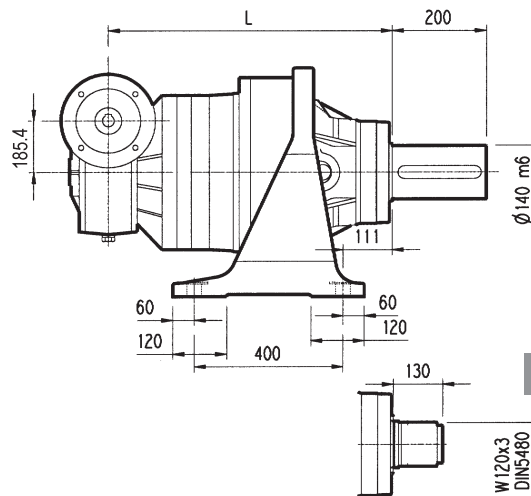
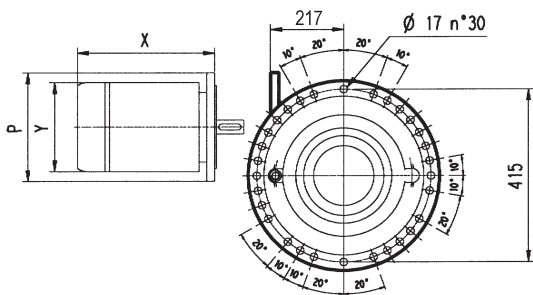
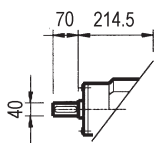
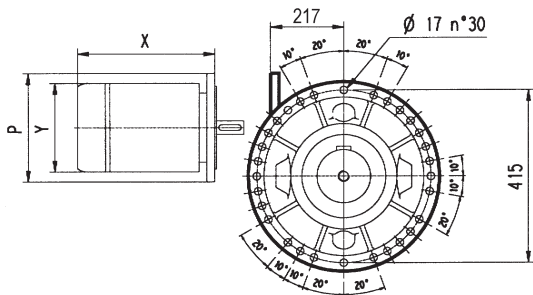
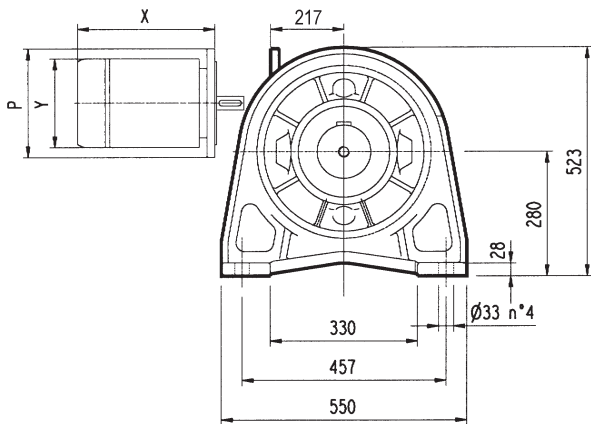
  

	P71		P80		P90		P100		P112		P132		P160		P180		P200		P225		P250	
	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P
313 L2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	195	350	186	400	216	450	216	550
313 L3	-	-	-	-	-	-	-	-	-	-	114	300	144	350	144	350	174	400	-	-	-	-
313 L4	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-	-	-	-	-





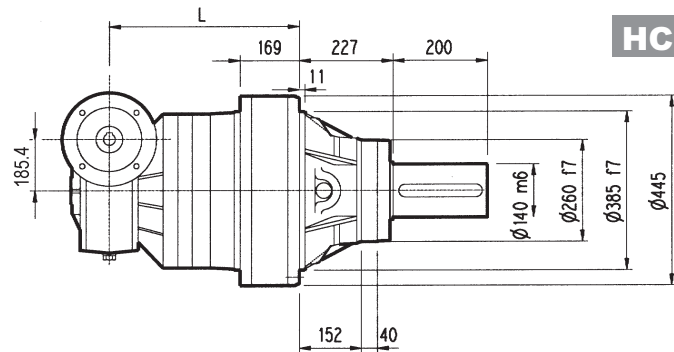
# 3/V 13L3



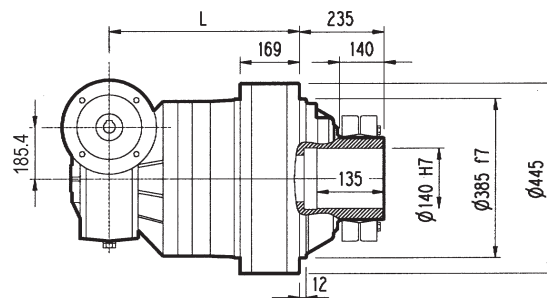
**PC**

**HZ PZ**

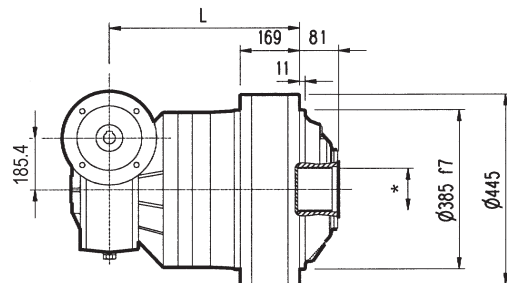
W120x3  
DIN5480



**HC**



**FP**



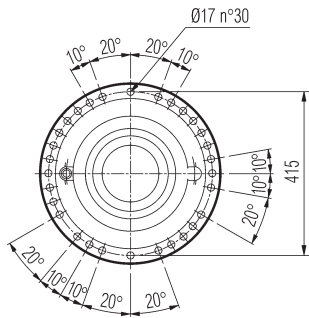
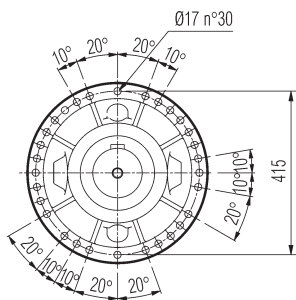
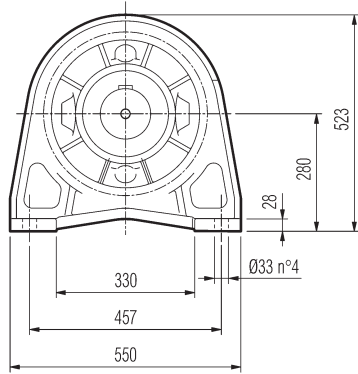
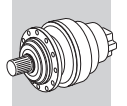
**FZ**

**FZB**

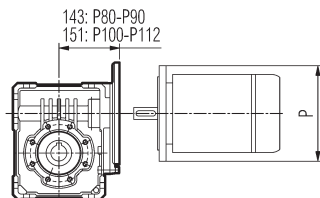
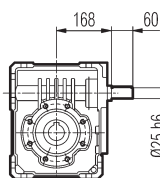
**FP**  $M_{2max} = 66000 \text{ Nm}$

	L				Kg				P80	P90	P100	P112	P132	P160	P180
	PC - PZ	HC - HZ	FZ	FP	PC - PZ	HC - HZ	FZ	FP	P	P	P	P	P	P	P
3/V 13L3	732	505	505	505	475	385	355	375	-	-	250	250	300	350	350

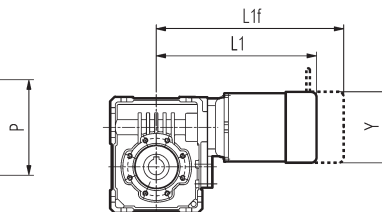
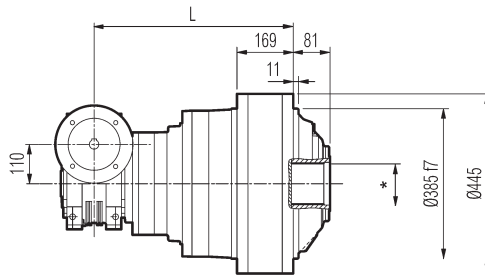
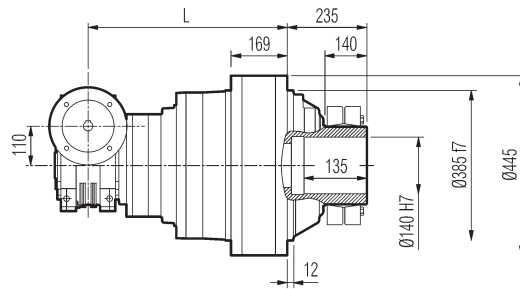
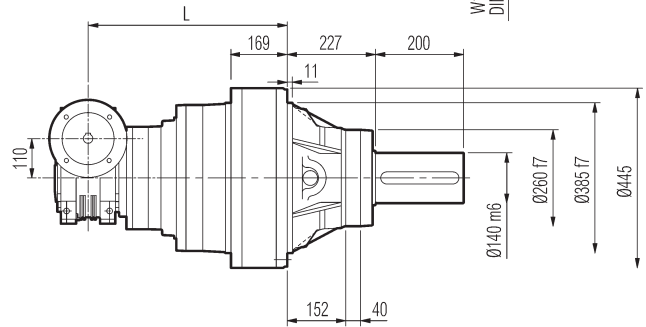
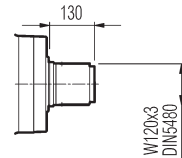
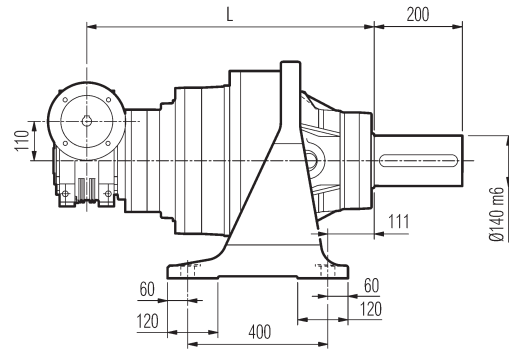
\* Per dimensioni vedere pag. 328  
For dimensions, refer to page 328  
Für Abmessungen finden Sie auf Seite 328  
Pour les dimensions, se référer à la page 328



Vista da  
View from **A**



**A** →



**PC**

**HZ PZ**

**HC**

**FP**

**FZ**

**FZB**

**FP**

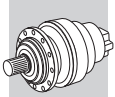
**M<sub>2max</sub> = 66000 Nm**

\* Per dimensioni vedere pag. 328  
For dimensions, refer to page 328  
Für Abmessungen finden Sie auf Seite 328  
Pour les dimensions, se référer à la page 328

	L				L1	L2	L3	L4	L5	Kg			
	PC - PZ	HC - HZ	FZ	FP						PC - PZ	HC - HZ	FZ	FP
3/V 13L4	780	553	553	553	110.1	153	25	138	60	425	335	305	325

	P80	P90	P 100	P112	S2 + M2S			S3 + M3S			S3 + M3L		
	P	P	P	P	L1	L1f	Y	L1	L1f	Y	L1	L1f	Y
3/V 13L4	200	200	250	250	364	440	156	407	503	193	439	530	193



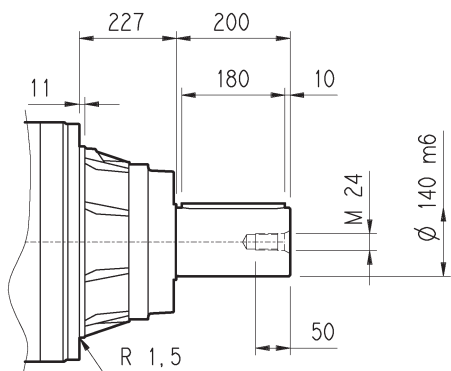
**313 L**

**313 R**

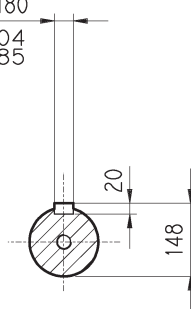
**3/V 13L3**

**3/V 13L4**

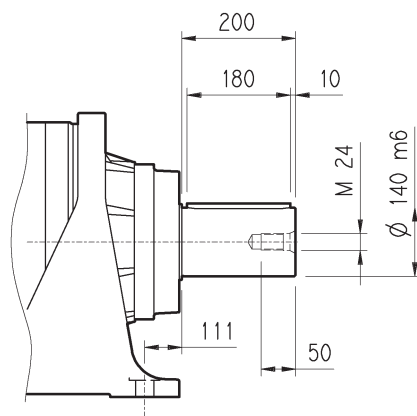
**HC**



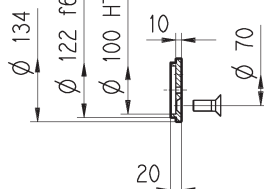
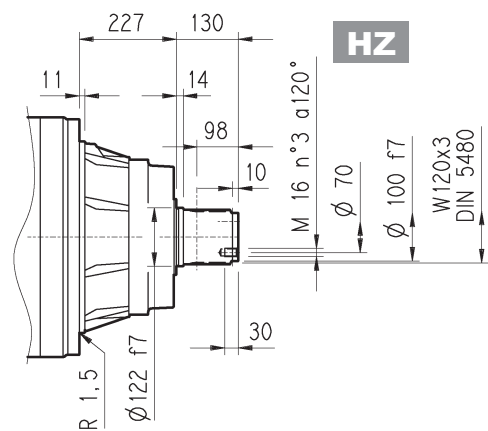
A 36x20x180  
UNI 6604  
DIN 6885



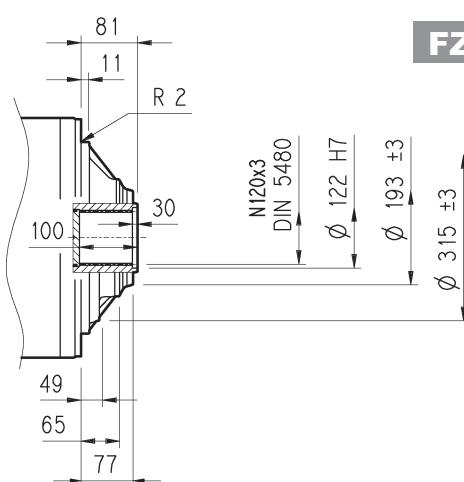
**PC**



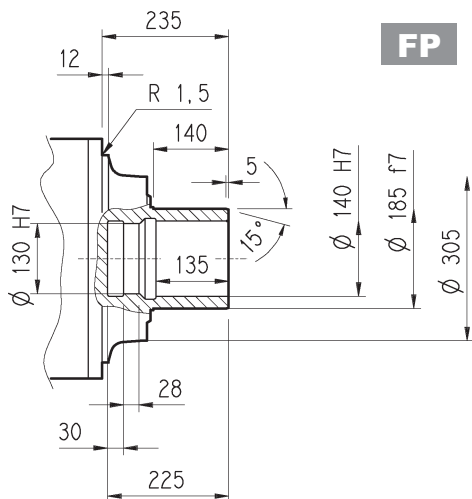
**HZ**



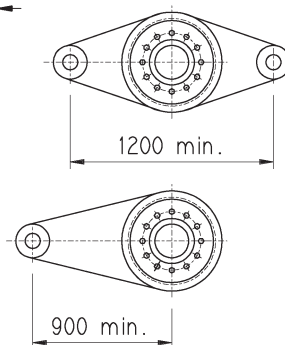
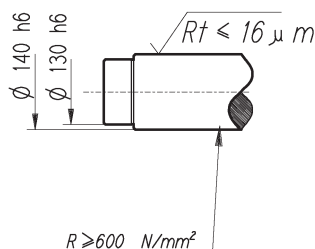
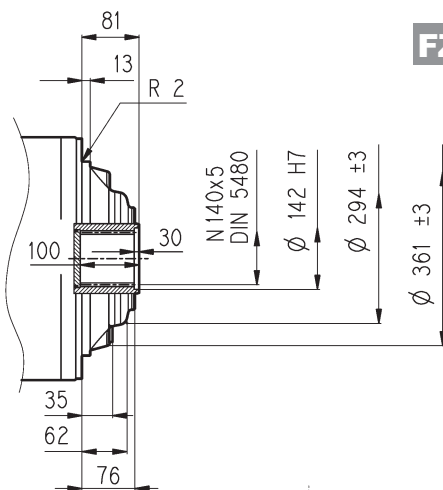
**FZ**



**FP**

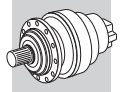
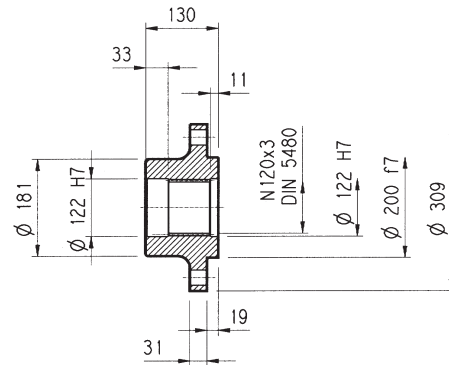
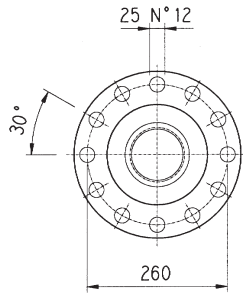
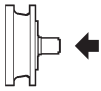


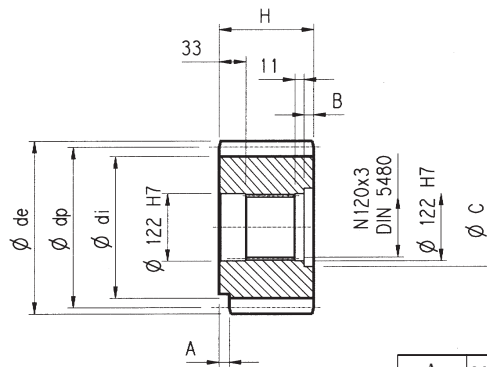
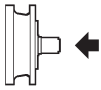
**FZB**



**FP**

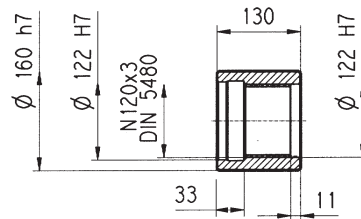
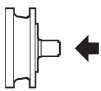
$M_{2max} = 66000 \text{ Nm}$

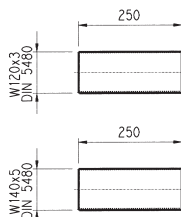
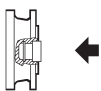
**313 L****313 R****3/V 13L3****3/V 13L4**
**Flangia / Flange**  
**Flansch / Brides**
**WOA**
 Materiale : Acciaio C40  
 Material : Steel C40  
 Material : Stahl C40  
 Matière : Acier C40

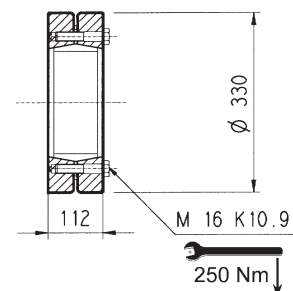
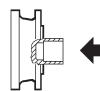
**Pignoni / Pinion gears**  
**Ritzel / Pignons**
**P...**

☆	Materiale / Material / Material / Matière
□	Acciaio 39NiCrMo3 Bonificato Steel 39NiCrMo3 hardened and tempered Vergüteter Stahl 39NiCrMo3 Acier bonifié 39NiCrMo3
■	Acciaio 18NiCrMo5 Cementato e temprato Steel 18NiCrMo5 Case hardened Einsatzstahl 18NiCrMo5 Einsatzgehärtet Acier cimenté et tempré 18NiCrMo5

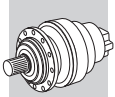
	m	z	x	dp	di	de	H	A	B	C	☆
PPH	16	17	0.500	272	247	315	135	0	5	136	□
PRI	18	18	0.333	324	294	365	140	0	10	140	□

**Manicotti lisci / Sleeve couplings**  
**Naben / Manchons lisses a cannelure interieure**
**MOA**
 Materiale : Acciaio 16CrNi4  
 Material : Steel 16CrNi4  
 Material : Stahl 16CrNi4  
 Matière : Acier 16CrNi4

**Barre scanalate / Spined bars**  
**Vielkeilwellen / Barre cannelée**
**B0A****FZ****FZB**
 Mat. acciaio 18NiCrMo5 UNI 5331 da cementare e  
 temperare 50-55 HRC  
 Case hardening steel 18NiCrMo5 UNI 5331 must be case  
 hardened to 50-55 HRC  
 Material: Einsatzstahl 18NiCrMo5 UNI 5331 muss einsatzgehärtet  
 werden 50-55 HRC  
 Acier 18 NiCrMo5 UNI 5331 doit être cémenté trempé 50-55 HRC

**Giunto ad attrito / Shrink disc**  
**Schrumpfscheibe / Frette de serrage**
**GOA**

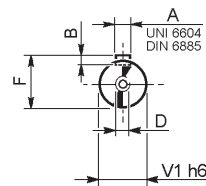
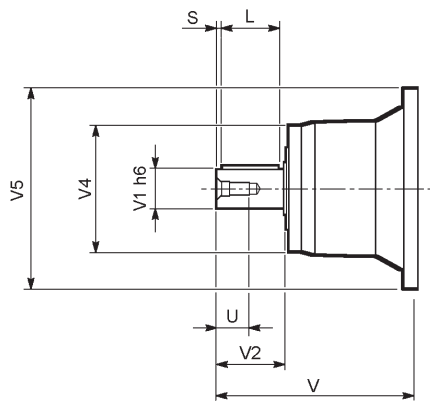




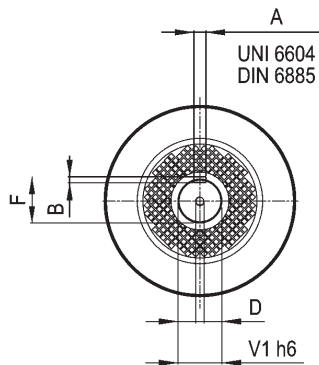
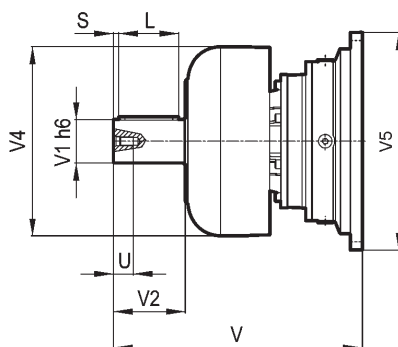
**313 L**

**313 R**

**V**



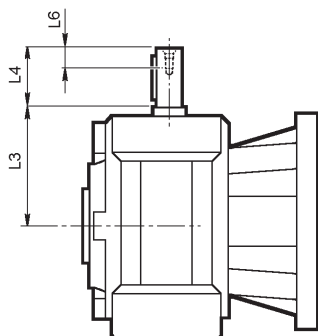
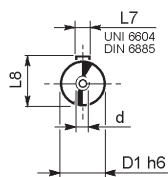
**FV**



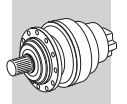
	input	V	V1	V2	V4	V5	A	B	F	L	S	D	U
313 L1	V11B	343	80	130	200	445	22	14	85	110	10	M16	36
	FV11B	451	80	130	347.5	445	22	14	85	110	10	M16	36
313 L2	V07B	315	80	130	200	345	22	14	85	110	10	M16	36
	FV07B	375	80	130	347.5	348	22	14	85	110	10	M16	36
	V07A	313	60	105	155	345	18	11	64	90	7.5	M16	36
	FV07A	363	60	105	309	348	18	11	64	90	7.5	M16	36
313 L3	V05B	239	48	82	155	245	14	9	51.5	70	6	M16	36
	FV05B	276	48	82	219.5	244	14	9	51.5	70	6	M16	36
313 L4	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28
313 R2 (B) (C)	V06B	307	60	105	155	292	18	11	64	90	7.5	M16	36
	FV06B	357	60	105	309	292	18	11	64	90	7.5	M16	36
313 R3	V05B	239	48	82	155	245	14	9	51.5	70	6	M16	36
313 R4	V01A	137.5	24	36	120	186	8	7	27	30	3	M8	19
	V01B	158	38	58	120	186	10	8	41	50	4	M12	28

**3/V 13L3**

**3/V 13L4**



	D1 h6	L3	L4	L6	L7	L8	d
3/V 13L3 HS	40	214.5	70	20	12	43	M8
3/V 13L4 HS	25	168	60	19	8	28	M8

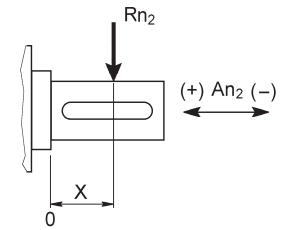
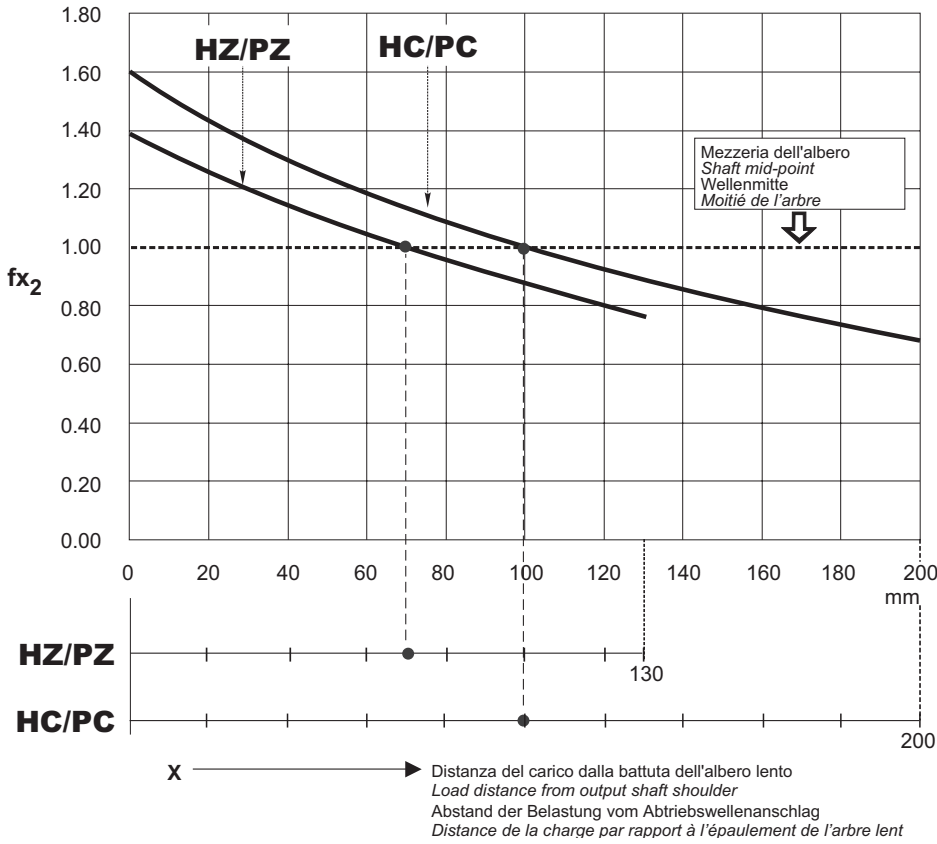


Fattore di posizione per carichi radiali sugli alberi in uscita.

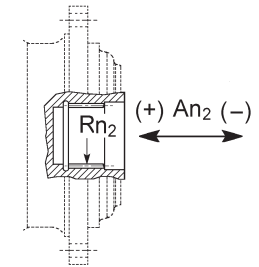
Load location factor for radial loading on output shaft.

Positionsfaktor für Radialkräfte an der Abtriebswelle.

Facteur de position pour charges radiales sur les arbres en sortie.



$R_{x2} = R_{n2} \cdot f_{x2}$		
$An_2 (\pm) = R_{n2} \cdot fa_2 (\pm)$		
	<b>fa<sub>2</sub> (+)</b>	<b>fa<sub>2</sub> (-)</b>
HZ/PZ	1.08	0.69
HC/PC	1.30	0.83



$An_2 (\pm) = R_{n2} \cdot fa_2 (\pm)$		
	<b>fa<sub>2</sub> (+)</b>	<b>fa<sub>2</sub> (-)</b>
FZ	0.94	0.94

Carichi radiali ammissibili sull'albero veloce per  $n_1 = 1000 \text{ min}^{-1}$  e 10000 h di vita teorica.

Permitted overhung loads on input shaft when  $n_1 = 1000 \text{ min}^{-1}$  and theoretical lifetime = 10000 h.

Zulässige Radialkräfte an den Antriebswellen für  $n_1 = 1000 \text{ min}^{-1}$  und 10000 std.

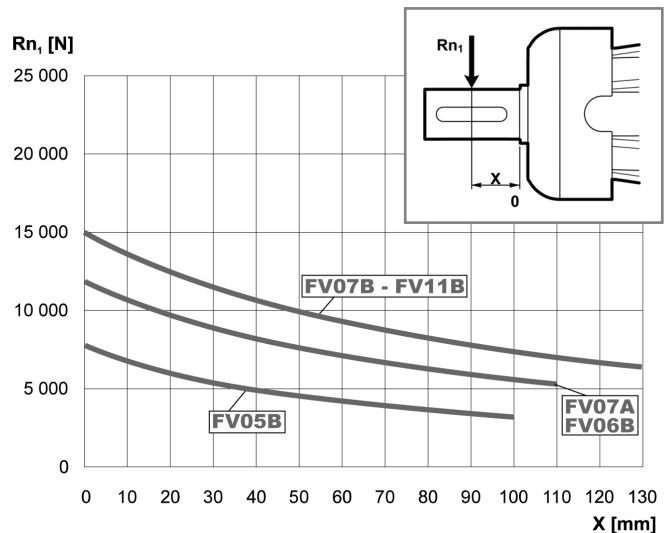
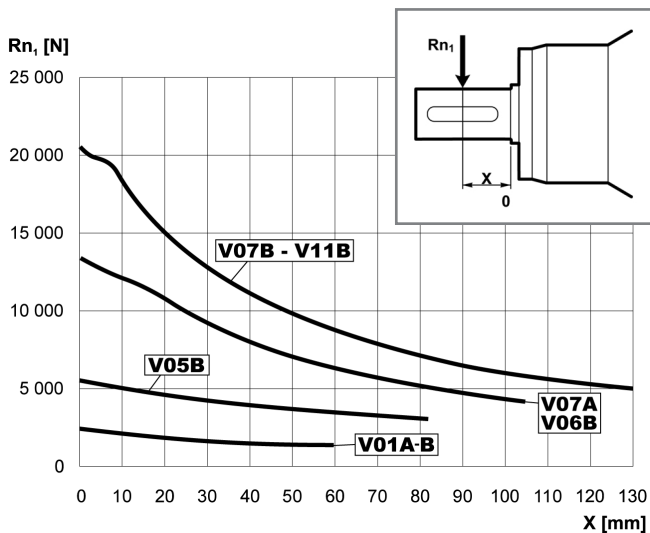
Charges radiales admissibles sur les arbres d'entrée pour  $n_1 = 1000 \text{ min}^{-1}$  et 10000 h.

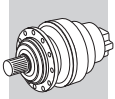
Per velocità di comando e/o durate diverse vedi il capitolo: Verifiche.

For drive speed and/or lifetimes other than those specified here, see Chapter: Verifications.

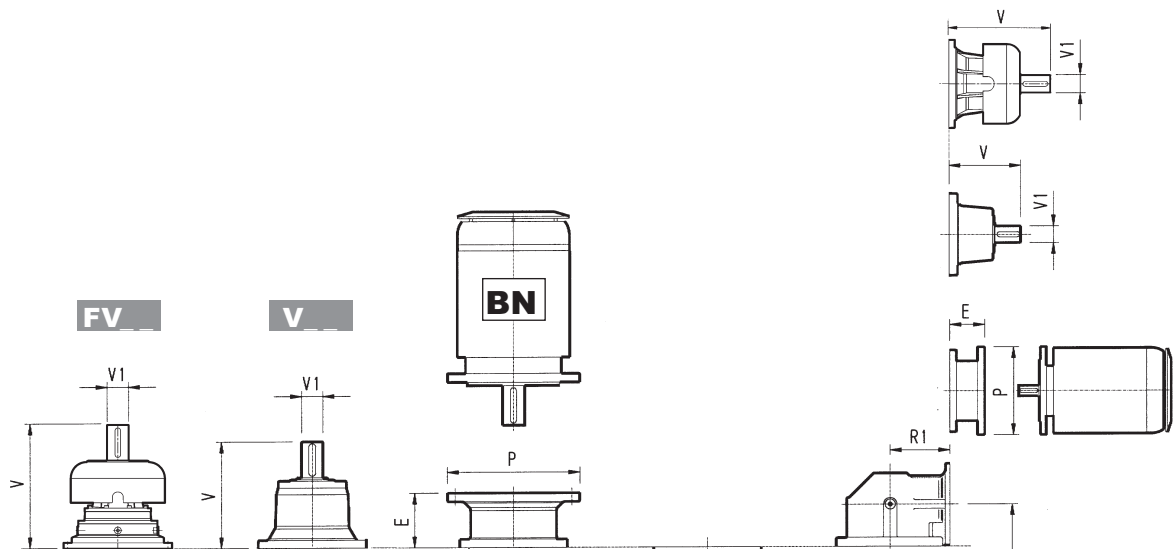
Im Hinblick auf Geschwindigkeit und/oder anderweitige Dauern verweisen wir auf Par: Prüfungen

Pour des vitesses et/ou durées différentes, voir par. Vérifications.



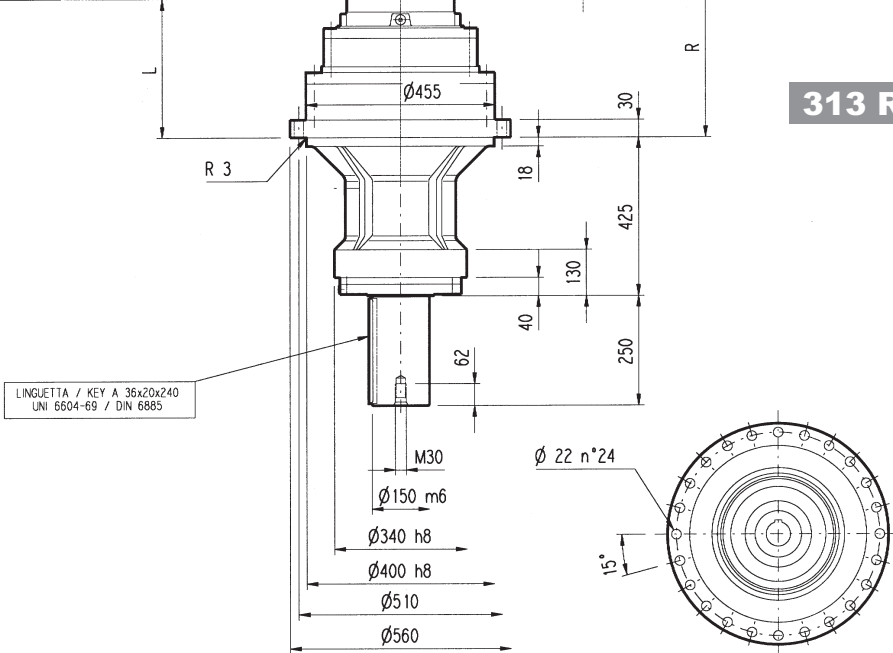


# 313\_VK



## 313 L\_VK

## 313 R\_VK

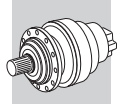


	L													
		Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg
313 L1	158	380	343	80	55	-	-	-	451	80	71	-	-	-
313 L2	308	440	315	80	35	313	60	28	375	80	48	363	60	34
313 L3	397	450	239	48	15	-	-	-	276	48	17	-	-	-
313 L4	462	460	137.5	24	6	158	38	7	-	-	-	-	-	-

	P71		P80		P90		P100		P112		P132		P160		P180		P200		P225		P250	
	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P
313 L2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	195	350	186	400	216	450	216	550
313 L3	-	-	-	-	-	-	-	-	-	-	114	300	144	350	144	350	174	400	-	-	-	-
313 L4	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-	-	-	-	-

	R		R1														
		Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg
313 R2 (B)	388	345	510	307	60	23	-	-	-	-	357	60	28	-	-	-	-
313 R2 (C)	388	390	520	307	60	23	-	-	-	-	357	60	28	-	-	-	-
313 R3	427	225	490	239	48	15	-	-	-	-	-	-	-	-	-	-	-
313 R4	489	140	470	137.5	24	6	158	38	7	-	-	-	-	-	-	-	-

	P71		P80		P90		P100		P112		P132		P160		P180		P200		P225		P250	
	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P
313 R2 (B)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	152	350	182	400	212	450	193	550
313 R2 (C)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	152	350	182	400	212	450	193	550
313 R3	-	-	-	-	-	-	-	-	-	-	114	300	144	350	144	350	174	400	-	-	-	-
313 R4	65	160	84	200	84	200	94	250	94	250	114	300	144	350	-	-	-	-	-	-	-	-



Il diagramma seguente consente di ricavare il carico radiale ammissibile  $R_{x2}$  quando questo è applicato alla distanza  $x$  dallo spallamento dell'albero lento del riduttore 313\_VK.

Le curve si riferiscono al valore risultante dal rapporto fra il carico assiale  $A_{n2}$  e il carico radiale  $R_{n2}$ , entrambi riferiti a  $n_2 = 10 \text{ min}^{-1}$  e durata teorica di 10000 h.

The diagram below allows the calculation of permitted overhung load  $R_{x2}$  on the output shaft of gearbox type 313\_VK, with radial force applying at a distance  $x$  from shaft shoulder.

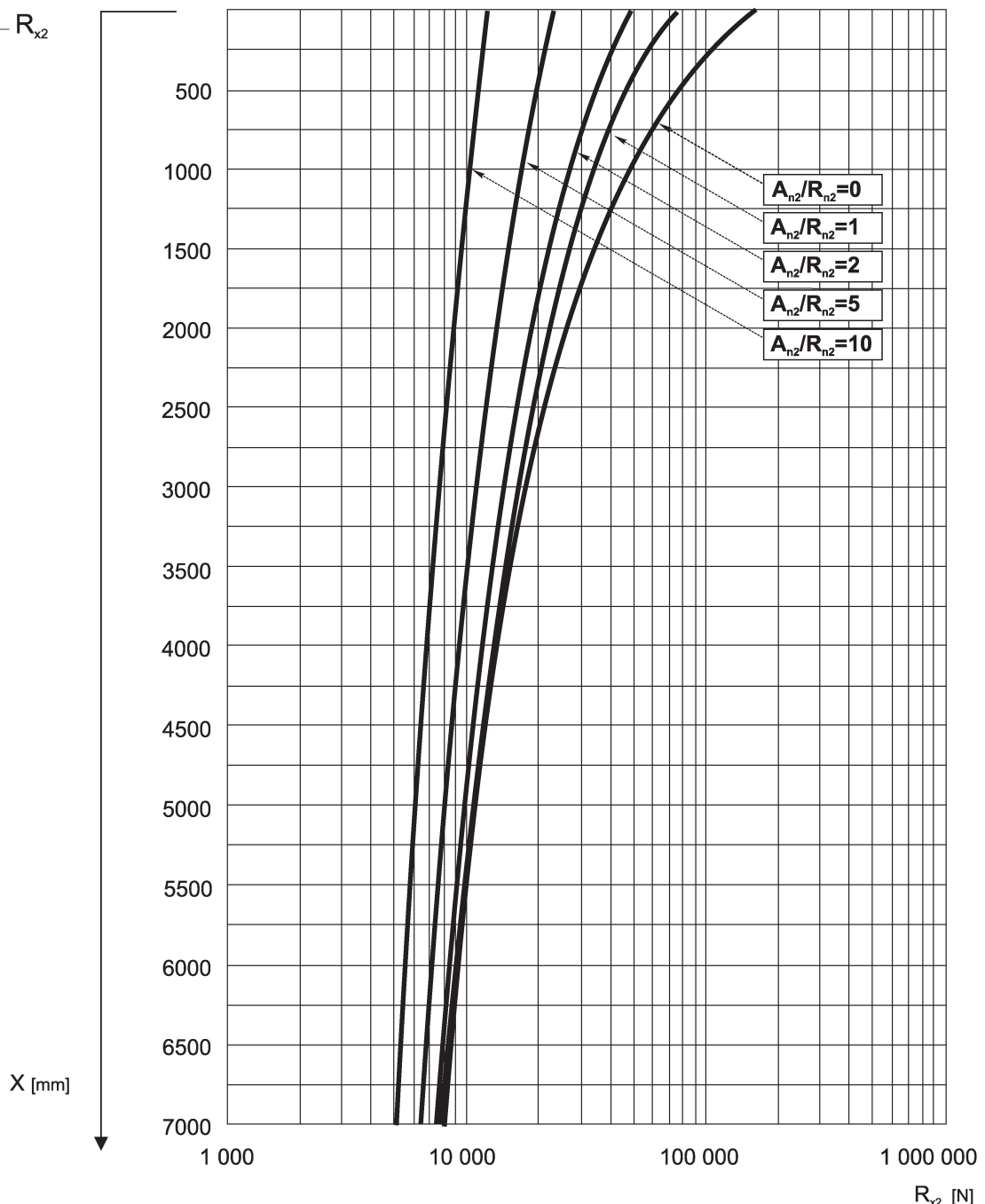
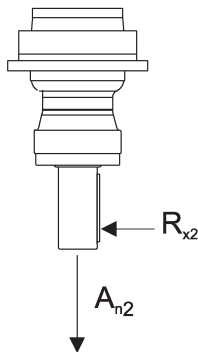
The curves are relevant to value resulting from the relationship of trust load  $A_{n2}$  to radial load  $R_{n2}$ , based on  $n_2 = 10 \text{ min}^{-1}$  and 10000 hrs theoretical lifetime.

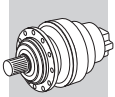
Das nachstehende Diagram ermöglicht das Individuieren der zulässigen, auf die Welle des Getriebes 313\_VK einwirkenden Radialkraft, die auf der Distanz  $x$  vom Anschlag der Welle selbst appliziert wird.

Die Kurven beziehen sich auf den Wert, der sich aus dem Verhältnis zwischen der Axialkraft  $A_{n2}$  und der Radialkraft  $R_{n2}$  für  $n_2 = 10 \text{ min}^{-1}$  und einer Dauer von 10000 Std. ergibt.

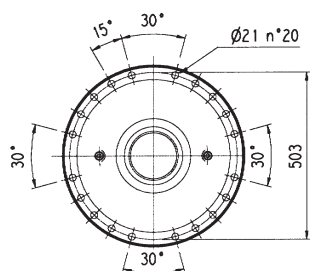
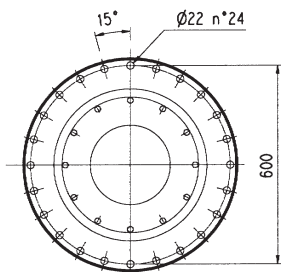
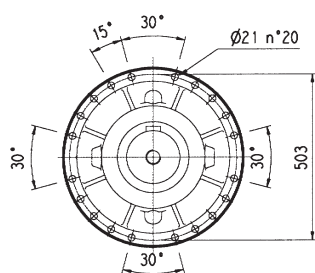
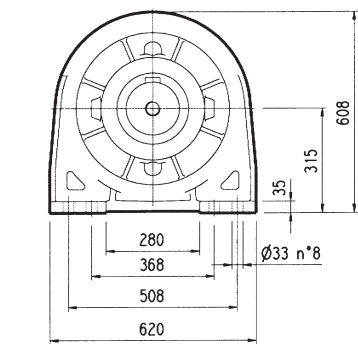
Le diagramme suivant permet de déterminer la charge radiale admissible  $R_{x2}$  sur l'arbre lent du réducteur 313\_VK appliqué à la distance  $x$  de l'épaule de l'arbre.

Les courbes se réfèrent à la valeur résultant de l'équation entre la charge axiale  $A_{n2}$  et la charge radiale  $R_{n2}$  pour  $n_2 = 10 \text{ min}^{-1}$  et durée de 10000 h.

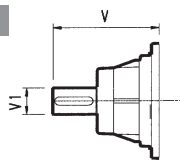




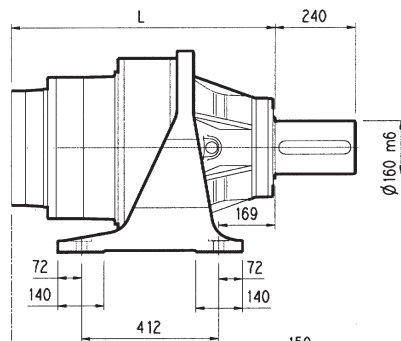
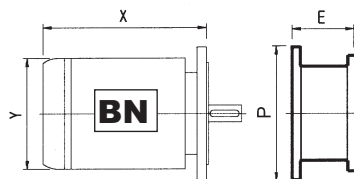
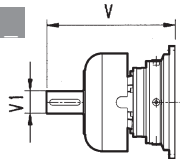
# 314 L



**V**



**FV**

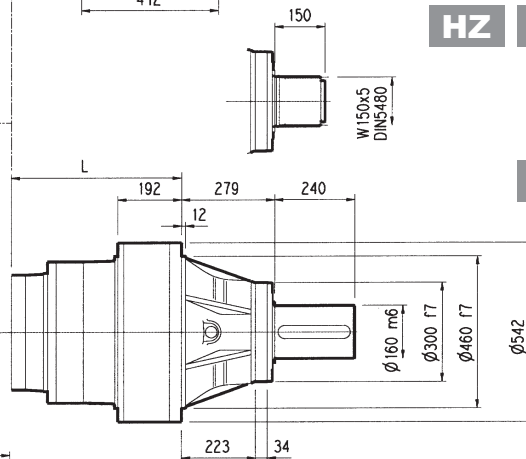


**PC**

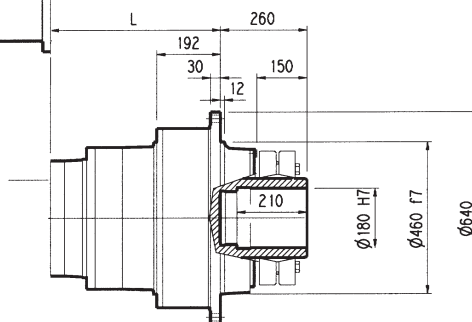
**HZ**

**PZ**

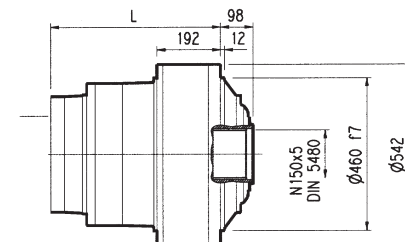
**HC**



**FP**



**FZ**



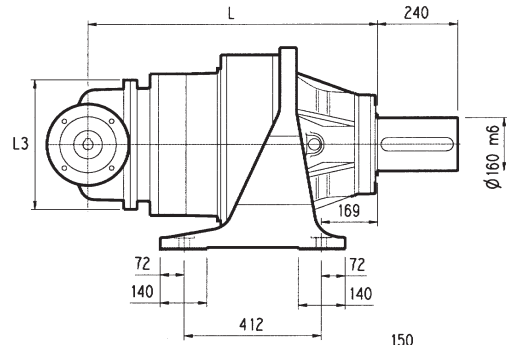
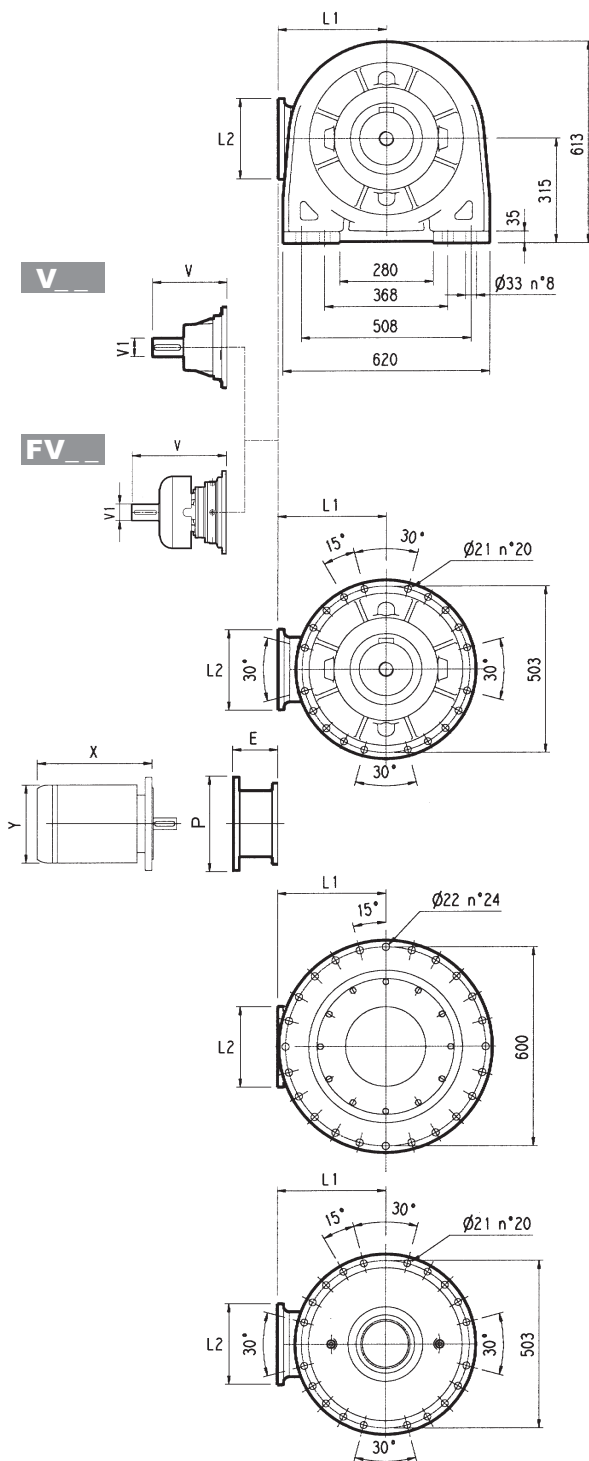
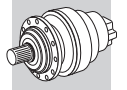
**FP**

$M_{2max} = 126000 \text{ Nm}$

	L				Kg				Kg				Kg							
	PC - PZ	HC - HZ	FZ	FP	PC - PZ	HC - HZ	FZ	FP	V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg
314 L2	641	362	362	362	545	415	325	375	377	80	50	-	-	-	457	80	63	-	-	-
314 L3	777	498	498	498	590	460	370	420	307	60	23	-	-	-	357	60	28	-	-	-
314 L4	842	563	563	563	600	470	380	430	239	48	15	-	-	-	276	48	17	-	-	-

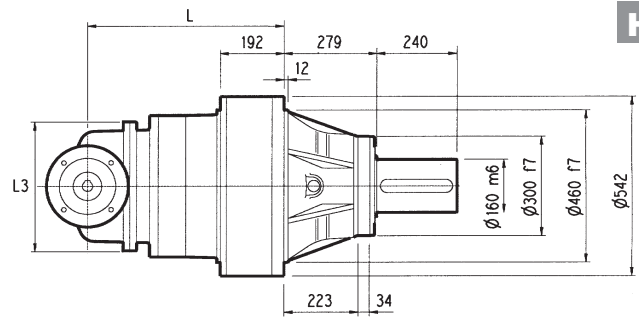
  

	P132		P160		P180		P200		P225		P250	
	E	P	E	P	E	P	E	P	E	P	E	P
314 L2	-	-	-	-	-	-	271	400	301	450	281	550
314 L3	-	-	153	350	153	350	183	400	213	450	193	550
314 L4	114	300	144	350	144	350	174	400	-	-	-	-

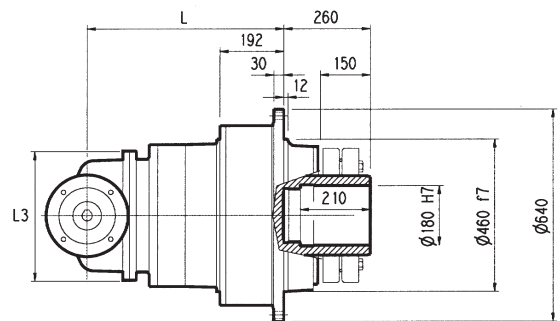


PC

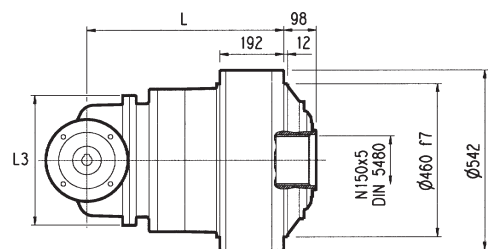
HZ PZ



HC



FP



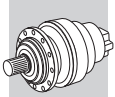
FZ

**FP**  $M_{2max} = 126000 \text{ Nm}$

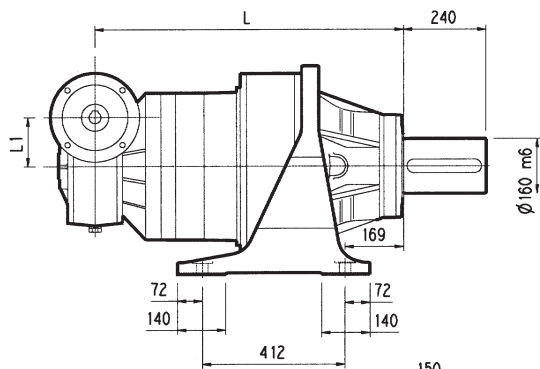
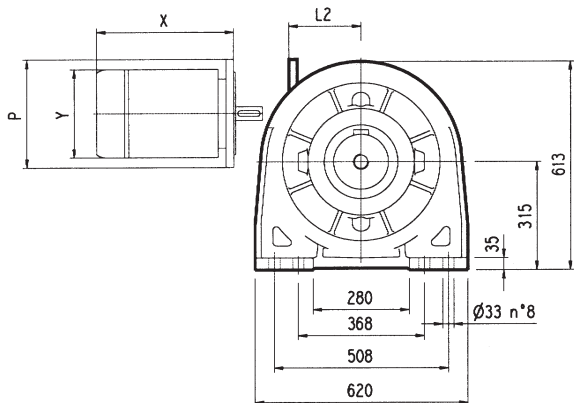
	L				L1	L2	L3	Kg				Kg				Kg							
	PC-PZ	HC-HZ	FZ	FP				PC-PZ	HC-HZ	FZ	FP	V	V1	Kg	V	V1	Kg	V	V1	Kg			
314 R3 (B)	848	569	569	569	345	292	400	720	590	500	550	307	60	23	-	-	-	357	60	28	-	-	-
314 R3 (C)	856	587	587	587	390	292	480	730	600	510	560	307	60	23	-	-	-	357	60	28	-	-	-
314 R4	914	635	635	635	225	245	345	680	550	460	510	239	48	15	-	-	-	-	-	-	-	-	-

	P90		P100		P112		P132		P160		P180		P200		P225		P250	
	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P
314 R3 (B)	-	-	-	-	-	-	-	-	-	-	152	350	182	400	212	450	193	550
314 R3 (C)	-	-	-	-	-	-	-	-	-	-	152	350	182	400	212	450	193	550
314 R4	84	200	94	250	94	250	114	300	144	350	144	350	174	400	-	-	-	-

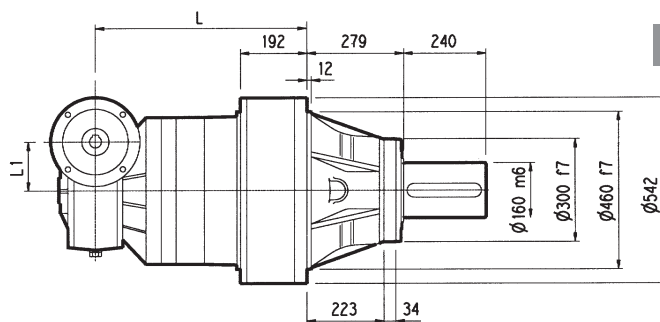
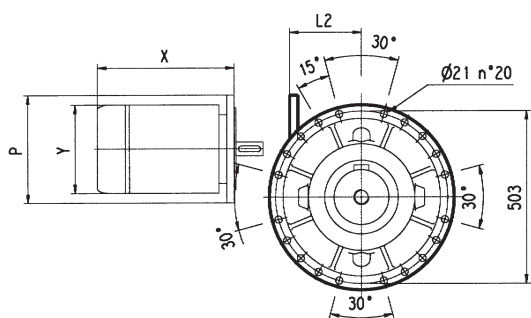
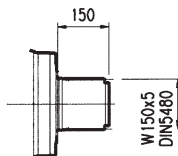


# 3/V 14L3

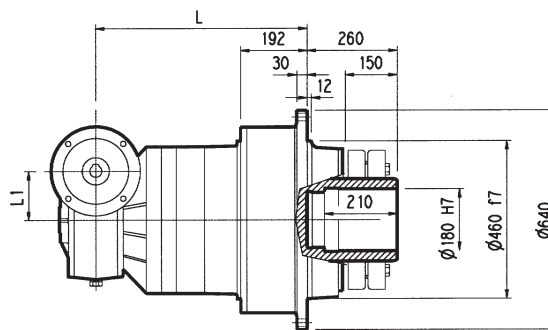
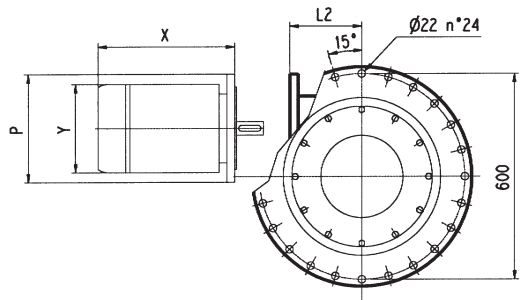
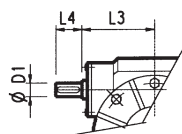


**PC**

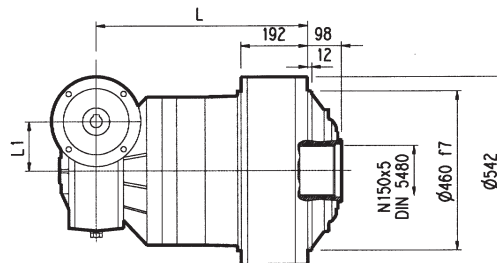
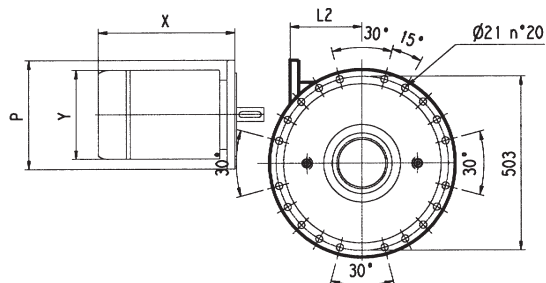
**HZ PZ**



**HC**



**FP**

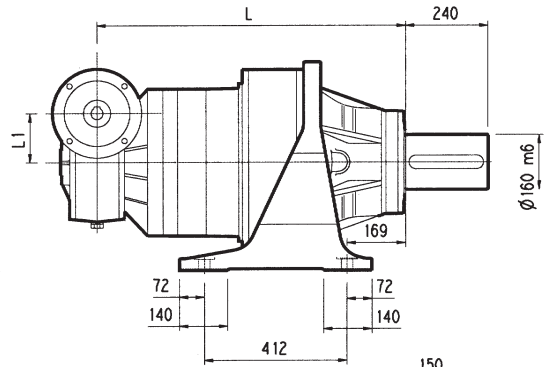
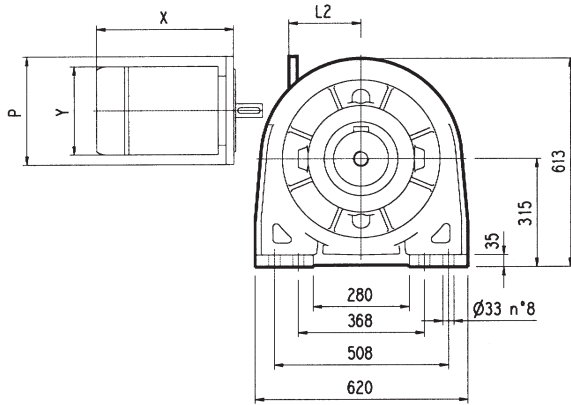
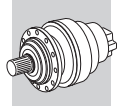


**FZ**

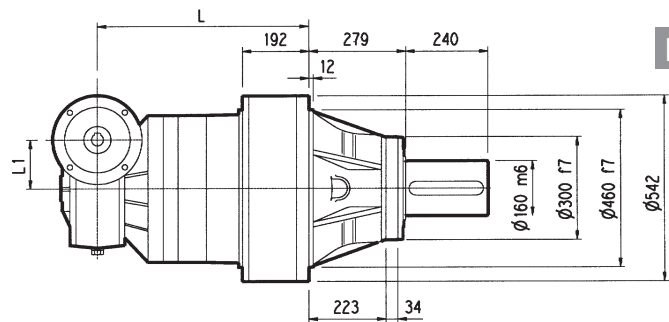
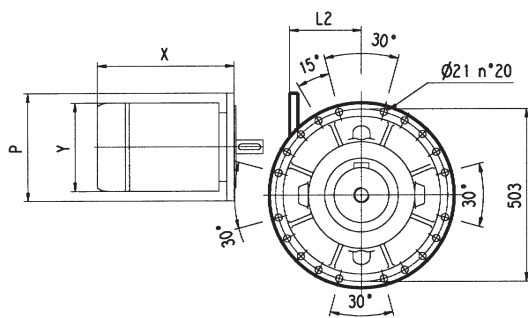
**FP**

$M_{2max} = 126000 \text{ Nm}$

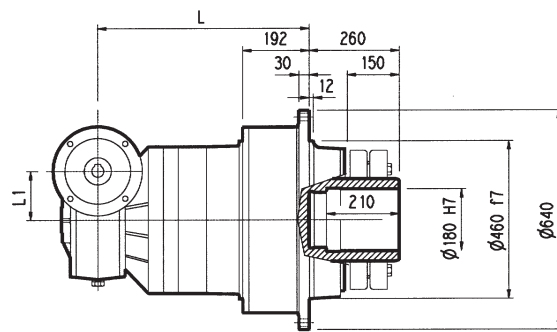
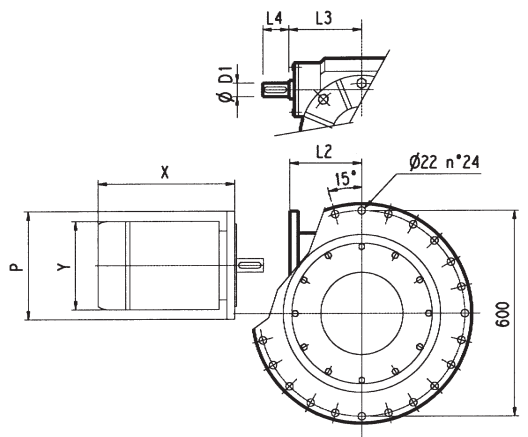
	L				L1	L2	D1	L3	L4	Kg			
	PC - PZ	HC - HZ	FZ	FP						PC - PZ	HC - HZ	FZ	FP
3/V 14L3	920	641	641	641	185	217	40	214.5	70	665	535	445	495
3/V 14L3	P100	P112	P132		P160		P180		-	-	-	-	-
	P	P	L2	P	L2	P	L2	P					
	250	250	-	300	-	350	-	-	-	-	-	-	350



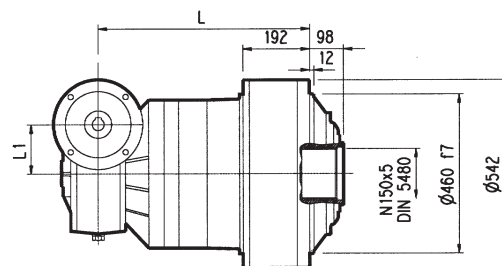
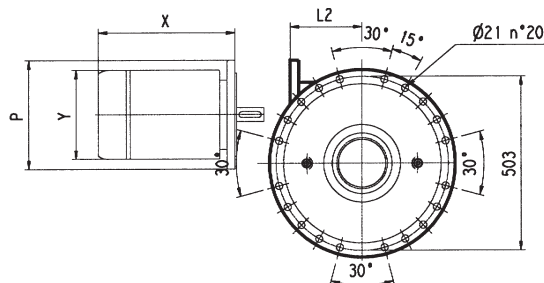
**PC**



**HC**



**FP**



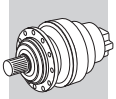
**FZ**

**FP**  $M_{2max} = 126000 \text{ Nm}$

	L				L1	L2	D1	L3	L4	Kg			
	PC - PZ	HC - HZ	FZ	FP						PC - PZ	HC - HZ	FZ	FP
3/V 14L4	961	682	682	682	150	190	35	185	65	690	560	470	520

	P100		P112		P132		P160		P180	
	P	P	L2	P	L2	P	L2	P	L2	P
3/V 14L4	250	250	-	300	-	350	-	-	-	-





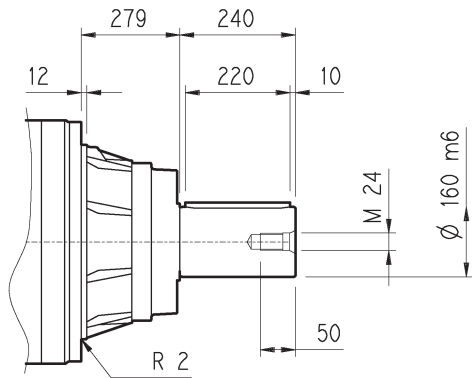
**314 L**

**314 R**

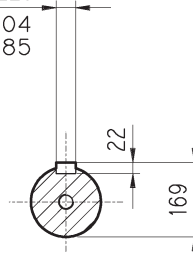
**3/V 14L3**

**3/V 14L4**

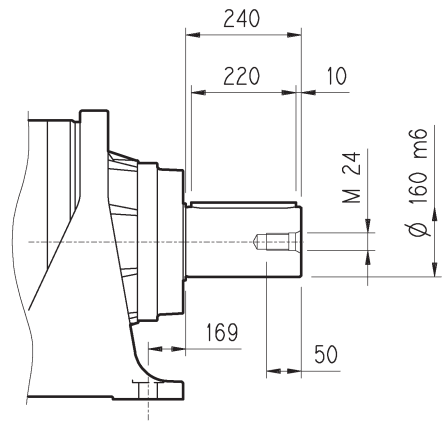
**HC**



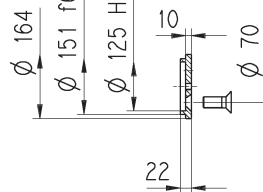
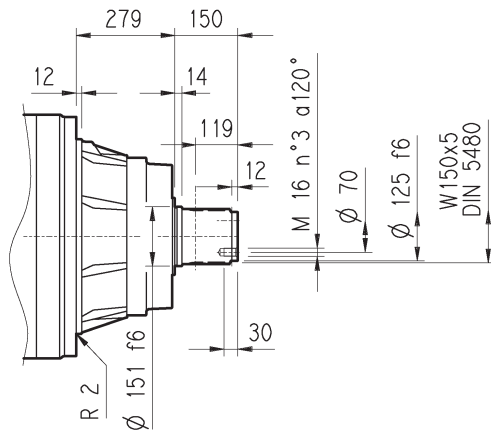
A 40x22x220  
UNI 6604  
DIN 6885



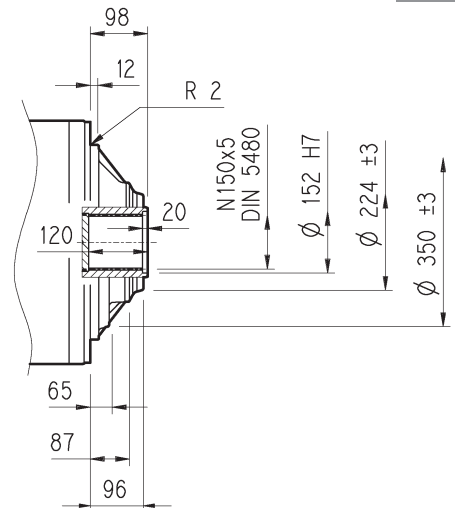
**PC**



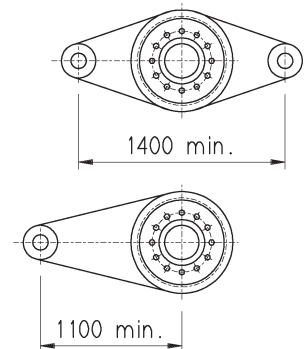
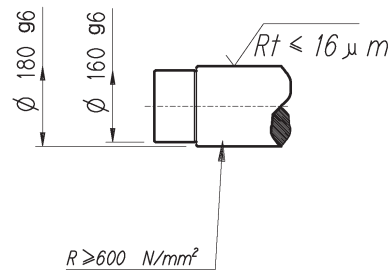
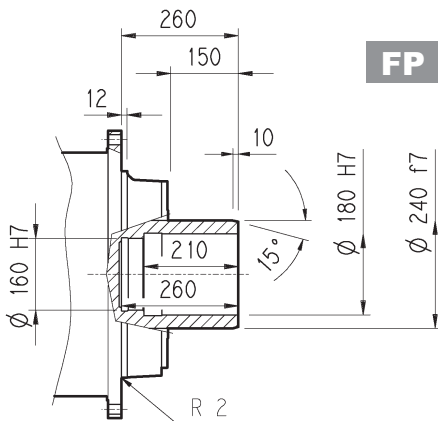
**HZ**



**FZ**



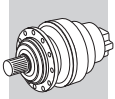
**FP**



**FP**

$M_{2max} = 126000\text{ Nm}$

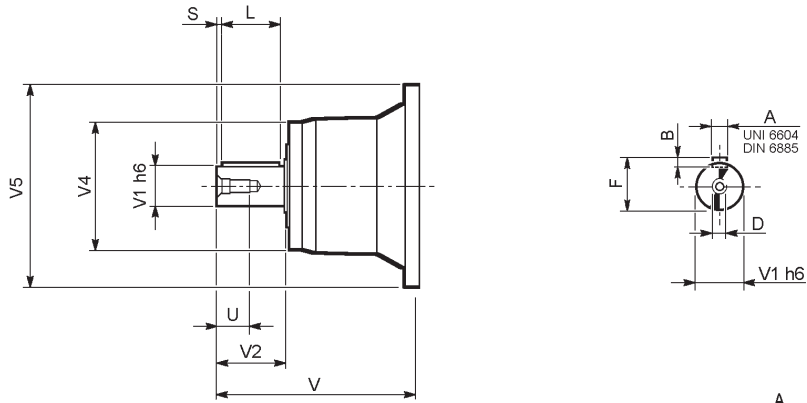




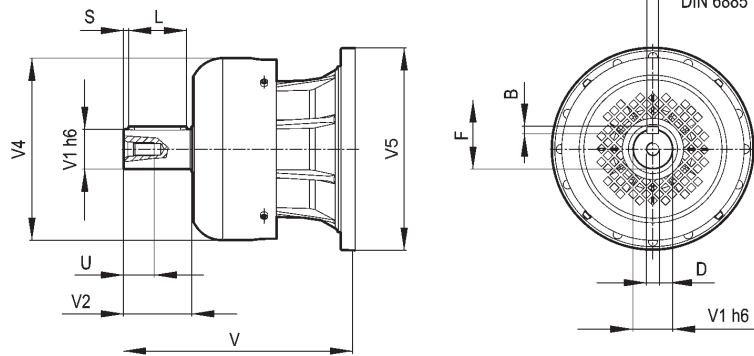
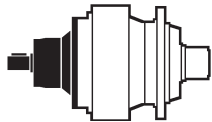
**314 L**

**314 R**

**V** \_ \_



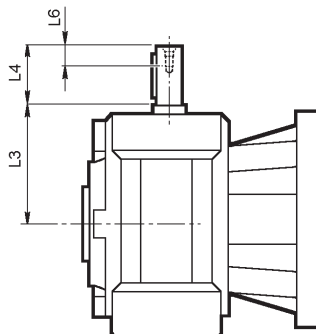
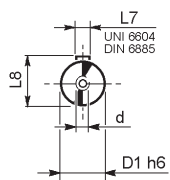
**FV** \_ \_



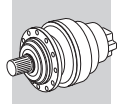
	input	V	V1	V2	V4	V5	A	B	F	L	S	D	U
314 L2	V10B	377	80	130	200	400	22	14	85	110	10	M16	36
	FV10B	457	80	130	347.5	400	22	14	85	110	10	M16	36
314 L3	V06B	307	60	105	155	292	18	11	64	90	7.5	M16	36
	FV06B	357	60	105	309	292	18	11	64	90	7.5	M16	36
314 L4	V05B	239	48	82	155	245	14	9	51.5	70	6	M16	36
	FV05B	276	48	82	219.5	244	14	9	51.5	70	6	M16	36
314 R3 (B) (C)	V06B	307	60	105	155	292	18	11	64	90	7.5	M16	36
	FV06B	357	60	105	309	292	18	11	64	90	7.5	M16	36
314 R4	V05B	239	48	82	155	245	14	9	51.5	70	6	M16	36

**3/V 14L3**

**3/V 14L4**



	D1 h6	L3	L4	L6	L7	L8	d
3/V 14L3 HS	40	214.5	70	20	12	43	M8
3/V 14L4 HS	35	185	65	20	10	38	M8

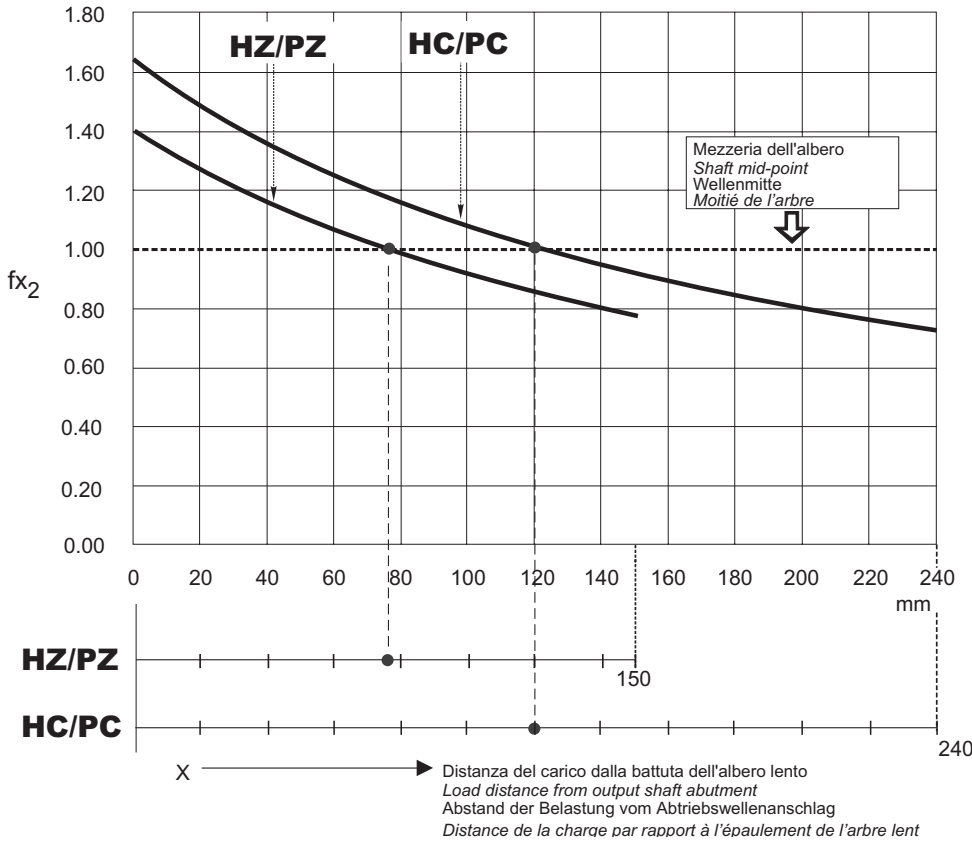


Fattore di posizione per carichi radiali sugli alberi in uscita.

Load location factor for radial loading on output shaft.

Positionsfaktor für Radialkräfte an der Abtriebswelle.

Facteur de position pour charges radiales sur les arbres en sortie.



Carichi radiali ammissibili sull'albero veloce per  $n_1 = 1000 \text{ min}^{-1}$  e 10000 h di vita teorica.

Permitted overhung loads on input shaft when  $n_1 = 1000 \text{ min}^{-1}$  and theoretical lifetime = 10000 h.

Zulässige Radialkräfte an den Antriebswellen für  $n_1 = 1000 \text{ min}^{-1}$  und 10000 std.

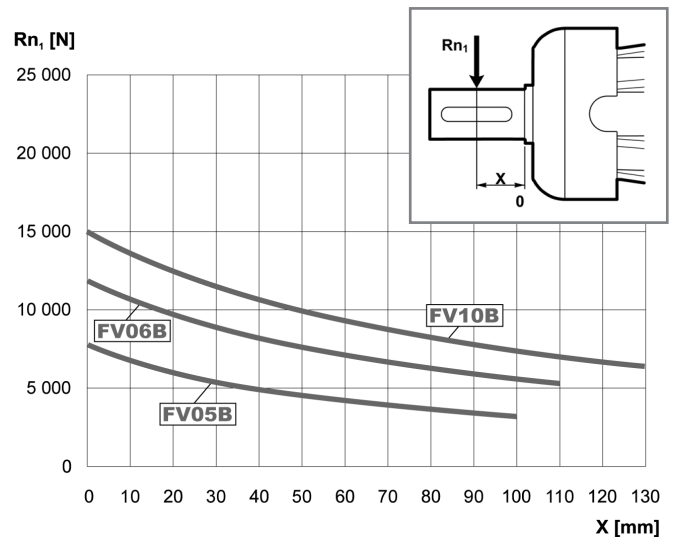
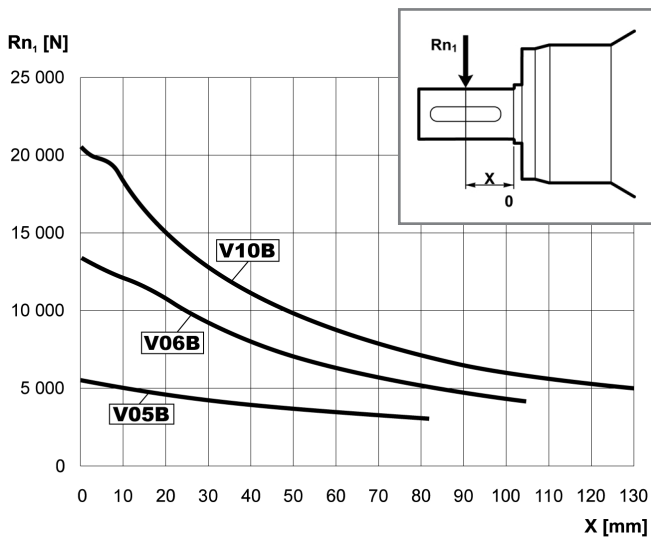
Charges radiales admissibles sur les arbres d'entrée pour  $n_1 = 1000 \text{ min}^{-1}$  et 10000 h.

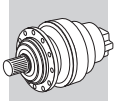
Per velocità di comando e/o durate diverse vedi il capitolo: Verifiche.

For drive speed and/or lifetimes other than those specified here, see Chapter: Verifications.

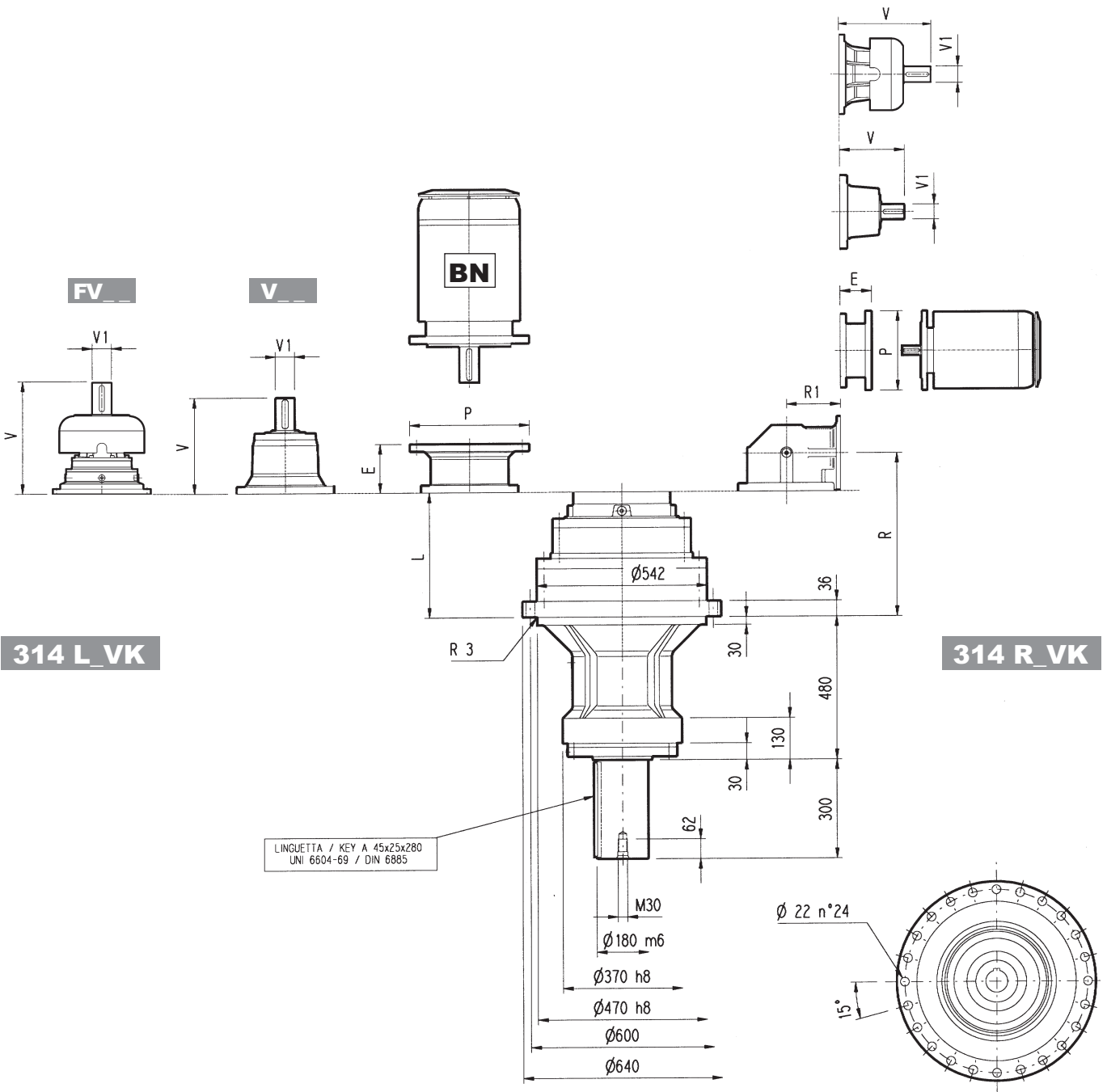
Im Hinblick auf Geschwindigkeit und/oder anderweitige Dauern verweisen wir auf Par: Prüfungen

Pour des vitesses et/ou durées différentes, voir par. Vérifications.





# 314\_VK



**314 L\_VK**

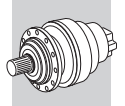
**314 R\_VK**

LINGUETTA / KEY A 45x25x280  
UNI 6604-69 / DIN 6885

	L													P132		P160		P180		P200		P225		P250	
		Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg	E	P	E	P	E	P	E	P	E	P	
<b>314 L2</b>	386	650	348	80	55	-	-	-	457	80	63	-	-	-	-	-	-	-	-	271	400	301	450	281	550
<b>314 L3</b>	519	700	315	80	35	313	60	28	357	60	28	-	-	-	-	153	350	153	350	183	400	213	450	193	550
<b>314 L4</b>	608	710	239	48	15	-	-	-	276	48	17	-	-	-	114	300	144	350	144	350	174	400	-	-	-

	R	R1	Kg												
				V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg
<b>314 R3 (B)</b>	611	345	720	307	60	23	-	-	-	357	60	28	-	-	-
<b>314 R3 (C)</b>	611	390	730	307	60	23	-	-	-	357	60	28	-	-	-
<b>314 R4</b>	638	225	690	239	48	15	-	-	-	-	-	-	-	-	-

	P90		P100		P112		P132		P160		P180		P200		P225		P250	
	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P
<b>314 R3 (B)</b>	-	-	-	-	-	-	-	-	-	-	152	350	182	400	212	450	193	550
<b>314 R3 (C)</b>	-	-	-	-	-	-	-	-	-	-	152	350	182	400	212	450	193	550
<b>314 R4</b>	84	200	94	250	94	250	114	300	144	350	144	350	174	400	-	-	-	-



Il diagramma seguente consente di ricavare il carico radiale ammissibile  $R_{x2}$  quando questo è applicato alla distanza  $x$  dallo spallamento dell'albero lento del riduttore 314\_VK.

Le curve si riferiscono al valore risultante dal rapporto fra il carico assiale  $A_{n2}$  e il carico radiale  $R_{n2}$ , entrambi riferiti a  $n_2 = 10 \text{ min}^{-1}$  e durata teorica di 10000 h.

The diagram below allows the calculation of permitted overhung load  $R_{x2}$  on the output shaft of gearbox type 314\_VK, with radial force applying at a distance  $x$  from shaft shoulder.

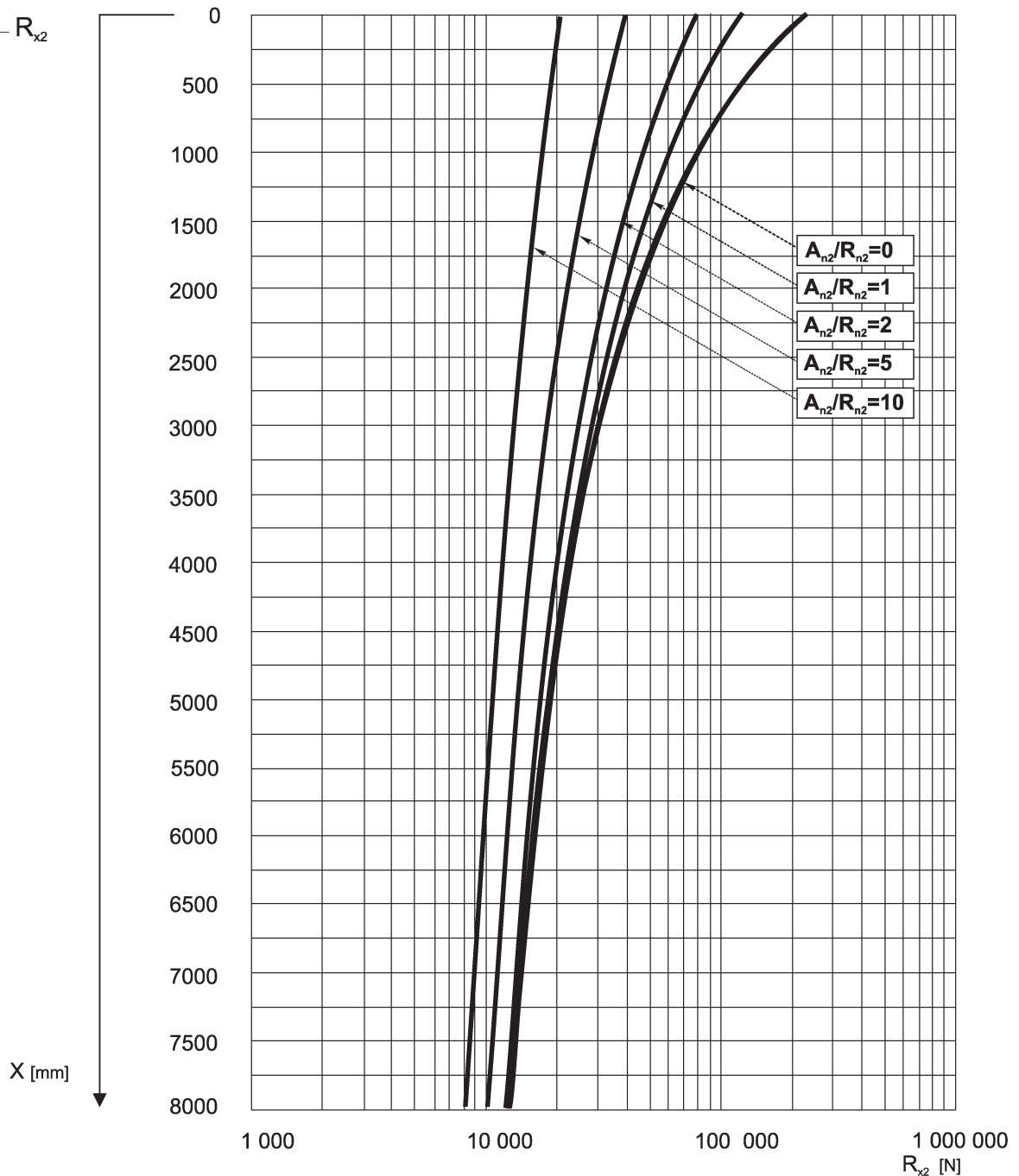
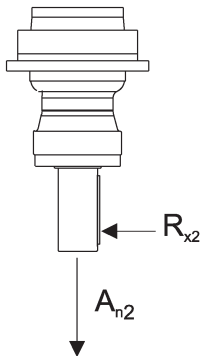
The curves are relevant to value resulting from the relationship of trust load  $A_{n2}$  to radial load  $R_{n2}$ , based on  $n_2 = 10 \text{ min}^{-1}$  and 10000 hrs theoretical lifetime.

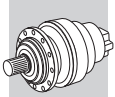
Das nachstehende Diagram ermöglicht das Individuieren der zulässigen, auf die Welle des Getriebes 314\_VK einwirkenden Radialkraft, die auf der Distanz  $x$  vom Anschlag der Welle selbst appliziert wird.

Die Kurven beziehen sich auf den Wert, der sich aus dem Verhältnis zwischen der Axialkraft  $A_{n2}$  und der Radialkraft  $R_{n2}$  für  $n_2 = 10 \text{ min}^{-1}$  und einer Dauer von 10000 Std. ergibt.

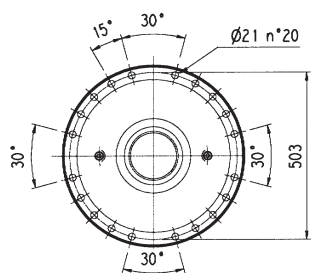
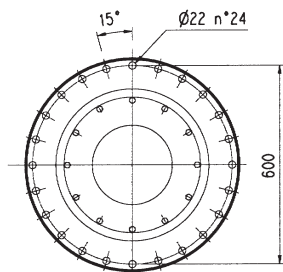
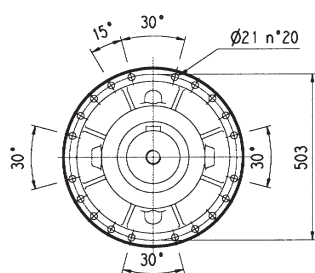
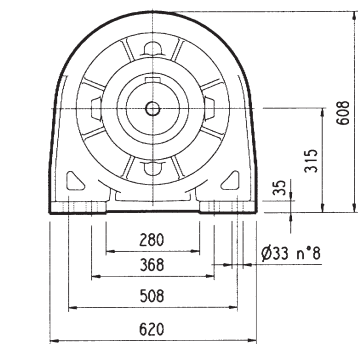
Le diagramme suivant permet de déterminer la charge radiale admissible  $R_{x2}$  sur l'arbre lent du réducteur 314\_VK appliqué à la distance  $x$  de l'épaulement de l'arbre.

Les courbes se réfèrent à la valeur résultant de l'équation entre la charge axiale  $A_{n2}$  et la charge radiale  $R_{n2}$  pour  $n_2 = 10 \text{ min}^{-1}$  et durée de 10000 h.

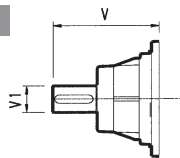




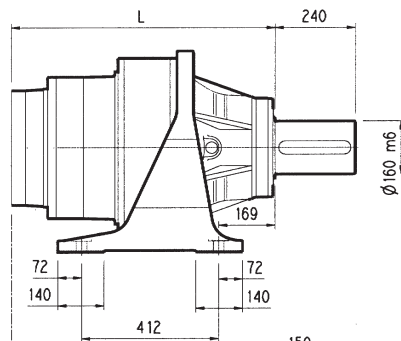
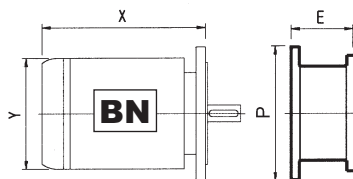
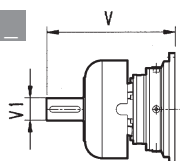
# 315 L



**V**



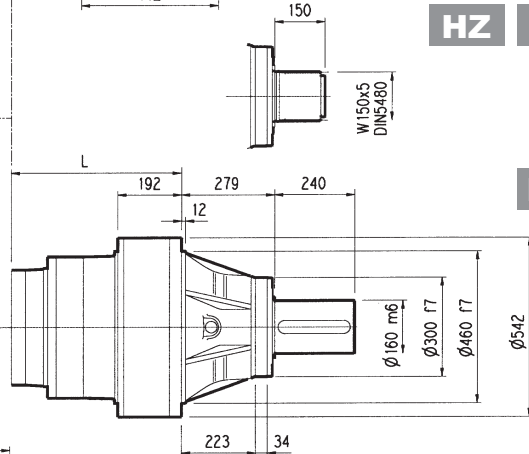
**FV**



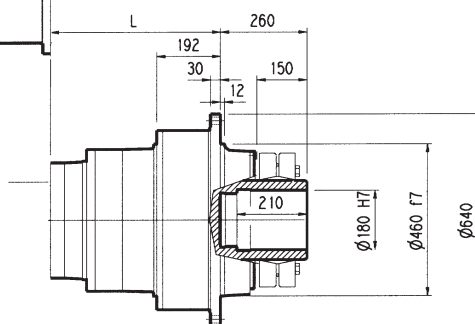
**PC**

**HZ PZ**

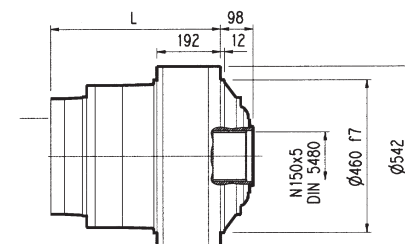
**HC**



**FP**



**FZ**



**FP**

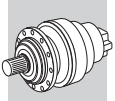
**M<sub>2max</sub> = 126000 Nm**

	L				Kg				Kg				Kg			
	PC - PZ	HC - HZ	FZ	FP	PC - PZ	HC - HZ	FZ	FP	V	V1	V	V1	V	V1	V	V1
<b>315 L2</b>	665	386	386	386	585	455	365	415	348	80	55	-	-	456	80	85
<b>315 L3</b>	798	519	519	519	630	500	410	460	315	80	35	313	60	28	375	80
<b>315 L4</b>	887	608	608	608	642	512	422	472	239	48	15	-	-	276	48	17

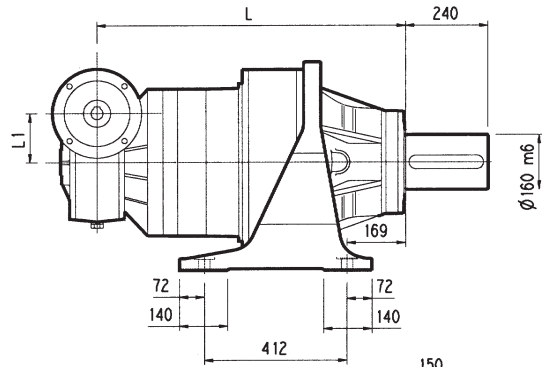
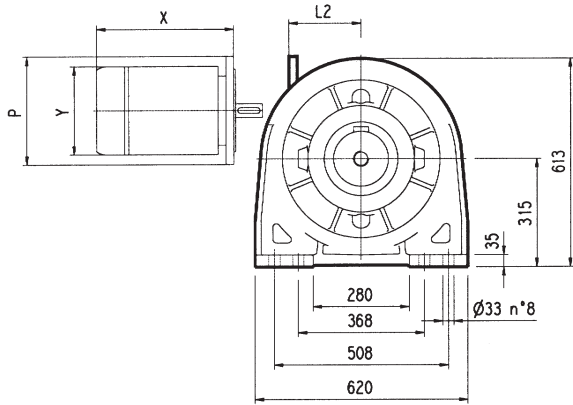
	P132		P160		P180		P200		P225		P250	
	E	P	E	P	E	P	E	P	E	P	E	P
<b>315 L3</b>	-	-	-	-	195	350	186	400	216	450	215	550
<b>315 L4</b>	114	300	144	350	144	350	174	400	-	-	-	-



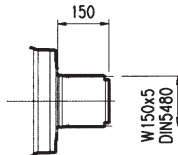




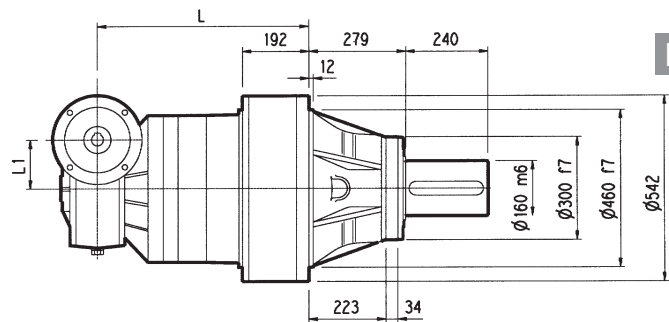
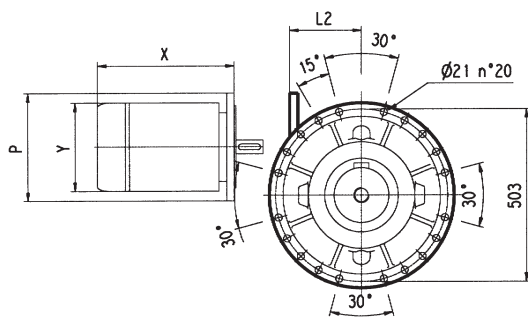
# 3/V 15L3



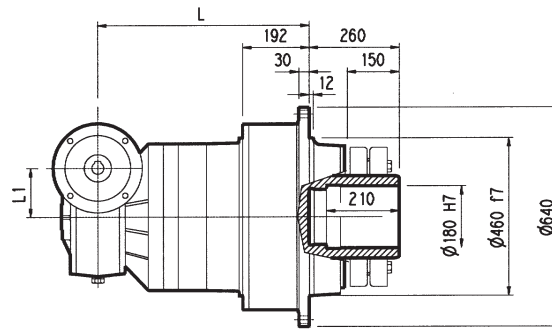
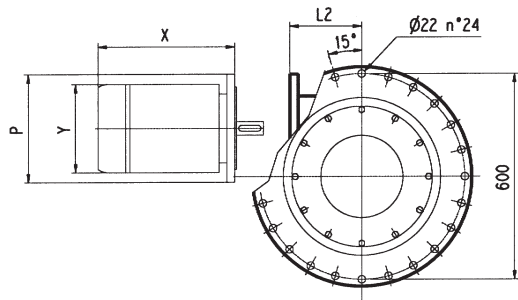
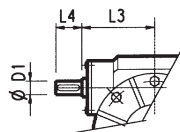
**PC**



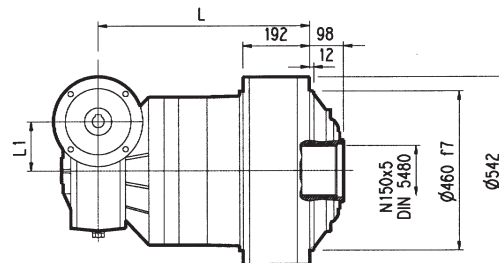
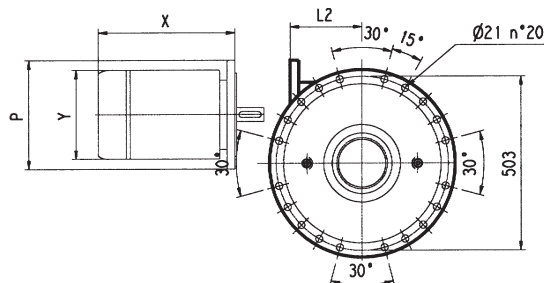
**HZ PZ**



**HC**



**FP**

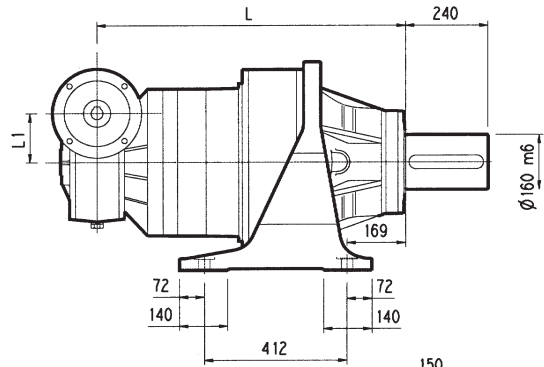
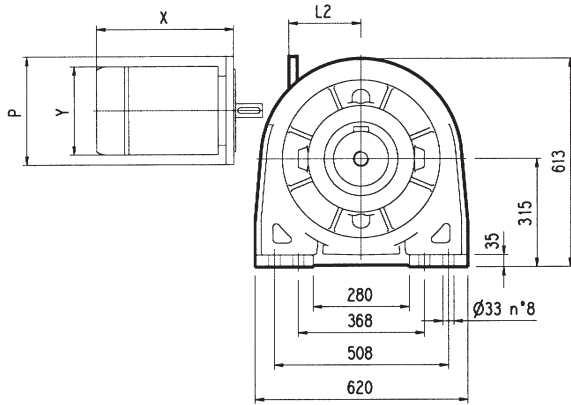
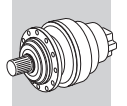


**FZ**

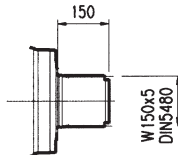
**FP**  $M_{2max} = 126000 \text{ Nm}$

	L				L1	L2	D1	L3	L4	Kg			
	PC - PZ	HC - HZ	FZ	FP						PC - PZ	HC - HZ	FZ	FP
3/V 15L3	885	606	606	606	210	-	48	230	110	800	670	575	625

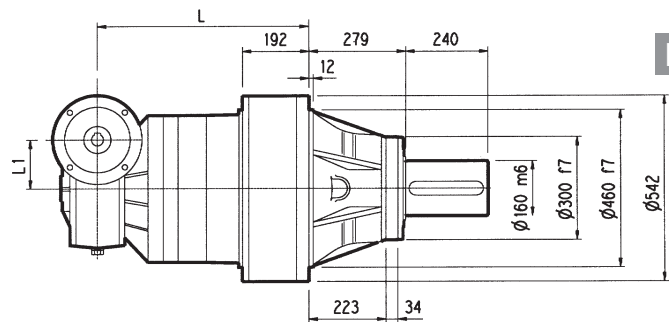
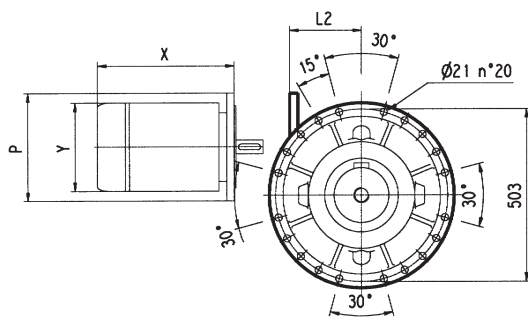
	P100		P112		P132		P160		P180		P200		P225	
	P	P	L2	P	L2	P	L2	P	L2	P	L2	P	L2	P
3/V 15L3	-	-	485	300	460	350	460	350	485	400	490	450		



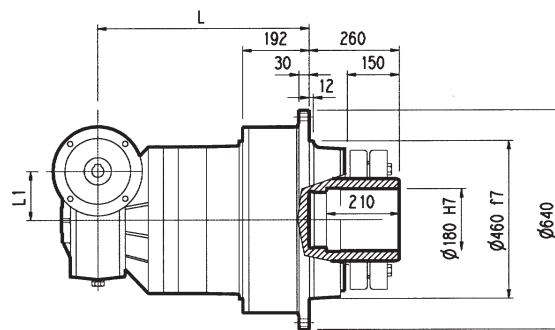
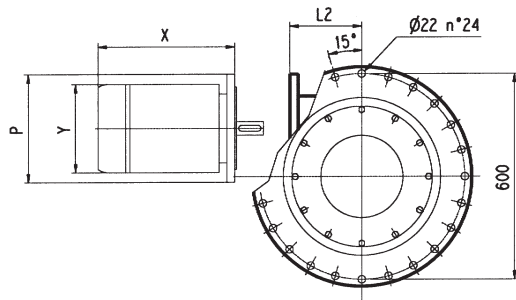
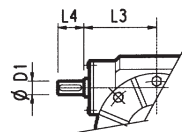
**PC**



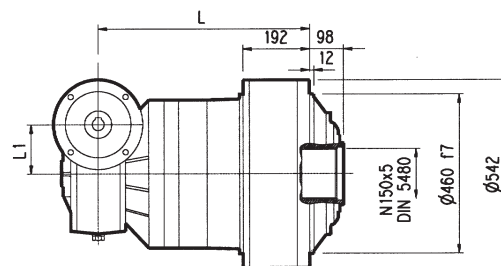
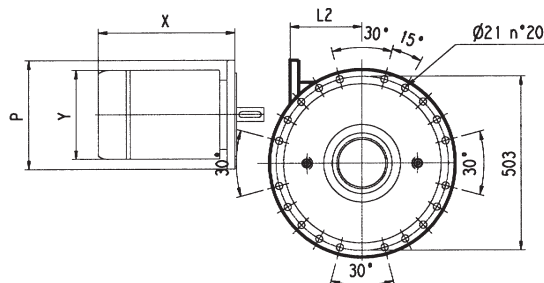
**HZ PZ**



**HC**



**FP**



**FZ**

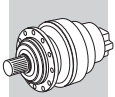
**FP**

$M_{2max} = 126000 \text{ Nm}$

	L				L1	L2	D1	L3	L4	Kg			
	PC - PZ	HC - HZ	FZ	FP						PC - PZ	HC - HZ	FZ	FP
3/V 15L4	989	710	710	710	150	190	35	185	65	690	560	470	520

	P100	P112	P132		P160		P180		P200		P225	
	P	P	L2	P	L2	P	L2	P	L2	P	L2	P
3/V 15L4	250	250	-	300	-	350	-	-	-	-	-	-



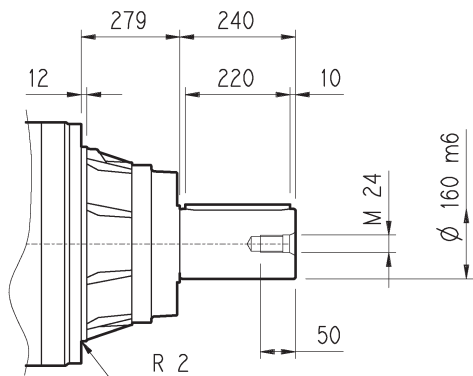
**315 L**

**315 R**

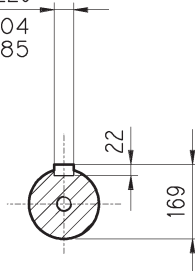
**3/V 15L3**

**3/V 15L4**

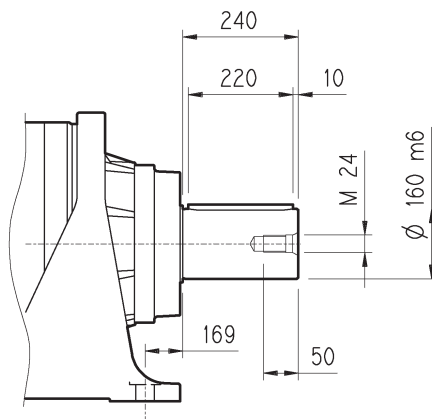
**HC**



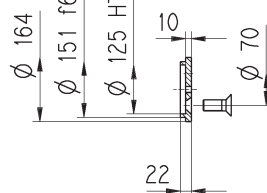
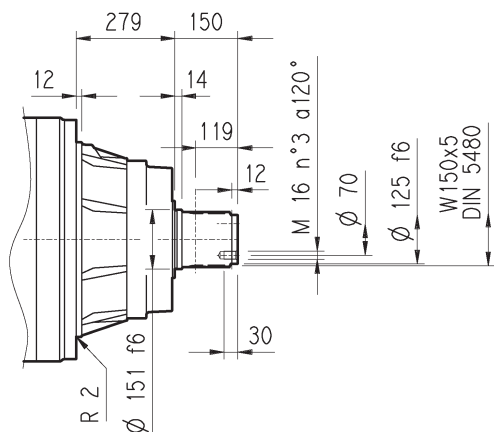
A 40x22x220  
UNI 6604  
DIN 6885



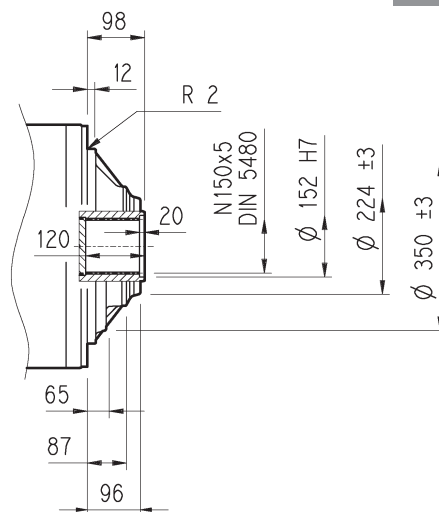
**PC**



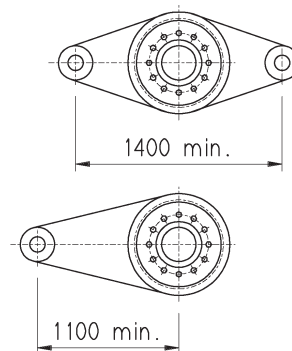
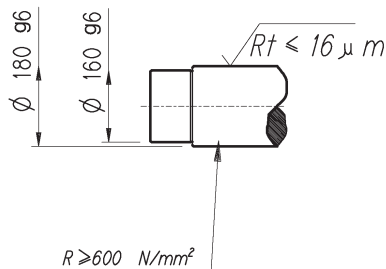
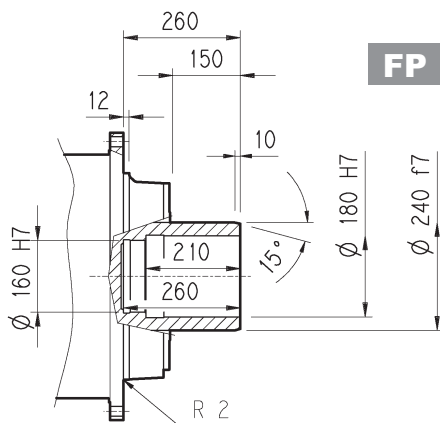
**HZ**



**FZ**



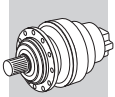
**FP**



**FP**

$M_{2max} = 126000\text{ Nm}$

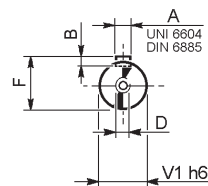
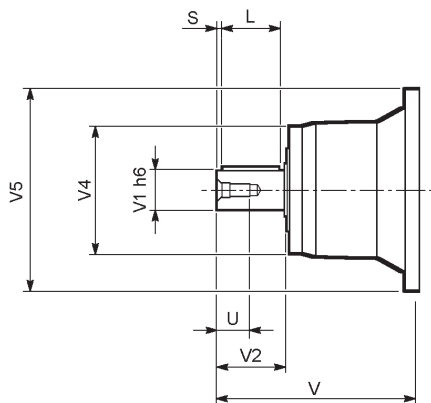




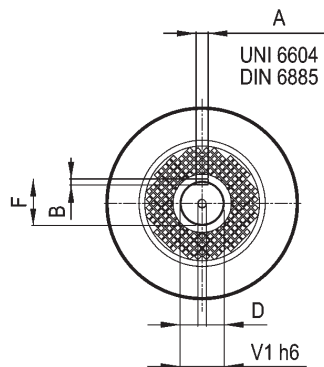
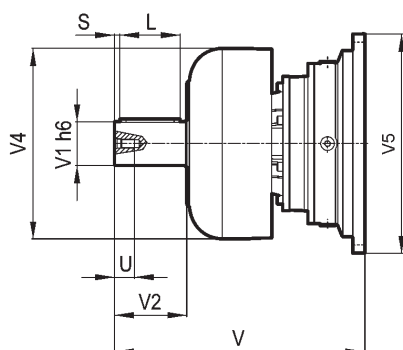
**315 L**

**315 R**

**V**



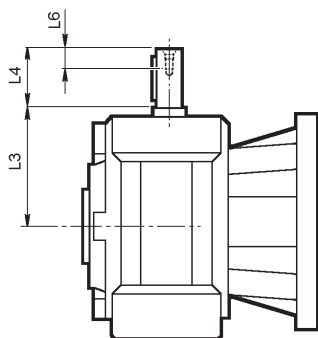
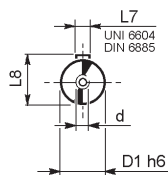
**FV**



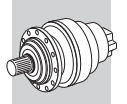
	input	V	V1	V2	V4	V5	A	B	F	L	S	D	U
315 L2	V11B	348	80	130	200	418	22	14	85	110	10	M16	36
	FV11B	456	80	130	347.5	428	22	14	85	110	10	M16	36
315 L3	V07B	315	80	130	200	345	22	14	85	110	10	M16	36
	FV07B	375	80	130	347.5	348	22	14	85	110	10	M16	36
	V07A	313	60	105	155	345	18	11	64	90	7.5	M16	36
315 L4	FV07A	363	60	105	309	348	18	11	64	90	7.5	M16	36
	V05B	239	48	82	155	245	14	9	51.5	70	6	M16	36
315 R3 (B) (C)	FV05B	276	48	82	219.5	244	14	9	51.5	70	6	M16	36
	V06B	307	60	105	155	292	18	11	64	90	7.5	M16	36
315 R4	FV06B	357	60	105	309	292	18	11	64	90	7.5	M16	36
	V05B	239	48	82	155	245	14	9	51.5	70	6	M16	36
	FV05B	276	48	82	219.5	244	14	9	51.5	70	6	M16	36

**3/V 15L3**

**3/V 15L4**



	D1 h6	L3	L4	L6	L7	L8	d
3/V 15L3 HS	48	230	110	40	14	51.5	M16
3/V 15L4 HS	35	185	65	20	10	38	M8

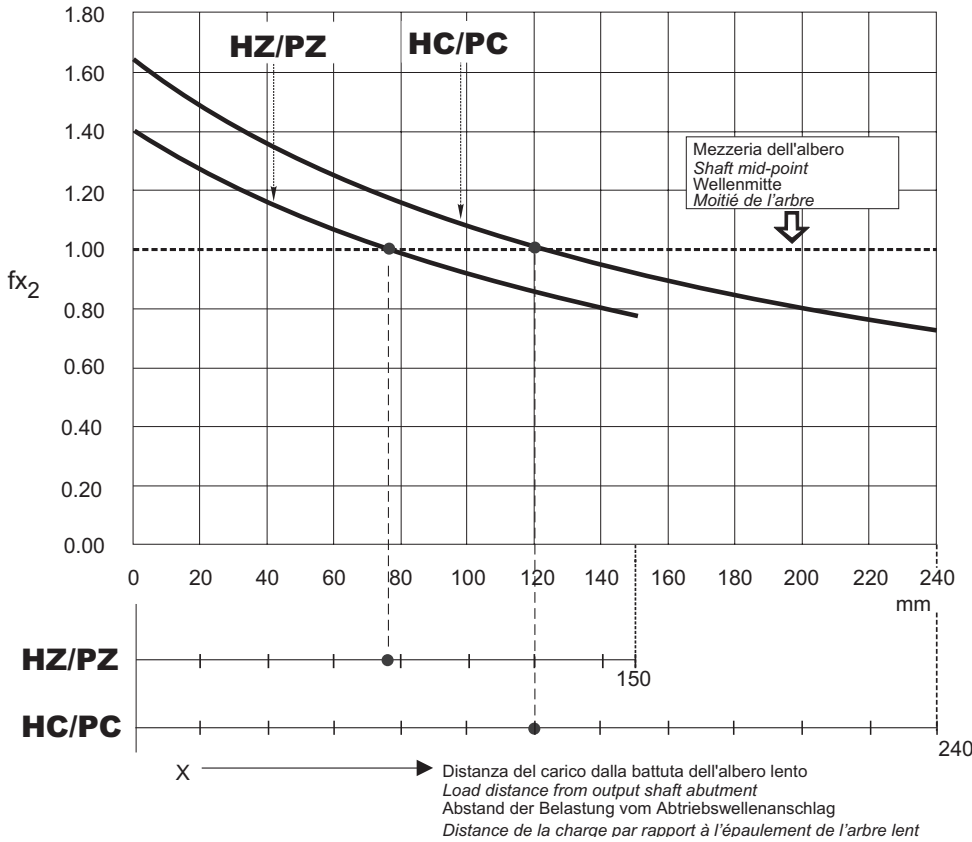


Fattore di posizione per carichi radiali sugli alberi in uscita.

Load location factor for radial loading on output shaft.

Positionsfaktor für Radialkräfte an der Abtriebswelle.

Facteur de position pour charges radiales sur les arbres en sortie.



Carichi radiali ammissibili sull'albero veloce per  $n_1 = 1000 \text{ min}^{-1}$  e 10000 h di vita teorica.

Permitted overhung loads on input shaft when  $n_1 = 1000 \text{ min}^{-1}$  and theoretical lifetime = 10000 h.

Zulässige Radialkräfte an den Antriebswellen für  $n_1 = 1000 \text{ min}^{-1}$  und 10000 std.

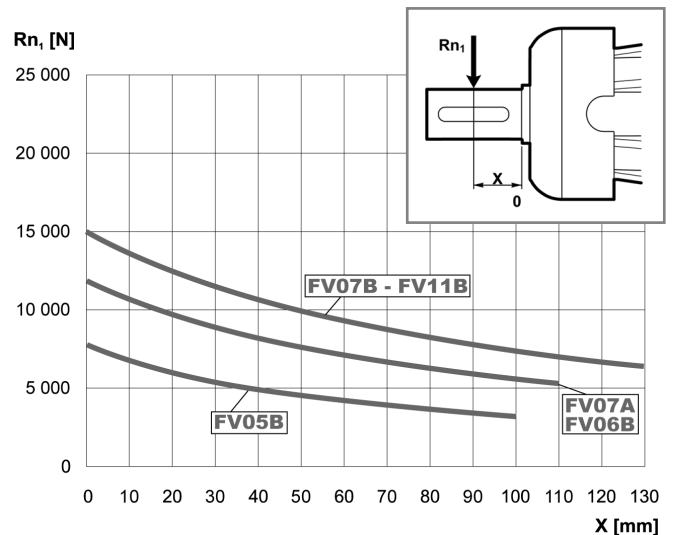
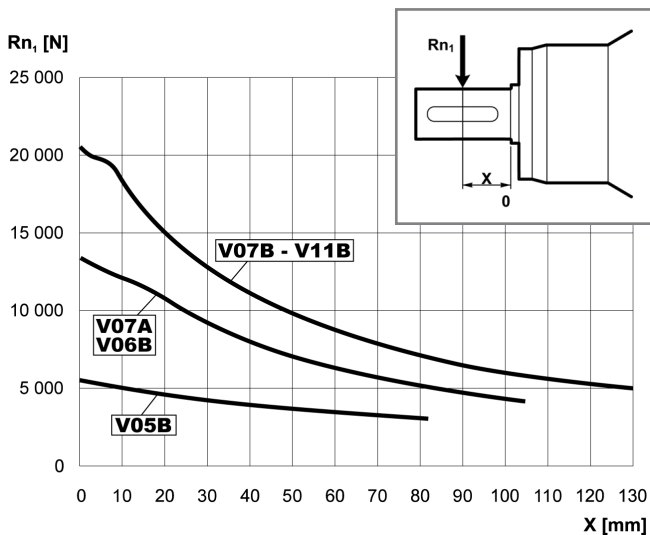
Charges radiales admissibles sur les arbres d'entrée pour  $n_1 = 1000 \text{ min}^{-1}$  et 10000 h.

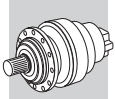
Per velocità di comando e/o durate diverse vedi il capitolo: Verifiche.

For drive speed and/or lifetimes other than those specified here, see Chapter: Verifications.

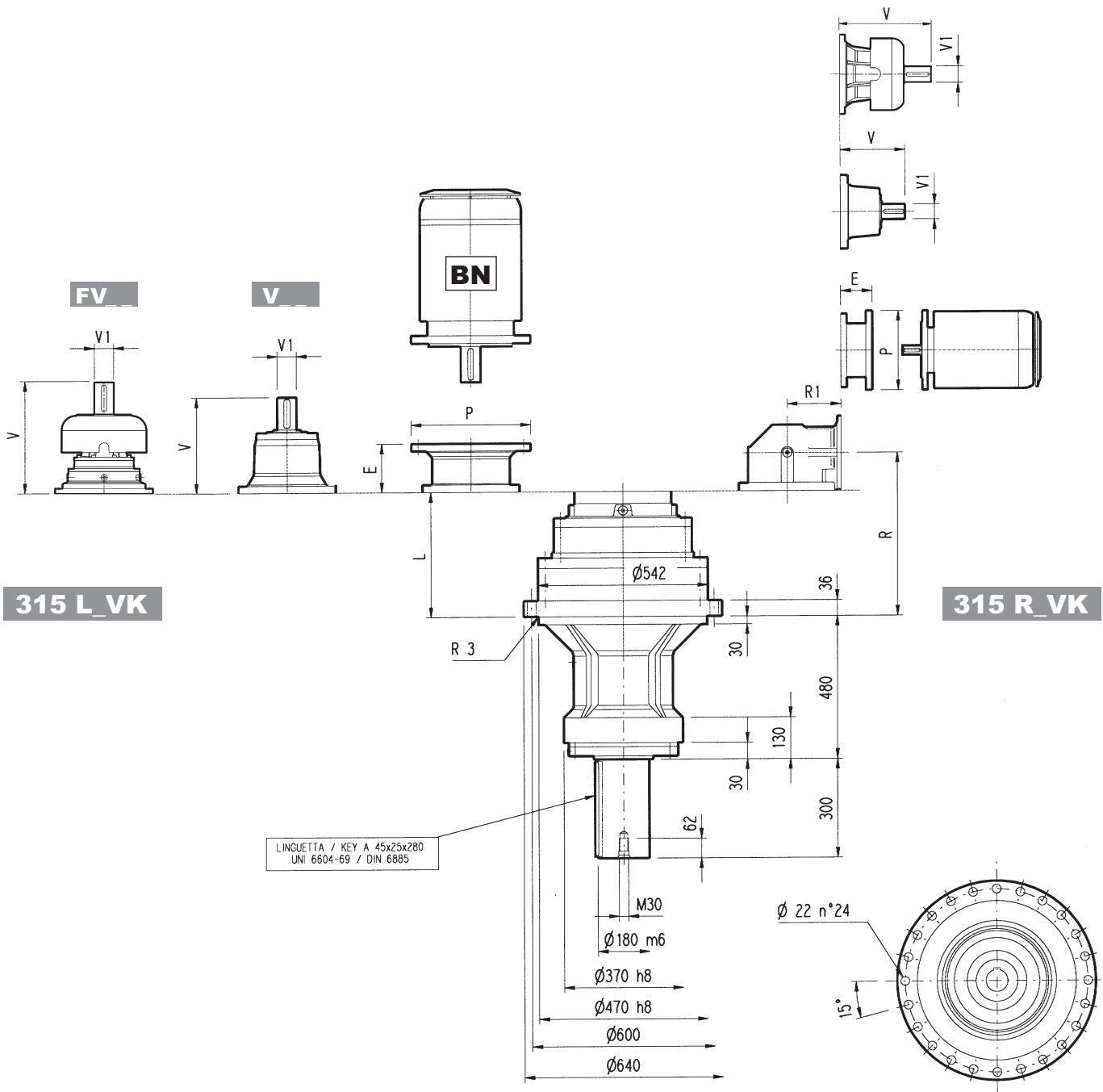
Im Hinblick auf Geschwindigkeit und/oder anderweitige Dauern verweisen wir auf Par: Prüfungen

Pour des vitesses et/ou durées différentes, voir par. Vérifications.





# 315\_VK



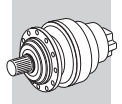
**315 L\_VK**

**315 R\_VK**

	L	Kg													P132		P160		P180		P200		P225		P250	
			V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg	E	P	E	P	E	P	E	P	E	P	E	P
<b>315 L2</b>	386	650	348	80	55	-	-	-	456	80	85	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>315 L3</b>	519	700	315	80	35	313	60	28	375	80	48	363	60	34	-	-	-	-	195	350	186	400	216	450	215	550
<b>315 L4</b>	608	710	239	48	15	-	-	-	276	48	17	-	-	-	114	300	144	350	144	350	174	400	-	-	-	-

	R	R1	Kg													P132		P160		P180		P200		P225		P250	
				V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg	E	P	E	P	E	P	E	P	E	P	E	P
<b>315 R3 (B)</b>	611	345	720	307	60	23	-	-	-	357	60	28	-	-	-	-	-	-	152	350	182	400	212	450	193	550	
<b>315 R3 (C)</b>	611	390	730	307	60	23	-	-	-	357	60	28	-	-	-	-	-	-	152	350	182	400	212	450	193	550	
<b>315 R4</b>	638	225	690	239	48	15	-	-	-	276	48	17	-	-	-	114	300	144	350	144	350	174	400	-	-	-	



Il diagramma seguente consente di ricavare il carico radiale ammissibile  $R_{x2}$  quando questo è applicato alla distanza  $x$  dallo spallamento dell'albero lento del riduttore 315\_VK.

Le curve si riferiscono al valore risultante dal rapporto fra il carico assiale  $A_{n2}$  e il carico radiale  $R_{n2}$ , entrambi riferiti a  $n_2 = 10 \text{ min}^{-1}$  e durata teorica di 10000 h.

The diagram below allows the calculation of permitted overhung load  $R_{x2}$  on the output shaft of gearbox type 315\_VK, with radial force applying at a distance  $x$  from shaft shoulder.

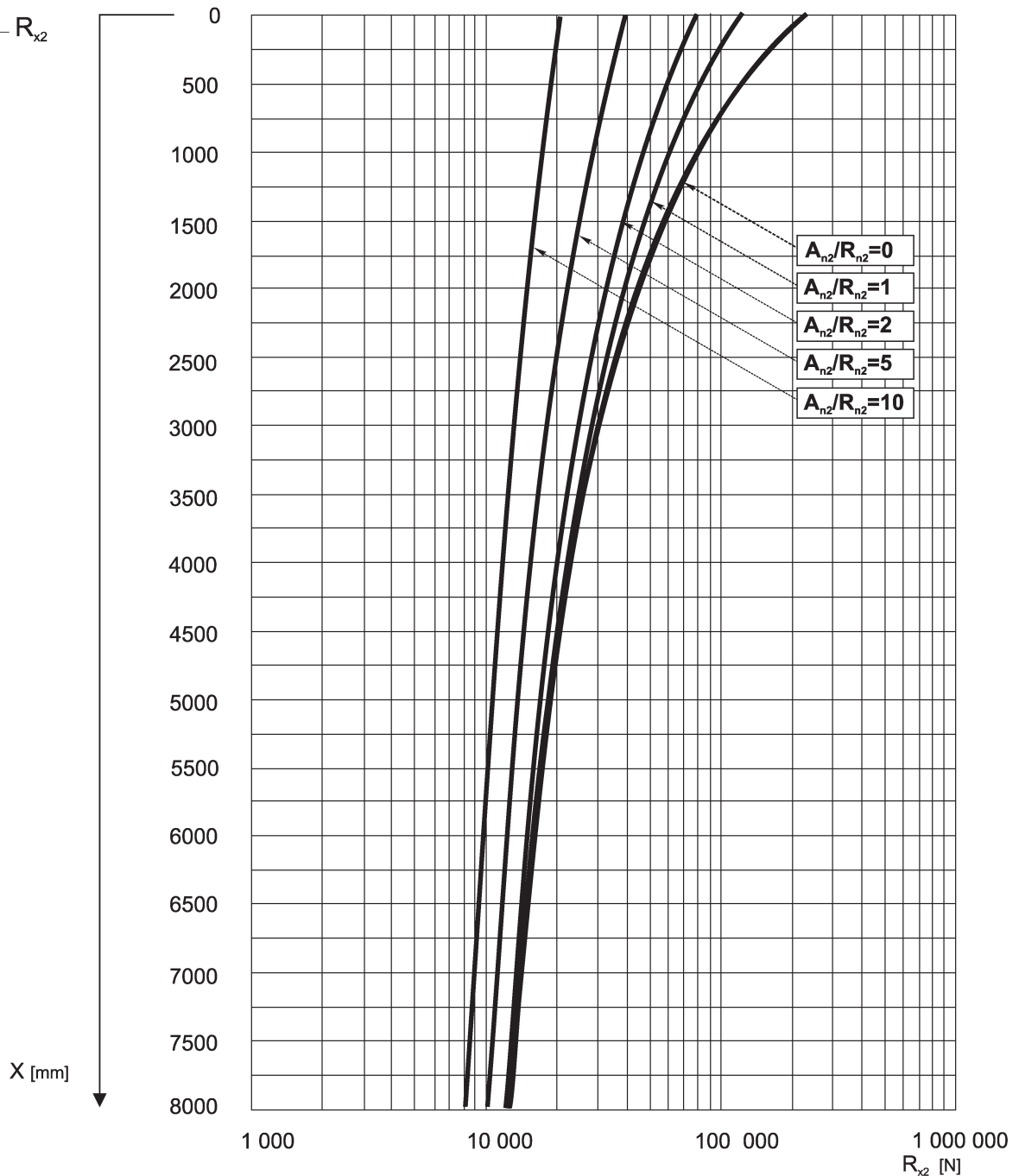
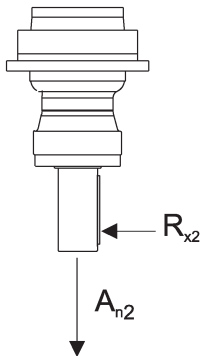
The curves are relevant to value resulting from the relationship of trust load  $A_{n2}$  to radial load  $R_{n2}$ , based on  $n_2 = 10 \text{ min}^{-1}$  and 10000 hrs theoretical lifetime.

Das nachstehende Diagram ermöglicht das Individuieren der zulässigen, auf die Welle des Getriebes 315\_VK einwirkenden Radialkraft, die auf der Distanz  $x$  vom Anschlag der Welle selbst appliziert wird.

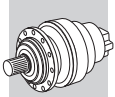
Die Kurven beziehen sich auf den Wert, der sich aus dem Verhältnis zwischen der Axialkraft  $A_{n2}$  und der Radialkraft  $R_{n2}$  für  $n_2 = 10 \text{ min}^{-1}$  und einer Dauer von 10000 Std. ergibt.

Le diagramme suivant permet de déterminer la charge radiale admissible  $R_{x2}$  sur l'arbre lent du réducteur 315\_VK appliqué à la distance  $x$  de l'épaulement de l'arbre.

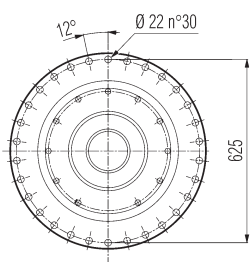
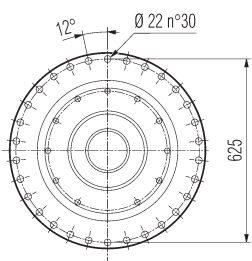
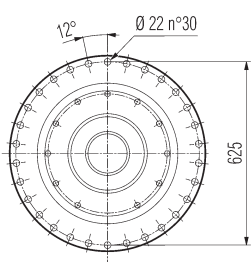
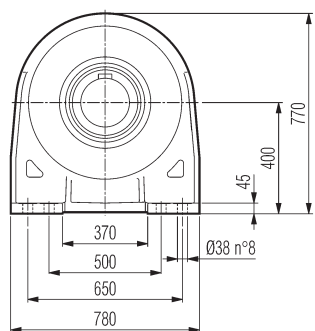
Les courbes se réfèrent à la valeur résultant de l'équation entre la charge axiale  $A_{n2}$  et la charge radiale  $R_{n2}$  pour  $n_2 = 10 \text{ min}^{-1}$  et durée de 10000 h.



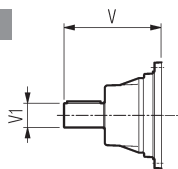




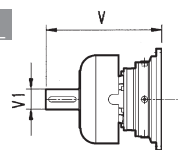
# 316 L



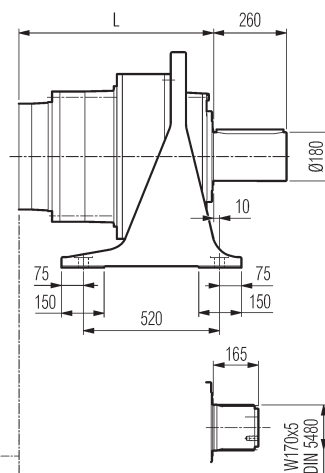
**V**



**FV**

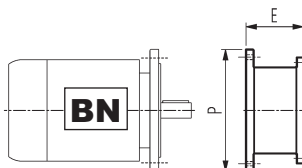
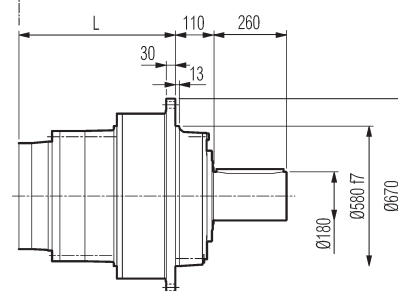


**PC**

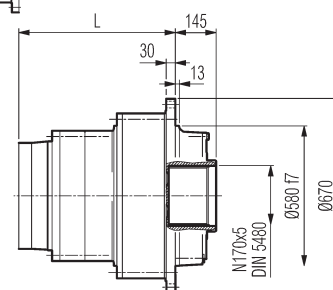


**HZ PZ**

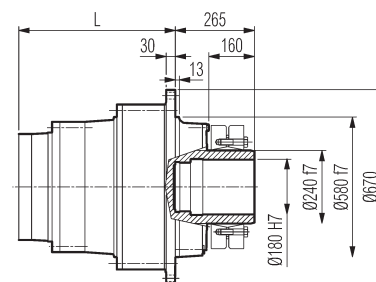
**HC**



**FZ**



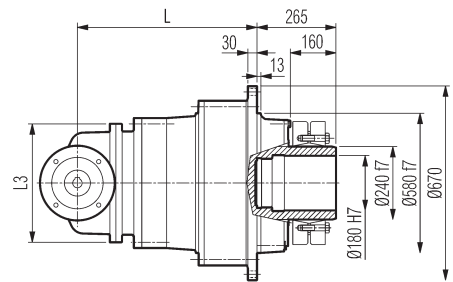
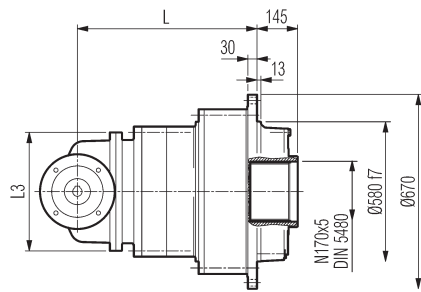
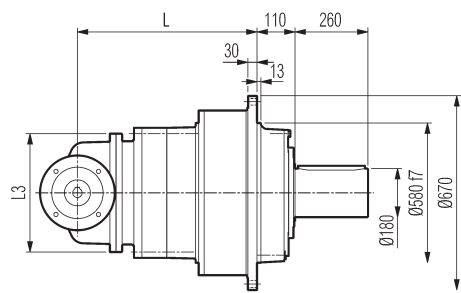
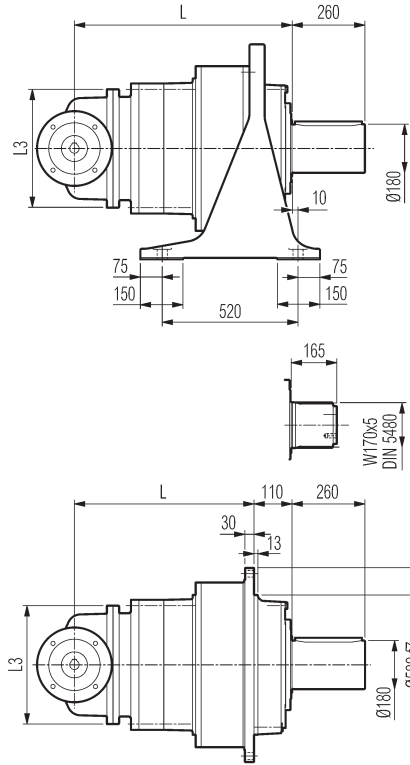
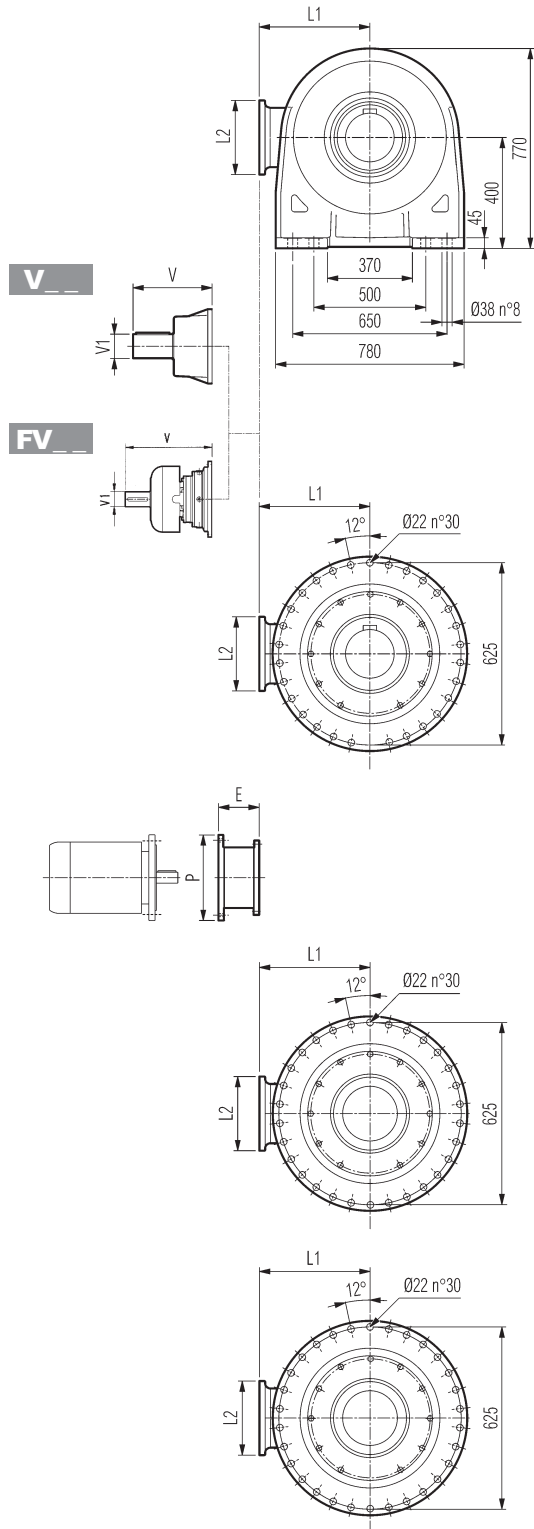
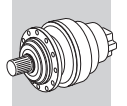
**FP**



**FP**

$M_{2max} = 162000 \text{ Nm}$

	L				Kg															
	PC - PZ	HC - HZ	FZ	FP	PC - PZ	HC - HZ	FZ	FP	V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg
<b>316 L2</b>	541	431	431	431	790	590	520	540	348	80	55	-	-	-	456	80	85	-	-	-
<b>316 L3</b>	674	564	564	564	840	640	570	590	315	80	35	313	60	28	375	80	48	363	60	34
<b>316 L4</b>	763	653	653	653	860	660	590	610	239	48	15	-	-	-	276	48	17	-	-	-
	P132		P160		P180		P200		P225		P250									
	E	P	E	P	E	P	E	P	E	P	E	P	E	P						
<b>316 L3</b>	-	-	-	-	195	350	186	400	216	450	215	550	-	-						
<b>316 L4</b>	114	300	144	350	144	350	174	400	-	-	-	-	-	-						



PC

HZ PZ

HC

FZ

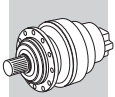
FP

**FP**  $M_{2max} = 162000 \text{ Nm}$

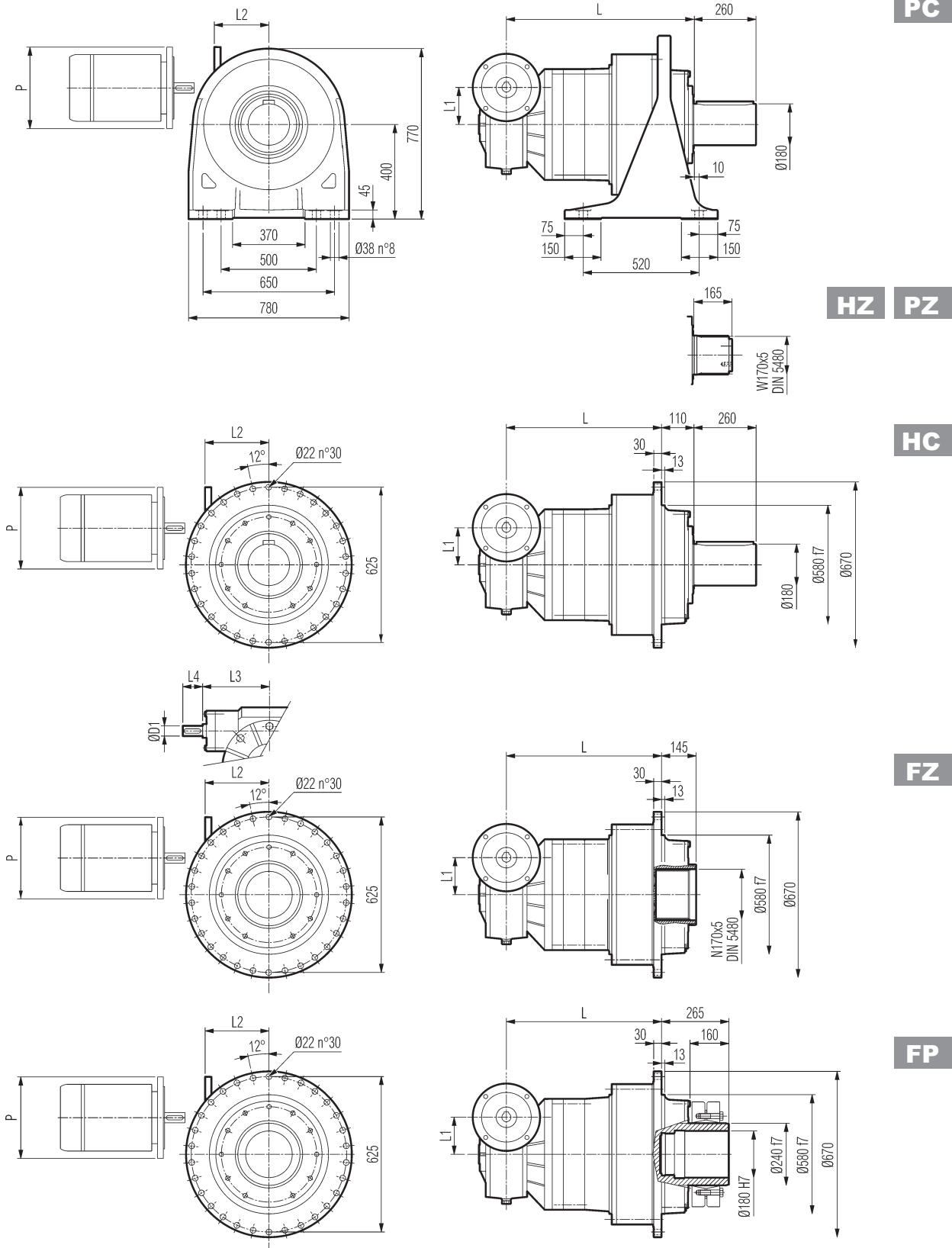
	L				L1	L2	L3	Kg				Kg			Kg			Kg					
	PC-PZ	HC-HZ	FZ	FP				PC-PZ	HC-HZ	FZ	FP	V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg
<b>316 R3 (B)</b>	766	656	656	656	345	292	400	910	710	640	660	307	60	23	-	-	-	357	60	28	-	-	-
<b>316 R3 (C)</b>	766	656	656	656	390	292	480	920	720	650	670	307	60	23	-	-	-	357	60	28	-	-	-
<b>316 R4</b>	793	683	683	683	225	245	345	890	690	620	640	239	48	15	-	-	-	276	48	17	-	-	-

	P132		P160		P180		P200		P225		P250	
	E	P	E	P	E	P	E	P	E	P	E	P
<b>316 R3 (B)</b>	-	-	-	-	152	350	182	400	212	450	193	550
<b>316 R3 (C)</b>	-	-	-	-	152	350	182	400	212	450	193	550
<b>316 R4</b>	114	300	144	350	144	350	174	400	-	-	-	-



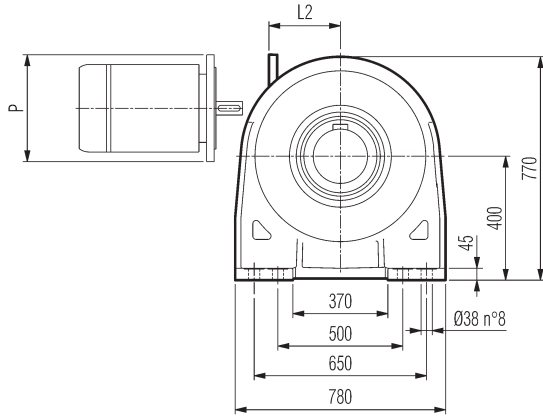
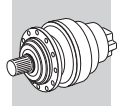
# 3/V 16L3



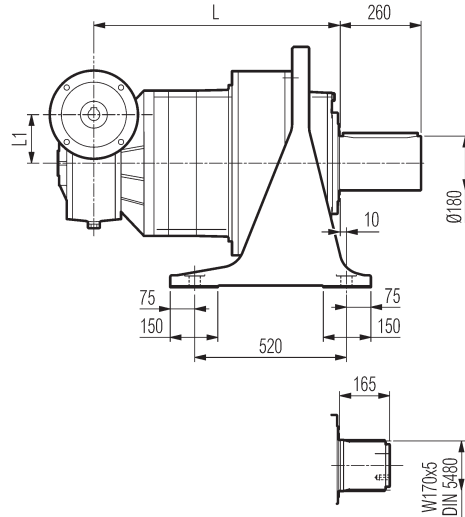
**FP**  $M_{2max} = 162000 \text{ Nm}$

	L				L1	D1	L3	L4	Kg			
	PC - PZ	HC - HZ	FZ	FP					PC - PZ	HC - HZ	FZ	FP
3/V 16L3	766	656	656	656	210	48	230	110	990	790	720	740
	P132		P160		P180		P200		P225			
	L2	P	L2	P	L2	P	L2	P	L2	P		
3/V 16L3	485	300	460	350	460	350	485	400	490	450		

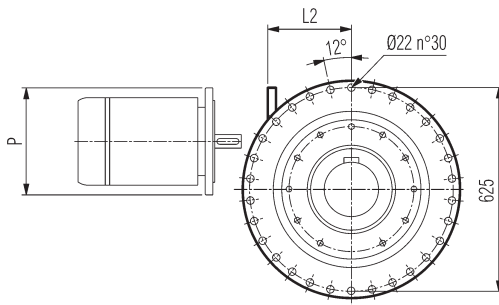
# 3/V 16L4



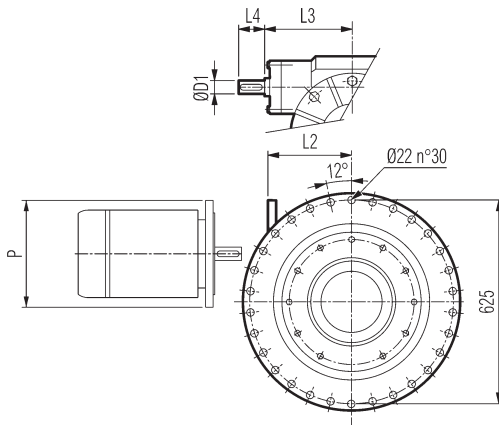
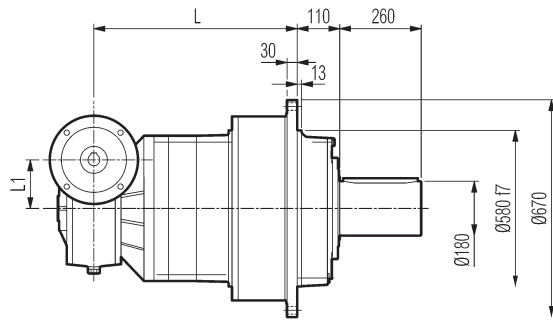
**PC**



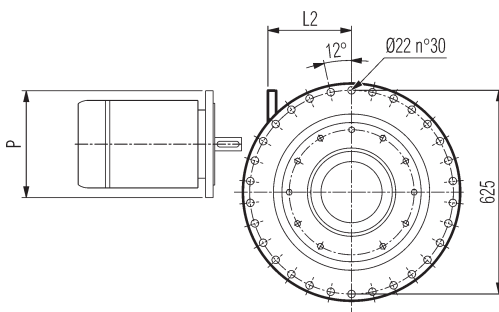
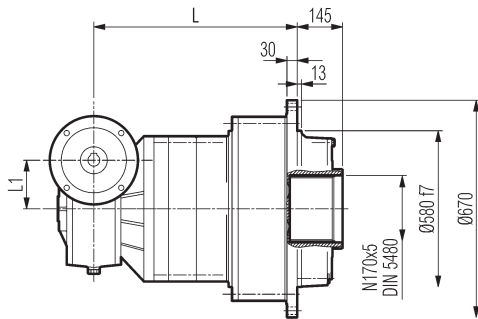
**HZ PZ**



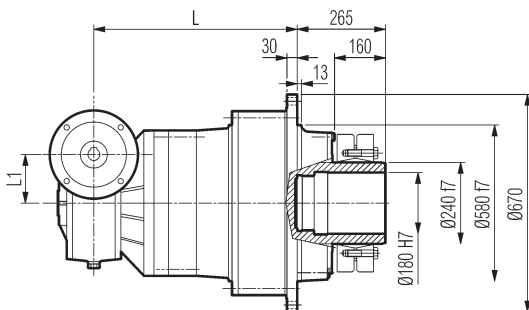
**HC**



**FZ**



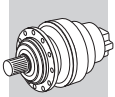
**FP**



**FP**

$M_{2max} = 162000 \text{ Nm}$

	L				L1	D1	L3	L4	Kg			
	PC - PZ	HC - HZ	FZ	FP					PC - PZ	HC - HZ	FZ	FP
3/V 16L4	865	755	755	755	150	35	185	65	900	700	630	650
3/V 16L4	P100		P112		P132		P160		P			
	L2	P	L2	P	L2	P	L2	P	L2	P		
	190	250	190	250	190	300	190	350				

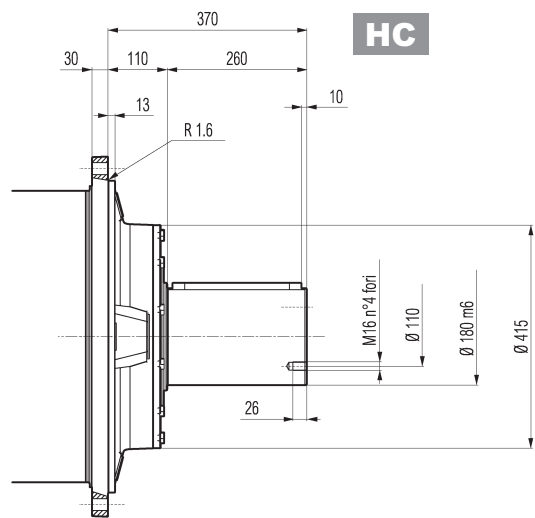


316 L

316 R

3/V 16L3

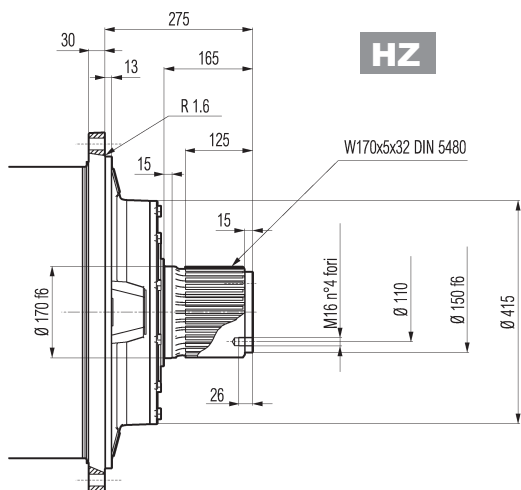
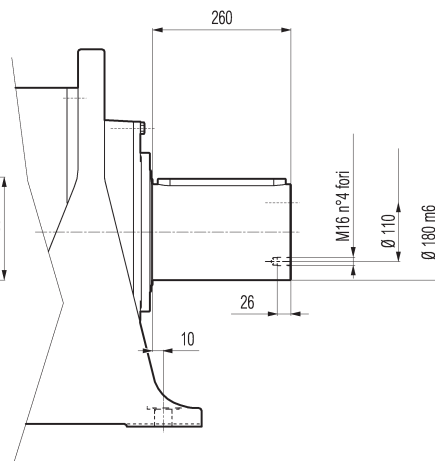
3/V 16L4



HC

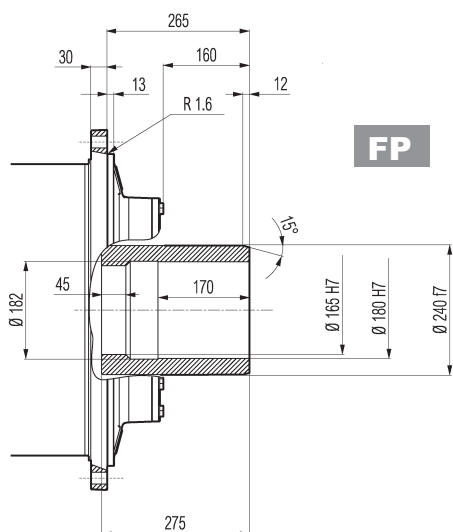
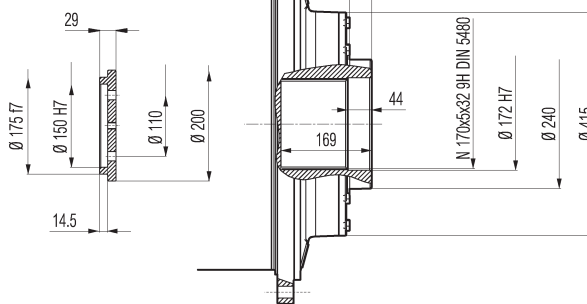
PC

A45x25x240  
UNI 6604  
DIN 6885

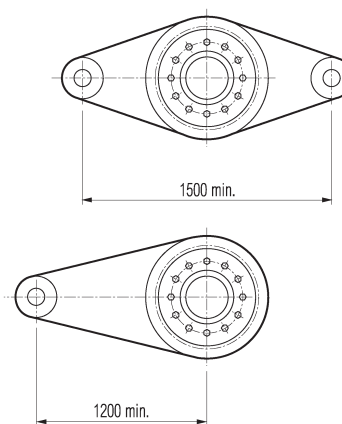
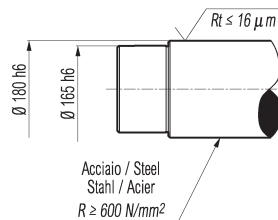


HZ

FZ

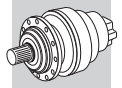


FP

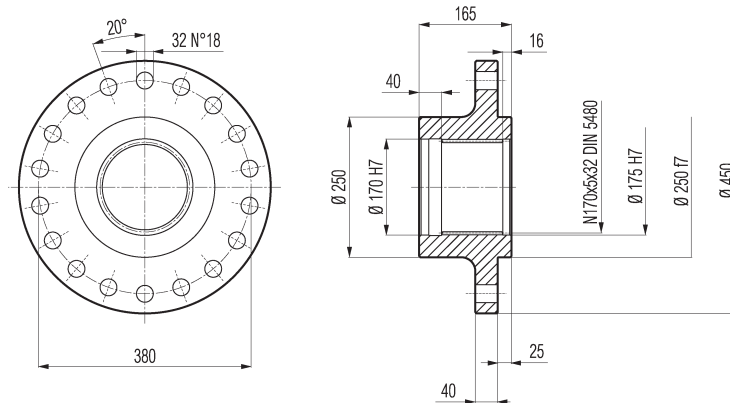
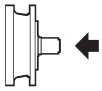


FP

M<sub>2max</sub> = 162000 Nm

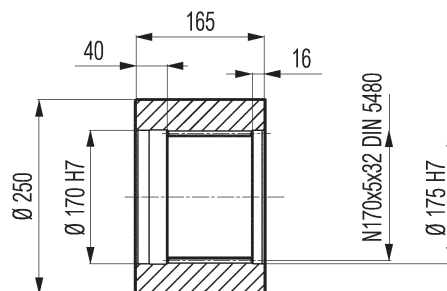
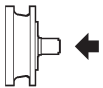
**316 L****316 R****3/V 16L3****3/V 16L4**

Flangia / Flange  
Flansch / Brides

**WOA**

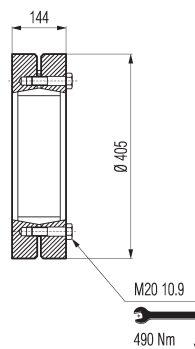
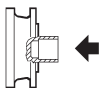
Materiale : Acciaio C40  
Material : Steel C40  
Material : Stahl C40  
Màterial : Acier C40

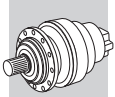
Manicotti lisci / Sleeve couplings  
Naben / Manchons lisses a canneleure interieure

**MOA**

Materiale : Acciaio C40  
Material : Steel C40  
Material : Stahl C40  
Màterial : Acier C40

Giunto ad attrito / Shrink disc  
Schrumpfscheibe / Frette de serrage

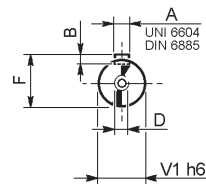
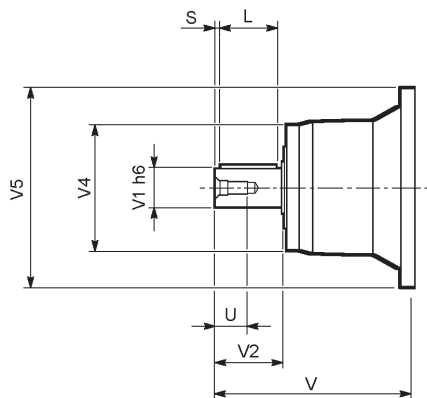
**GOA**



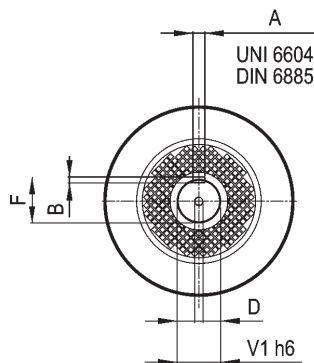
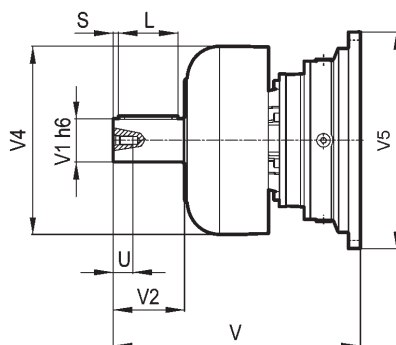
**316 L**

**316 R**

**V**



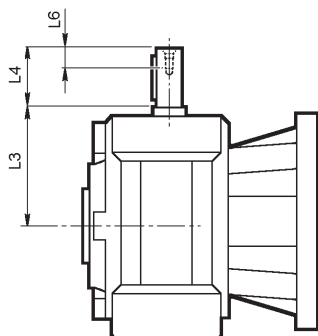
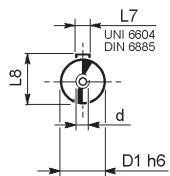
**FV**



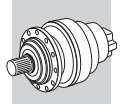
	input	V	V1	V2	V4	V5	A	B	F	L	S	D	U
316 L2	V11B	348	80	130	200	418	22	14	85	110	10	M16	36
	FV11B	456	80	130	347.5	428	22	14	85	110	10	M16	36
316 L3	V07B	315	80	130	200	345	22	14	85	110	10	M16	36
	FV07B	375	80	130	347.5	348	22	14	85	110	10	M16	36
	V07A	313	60	105	155	345	18	11	64	90	7.5	M16	36
316 L4	FV07A	363	60	105	309	348	18	11	64	90	7.5	M16	36
	V05B	239	48	82	155	245	14	9	51.5	70	6	M16	36
316 R3 (B) (C)	FV05B	276	48	82	219.5	244	14	9	51.5	70	6	M16	36
	V06B	307	60	105	155	292	18	11	64	90	7.5	M16	36
316 R4	FV06B	357	60	105	309	292	18	11	64	90	7.5	M16	36
	V05B	239	48	82	155	245	14	9	51.5	70	6	M16	36
	FV05B	276	48	82	219.5	244	14	9	51.5	70	6	M16	36

**3/V 16L3**

**3/V 16L4**



	D1 h6	L3	L4	L6	L7	L8	d
3/V 16L3 HS	48	230	110	40	14	51.5	M16
3/V 16L4 HS	35	185	65	20	10	38	M8

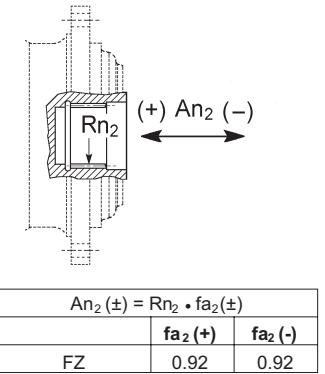
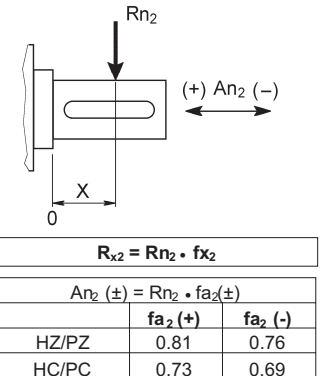
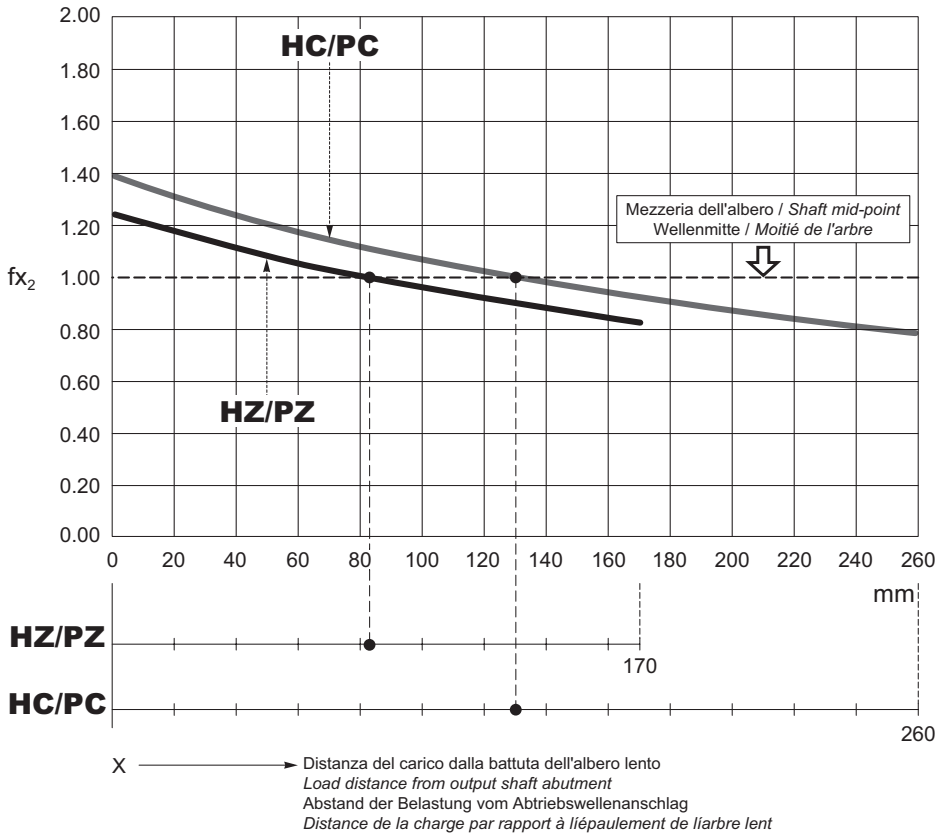


Fattore di posizione per carichi radiali sugli alberi in uscita.

Load location factor for radial loading on output shaft.

Positionsfaktor für Radialkräfte an der Abtriebswelle.

Facteur de position pour charges radiales sur les arbres en sortie.



Carichi radiali ammissibili sull'albero veloce per  $n_1 = 1000 \text{ min}^{-1}$  e 10000 h di vita teorica.

Permitted overhung loads on input shaft when  $n_1 = 1000 \text{ min}^{-1}$  and theoretical lifetime = 10000 h.

Zulässige Radialkräfte an den Antriebswellen für  $n_1 = 1000 \text{ min}^{-1}$  und 10000 std.

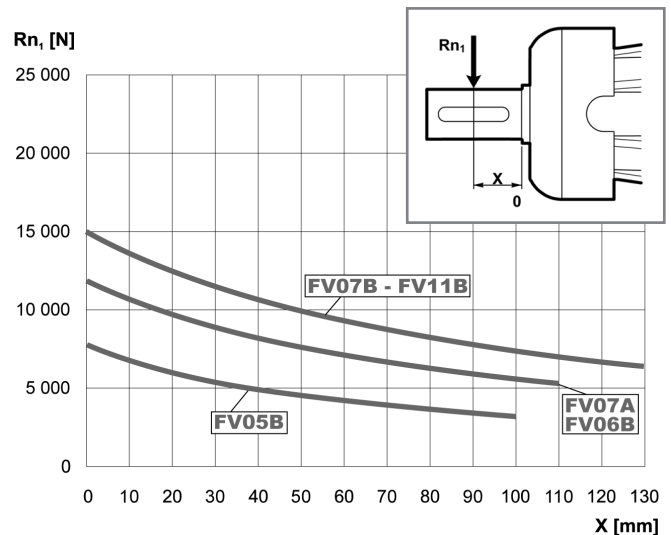
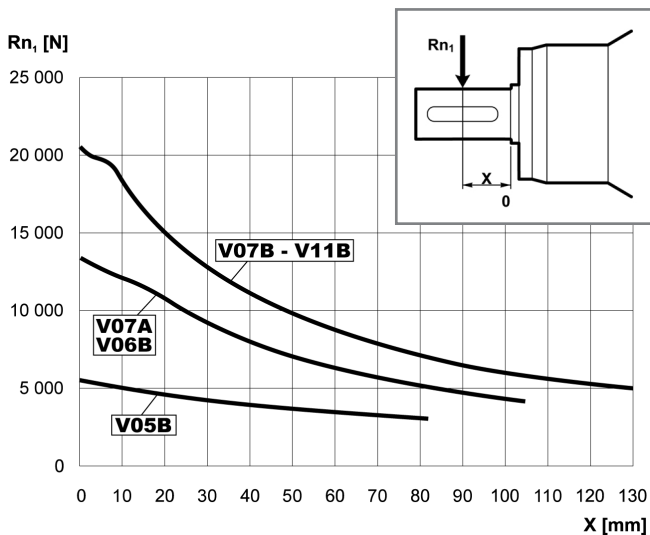
Charges radiales admissibles sur les arbres d'entrée pour  $n_1 = 1000 \text{ min}^{-1}$  et 10000 h.

Per velocità di comando e/o durate diverse vedi il capitolo: Verifiche.

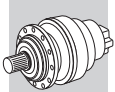
For drive speed and/or lifetimes other than those specified here, see Chapter: Verifications.

Im Hinblick auf Geschwindigkeit und/oder anderweitige Dauerverweisen wir auf Par: Prüfungen

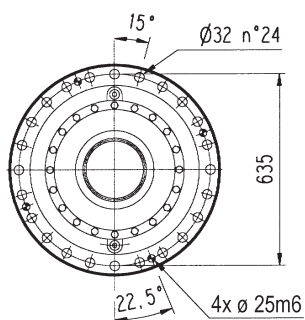
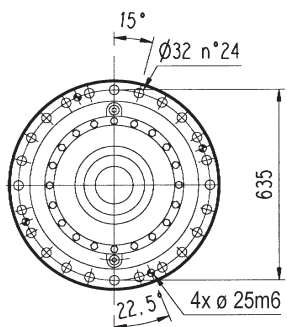
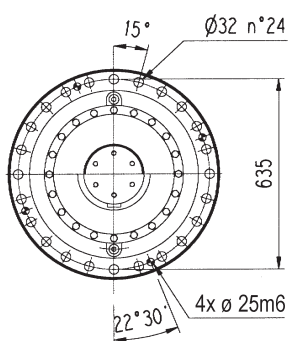
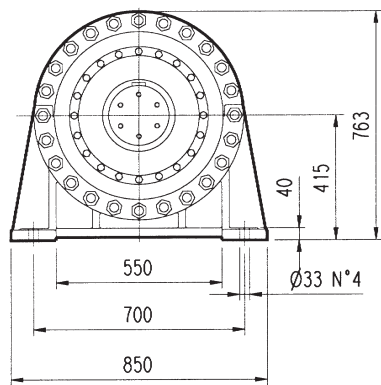
Pour des vitesses et/ou durées différentes, voir par. Vérifications.



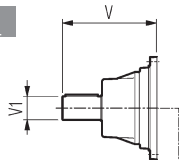




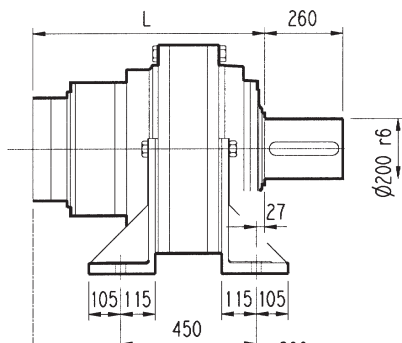
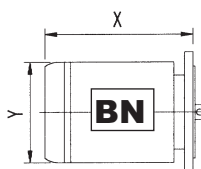
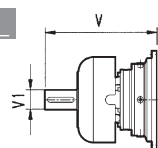
# 317 L



**V**



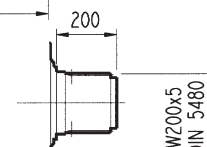
**FV**



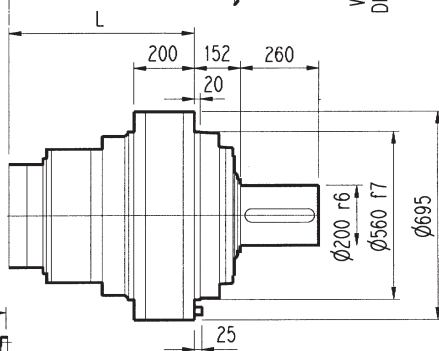
**PC**

**HZ**

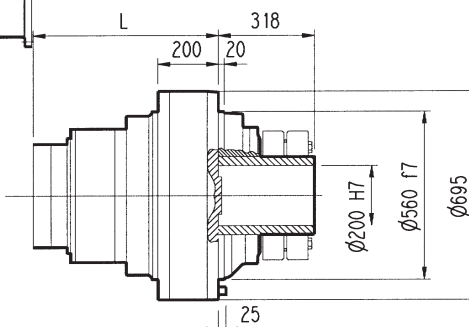
**PZ**



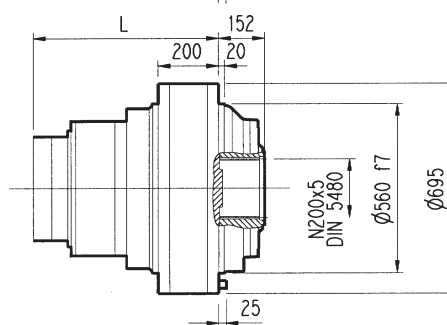
**HC**



**FP**



**FZ**



**FP**

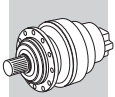
**M<sub>2max</sub> = 216000 Nm**

	L				Kg				Kg				Kg							
	PC - PZ	HC - HZ	FZ	FP	PC - PZ	HC - HZ	FZ	FP	V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg
<b>317 L2</b>	624	475	475	475	1080	930	880	930	343	80	55	-	-	-	451	80	71	-	-	-
<b>317 L3</b>	774	622	622	622	1140	990	940	990	315	80	35	313	60	28	375	80	48	363	60	34
<b>317 L4</b>	862	710	710	710	1152	1000	952	1000	239	48	15	-	-	-	276	48	17	-	-	-

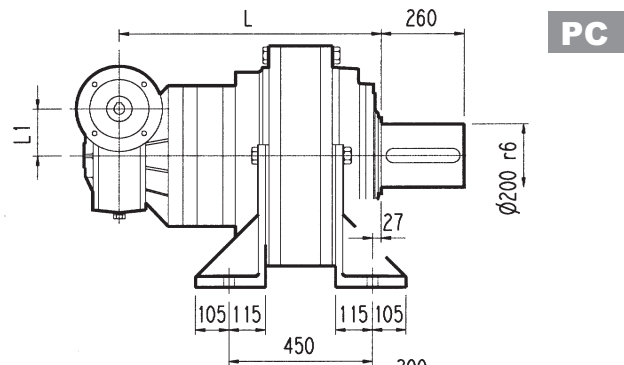
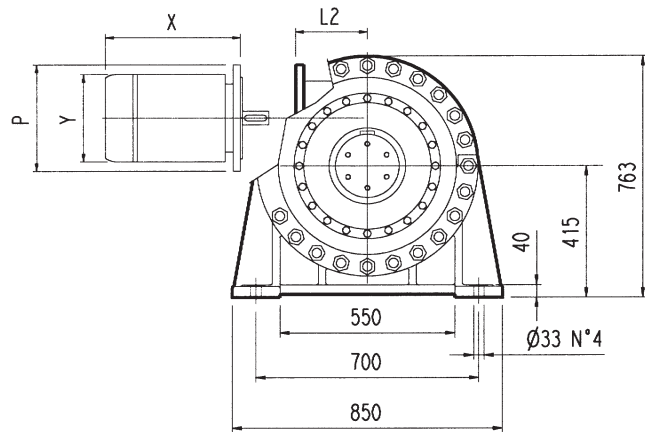
  

	P132		P160		P180		P200		P225		P250	
	E	P	E	P	E	P	E	P	E	P	E	P
<b>317 L3</b>	-	-	-	-	196	350	186	400	216	450	216	550
<b>317 L4</b>	114	300	144	350	144	350	174	400	-	-	-	-

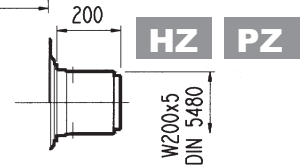




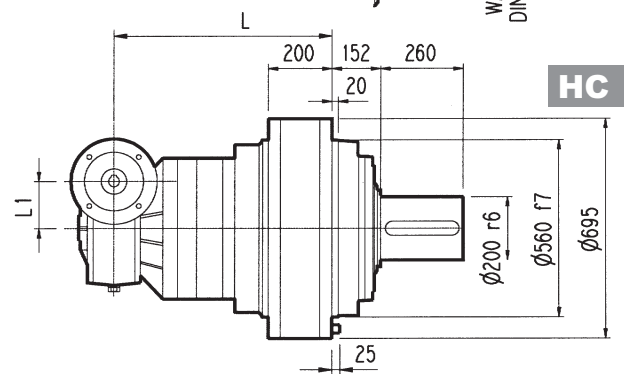
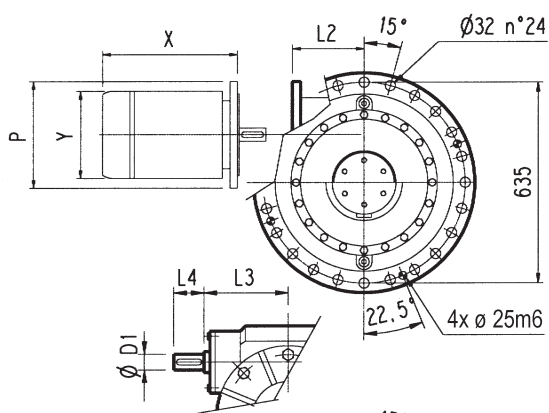
# 3/V 17L3



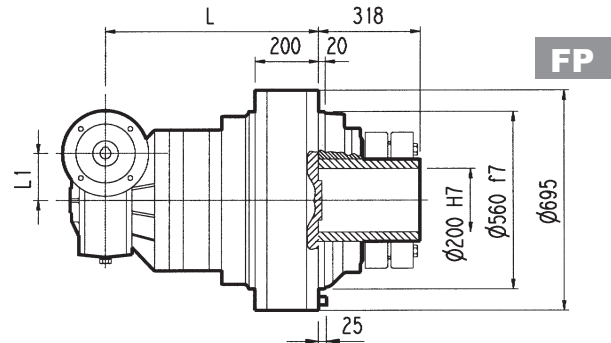
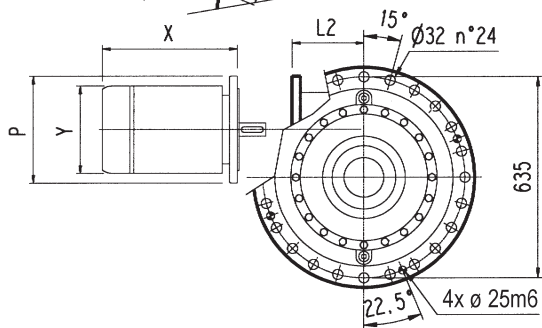
**PC**



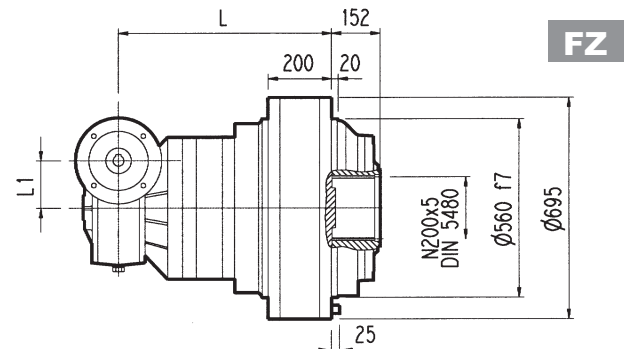
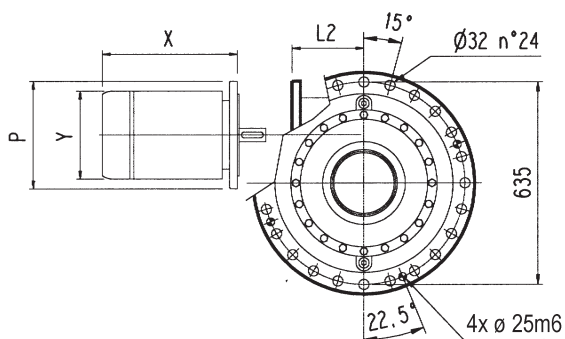
**HZ PZ**



**HC**



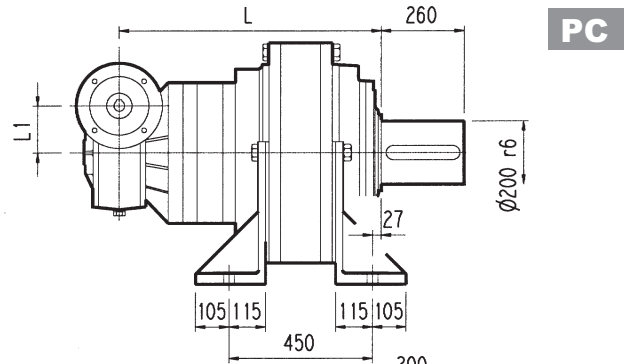
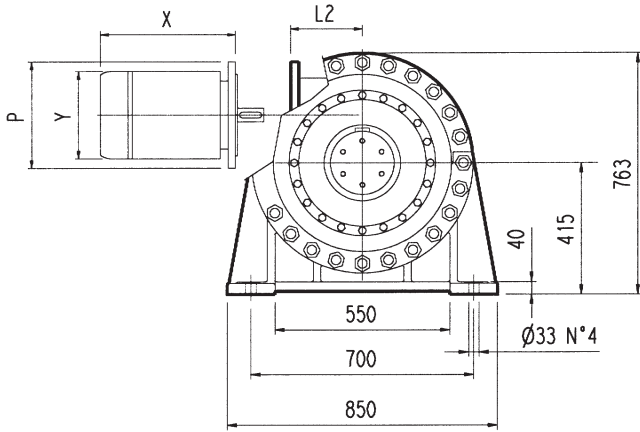
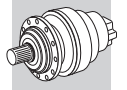
**FP**



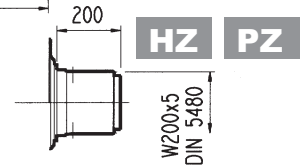
**FZ**

**FP**  $M_{2max} = 216000 \text{ Nm}$

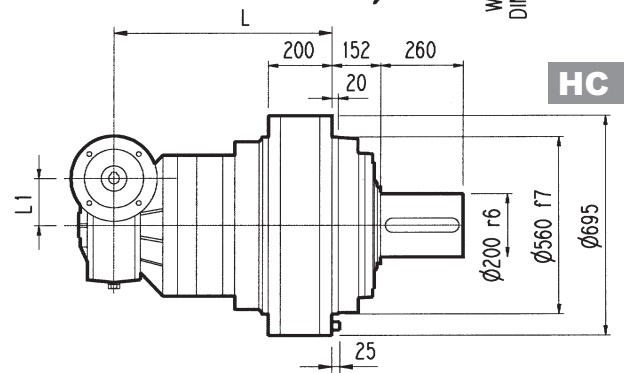
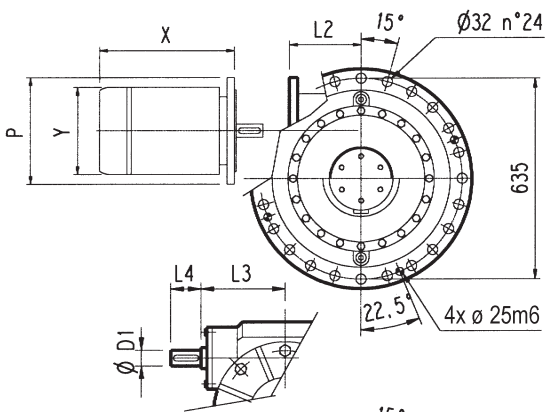
	L				L1	D1	L3	L4	Kg			
	PC - PZ	HC - HZ	FZ	FP						PC - PZ	HC - HZ	FZ
3/V 17L3	894	745	745	745	250	55	276	110	1400	1250	1200	1250
3/V 17L3	P132		P160		P180		P200		P225			
	L2	P	L2	P	L2	P	L2	P	L2	P	L2	P
	531	300	506	350	506	350	531	400	536	450		



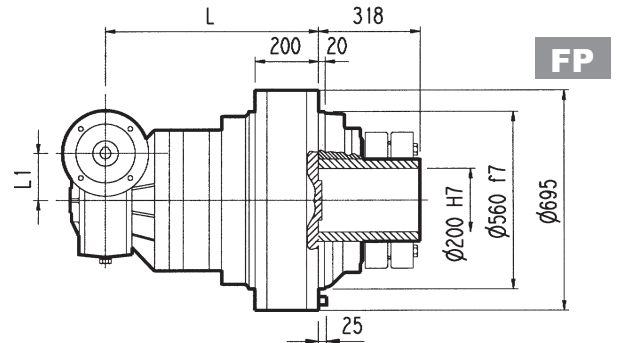
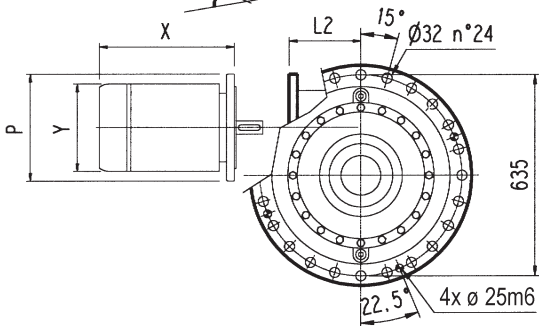
**PC**



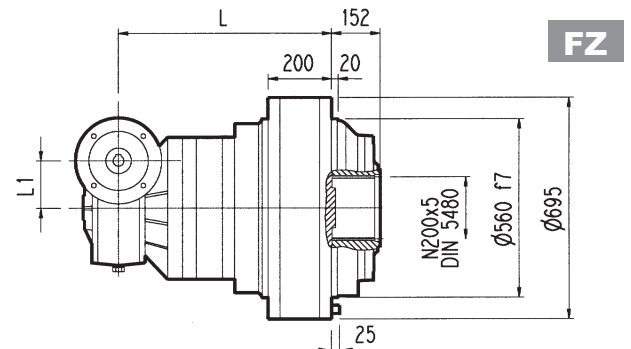
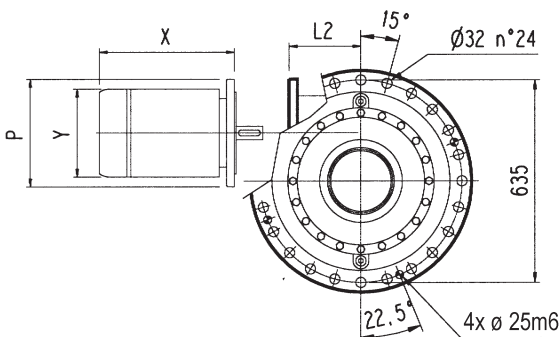
**HZ PZ**



**HC**



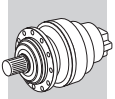
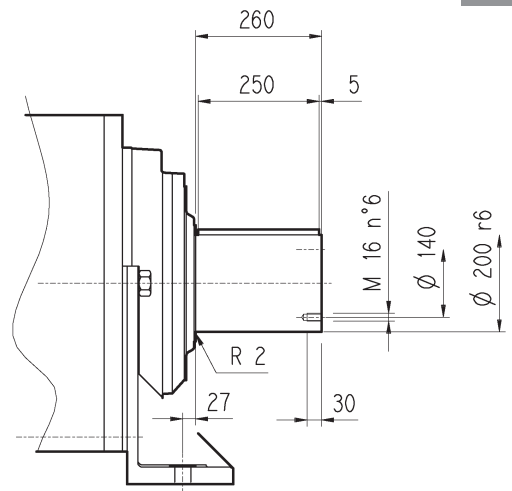
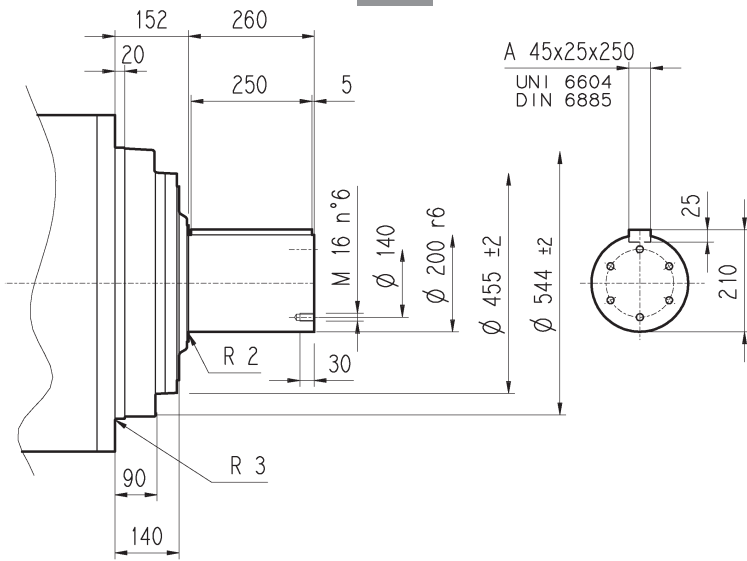
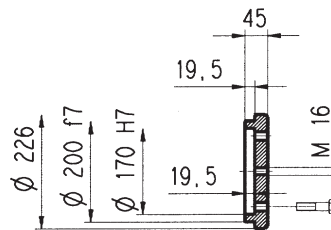
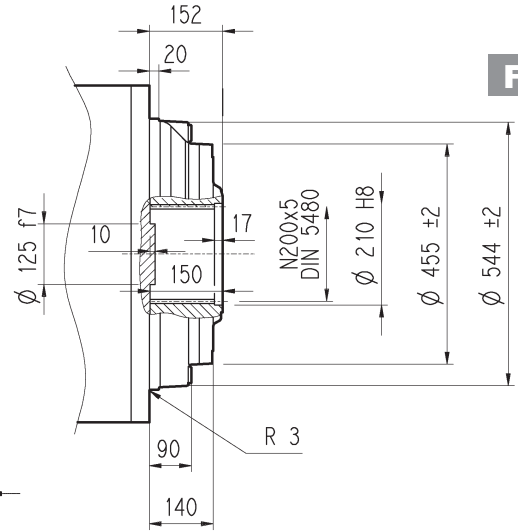
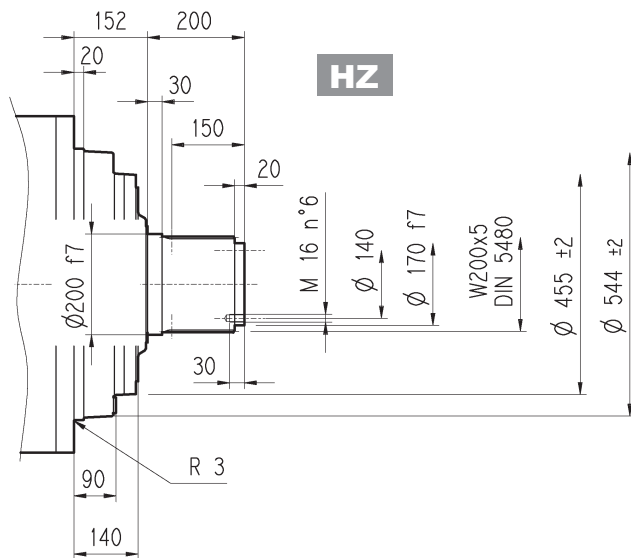
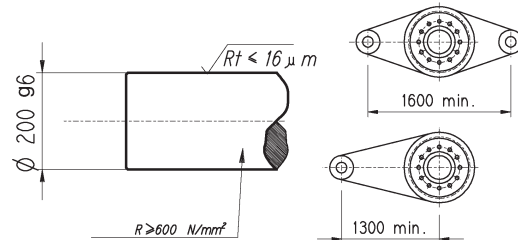
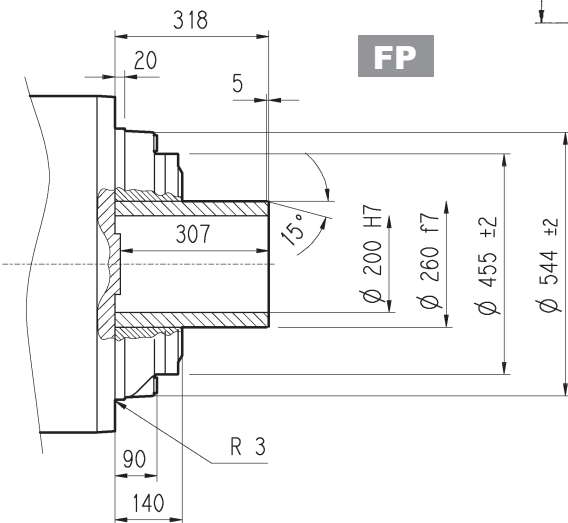
**FP**

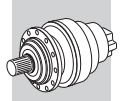


**FZ**

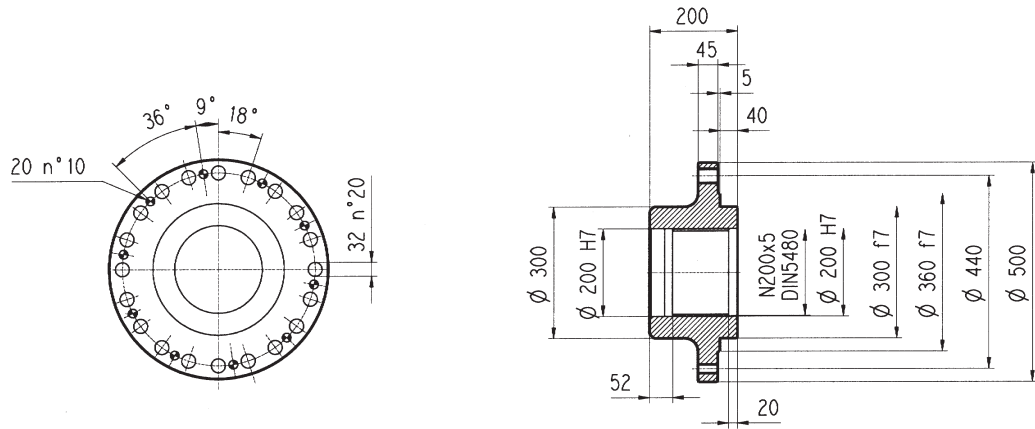
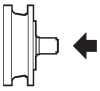
**FP**  $M_{2max} = 216000 \text{ Nm}$

	L				L1	D1	L3	L4	Kg				
	PC - PZ	HC - HZ	FZ	FP						PC - PZ	HC - HZ	FZ	FP
3/V 17L4	975	823	823	823	185.4	40	214.5	70		1250	1090	1040	1090
	P100		P112		P132		P160		P180				
	P	P	L2	P	L2	P	L2	P	L2	P			
3/V 17L4	250	250	217	300	217	350	217	350	217	350			

**317 L****317 R****3/V 17L3****3/V 17L4****HC****PC****HZ****FZ****FP****FP** $M_{2max} = 216000 \text{ Nm}$

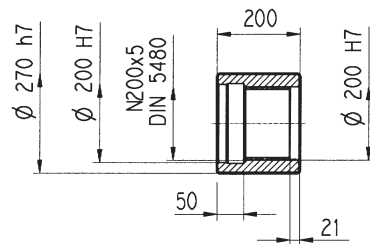
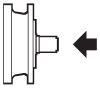
**317 L****317 R****3/V 17L3****3/V 17L4**

Flangia / Flange  
Flansch / Brides

**WOA**

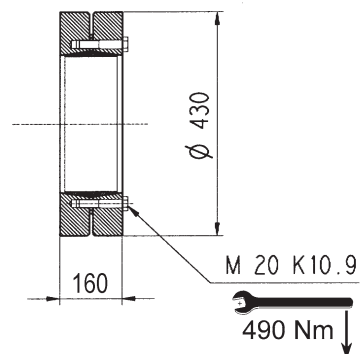
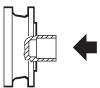
Materiale : Acciaio C40  
Material : Steel C40  
Material : Stahl C40  
Màterial : Acier C40

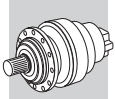
Manicotti lisci / Sleeve couplings  
Naben / Manchons lisses a cannelure interieure

**MOA**

Materiale : Acciaio 16CrNi4  
Material : Steel 16CrNi4  
Material : Stahl 16CrNi4  
Màterial : Acier 16CrNi4

Giunto ad attrito / Shrink disc  
Schrumpfscheibe / Frette de serrage

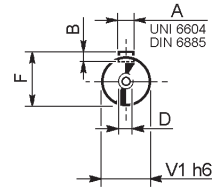
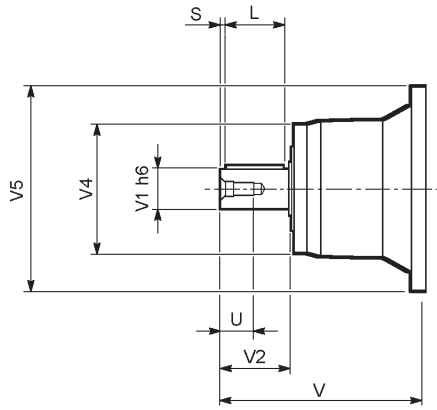
**GOA**



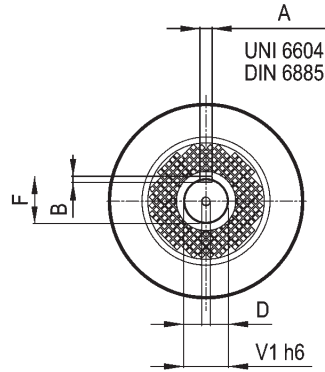
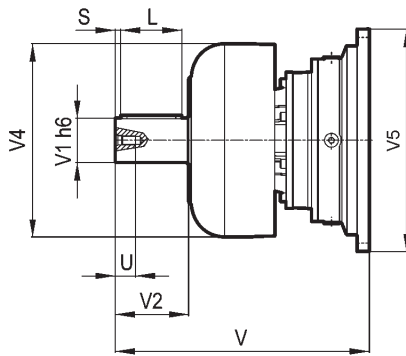
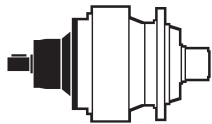
**317 L**

**317 R**

**V**



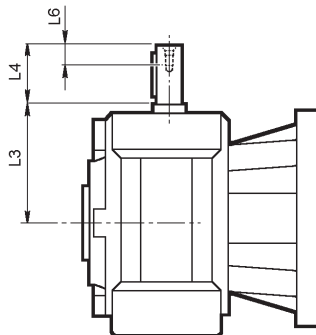
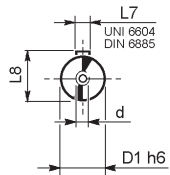
**FV**



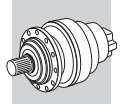
	input	V	V1	V2	V4	V5	A	B	F	L	S	D	U
317 L2	V11B	343	80	130	200	445	22	14	85	110	10	M16	36
	FV11B	451	80	130	347.5	445	22	14	85	110	10	M16	36
317 L3	V07B	315	80	130	200	345	22	14	85	110	10	M16	36
	FV07B	375	80	130	347.5	348	22	14	85	110	10	M16	36
	V07A	313	60	105	155	345	18	11	64	90	7.5	M16	36
317 L4	FV07A	363	60	105	309	348	18	11	64	90	7.5	M16	36
	V05B	239	48	82	155	245	14	9	51.5	70	6	M16	36
317 R3 (B) (C)	FV05B	276	48	82	219.5	244	14	9	51.5	70	6	M16	36
	V06B	307	60	105	155	292	18	11	64	90	7.5	M16	40
317 R4	FV06B	357	60	105	309	292	18	11	64	90	7.5	M16	36
	V05B	239	48	82	155	245	14	9	51.5	70	6	M16	36
	FV05B	276	48	82	219.5	244	14	9	51.5	70	6	M16	36

**3/V 17L3**

**3/V 17L4**



	D1 h6	L3	L4	L6	L7	L8	d
3/V 17L3 HS	55	276	110	40	16	59	M16
3/V 17L4 HS	40	214.5	70	20	12	43	M8

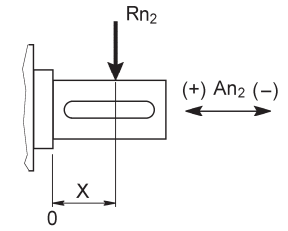
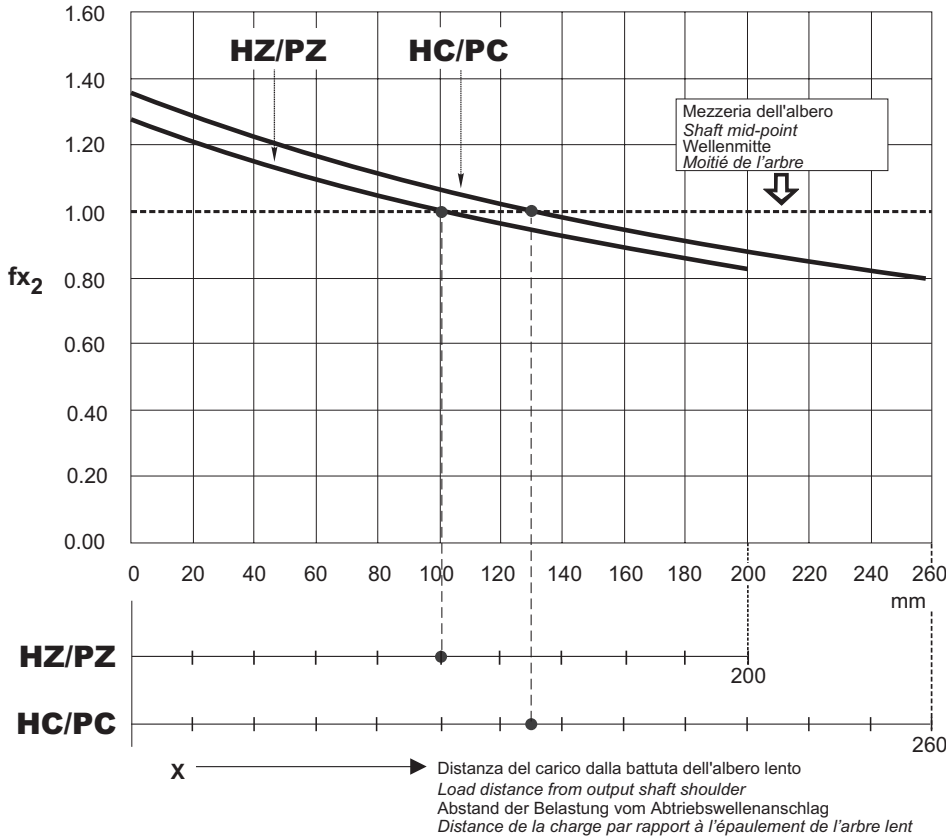


Fattore di posizione per carichi radiali sugli alberi in uscita.

Load location factor for radial loading on output shaft.

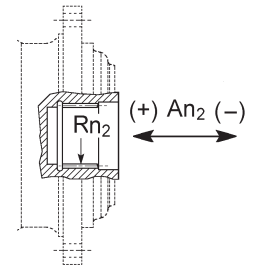
Positionsfaktor für Radialkräfte an der Abtriebswelle.

Facteur de position pour charges radiales sur les arbres en sortie.



$$R_{x2} = R_{n2} \cdot f_{x2}$$

$An_2 (\pm) = R_{n2} \cdot fa_2 (\pm)$		
	$fa_2 (+)$	$fa_2 (-)$
HZ/PZ	0.77	0.64
HC/PC	0.81	0.68



$$An_2 (\pm) = R_{n2} \cdot fa_2 (\pm)$$

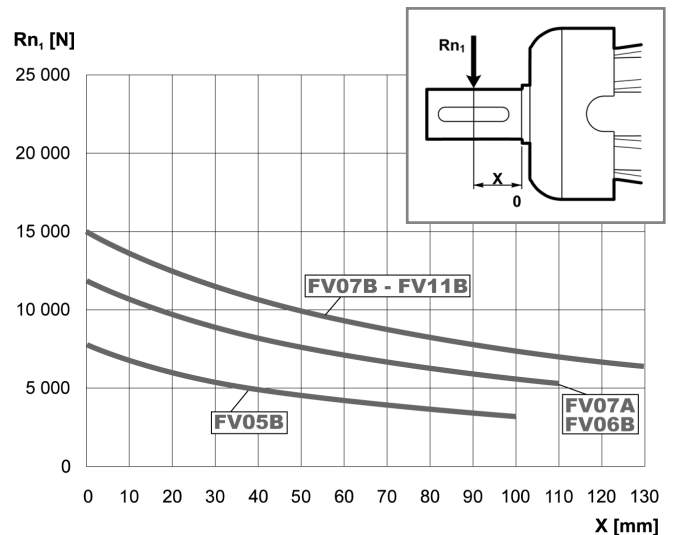
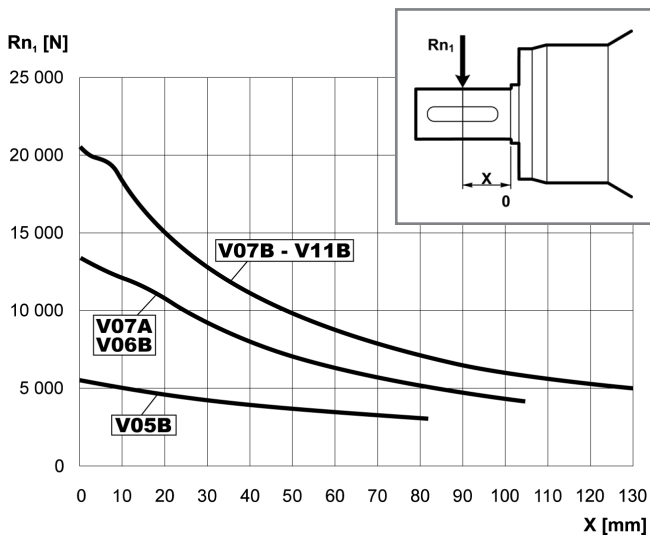
	$fa_2 (+)$	$fa_2 (-)$
FZ	1.00	1.00

Carichi radiali ammissibili sull'albero veloce per  $n_1 = 1000 \text{ min}^{-1}$  e 10000 h di vita teorica. Per velocità di comando e/o durate diverse vedi il capitolo: Verifiche.

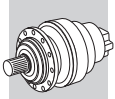
Permitted overhung loads on input shaft when  $n_1 = 1000 \text{ min}^{-1}$  and theoretical lifetime = 10000 h. For drive speed and/or lifetimes other than those specified here, see Chapter: Verifications.

Zulässige Radialkräfte an den Antriebswellen für  $n_1 = 1000 \text{ min}^{-1}$  und 10000 std. Im Hinblick auf Geschwindigkeit und/oder anderweitige Dauern verweisen wir auf Par: Prüfungen

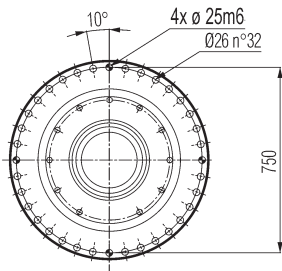
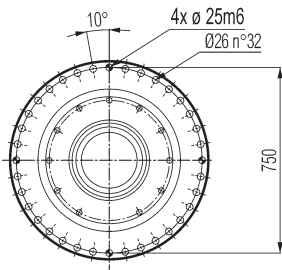
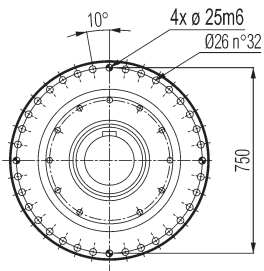
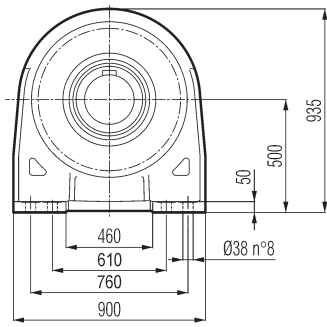
Charges radiales admissibles sur les arbres d'entrée pour  $n_1 = 1000 \text{ min}^{-1}$  et 10000 h. Pour des vitesses et/ou durées différentes, voir par. Vérifications.



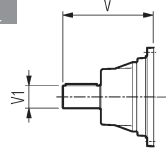




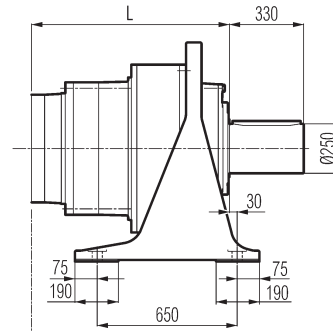
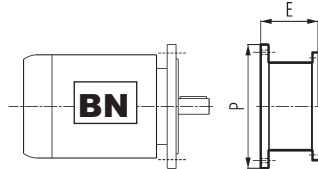
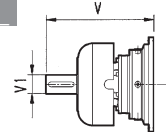
# 318 L



**V**

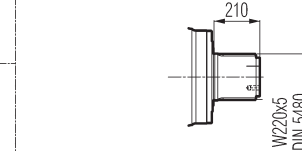


**FV**

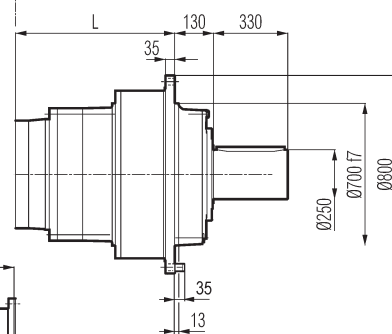


**PC**

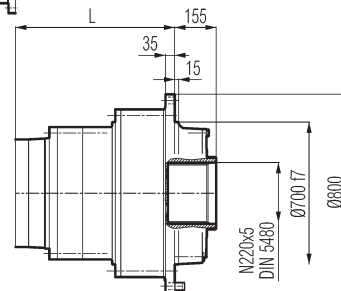
**HZ PZ**



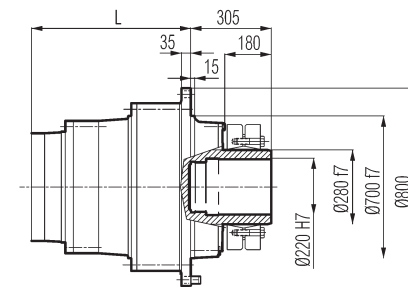
**HC**



**FZ**



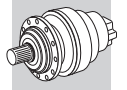
**FP**



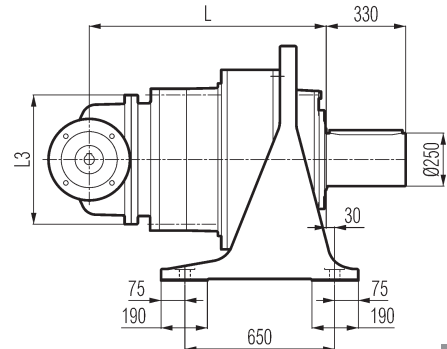
**FP**

$M_{2max} = 300000 \text{ Nm}$

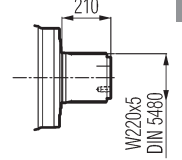
	L				Kg				Kg				Kg							
	PC - PZ	HC - HZ	FZ	FP	PC - PZ	HC - HZ	FZ	FP	V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg
318 L3	889	759	759	759	1600	1300	1150	1180	348	80	55	-	-	-	456	80	85	-	-	-
318 L4	1022	892	892	892	1650	1350	1200	1230	315	80	35	313	60	28	375	80	48	363	60	34
	P180		P200		P225		P250													
	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P
318 L3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
318 L4	195	350	186	400	216	450	215	550												



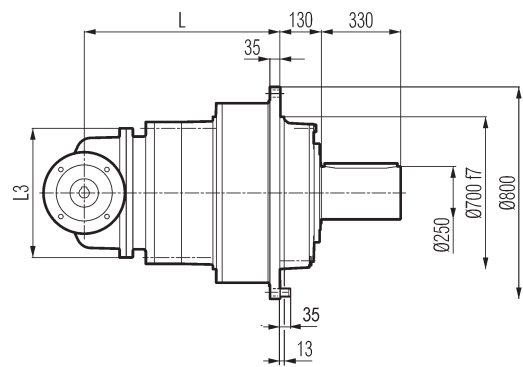
**PC**



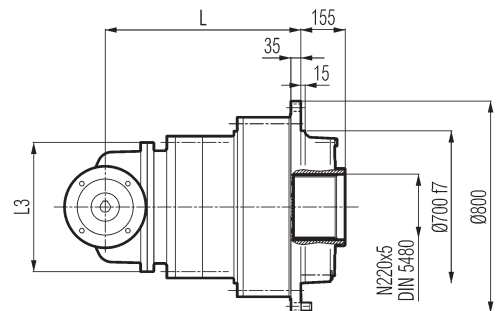
**HZ PZ**



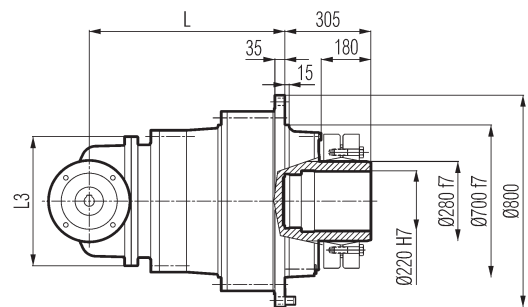
**HC**



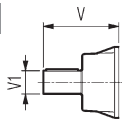
**FZ**



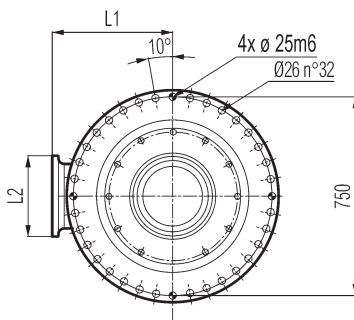
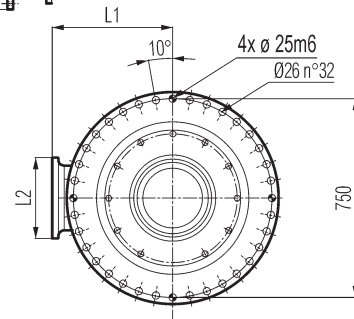
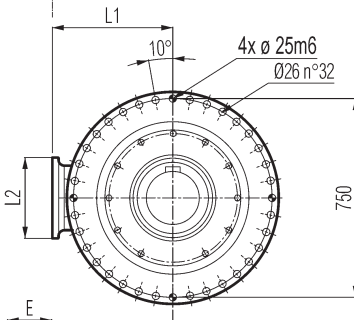
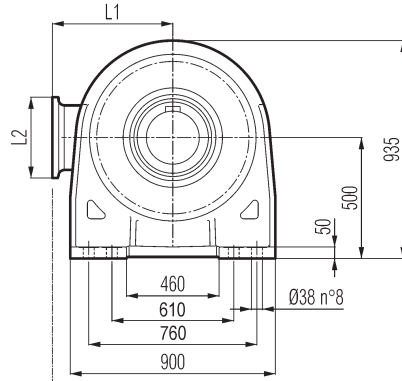
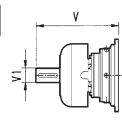
**FP**



**V**



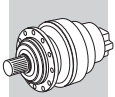
**FV**



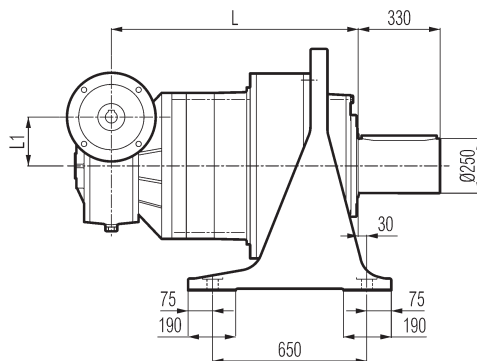
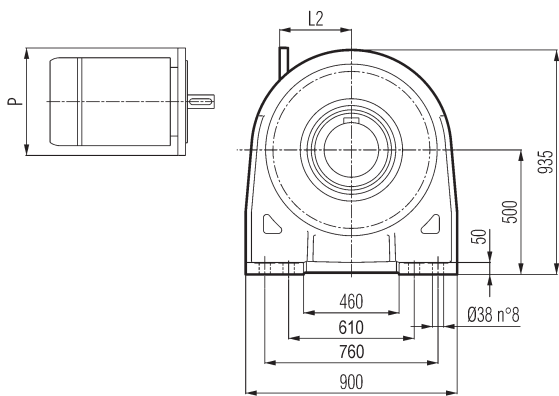
**FP**

$M_{2max} = 300000 \text{ Nm}$

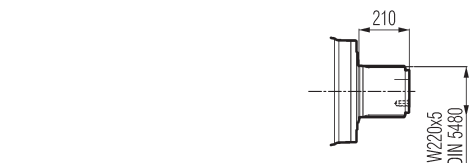
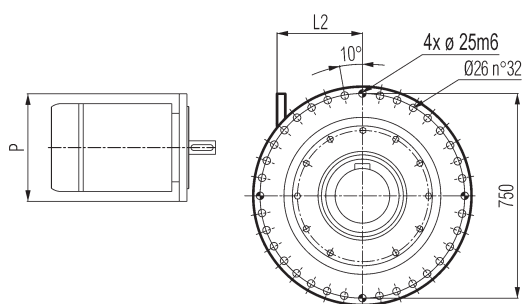
	L				L1	L2	L3	Kg				V				V1							
	PC-PZ	HC-HZ	FZ	FP				PC-PZ	HC-HZ	FZ	FP	V	V1	Kg	V	V1	Kg	V	V1	Kg			
<b>318 R4 (B)</b>	1115	985	985	985	345	292	400	1720	1420	1270	1300	307	60	23	-	-	-	357	60	28	-	-	-
<b>318 R4 (C)</b>	1115	985	985	985	390	292	480	1730	1430	1280	1310	307	60	23	-	-	-	357	60	28	-	-	-
	P132		P160		P180		P200		P225		P250												
	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	E	P	
<b>318 R4 (B)</b>	-	-	-	-	152	350	182	400	212	450	193	550											
<b>318 R4 (C)</b>	-	-	-	-	152	350	182	400	212	450	193	550											



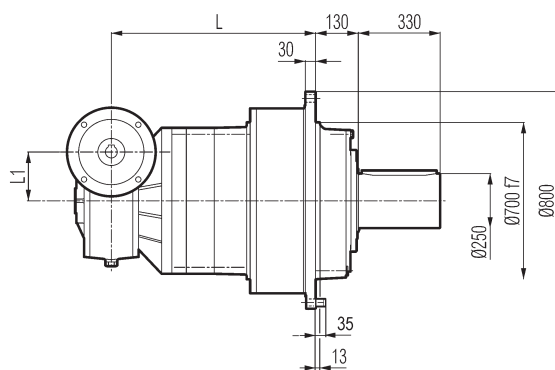
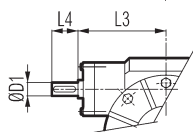
# 3/V 18L4



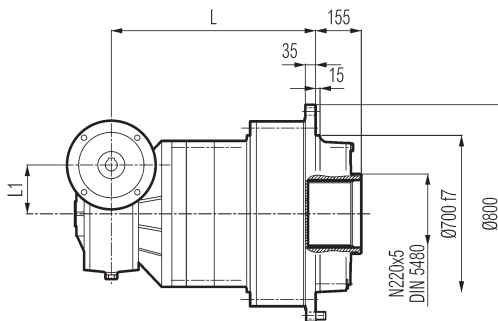
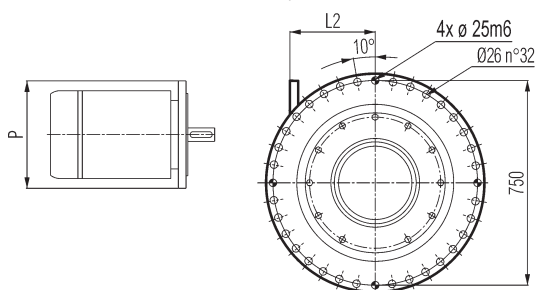
**PC**



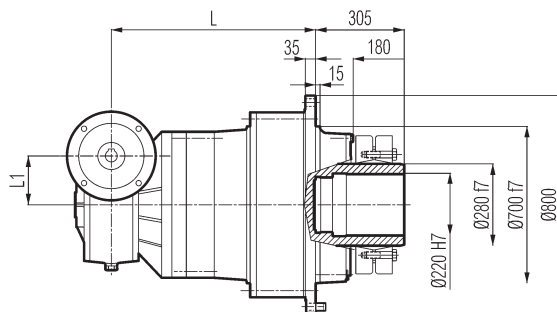
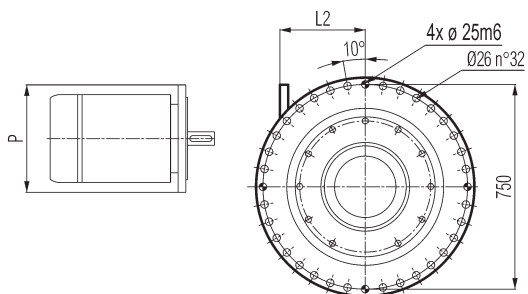
**HZ PZ**



**HC**



**FZ**



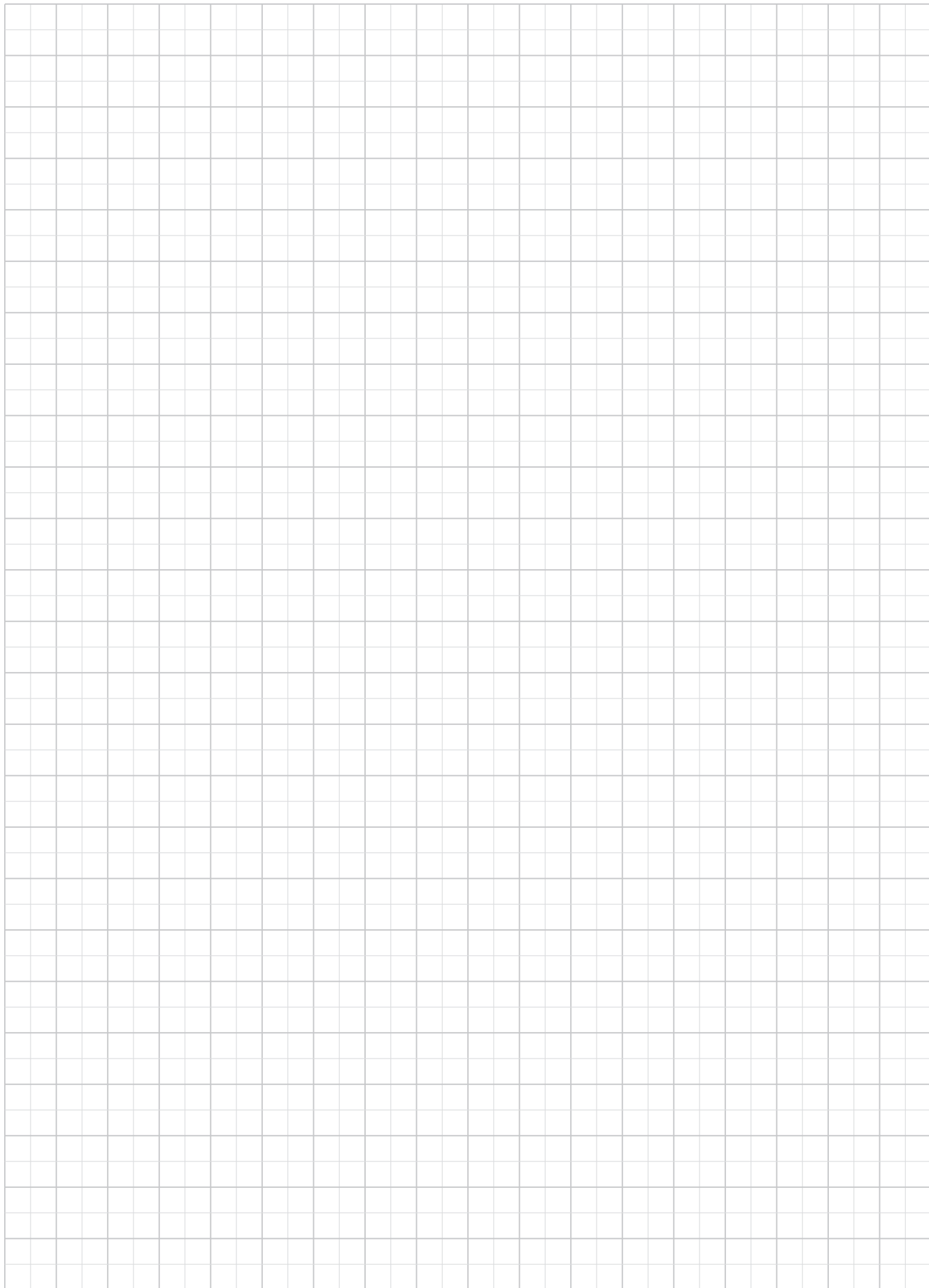
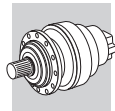
**FP**

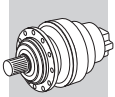
**FP**

$M_{2max} = 300000 \text{ Nm}$

	L				L1	D1	L3	L4	Kg			
	PC - PZ	HC - HZ	FZ	FP					PC - PZ	HC - HZ	FZ	FP
3/V 18L4	1114	984	984	984	210	48	230	110	1810	1510	1360	1390

3/V 18L4	P132		P160		P180		P200		P225	
	L2	P	L2	P	L2	P	L2	P	L2	P
3/V 18L4	485	300	460	350	460	350	485	400	490	450



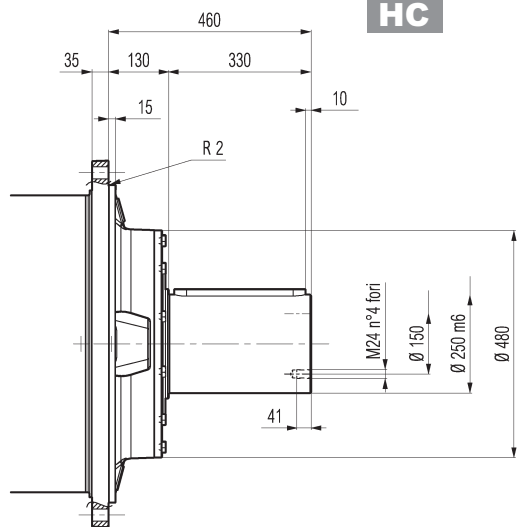


318 L

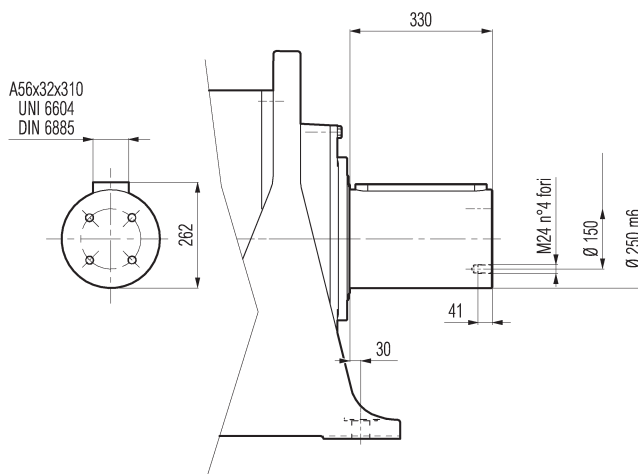
318 R

3/V 18L4

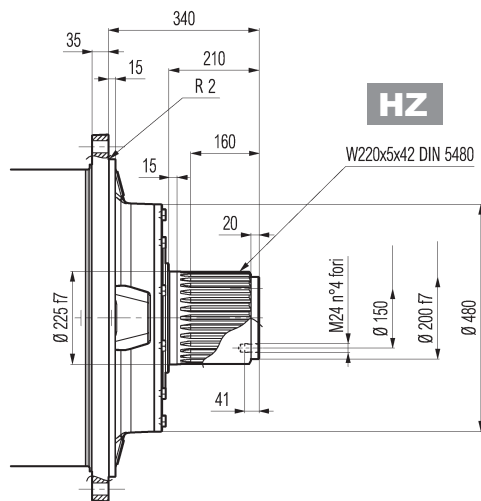
HC



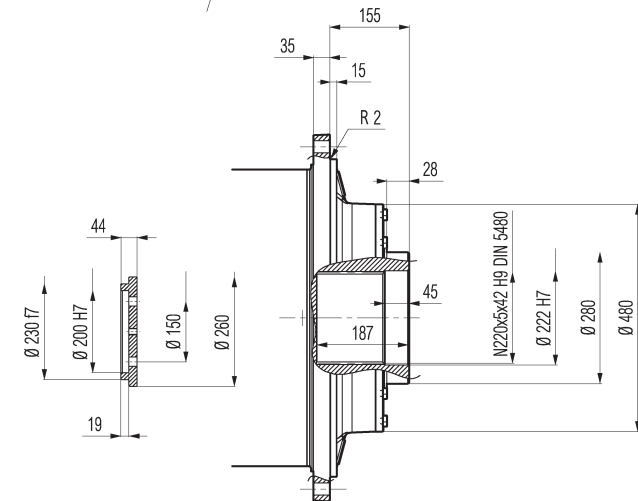
PC



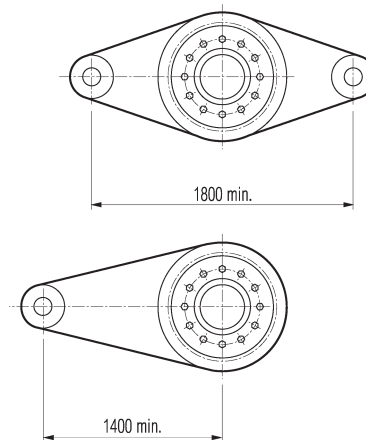
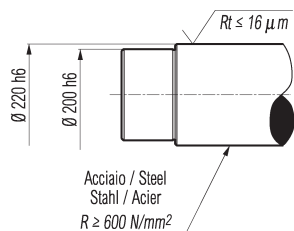
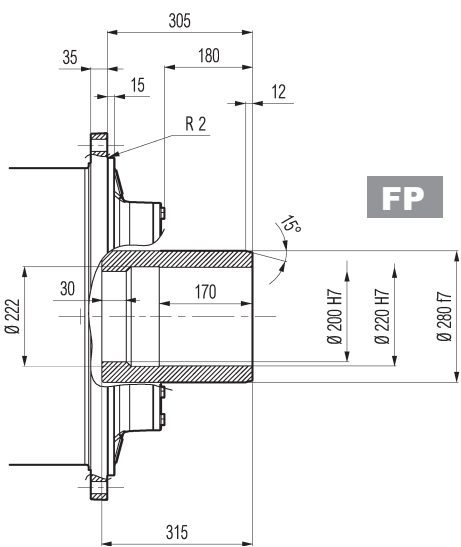
HZ



FZ

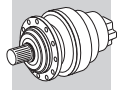


FP

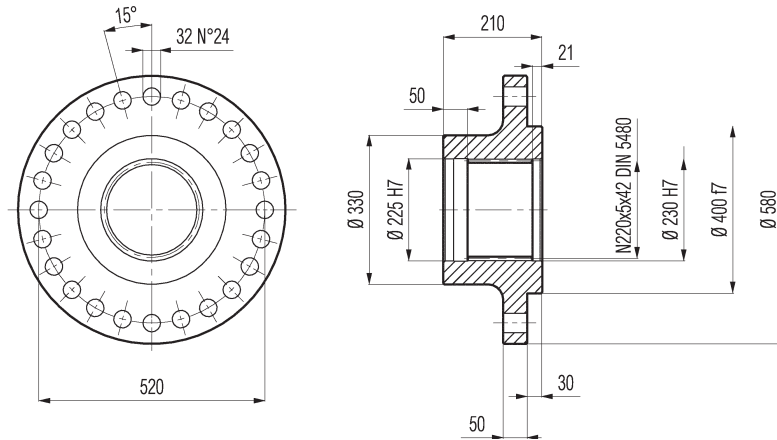
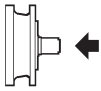


FP

M<sub>2max</sub> = 30000 Nm

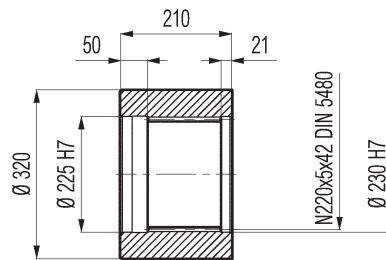
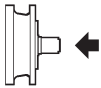
**318 L****318 R****3/V 18L4**

**Flangia / Flange**  
**Flansch / Brides**

**WOA**

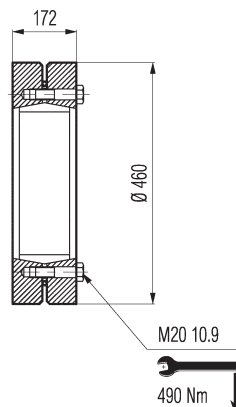
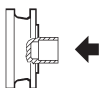
Materiale : Acciaio C40  
 Material : Steel C40  
 Material : Stahl C40  
 Matière : Acier C40

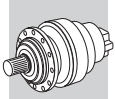
**Manicotti lisci / Sleeve couplings**  
**Nabens / Manchons lisses a cannelure interieure**

**MOA**

Materiale : Acciaio C40  
 Material : Steel C40  
 Material : Stahl C40  
 Matière : Acier C40

**Giunto ad attrito / Shrink disc**  
**Schrumpfscheibe / Frette de serrage**

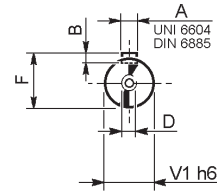
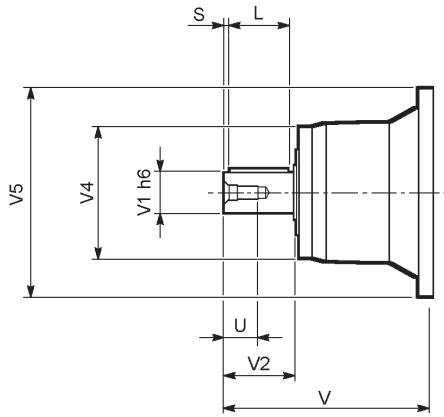
**GOA**



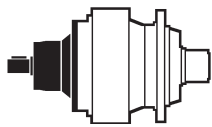
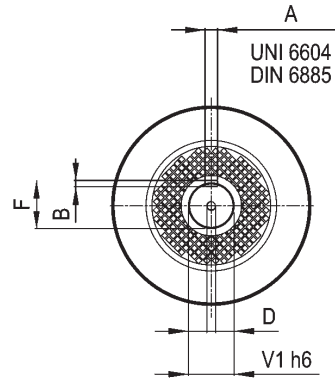
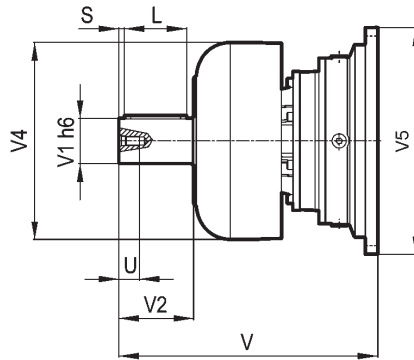
**318 L**

**318 R**

**V** \_ \_

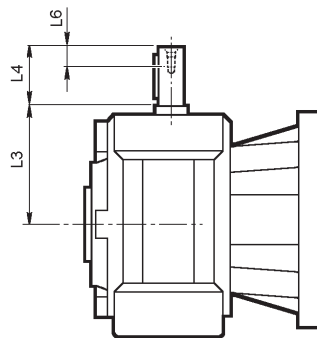
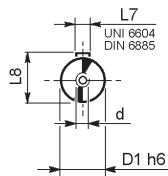


**FV** \_ \_

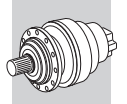


	input	V	V1	V2	V4	V5	A	B	F	L	S	D	U
318 L3	V11B	348	80	130	200	428	22	14	85	110	10	M16	36
	FV11B	456	80	130	347.5	428	22	14	85	110	10	M16	36
318 L4	V07B	315	80	130	200	345	22	14	85	110	10	M16	36
	FV07B	375	80	130	347.5	348	22	14	85	110	10	M16	36
	V07A	313	60	105	155	345	18	11	64	90	7.5	M16	36
318 R4 (B) (C)	FV07A	363	60	105	309	348	18	11	64	90	7.5	M16	36
	V06B	307	60	105	155	292	18	11	64	90	7.5	M16	36
	FV06B	357	60	105	309	292	18	11	64	90	7.5	M16	36

**3/V 18L4**



	D1 h6	L3	L4	L6	L7	L8	d
3/V 18L4 HS	48	230	110	40	14	51.5	M16

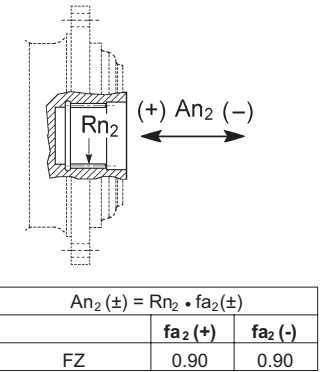
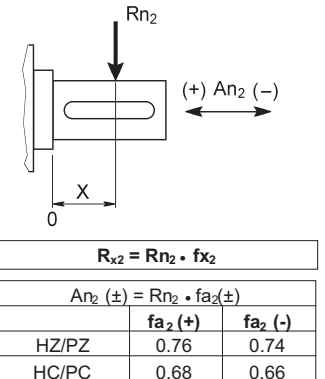
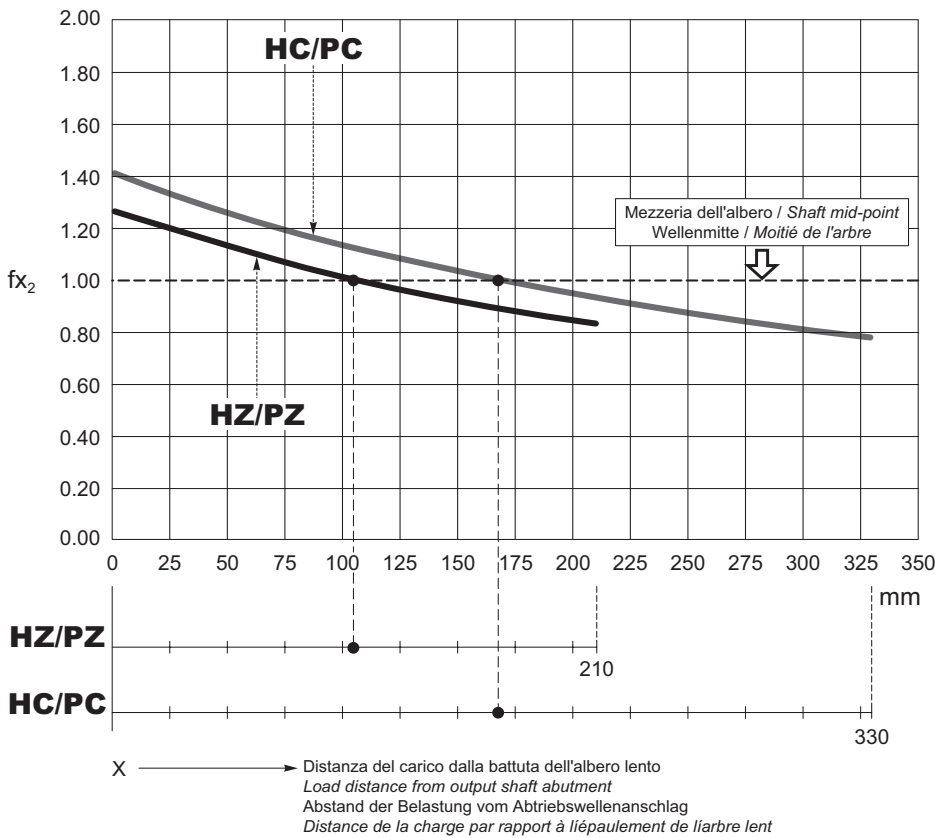


Fattore di posizione per carichi radiali sugli alberi in uscita.

Load location factor for radial loading on output shaft.

Positionsfaktor für Radialkräfte an der Abtriebswelle.

Facteur de position pour charges radiales sur les arbres en sortie.



Carichi radiali ammissibili sull'albero veloce per  $n_1 = 1000 \text{ min}^{-1}$  e 10000 h di vita teorica.

Permitted overhung loads on input shaft when  $n_1 = 1000 \text{ min}^{-1}$  and theoretical lifetime = 10000 h.

Zulässige Radialkräfte an den Antriebswellen für  $n_1 = 1000 \text{ min}^{-1}$  und 10000 std.

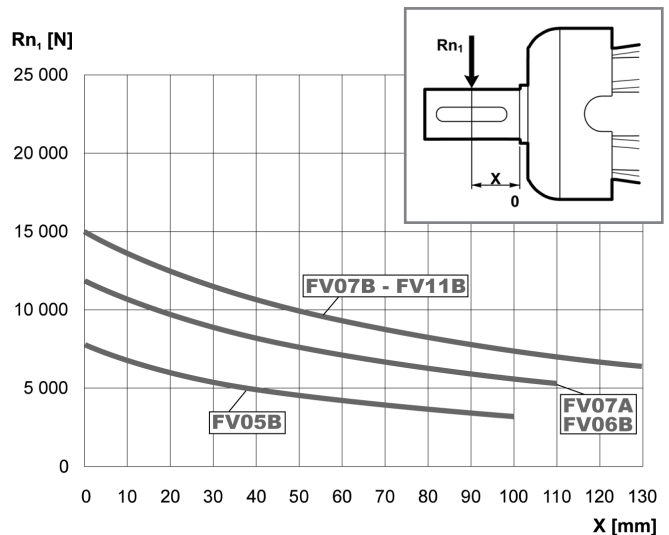
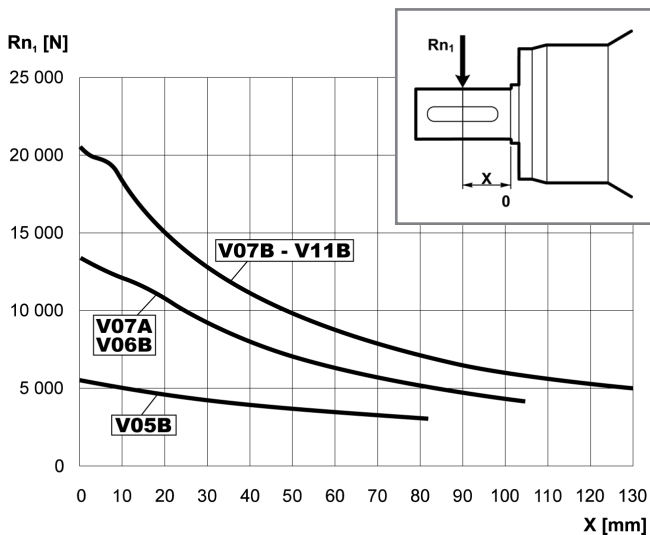
Charges radiales admissibles sur les arbres d'entrée pour  $n_1 = 1000 \text{ min}^{-1}$  et 10000 h.

Per velocità di comando e/o durate diverse vedi il capitolo: Verifiche.

For drive speed and/or lifetimes other than those specified here, see Chapter: Verifications.

Im Hinblick auf Geschwindigkeit und/oder anderweitige Dauern verweisen wir auf Par: Prüfungen

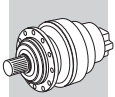
Pour des vitesses et/ou durées différentes, voir par. Vérifications.



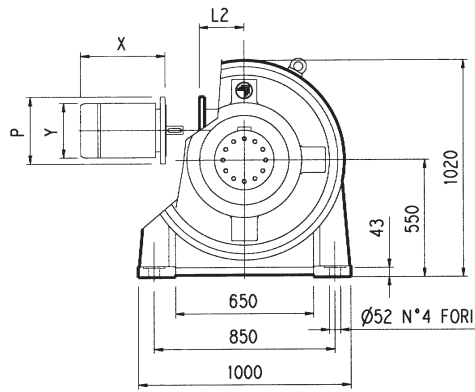




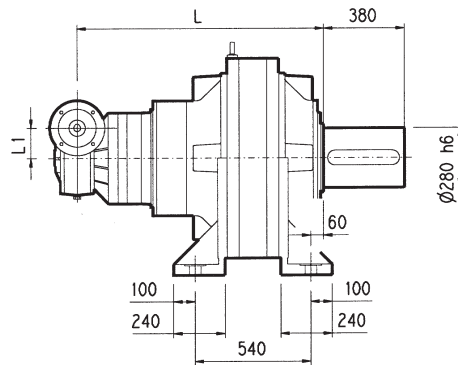




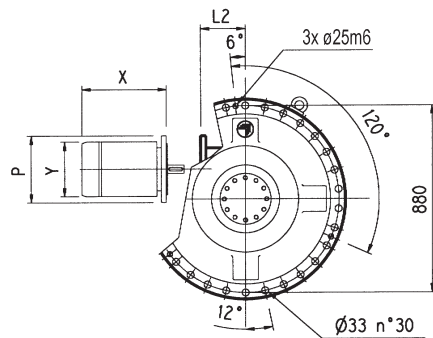
# 3/V 19L4



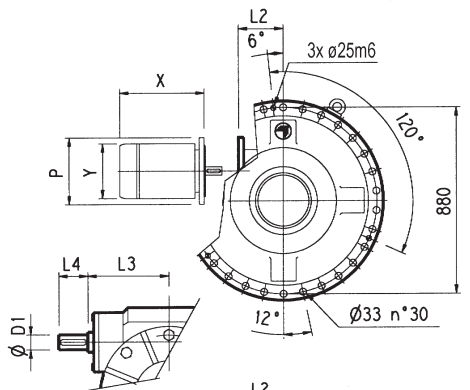
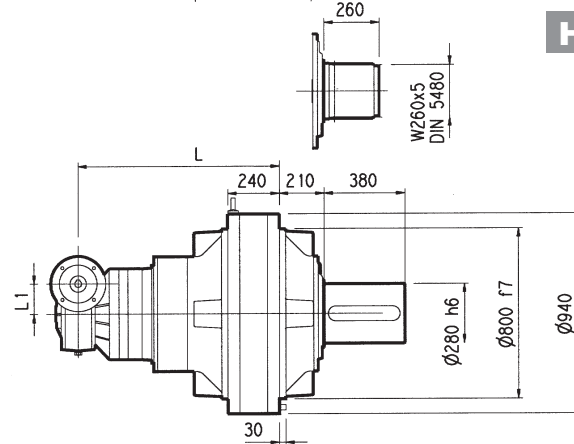
**PC**



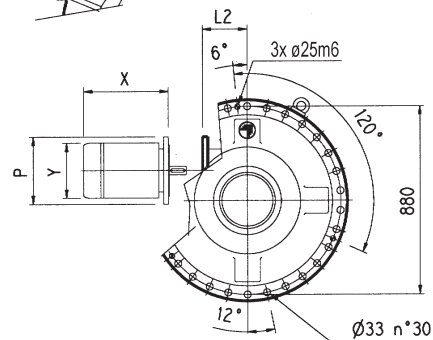
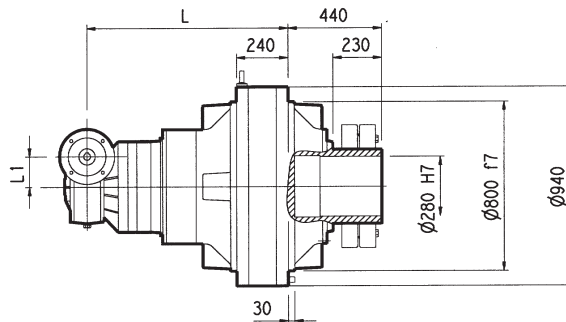
**HZ PZ**



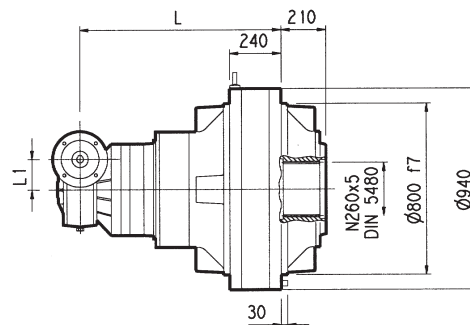
**HC**



**FP**

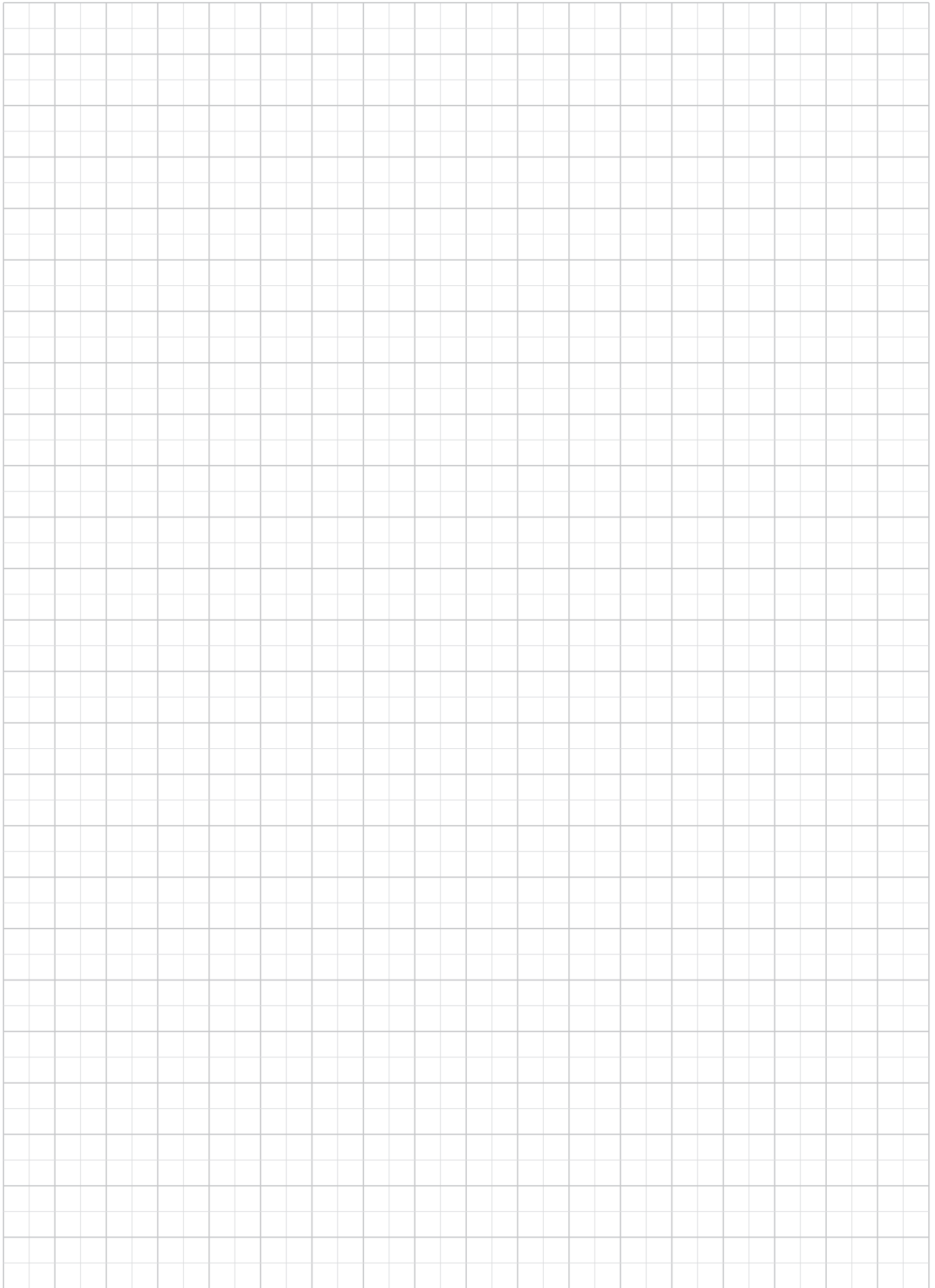
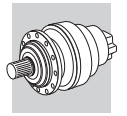


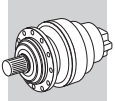
**FZ**



**FP**  $M_{2max} = 420000 \text{ Nm}$

	L				L1	D1	L3	L4	Kg			
	PC - PZ	HC - HZ	FZ	FP					PC - PZ	HC - HZ	FZ	FP
3/V 19L4	1210	1000	1000	1000	210	48	230	110	2650	2350	2250	2250
3/V 19L4	P132		P160		P180		P200		P225			
	L2	P	L2	P	L2	P	L2	P	L2	P		
	485	300	460	350	460	350	485	400	490	450		





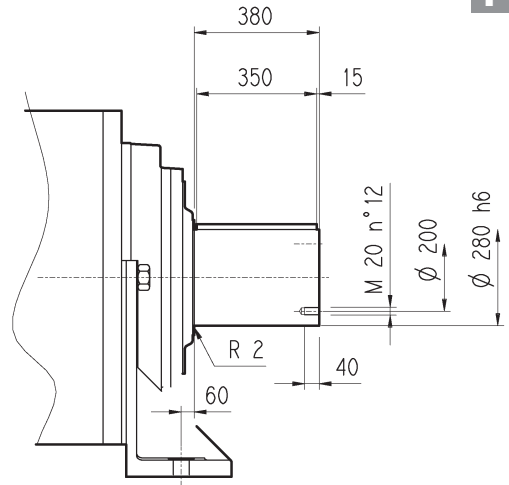
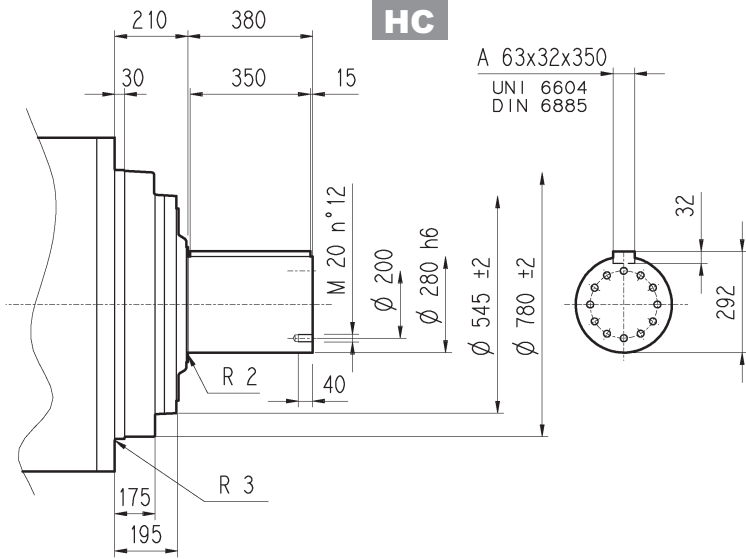
**319 L**

**319 R**

**3/V 19L4**

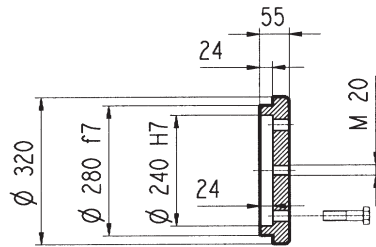
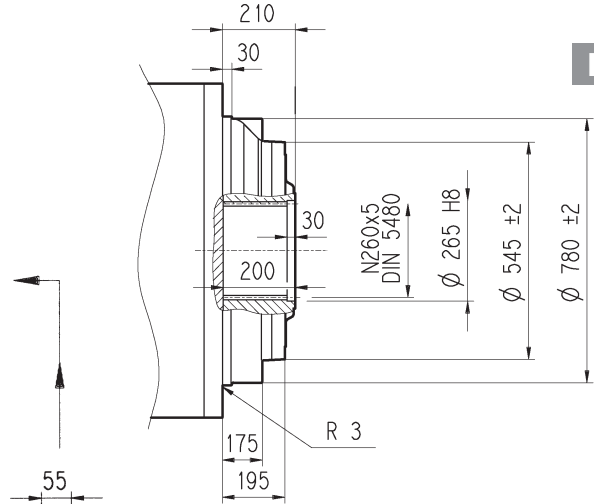
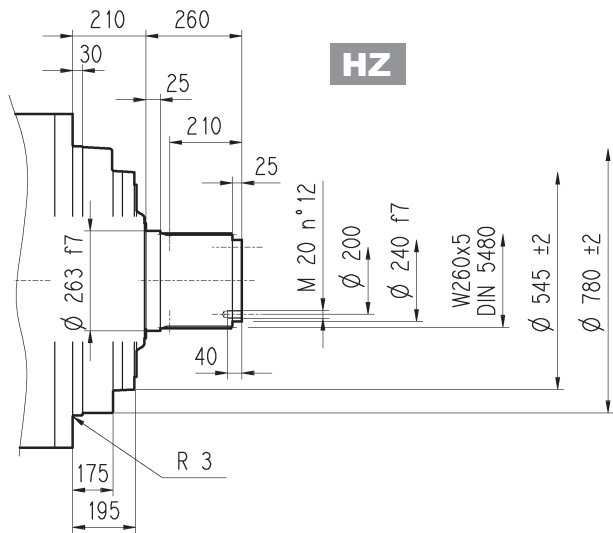
**HC**

**PC**

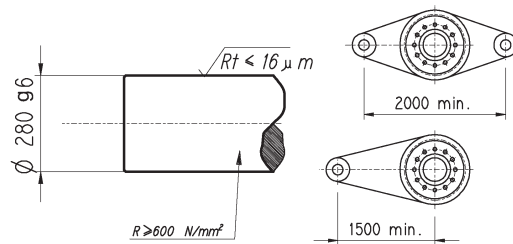
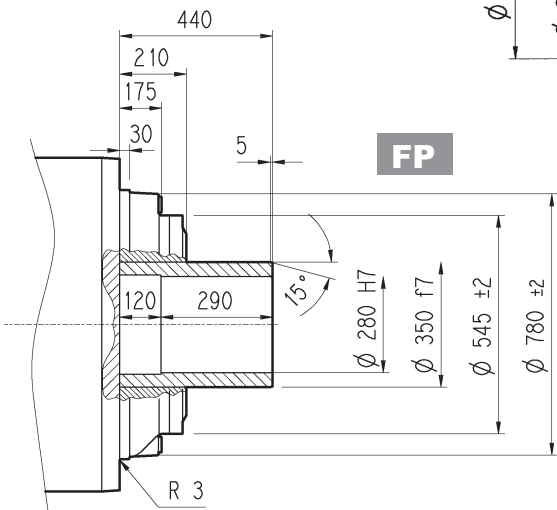


**HZ**

**FZ**

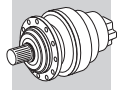


**FP**

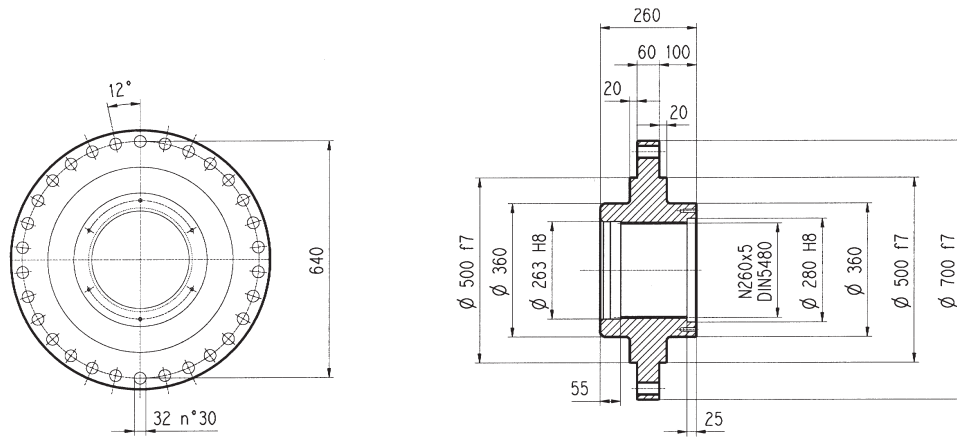


**FP**

$M_{2max} = 420000 \text{ Nm}$

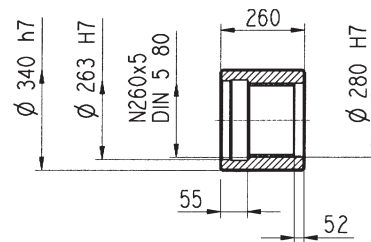
**319 L****319 R****3/V 19L4**

Flangia / Flange  
Flansch / Brides

**WOA**

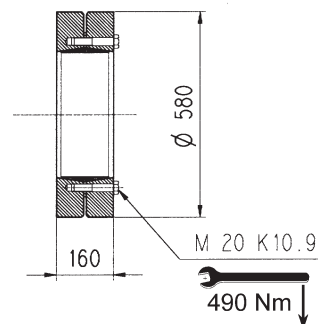
Materiale : Acciaio C40  
Material : Steel C40  
Material : Stahl C40  
Màterial : Acier C40

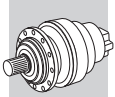
Manicotti lisci / Sleeve couplings  
Naben / Manchons lisses a cannelure interieure

**MOA**

Materiale : Acciaio 16CrNi4  
Material : Steel 16CrNi4  
Material : Stahl 16CrNi4  
Màterial : Acier 16CrNi4

Giunto ad attrito / Shrink disc  
Schrumpfscheibe / Frette de serrage

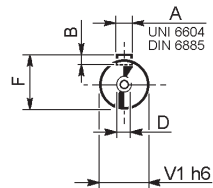
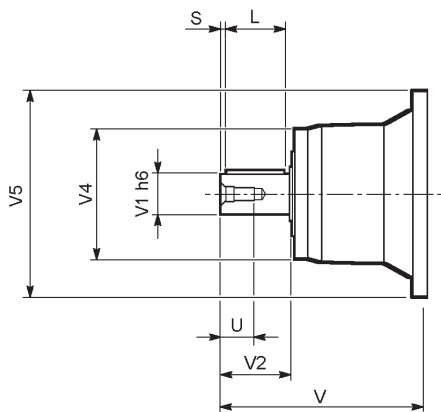
**GOA**



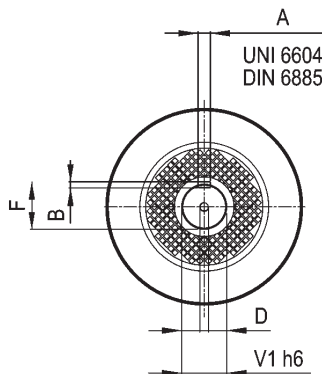
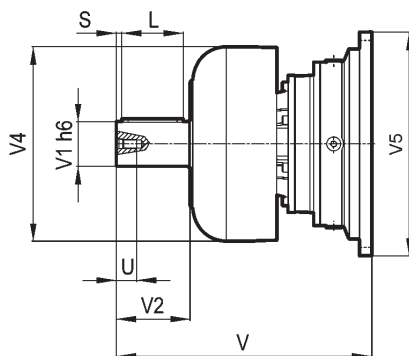
**319 L**

**319 R**

**V**

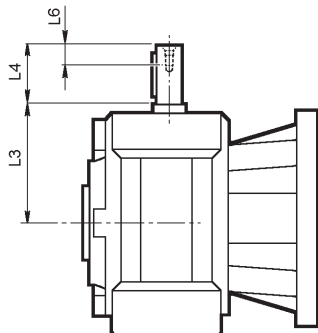
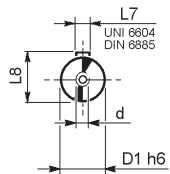


**FV**

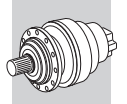


	input	V	V1	V2	V4	V5	A	B	F	L	S	D	U
319 L3	V11B	348	80	130	200	428	22	14	85	110	10	M16	36
	FV11B	456	80	130	347.5	428	22	14	85	110	10	M16	36
319 L4	V07B	315	80	130	200	345	22	14	85	110	10	M16	36
	FV07B	375	80	130	347.5	348	22	14	85	110	10	M16	36
	V07A	313	60	105	155	345	18	11	64	90	7.5	M16	36
	FV07A	363	60	105	309	348	18	11	64	90	7.5	M16	36
319 R4 (B) (C)	V06B	307	60	105	155	292	18	11	64	90	7.5	M16	36
	FV06B	357	60	105	309	292	18	11	64	90	7.5	M16	36

**3/V 19L4**



	D1 h6	L3	L4	L6	L7	L8	d
3/V 19L4 HS	48	230	110	40	14	51.5	M16

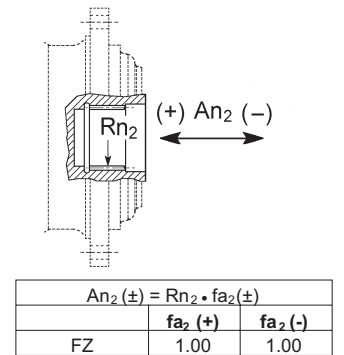
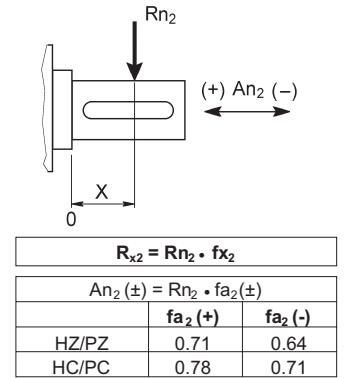
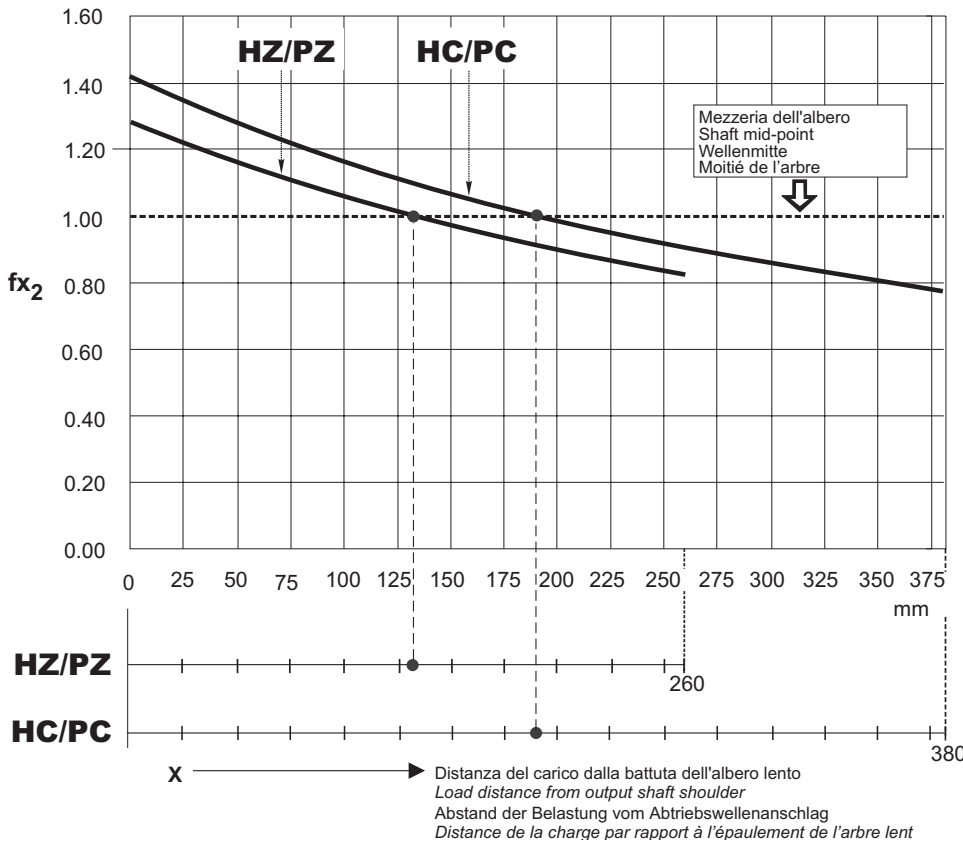


Fattore di posizione per carichi radiali sugli alberi in uscita.

Load location factor for radial loading on output shaft.

Positionsfaktor für Radialkräfte an der Abtriebswelle.

Facteur de position pour charges radiales sur les arbres en sortie.



Carichi radiali ammissibili sull'albero veloce per  $n_1 = 1000 \text{ min}^{-1}$  e 10000 h di vita teorica.

Permitted overhung loads on input shaft when  $n_1 = 1000 \text{ min}^{-1}$  and theoretical lifetime = 10000 h.

Zulässige Radialkräfte an den Antriebswellen für  $n_1 = 1000 \text{ min}^{-1}$  und 10000 std.

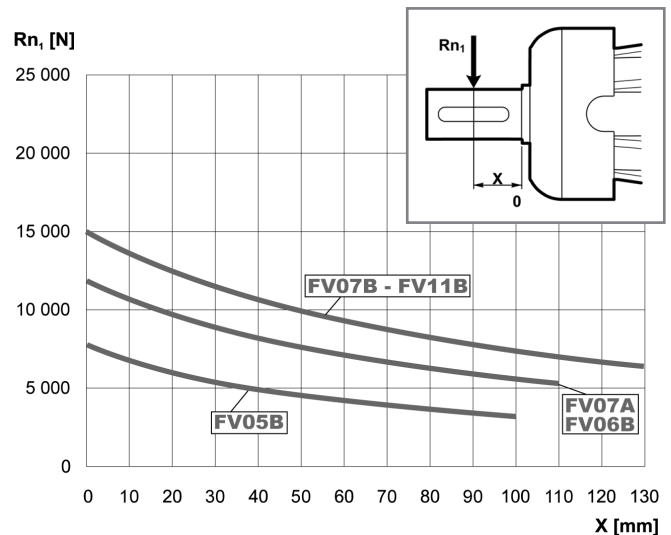
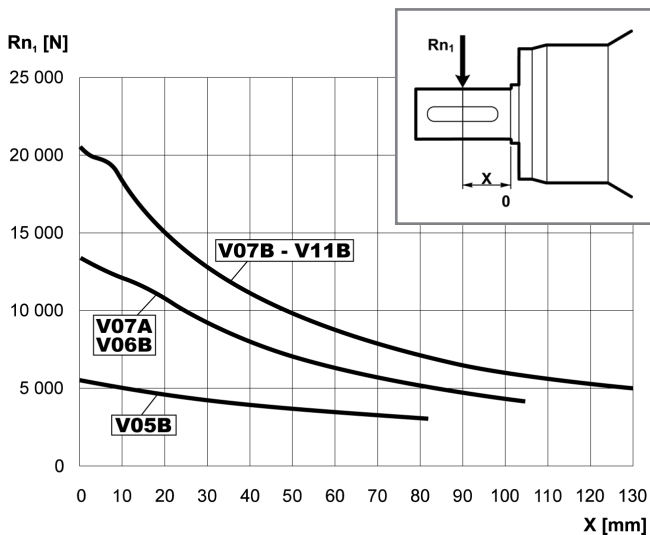
Charges radiales admissibles sur les arbres d'entrée pour  $n_1 = 1000 \text{ min}^{-1}$  et 10000 h.

Per velocità di comando e/o durate diverse vedi il capitolo: Verifiche.

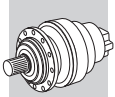
For drive speed and/or lifetimes other than those specified here, see Chapter: Verifications.

Im Hinblick auf Geschwindigkeit und/oder anderweitige Dauern verweisen wir auf Par: Prüfungen

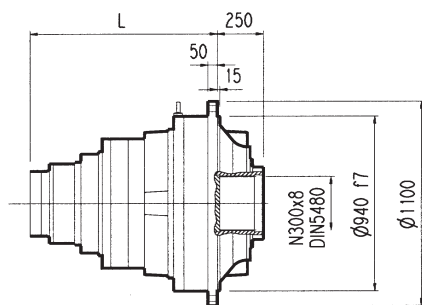
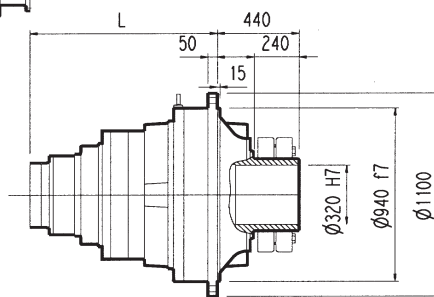
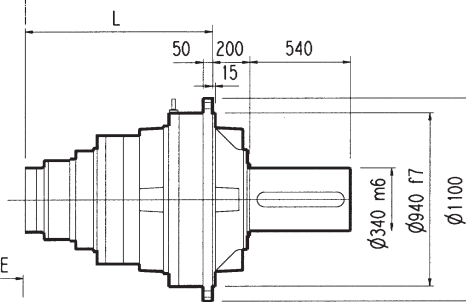
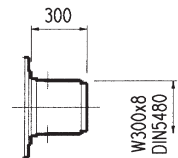
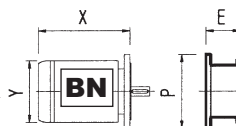
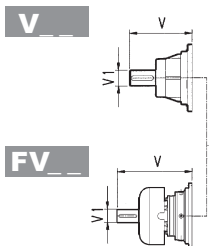
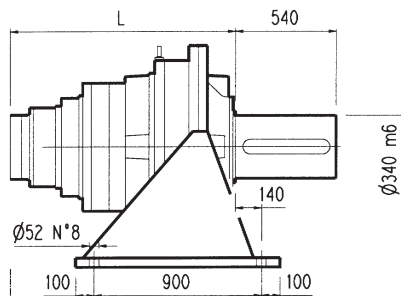
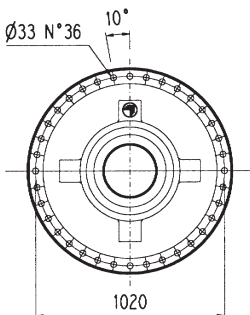
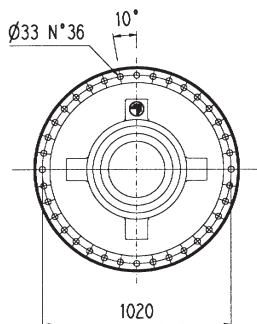
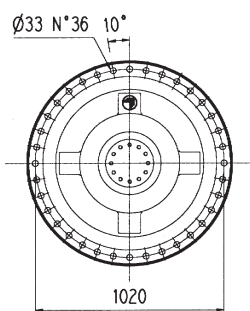
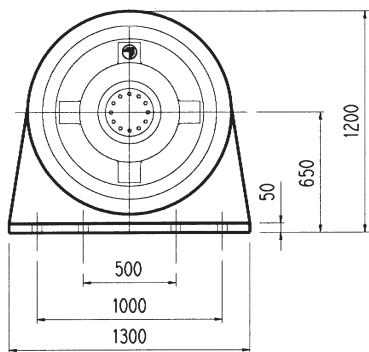
Pour des vitesses et/ou durées différentes, voir par: Vérifications.







# 321 L



PC

HZ PZ

HC

FP

FZ

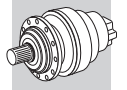
FP

$M_{2max} = 648000 \text{ Nm}$

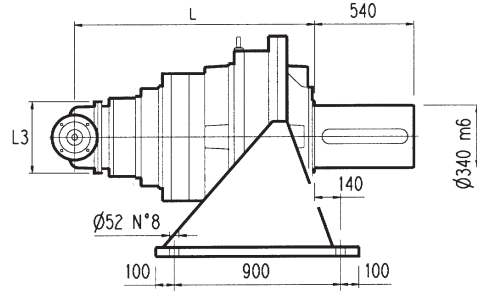
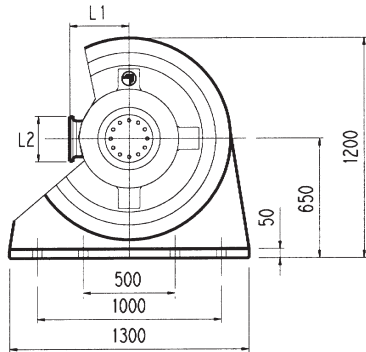
	L				Kg				Kg						Kg					
	PC - PZ	HC - HZ	FZ	FP	PC - PZ	HC - HZ	FZ	FP	V	V1	Kg	V	V1	Kg	V	V1	Kg	V	V1	Kg
321 L3	1104	904	904	904	3120	2820	2720	2720	343	80	55	-	-	-	451	80	71	-	-	-
321 L4	1253	1053	1053	1053	3180	2880	2780	2780	315	80	35	313	60	28	375	80	48	363	60	34

321 L4	P180		P200		P225		P250	
	E	P	E	P	E	P	E	P
	195	350	186	400	216	450	216	550



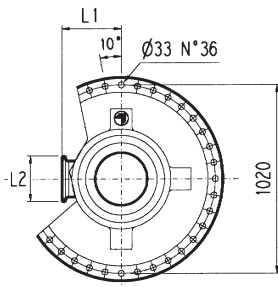
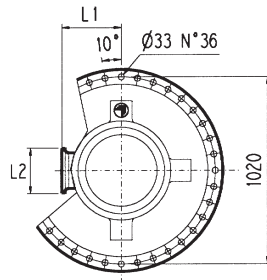
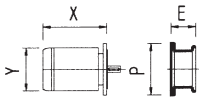
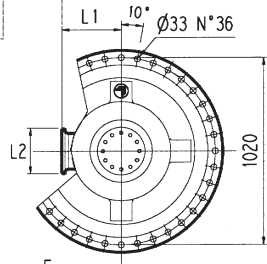
**PC**



**V**

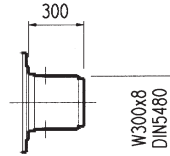


**FV**

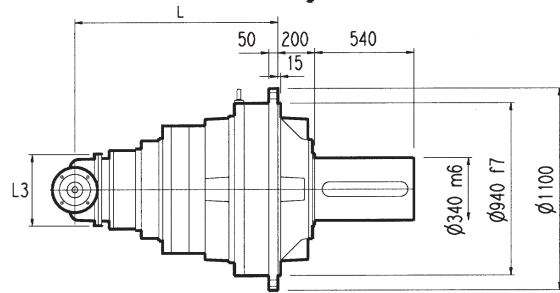


**HZ**

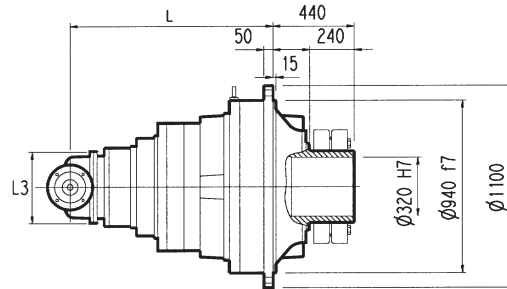
**PZ**



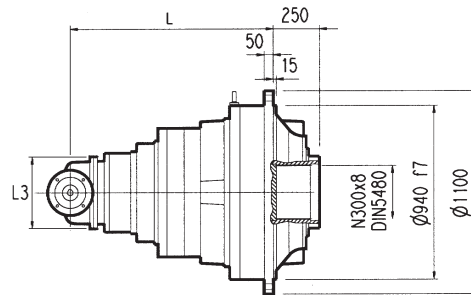
**HC**



**FP**



**FZ**

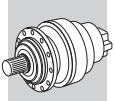


**FP**

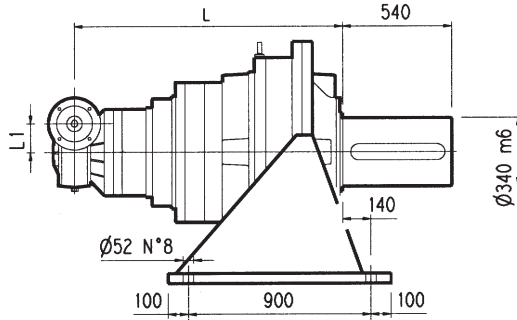
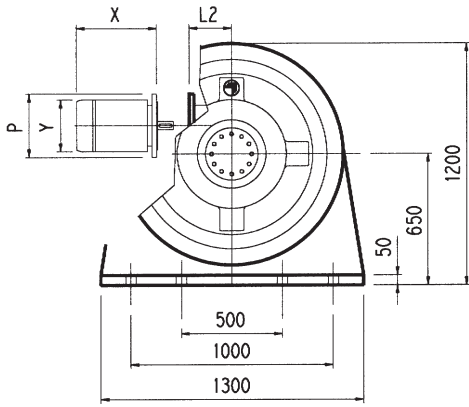
$M_{2max} = 648000 \text{ Nm}$

	L				L1	L2	L3	Kg				Kg				Kg							
	PC-PZ	HC-HZ	FZ	FP				PC-PZ	HC-HZ	FZ	FP	V	V1	Kg	V	V1	Kg	V	V1	Kg			
321 R4 (B)	1334	1134	1134	1134	345	292	400	3250	2950	2850	2850	307	60	23	-	-	-	357	60	28	-	-	-
321 R4 (C)	1334	1134	1134	1134	390	292	480	3260	2960	2860	2860	307	60	23	-	-	-	357	60	28	-	-	-

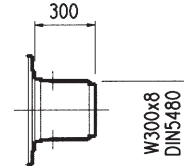
	P132		P160		P180		P200		P225		P250	
	E	P	E	P	E	P	E	P	E	P	E	P
321 R4 (B)	-	-	-	-	152	350	182	400	212	450	193	550
321 R4 (C)	-	-	-	-	152	350	182	400	212	450	193	550



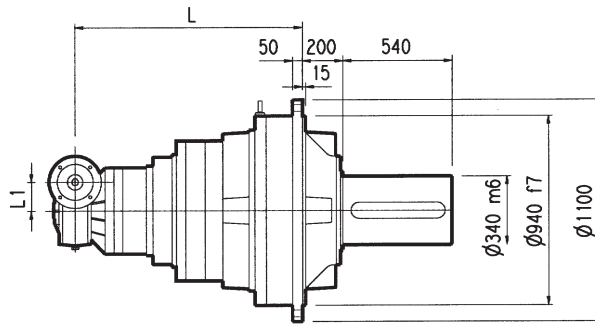
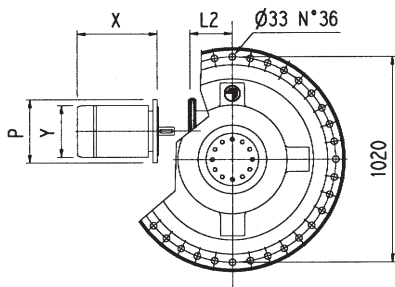
# 3/V 21L4



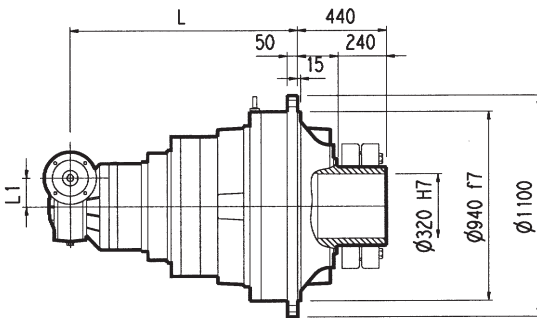
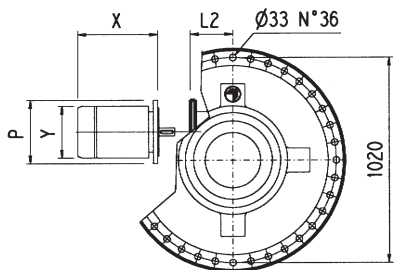
PC



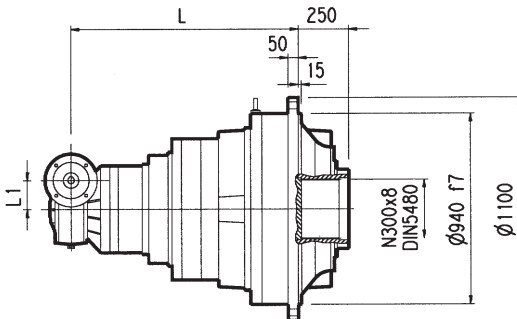
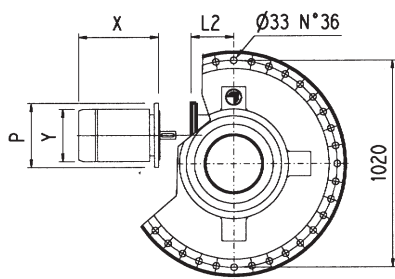
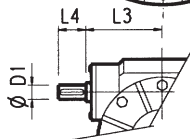
HZ PZ



HC



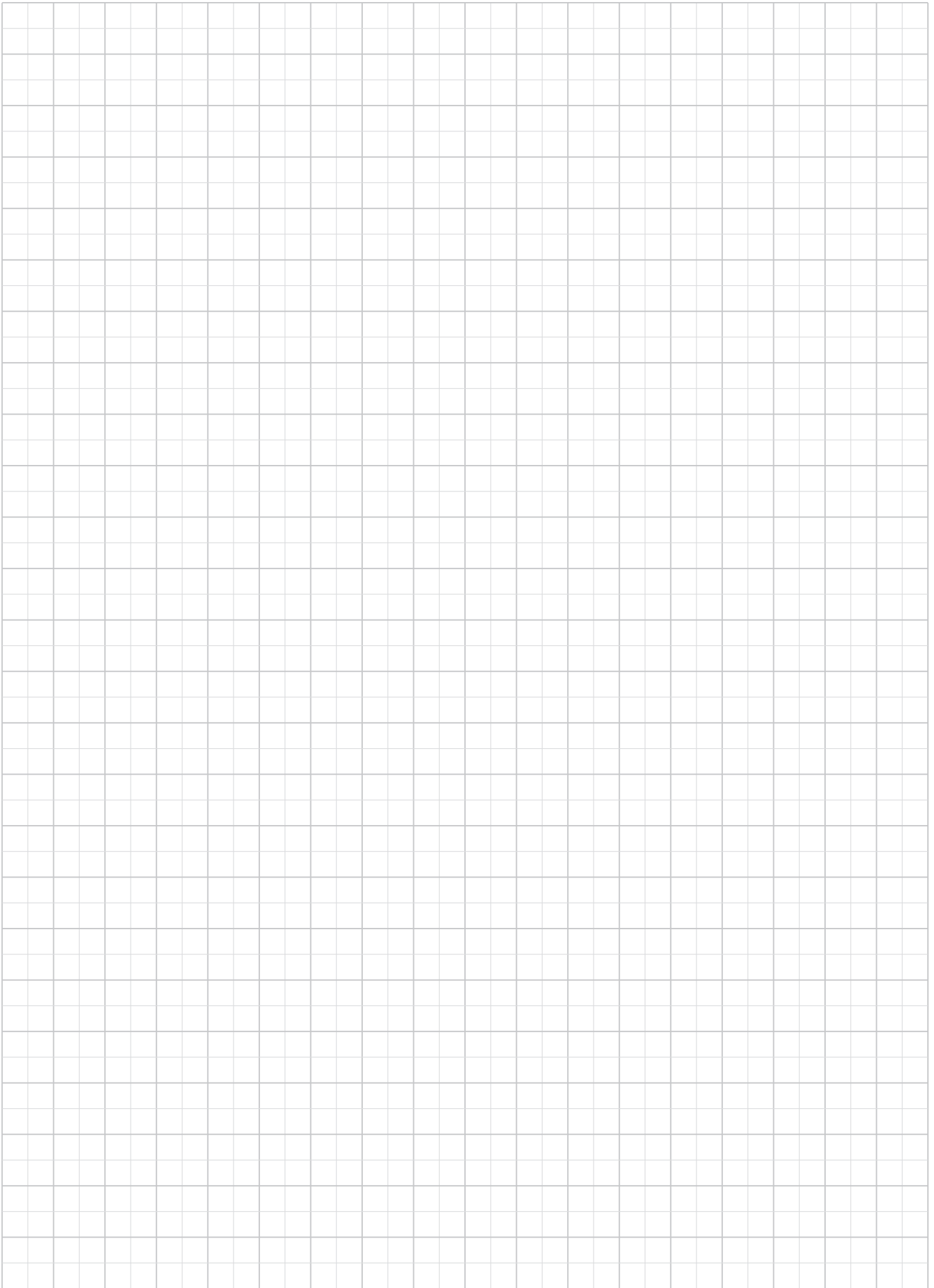
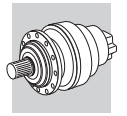
FP

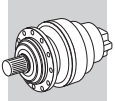


FZ

**FP**  $M_{2max} = 648000 \text{ Nm}$

	L				L1	L2	D1	L3	L4	Kg			
	PC - PZ	HC - HZ	FZ	FP						PC - PZ	HC - HZ	FZ	FP
3/V 21L4	1374	1174	1174	1174	250	-	55	276	110	3430	3130	3030	3030
3/V 21L4	P132		P160		P180		P200		P225				
	L2	P	L2	P	L2	P	L2	P	L2	P	L2	P	
	531	300	506	350	506	350	531	400	536	450			



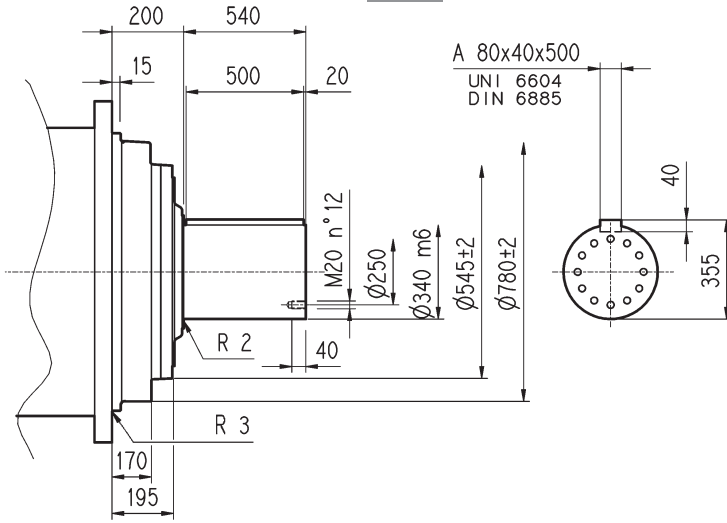


**321 L**

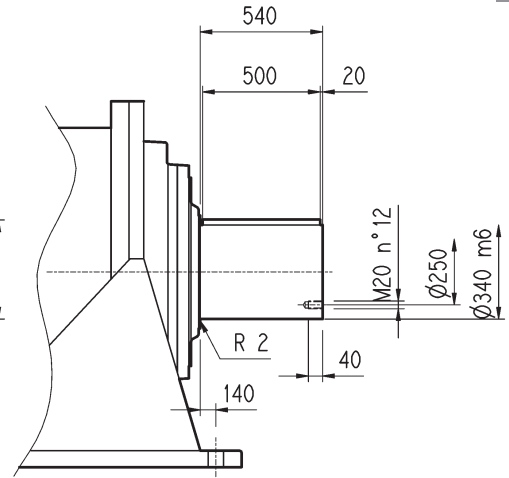
**321 R**

**3/V 21L4**

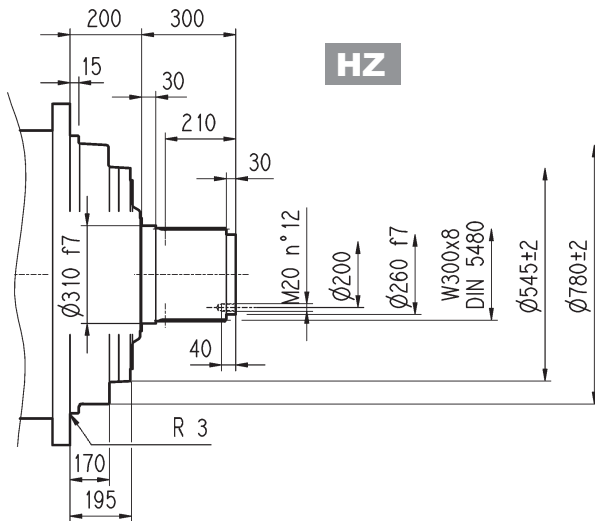
**HC**



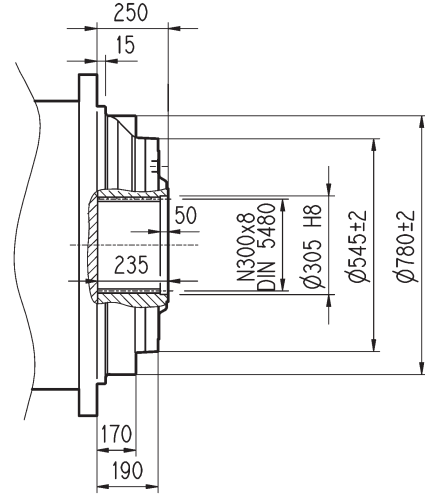
**PC**



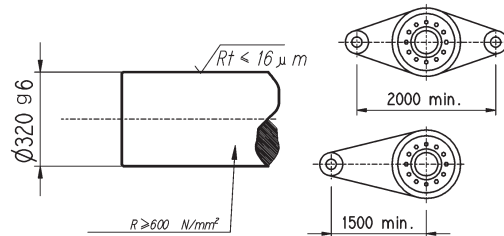
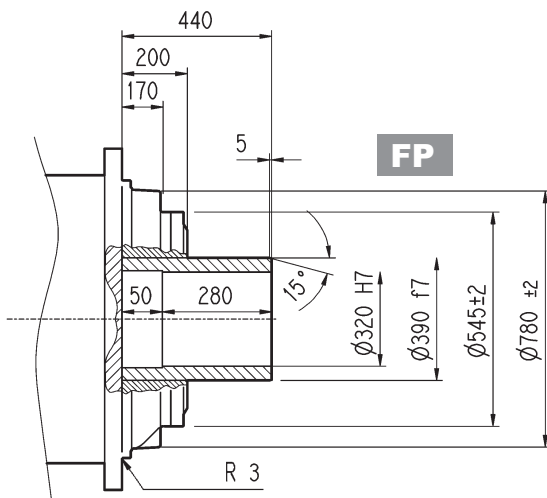
**HZ**



**FZ**

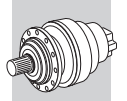


**FP**

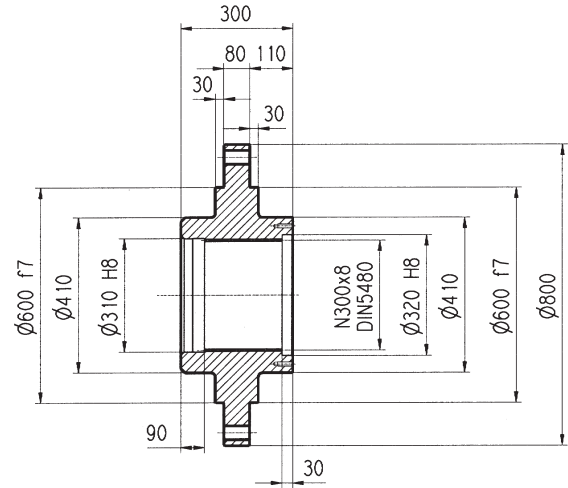
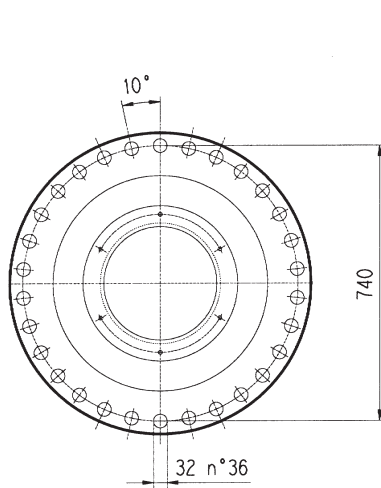
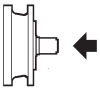


**FP**

**M<sub>2max</sub> = 648000 Nm**

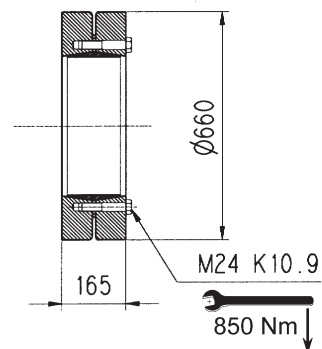
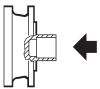
**321 L****321 R****3/V 21L4**

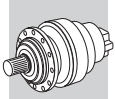
Flangia / Flange  
Flansch / Brides

**WOA**

Materiale : Acciaio C40  
Material : Steel C40  
Material : Stahl C40  
Màterial : Acier C40

Giunto ad attrito / Shrink disc  
Schrumpfscheibe / Frette de serrage

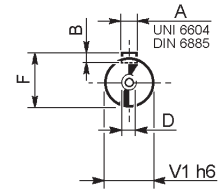
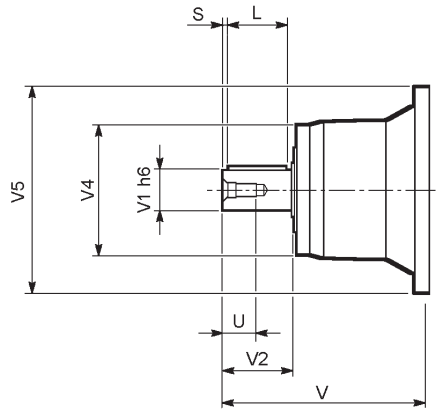
**GOA**



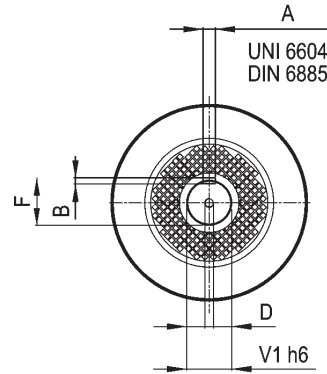
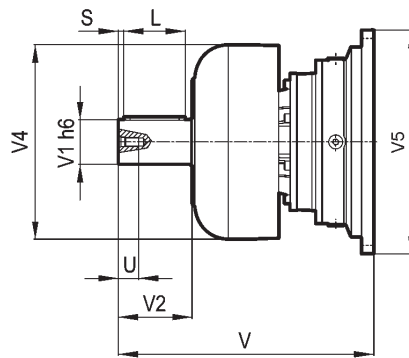
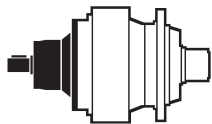
**321 L**

**321 R**

**V \_ \_**

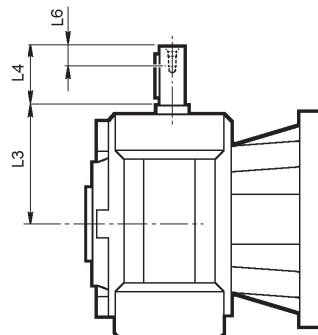
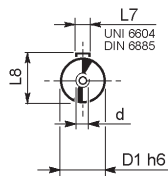


**FV \_ \_**

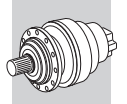


	input	V	V1	V2	V4	V5	A	B	F	L	S	D	U
321 L3	V11B	343	80	130	200	445	22	14	85	110	10	M16	36
	FV11B	451	80	130	347.5	445	22	14	85	110	10	M16	36
321 L4	V07B	315	80	130	200	345	22	14	85	110	10	M16	36
	FV07B	375	80	130	347.5	348	22	14	85	110	10	M16	36
	V07A	313	60	105	155	345	18	11	64	90	7.5	M16	36
	FV07A	363	60	105	309	348	18	11	64	90	7.5	M16	36
321 R4 (B) (C)	V06B	307	60	105	155	292	18	11	64	90	7.5	M16	36
	FV06B	357	60	105	309	292	18	11	64	90	7.5	M16	36

**3/V 21L4**



	D1 h6	L3	L4	L6	L7	L8	d
3/V 21L4 HS	55	276	110	40	16	59	M16

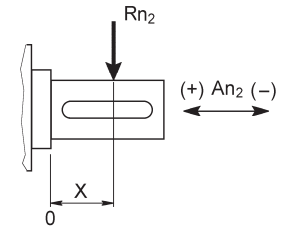
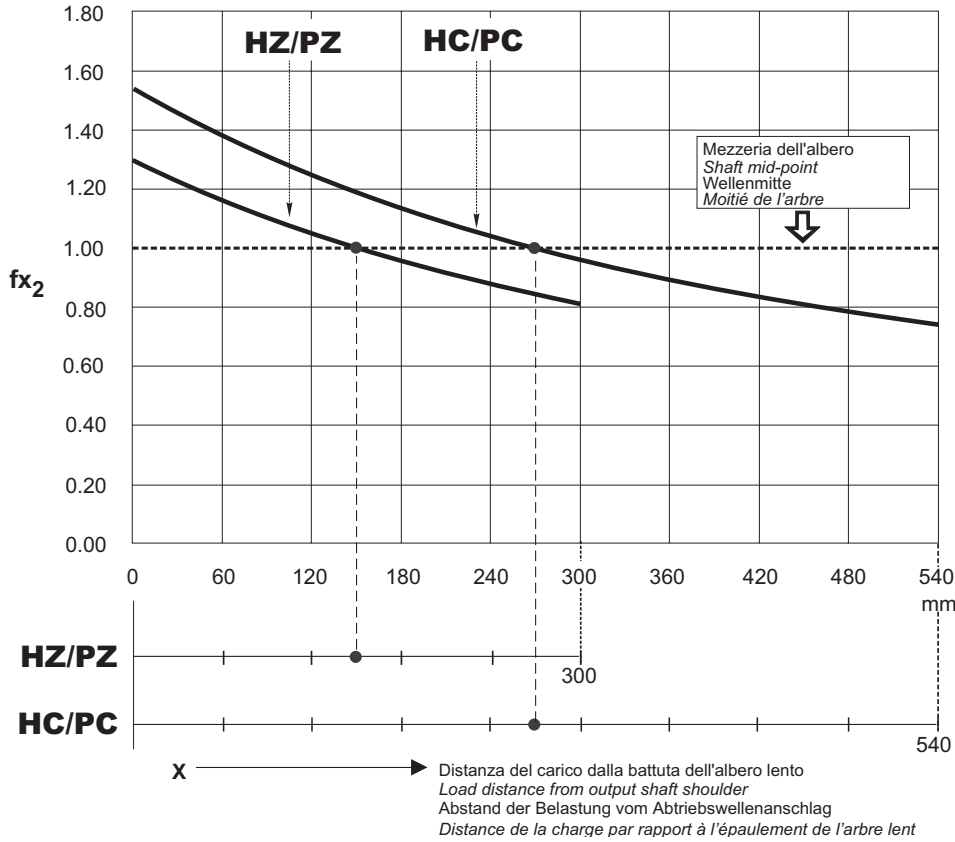


Fattore di posizione per carichi radiali sugli alberi in uscita.

Load location factor for radial loading on output shaft.

Positionsfaktor für Radialkräfte an der Abtriebswelle.

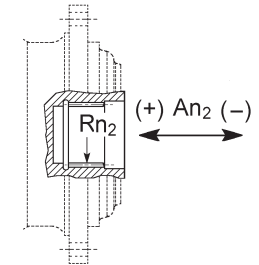
Facteur de position pour charges radiales sur les arbres en sortie.



$$R_{x2} = Rn_2 \cdot fx_2$$

$$An_2 (\pm) = Rn_2 \cdot fa_2 (\pm)$$

	fa <sub>2</sub> (+)	fa <sub>2</sub> (-)
HZ/PZ	0.20	0.26
HC/PC	0.23	0.31



$$An_2 (\pm) = Rn_2 \cdot fa_2 (\pm)$$

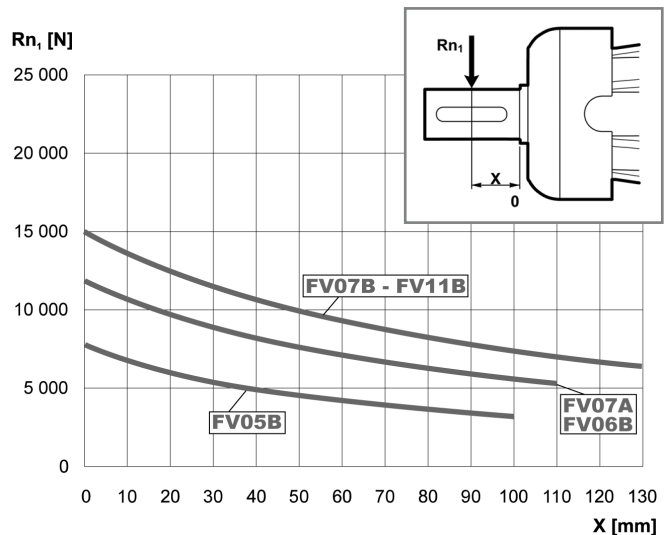
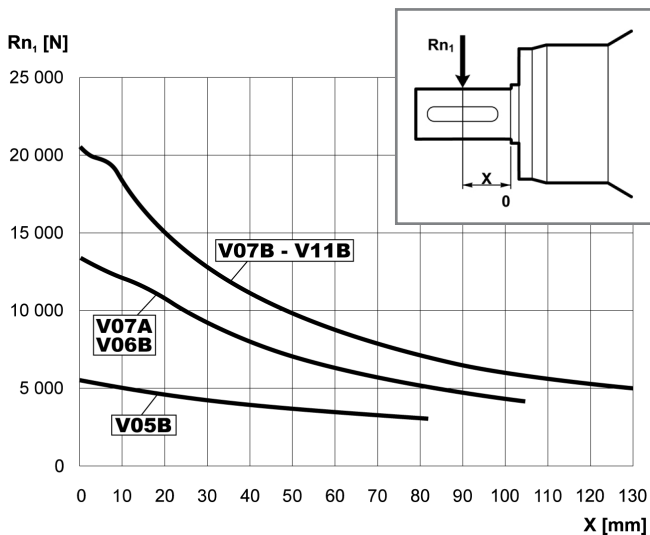
	fa <sub>2</sub> (+)	fa <sub>2</sub> (-)
FZ	0.15	0.15

Carichi radiali ammissibili sull'albero veloce per  $n_1 = 1000 \text{ min}^{-1}$  e 10000 h di vita teorica.  
Per velocità di comando e/o durate diverse vedi il capitolo: Verifiche.

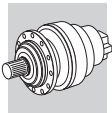
Permitted overhung loads on input shaft when  $n_1 = 1000 \text{ min}^{-1}$  and theoretical lifetime = 10000 h.  
For drive speed and/or lifetimes other than those specified here, see Chapter: Verifications.

Zulässige Radialkräfte an den Antriebswellen für  $n_1 = 1000 \text{ min}^{-1}$  und 10000 std.  
Im Hinblick auf Geschwindigkeit und/oder anderweitige Dauern verweisen wir auf Par: Prüfungen

Charges radiales admissibles sur les arbres d'entrée pour  $n_1 = 1000 \text{ min}^{-1}$  et 10000 h.  
Pour des vitesses et/ou durées différentes, voir par. Vérifications.







## 29.0 - SISTEMI AUSILIARI DI RAFFREDDAMENTO

Qualora la potenza meccanica trasmessa sia superiore a quella termica trasmissibile (vedi tabelle dati tecnici motoriduttori e riduttori), è possibile fornire il riduttore corredato di centralina di raffreddamento.

## 29.0 - SUPPLEMENTARY COOLING SYSTEMS

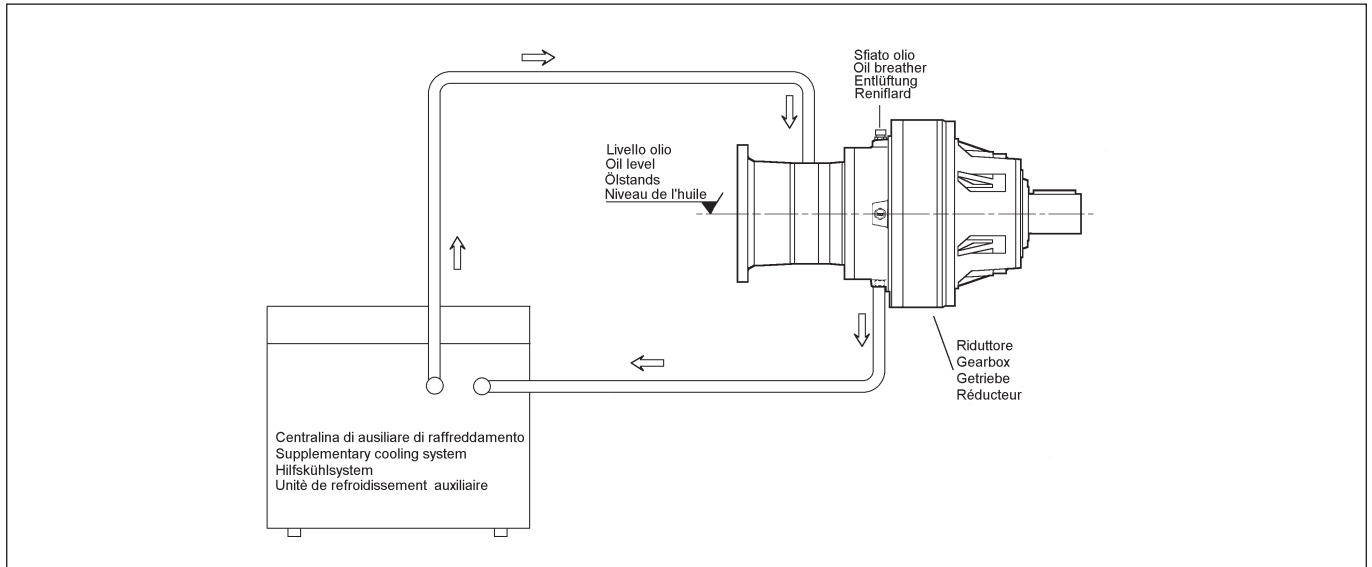
*Should the transmitted mechanical power be greater than the thermal capacity the unit is rated for, supplementary cooling systems can be specified.*

## 29.0 - HILFSKÜHLSYSTEME

Sollte die übertragende mechanische Leistung über der übertragbaren Wärmeleistung liegen (siehe Tabelle mit technischen Getriebedaten), ist die Lieferung eines, mit einem Kühlsystem ausgestatteten Getriebe möglich.

## 29.0 - SYSTEMES AUXILIAIRES DE REFROIDISSEMENT

*Au cas où la puissance mécanique transmise serait supérieure à celle thermique transmissible (confronter tableaux données techniques réducteurs), il est possible de d'équiper le réducteur d'une unité de refroidissement.*



Le centraline autonome di raffreddamento sono unità composte da uno scambiatore di calore aria-olio, una motopompa, un filtro dell'olio da raffreddare, un elettroventilatore ed un impianto elettrico comprendente la protezione termica dei motori elettrici. Caratteristica delle centraline è il basso livello di rumorosità.

*Independent cooling systems are made up of an air-oil heat exchanger, a motor pump, a filter and an electric system that incorporates a thermostatic sensor that protects the electric motor. Cooling units are particularly quiet in operation.*

Die autonomen Kühlsysteme sind Einheiten, die sich aus einem Luft-Öl-Wärmeaustauscher, einer Motorpumpe, einem Filter für das zu kühlende Öl, einem Elektroventilator und einer elektrischen Anlage, welche den Wärmeschutz der Elektromotoren enthält, zusammensetzen.

*Les unités indépendantes de refroidissement sont des sous-ensembles se composant d'un échangeur de chaleur air/huile, d'une motopompe, d'un filtre pour l'huile à refroidir, d'un électroventilateur et d'un système électrique incluant une protection thermique des moteurs électriques. Cette unité est caractérisée par un bas niveau de nuisance sonore.*

### 29.1 Dati tecnici

### 29.1 Technical data

### 29.1 Technische daten

### 29.1 Donnée techniques

		CR1	CR2	CR3
Potenza assorbita / Absorbed power Leistungsaufn / Puissance absorbée	[kW]	0.55	0.75	1.1
Portata pompa / Oil flow rate Pumpeausflussmenge / Débit de pompe	[l/min]	13	22	34
Portata aria / Air flow rate Luftausflussmenge / Débit d'air	[m <sup>3</sup> /h]	850	1500	2000
Livello di rumorosità a 1 metro / Noise level at 1m Geräuschpegel / Niveau sonore à 1 mètre	[dB(A)]	68	70	75
Peso / Weight Gewicht / Poids	[Kg]	24	36	58

### 29.2 Criteri di scelta

Nota la potenza da trasmettere P e verificato che questa sia superiore alla potenza termica Pt, calcolare la potenza da smaltire Ps con la formula:

### 29.2 Selection criteria

*If the mechanical power P is greater than the thermal rating Pt, the heating to be dissipated [Ps] can be calculated through the following equation:*

### 29.2 Auswahlkriterien

Hat man einmal die Date der zu übertragenden Leistung P zur Verfügung stehen und überprüft, ob diese über der Wärmeleistung Pt liegt, muß man die Überleistung Ps unter Anwendung der folgenden Formel berechnen:

### 29.2 Critères de sélection

*La puissance P à transmettre connue, et une fois vérifié que celle-ci est supérieure à la puissance thermique Pt, calculer la puissance à éliminer Ps par la formule :*

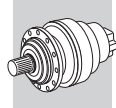
$$P_s = 0.1 \times (P_{r1} - P_t) \quad (28)$$

Selezionare la grandezza della centralina sul diagramma (D01)

*Select cooling system size in chart (D01) according to ambi-*

Die Größe des Systems auf dem Diagramm (D01) in Anbetracht

*Sélectionner la taille de l'unité sur le diagramme (D01), se rap-*



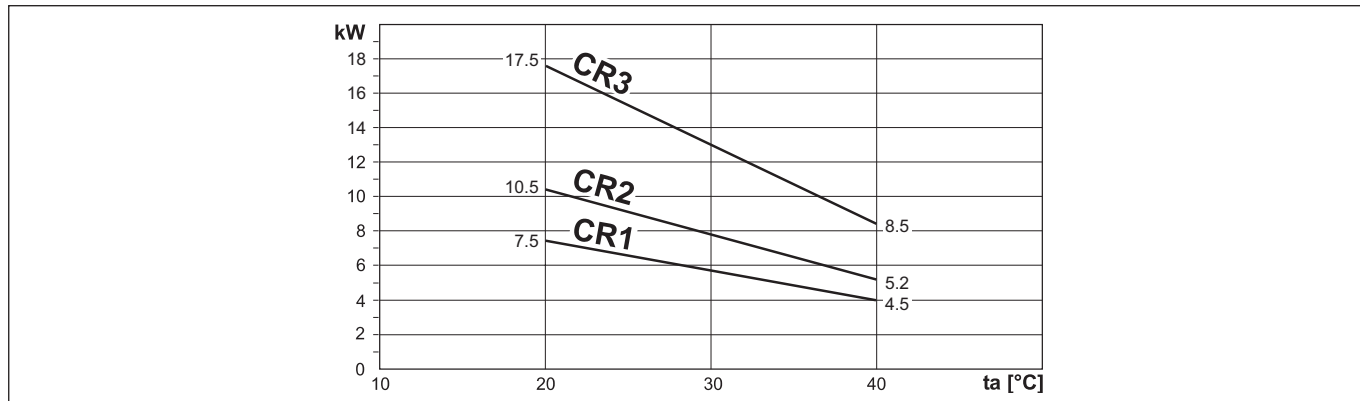
in funzione della temperatura ambiente  $t_a$  (20° - 40°C). Verificare che la centralina sia installabile sul riduttore selezionato (vedi tabella D02). In caso contrario, contattare la ns. Organizzazione di vendita.

ent temperature  $t_a$  (20° - 40°C). Check that the cooling system you have selected will fit the gearbox (see table D02). If this is not the case, contact our sales organization.

der Umgebungstemperatur  $t_a$  (20° - 40°C) auswählen. Überprüfen, ob die Zentrale auch auf dem ausgewählten Getriebe installierbar ist (siehe Tabelle D02). Ist dies nicht der Fall, müssen Sie sich mit unserem Verkaufsnetz in Verbindung setzen.

portant à la température ambiante (20° - 40°C). Veiller à ce que l'unité puisse être installée sur le réducteur sélectionné (voir tableau D02). Vice versa, contacter notre réseau de vente.

(D01)



(D02)

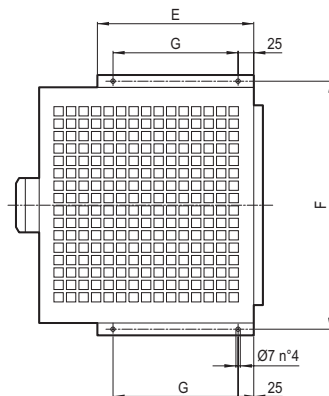
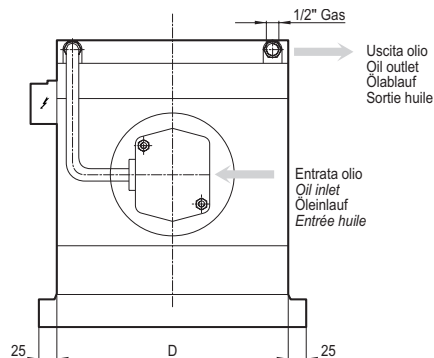
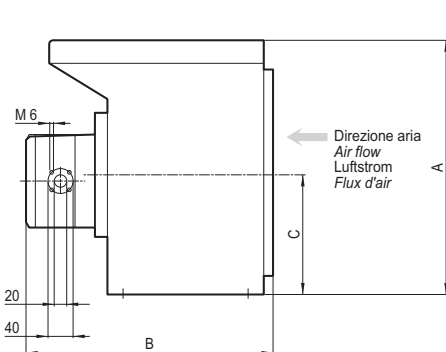
Riduttore / Gearbox Getriebe / Réducteur	L1	L2	L3	L4	R2	R3	R4
306	CR1	CR1	—	—	—	—	—
307	CR1	CR1	—	—	CR1	—	—
309	CR1	CR1	CR1	—	CR1	—	—
310	CR2	CR1	CR1	—	—	CR1	—
311	CR2	CR1	CR1	—	CR1	CR1	—
313	CR2	CR1	CR1	—	CR1	CR1	—
314	CR2	CR1	CR1	—	CR1	CR1	—
315	CR3	CR2	CR1	—	CR1	CR1	—
316	CR3	CR2	CR1	—	CR1	CR1	—
317	CR3	CR2	CR2	CR1	—	—	—
318	CR3	CR2	CR2	CR1	—	—	—
319	CR3	CR2	CR2	CR1	—	—	—
321	CR3	CR2	CR2	CR2	—	—	—

### 29.3 Dimensioni

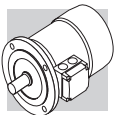
### 29.3 Dimensions

### 29.3 Abmessungen

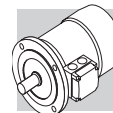
### 29.3 Dimensions



	A	B	C	D	E	F	G
CR1	410	395	193	370	250	400	200
CR2	450	405	203	470	250	500	200
CR3	495	455	225	520	290	550	240


**MOTORI ELETTRICI**
**ELECTRIC MOTORS**
**ELEKTROMOTOREN**
**MOTEURS  
ELECTRIQUES**
**M1 - SIMBOLOGIA E  
UNITÀ DI MISURA**
**M1 - SYMBOLS AND UNITS  
OF MEASUREMENT**
**M1 - SYMBOLE UND  
MAßEINHEITEN**
**M1 - SYMBOLES ET UNITES  
DE MESURE**

Simb. Symb.	U.m. Einheit	Descrizione	Description	Beschreibung	Description
$\cos\varphi$	–	Fattore di potenza	Power factor	Leistungsfaktor	Facteur de puissance
$\eta$	–	Rendimento	Efficiency	Wirkungsgrad	Rendement
$f_m$	–	Fattore correttivo della potenza	Power adjusting factor	Leistungskorrekturfaktor	Facteur de correction de la puissance
$I$	–	Rapporto di intermittenza	Cyclic duration factor	Relative Einschaltdauer	Rapport d'intermittence
$I_N$	[A]	Corrente nominale	Rated current	Nennstrom	Courant nominal
$I_s$	[A]	Corrente di spunto	Locked rotor current	Kurzschlußstrom	Courant de démarrage
$J_C$	[Kgm <sup>2</sup> ]	Momento di inerzia del carico	Load moment of inertia	Massenträgheitsmoment der externen Massen	Moment d'inertie de la charge
$J_M$	[Kgm <sup>2</sup> ]	Momento di inerzia motore	Moment of inertia	Trägheitsmoment	Moment d'inertie du moteur
$K_C$	–	Fattore di coppia	Torque factor	Drehmomentfaktor	Facteur de couple
$K_d$	–	Fattore di carico	Load factor	Lastfaktor	Facteur de charge
$K_J$	–	Fattore di inerzia	Inertia factor	Trägheitsfaktor	Facteur d'inertie
$M_A$	[Nm]	Coppia accelerante media	Mean breakaway torque	Losbrechmoment	Couple d'accélération moyen
$M_B$	[Nm]	Coppia frenante	Brake torque	Bremsemoment	Couple du frein
$M_N$	[Nm]	Coppia nominale	Rated torque	Nennmoment	Couple nominal
$M_L$	[Nm]	Coppia resistente media	Counter-torque during acceleration	Lastmoment	Couple résistant moyen
$M_S$	[Nm]	Coppia di spunto	Starting torque	Startmoment	Couple de démarrage
$n$	[min <sup>-1</sup> ]	Velocità nominale	Rated speed	Nennzahl	Vitesse nominale
$P_B$	[W]	Potenza assorbita dal freno a 20°C	Power drawn by the brake at 20°C	Leistungsaufnahme der Bremse bei 20°C	Puissance absorbée par le frein à 20°C
$P_n$	[kW]	Potenza nominale	Motor rated power	Nennleistung	Puissance nominale
$P_r$	[kW]	Potenza richiesta	Required power	Benötigte Leistung	Puissance nécessaire
$t_1$	[ms]	Ritardo di sblocco del freno con alimentatore a semionda	Brake response time with one-way rectifier	Ansprechzeit Bremse mit Einweg-Gleichrichter	Temps de déblocage du frein avec alimentation à demi-onde
$t_{1s}$	[ms]	Tempo di sblocco del freno con alimentatore a controllo elettronico	Brake response time with electronic-controlled rectifier	Ansprechzeit Bremse mit elektronisch gesteuertem Gleichrichter	Temps de déblocage du frein avec alimentation à contrôle électronique
$t_2$	[ms]	Ritardo di frenatura con disgiunzione lato c.a.	Brake reaction time with a.c. disconnect	Einfallzeit Bremse bei Unterbrechung der Stromversorgung WS	Retard de freinage avec coupure coté c.a.
$t_{2c}$	[ms]	Ritardo di frenatura con disgiunzione circuito c.a. e c.c.	Brake reaction time with a.c. and d.c. disconnect	Einfallzeit Bremse bei Unterbrechung der Stromversorgung WS und GS	Retard de freinage avec coupure coté c.a. et c.c.
$t_a$	[°C]	Temperatura ambiente	Ambient temperature	Umgebungstemperatur	Température ambiante
$t_f$	[min]	Tempo di funzionamento a carico costante	Work time at constant load	Betriebsdauer unter Nennbelastung	Temps de fonctionnement à charge constante
$t_r$	[min]	Tempo di riposo	Rest time	Aussetzzeit	Temps de repos
$W$	[J]	Lavoro di frenatura accumulato tra due regolazioni del traferro	Braking work between service interval	Bremsenergie zwischen zwei Einstellungen	Energie de freinage accumulée entre deux réglages de l'entrefer
$W_{max}$	[J]	Energia massima per singola frenatura	Maximum brake work for each braking	Max. Bremsarbeit pro Bremsvorgang	Energie maxi par freinage
$Z$	[1/h]	N° di avviamenti ammissibili, a carico	Permissible starting frequency, loaded	Schalhäufigkeit Nennbetrieb	Nombre de démarrages admissibles en charge
$Z_0$	[1/h]	N° di avviamenti ammissibili a vuoto (I = 50%)	Max. permissible unloaded starting frequency (I = 50%)	Max. Schalhäufigkeit im Leerlauf (relative Einschalt-dauer I = 50%)	Nombre de démarrages admissible à vide (I = 50%)



## M2 - CARATTERISTICHE GENERALI

### Programma di produzione

I motori elettrici asincroni trifase del programma di produzione della BONFIGLIOLI RIDUTTORI sono previsti nelle forme costruttive base IMB5, IMB14 e loro derivate con le seguenti polarità: 2, 4, 6, 2/4, 2/6, 2/8, 2/12. Nel presente catalogo sono evidenziate inoltre, le caratteristiche tecniche dei motori in versione integrata, tipo M.

### Normative

I motori descritti in questo catalogo sono costruiti in accordo alle Norme ed unificazioni applicabili evidenziate nella tabella seguente.

## M2 - GENERAL CHARACTERISTICS

### Production range

*The asynchronous three-phase electric motors of BONFIGLIOLI RIDUTTORI's production, are available in basic designs IMB5 and IMB14 and derived versions, with the following polarities: 2, 4, 6, 2/4, 2/6, 2/8, 2/12. The technical characteristics of compact motors, M type, are also supplied in this manual.*

### Standards

*The motors described in this catalogue are manufactured to the applicable standards shown in the following table.*

## M2 - ALLGEMEINE EIGENSCHAFTEN

### Produktprogramm

Die Dreiphasen-Asynchronmotoren aus dem Produktprogramm von BONFIGLIOLI RIDUTTORI gibt es in den Grundbauformen IMB5, IMB14 und deren Ableitungen mit folgenden Polzahlen: 2, 4, 6, 2/4, 2/6, 2/8 und 2/12. Im vorliegenden Katalog sind außerdem die technischen Eigenschaften der Motoren in Kompaktausführung hervorgehoben.

### Normen

Die in diesem Katalog beschriebenen Motoren sind in Übereinstimmung mit den in der folgenden Tabelle angegebenen einschlägigen Normen und Vereinlichungsrichtlinien konstruiert worden.

## M2 - CARACTERISTIQUES GENERALES

### Programme de production

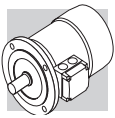
*Les moteurs électriques asynchrones triphasés du programme de production de BONFIGLIOLI RIDUTTORI sont prévus dans les formes de construction de base IMB5, IMB14 et leur dérivés avec les polarités suivantes: 2, 4, 6, 2/4, 2/6, 2/8, 2/12. Dans le présent catalogue sont également mises en évidence les caractéristiques techniques des moteurs en version compacte, type M.*

### Réglementations

*Les moteurs décrits dans ce catalogue sont construits en accord avec les Normes et standardisations applicables mises en évidence dans le tableau ci-dessous.*

(A26)

Titolo / Title / Titel / Titre	CEI	IEC
Prescrizioni generali per macchine elettriche rotanti <i>General requirements for rotating electrical machines</i> Allgemeine Vorschriften für umlaufende elektrische Maschinen <i>Prescriptions générales pour machines électriques tournantes</i>	CEI EN 60034-1	IEC 60034-1
Marcatura dei terminali e senso di rotazione per macchine elettriche rotanti <i>Terminal markings and direction of rotation of rotating machines</i> Kennzeichnung der Anschlußklemmen und Drehrichtung von umlaufenden elektrischen Maschinen <i>Définitions des bornes et sens de rotation pour machines électriques tournantes</i>	CEI 2-8	IEC 60034-8
Metodi di raffreddamento delle macchine elettriche <i>Methods of cooling for electrical machines</i> Verfahren zur Kühlung von elektrischen Maschinen <i>Méthodes de refroidissement des machines électriques</i>	CEI EN 60034-6	IEC 60034-6
Dimensioni e potenze nominali per macchine elettriche rotanti <i>Dimensions and output ratings for rotating electrical machines</i> Auslegung der Nennleistung von umlaufenden elektrischen Maschinen <i>Dimensions, puissances nominales pour machines électriques tournantes</i>	EN 50347	IEC 60072
Classificazione dei gradi di protezione delle macchine elettriche rotanti <i>Classification of degree of protection provided by enclosures for rotating machines</i> Klassifizierung der Schutzart von umlaufenden elektrischen Maschinen <i>Classification des degrés de protection des machines électriques tournantes</i>	CEI EN 60034-5	IEC 60034-5
Limiti di rumorosità <i>Noise limits</i> Geräuschgrenzwerte <i>Limites de bruit</i>	CEI EN 60034-9	IEC 60034-9
Sigle di designazione delle forme costruttive e dei tipi di installazione <i>Classification of type of construction and mounting arrangements</i> Abkürzungen zur Kennzeichnung der Bauform und der Einbaulagen <i>Sigles de dénomination des formes de construction et des types d'installation</i>	CEI EN 60034-7	IEC 60034-7
Tensione nominale per i sistemi di distribuzione pubblica dell'energia elettrica a bassa tensione <i>Rated voltage for low voltage mains power</i> Nennspannung für öffentliche NS-Stromverteilungssysteme <i>Tension nominale pour les systèmes de distribution publique de l'énergie électrique en basse tension</i>	CEI 8-6	IEC 60038
Grado di vibrazione delle macchine elettriche <i>Vibration level of electric machines</i> Schwingstärke bei elektrischen Maschinen <i>Degré de vibration des machines électriques</i>	CEI EN 60034-14	IEC 60034-14



I motori corrispondono inoltre alle Norme straniere adeguate alle IEC 60034-1 e qui riportate.

*The motors also comply with foreign standards adapted to IEC 60034-1 as shown here below.*

Die Motoren entsprechen außerdem den an die IEC-Norm 60034-1 angepaßten ausländischen Normen, die in der folgenden Tabelle genannt werden.

*En outre, les moteurs correspondent aux Normes étrangères adaptées aux IEC 60034-1 indiquées dans le tableau ci-dessous.*

(A27)

DIN VDE 0530	Germania	Germany	Deutschland	Allemagne
BS5000 / BS4999	Gran Bretagna	Great Britain	Großbritannien	Grande Bretagne
AS 1359	Australia	Australia	Australien	Australie
NBNC 51 - 101	Belgio	Belgium	Belgien	Belgique
NEK - IEC 34	Norvegia	Norway	Norwegen	Norvège
NF C 51	Francia	France	Frankreich	France
O EVE M 10	Austria	Austria	Österreich	Autriche
SEV 3009	Svizzera	Switzerland	Schweiz	Suisse
NEN 3173	Paesi Bassi	Netherlands	Niederlande	Pays Bas
SS 426 01 01	Svezia	Sweden	Schweden	Suède

## CUS

### MOTORI PER USA E CANADA

I motori BN ed M sono disponibili in esecuzione NEMA Design C (per le caratteristiche elettriche), certificata in conformità alle norme CSA (Canadian Standard) C22.2 N° 100 e UL (Underwriters Laboratory) UL 1004 con targhetta riportante entrambi i marchi sotto illustrati, specificare in questo caso l'opzione CUS.

### MOTORS FOR USA AND CANADA

*BN and M motors are available in NEMA Design C configuration (concerning electrical characteristics), certified to CSA (Canadian standard) C22.2 No. 100 and UL (Underwriters Laboratory) UL 1004. By specifying the option CUS the name plate is marked with both symbols shown here below.*

### MOTOREN FÜR DIE USA UND KANADA

Die BN/M-Motoren sind in der Ausführung NEMA, Design C (aufgrund der elektrischen Eigenschaften), den Normen CSA (Canadian Standard) C22.2 Nr 100 und UL (Underwriters Laboratory) UL 1004 gemäß zertifiziert. Durch Spezifizieren der Option CUS wird das Typenschild mit den nachstehend aufgeführten Symbolen gekennzeichnet.

### MOTEURS POUR ETATS-UNIS ET CANADA

*Les moteurs BN et M sont disponibles en exécution NEMA Design C (pour les caractéristiques électriques), certifiée conforme aux normes CSA (Canadian Standard) C22.2 N°100 et UL (Underwriters Laboratory) UL 1004 avec une plaque signalétique indiquant chacun des symboles ci-dessous, dans ce cas, spécifier l'option CUS.*



Le tensioni delle reti di distribuzione americane e le corrispondenti tensioni nominali da specificare per il motore sono indicate nella tabella seguente:

*US power mains voltages and the corresponding rated voltages to be specified for the motor are indicated in the following table:*

Die Spannungen der amerikanischen Verteilernetze und die entsprechenden tens-Nennspannungen, die bei den Motoren angegeben werden müssen, können der folgenden Tabelle entnommen werden:

*Les tensions des réseaux de distribution américains ainsi que les tensions nominales à spécifier par le moteur sont indiquées dans le tableau suivant :*

(A28)

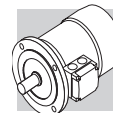
Frequenza / Frequency Frequenz / Fréquence	Tensione di rete / Mains voltage Netzspannung / Tension de réseau	V <sub>mot</sub>
60 Hz	208 V	<b>200 V</b>
	240 V	<b>230 V</b>
	480 V	<b>460 V</b>
	600 V	<b>575 V</b>

I motori dotati di collegamento YY/Y (es. 230/460-60; 220/440-60) presentano di serie una morsetteiera a 9 terminali. Per le stesse esecuzioni, e inoltre per l'alimentazione 575V-60Hz, la potenza di targa corrisponde a quella normalizzata a 50Hz. Per i motori autofrenanti con freno in c.c. tipo BN\_FD l'alimentazione del raddrizzatore è da morsetteiera motore con tensione 230V a.c. monofase. Per i motori autofrenanti l'alimentazione del freno è così predisposta:

*Motors with YY/Y connection (e.g. 230/460-60; 220/440-60) feature, as standard, a 9-stud terminal board. For same executions, as well as for 575V-60Hz supply, the nominal rating is coincident with the correspondent 50Hz rating. For DC brake motors type BN\_FD, the rectifier is connected to a single-phase 230 VAC supply voltage in the motor terminal box. Brake power supply for brake motors is as follows:*

Motoren mit YY/Y-Anschluss (z.B. 230/460-60; 220/440-60) sind standardmäßig mit 9 Pins auf dem Klemmbrett ausgeführt. Für gleiche Ausführungen, ebenso wie für 575V-60Hz, die Nennleistung ist gleich mit der entsprechenden 50 Hz-Leistung. Für Bremsmotoren mit Gleichstrombremse vom Typ BN\_FD erfolgt die Versorgung des Gleichrichters über den Motor-klemmenkasten mit einer Spannung von 230V (einphasiger Wechselstrom). Bei Bremsmotoren stellt sich die **Versorgung der Bremse** wie folgt dar:

*Les moteurs avec connexion YY/Y (ex. 230/460-60; 220/440-60) présentent, en standard, une plaque à borne avec 9 bornes. Pour les mêmes exécutions, et aussi pour l'alimentation 575V-60Hz, la puissance de plaque correspond à celle normalisée à 50Hz. Pour les moteurs frein avec frein en c.c. type BN\_FD, l'alimentation du redresseur provient de la boîte à bornes moteur avec une tension 230V c.a. monophasée. Pour les moteurs frein l'alimentation du frein est la suivante :*



BN_FD M_FD	BN_FA ; BN_BA M_FA	Specificare / Specify Bitte angeben / Spécifier
Da morsetti motore 1~230V c.a. Wired to terminal box 1~230V a.c. Vom Motorklemmenkasten 1~230V W.S. Depuis boîte à bornes moteur 1~230V c.a.	Alimentazione separata / <i>Separate power supply</i> Fremdversorgung / <i>Alimentation séparée</i> 230V Δ - 60Hz	230SA
	Alimentazione separata / <i>Separate power supply</i> Fremdversorgung / <i>Alimentation séparée</i> 460V Y - 60Hz	460SA

L'opzione CUS non è applicabile ai motori dotati di servoventilazione.

*The option CUS does not apply to servo-ventilated motors.*

Die CUS-Option ist für die Fremdlüftermotoren nicht anwendbar.

*L'option CUS n'est pas applicable aux moteurs doués de ventilation forcée.*

#### Direttive CEE 73/23 (LVD) e CEE 89/336 (EMC)

I motori delle serie BN ed M sono conformi ai requisiti delle Direttive CEE 73/23 (Direttiva Bassa Tensione) e CEE 89/336 (Direttiva Compatibilità Elettromagnetica), e riportano in targa la marcatura CE.

Per quanto riguarda la Direttiva EMC, la costruzione è in accordo alle Norme CEI EN 60034-1 sez. 12, EN 50081, EN 50082. I motori con freno in c.c. tipo FD, se corredati dell'opportuno filtro capacitivo in ingresso al raddrizzatore (opzione CF), rientrano nei limiti di emissione previsti dalla Norma EN 50081-1 "Compatibilità elettromagnetica - Norma Generica sull'emissione - Parte 1: Ambienti residenziali, commerciali e dell'industria leggera". I motori soddisfano inoltre le prescrizioni della Norma CEI EN 60204-1 "Equipaggiamento elettrico delle macchine".

È responsabilità del costruttore o dell'assemblatore dell'apparecchiatura che incorpora i motori come componenti garantire la sicurezza e la conformità alle direttive del prodotto finale.

#### Directives 73/23/EEC (LVD) and 89/336/EEC (EMC)

*BN motors meet the requirements of Directives 73/23/EEC (Low Voltage Directive) and 89/336/EEC (Electromagnetic Compatibility Directive) and their name plates bear the CE mark.*

*As for the EMC Directive, construction is in accordance with standards CEI EN 60034-1 Sect. 12, EN 50081, EN 50082.*

*Motors with FD brakes, when fitted with the suitable capacitive filter at rectifier input (option CF), meet the emission limits required by Standard EN 50081-1 "Electromagnetic compatibility - Generic Emission Standard - Part 1: Residential, commercial and light industrial environment". Motors also meet the requirements of standard CEI EN 60204-1 "Electrical equipment of machines".*

*The responsibility for final product safety and compliance with applicable directives rests with the manufacturer or the assembler who incorporate the motors as component parts.*

#### Richtlinien EWG 73/23 (LVD) und EWG 89/336 (EMC)

Die Motoren der Serie BN entsprechen den Anforderungen der Richtlinien EWG 73/23 (Richtlinie - Niederspannung) und CEE 89/336 (Richtlinie - elektromagnetische Kompatibilität) und sind mit dem CE-Zeichen ausgestattet.

Im Hinblick auf die Richtlinie EMC entspricht die Konstruktion den Normen CEI EN 60034-1, Abschn. 12, EN 50081, EN 50082.

Die Motoren mit dem Bremstyp FD fallen, falls mit dem entsprechenden kapazitiven Filter am Eingang des Gleichrichters ausgestattet (Option CF), unter die Emissionsgrenzwerte, die von der Norm EN 50081-1 "Elektromagnetische Kompatibilität - Allgemeine Norm für Emissionen - Teil 1: Wohngebiete, Handels- und Leichtindustriestrukturen" vorgesehen werden. Die Motoren entsprechen darüber hinaus den von der Norm CEI EN 60204-1 "Elektrische Maschinenausrüstung" gegebenen Vorschriften. Es liegt in der Verantwortung des Herstellers oder es Monteurs der Ausrüstung, in der die Motoren als Komponenten montiert werden, die Sicherheit und die Übereinstimmung mit den Richtlinien des Endprodukts zu gewährleisten.

#### Directives CEE 73/23 (LVD) et CEE 89/336 (EMC)

*Les moteurs de la série BN sont conformes aux conditions requises par les Directives CEE 73/23 (Directive Basse Tension) et CEE 89/336 (Directive Compatibilité Electromagnétique), et le marquage CE est indiqué sur la plaque signalétique.*

*En ce qui concerne la Directive EMC, la fabrication répond aux Normes CEI EN 60034-1 Sect. 12, EN 50081, EN 50082.*

*Les moteurs avec frein FD, s'ils sont équipés du frein capacitif approprié en entrée du redresseur (option CF), rentrent dans les limites d'émission prévues par la Norme EN 50081-1 "Compatibilité électromagnétique - Norme Générique sur l'émission - Partie 1 : Milieux résidentiels, commerciaux et de l'industrie légère".*

*Les moteurs répondent aussi aux prescriptions de la Norme CEI EN 60204-1 "Equipement électrique des machines".*

*Le fabricant ou le monteur de la machine qui comprend les moteurs comme composant est responsable et doit se charger de garantir la sécurité et la conformité aux directives du produit final.*

#### Rendimento - Accordo CEMEP

Con l'obiettivo di ridurre significativamente il consumo europeo di energia elettrica mediante la sensibilizzazione degli utenti all'uso di motori maggiormente efficienti, la Commissione Europea per l'Energia e il CEMEP hanno concordato le condizioni ricorrenti per la classificazione dei motori elettrici in classi di rendimento denominate, in senso decrescente, **eff1**, **eff2** ed **eff3**.

Oggetto di questo accordo sono solamente i motori trifase standard in c.a. a 2 e 4 poli, costruzione chiusa con rotore a gabbia di scoiattolo, ventilazione esterna e potenza all'albero compresa fra 1,1 e 90 kW, alimentazione a 400V - 50 Hz in servizio continuo S1.

È facoltà dei costruttori di motori elettrici decidere di classificare volontariamente i propri prodotti in una delle tre classi di rendimento sopra citate. In questo caso essi devono apporre sulla targa il marchio relativo alla classe di rendimento applicabile ed inserire, fra i dati tecnici, i valori

#### Efficiency - the CEMEP agreement

*CEMEP, the European Committee of Manufacturers of Electrical Machines and Power Electronics hopes to reduce electrical energy consumption in Europe by informing users of the efficiency of electrical motors. As a contribution in this direction, CEMEP has recently published an agreement stating the specifications for electric motor energy efficiency classes **eff1**, **eff2** and **eff3** (listed in order of decreasing efficiency).*

*The CEMEP agreement covers only standard, 2 and 4 pole, three phase, AC motors, of closed rotor and squirrel cage construction, with external ventilation and rated power at the output shaft of 1.1 to 90 kW, for use with a 400V - 50 Hz power supply under S1 continuous duty conditions.*

*It is left up to individual electric motor manufacturers to classify their products in one of the three above classes. If they decide to do so, they must apply the relevant efficiency mark to the motor and include, together with all the*

#### Wirkungsgrad - die CEMEP Vereinbarung

CEMEP, der europäische Herstellerverband von elektrischen Maschinen und Leistungs-Elektronik hofft, den elektrischen Energieverbrauch in Europa, durch Informationen über die Wirkungsgrade von elektrischen Motoren an die Benutzer, zu reduzieren. Als Beitrag in dieser Richtung, hat die CEMEP vor kurzem eine Vereinbarung veröffentlicht, die die Energie-Effizienz-Klassen **eff1**, **eff2** und **eff3** für Elektromotoren spezifiziert. (Aufgelistet nach abnehmendem Wirkungsgrad).

Die CEMEP Vereinbarung beinhaltet nur 2 und 4 polige Drehstrommotoren mit geschlossenem Rotor als Kurzschlussläufer, integriertem Lüfter, Nennleistungen an der Abtriebswelle von 1.1 - 90 kW, mit einer Energieversorgung von 400V - 50Hz und der Betriebsart S1 (Dauerbetrieb).

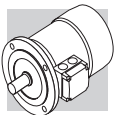
Es bleibt den einzelnen Elektromotoren Herstellern überlassen, ihre Produkte nach einer der drei oben benannten Effizienz-Klassen zu klassifizieren. Wenn sie sich dazu entscheiden, müssen sie die relevante Markierung auf dem Motor anbringen und zusammen mit allen anderen relevanten techni-

#### Rendement - L'accord CEMEP

*La Commission Européenne sur l'Energie et le CEMEP (European Committee of Manufacturers of Electrical Machines and Power Electronics), espère réduire de façon sensible la consommation européenne d'énergie électrique à travers l'information sur l'efficacité des moteurs électriques. Pour ce faire, ils ont fixés une classification des moteurs électriques en « classes de rendement » appelée, en sens décroissant d'efficacité : **eff1**, **eff2** et **eff3**.*

*Font partie de cet accord seulement les moteurs triphasés standard en c.a. à 2 et 4 pôles, de type fermé et rotor à cage, ventilation extérieure et puissance à l'arbre comprise entre 1,1 et 90 KW, alimentation à 400V - 50 Hz en service continue S1.*

*C'est au choix de chaque constructeur de moteurs électriques de décider de classer ces produits dans une des trois classes de rendement ci-dessus. Dans ce cas, le constructeur doit faire apparaître le logo de la classe de rendement sur la plaque marque*



di rendimento a pieno carico ed a  $\frac{3}{4}$  del carico nominale. I motori Bonfiglioli ricompresi nell'oggetto di questo accordo sono conformi alla classe di rendimento **eff2** e sono pertanto chiaramente identificati in targa tramite il logo sotto riportato:

other relevant technical specifications, the measured efficiency figures for full rated load and  $\frac{3}{4}$  rated load. Under the terms of this agreement, Bonfiglioli's electric motors conform to efficiency class **eff2** and are clearly identified as such by the following mark on the data plate:



schen Einzelheiten, die gemessenen Wirkungsgradangaben bei Voll- und Dreiviertellast ausweisen. Unter den Bedingungen dieser Vereinbarung entsprechen die elektrischen Motoren von Bonfiglioli der Effizienz-Klasse **eff2** und werden als solche durch die folgende Markierung auf dem Typenschild deutlich gekennzeichnet:

et introduire, dans les caractéristiques techniques, les valeurs de rendement à pleine charge et à  $\frac{3}{4}$  de la charge nominale. Le moteurs Bonfiglioli concernées dans cet accord, sont conformes à la classe de rendement **eff2** et de conséquence ils présentent, sur la plaque marque, le logo suivant :

### Tolleranze

Secondo le Norme sono ammesse le tolleranze indicate nella tabella seguente sulle grandezze garantite.

### Tolerances

As per the Norms applicable the tolerances here below apply to the following quantities.

### Toleranzen

Die Normen lassen die in folgenden Tabelle genannten Toleranzen bei den garantierten Größen zu.

### Tolérances

Selon les Normes, les tolérances indiquées dans le tableau ci-dessous sont admises sur les tailles garanties.

(A29)

-0.15 (1 - $\eta$ ) P $\leq$ 50kW	Rendimento	Efficiency	Wirkungsgrad	Rendement
$-(1 - \cos\phi)/6$ min 0.02 max 0.07	Fattore di potenza	Power factor	Leistungsfaktor	Facteur de puissance
$\pm 20\%$ *	Scorrimento	Slip	Schlupf	Glissement
+20%	Corrente a rotore bloccato	Locked rotor current	Strom bei blockiertem Läufer	Courant à rotor bloqué
-15% +25%	Coppia a rotore bloccato	Locked rotor torque	Drehmoment bei blockiertem Läufer	Couple à rotor bloqué
-10%	Coppia max	Max. torque	Max. Drehmoment	Couple max

\*  $\pm$  30% per motori con Pn < 1 kW

\*  $\pm$  30% for motors with Pn < 1 kW

\*  $\pm$  30% für Motoren mit Pn < 1 kW

\*  $\pm$  30% pour moteurs avec Pn < 1 kW

### M3 - CARATTERISTICHE MECCANICHE

#### Forme costruttive

I motori serie BN sono previsti nelle forme costruttive indicate in tabella (A30) secondo le Norme CEI EN 60034-14.

Le forme costruttive sono le seguenti:

**IM B5** (base)  
IM V1, IM V3 (derivate)

**IM B14** (base)  
IM V18, IM V19 (derivate)

I motori in forma costruttiva IM B5 possono essere installati nelle posizioni IM V1 e IM V3; i motori in forma costruttiva IM B14 possono essere installati nelle posizioni IM V18 e IM V19.

In questi casi, sulla targa del motore sarà indicata la forma costruttiva base IM B5 o IM B14. Nelle forme costruttive dove il motore assume una posizione verticale con albero in basso, si consiglia di richiedere l'esecuzione con tettuccio parapioggia (da prevedere sempre nel caso di motori autofrenanti). Tale esecuzione, presente nelle opzioni, va richiesta espressamente in fase di ordine in quanto non è prevista nella versione base.

### M3 - MECHANICAL FEATURES

#### Versions

IEC-normalised BN motors are available in the design versions indicated in table (A30) as per Standards CEI EN 60034-14.

Mounting versions are:

**IM B5** (basic)  
IM V1, IM V3 (derived)

**IM B14** (basic)  
IM V18, IM V19 (derived)

IM B5 design motors can be installed in positions IM V1 and IM V3; IM B14 design motors can be installed in positions IM V18 and IM V19.

In such cases, the basic design IM B5 or IM B14 is indicated on the motor name plate. In design versions with a vertically located motor and shaft downwards, it is recommended to request the drip cover (always necessary for brake motors). This facility, included in the option list should be specified when ordering as it does not come as a standard device.

### M3 - MECHANISCHE EIGENSCHAFTEN

#### Bauformen

Die Motoren der Serie BN weisen die in der Abbildung (A30) angegebene Bauform gemäß den Normen CEI EN 60034-14 auf.

Die Bauformen sind:

**IM B5** (Grundmodell)  
IM V1, IM V3 (Ableitungen)

**IM B14** (Grundmodell)  
IM V18, IM V19 (Ableitungen)

Die Motoren mit der Bauform IM B5 können mit den Einbaulagen IM V1 und IM V3 eingebaut werden; die Motoren mit der Bauform IM B14 können mit den Einbaulagen IM V18 und IM V19 eingebaut werden.

In diesen Fällen ist auf dem Leistungsschild des Motors die Bauform IM B5 oder IM B14 angegeben.

Bei Bauformen mit vertikaler Lage des Motors und nach unten gerichteter Welle wird die Ausführung mit Regenschutzabdeckung empfohlen (bei Bremsmotoren stets vorzusehen). Dieses wahlweise Zubehör muß ausdrücklich zum Zeitpunkt der Bestellung verlangt werden, da es bei der Grundausführung nicht vorgesehen ist.

### M3 - CARACTERISTIQUES MECANIQUES

#### Formes de construction

Les moteurs série BN sont prévus dans les formes de construction indiquées sur le tableau (A30) selon les normes CEI EN 60034-14.

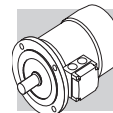
Les formes de construction sont les suivantes:

**IM B5** (base)  
IM V1, IM V3 (dérivées)

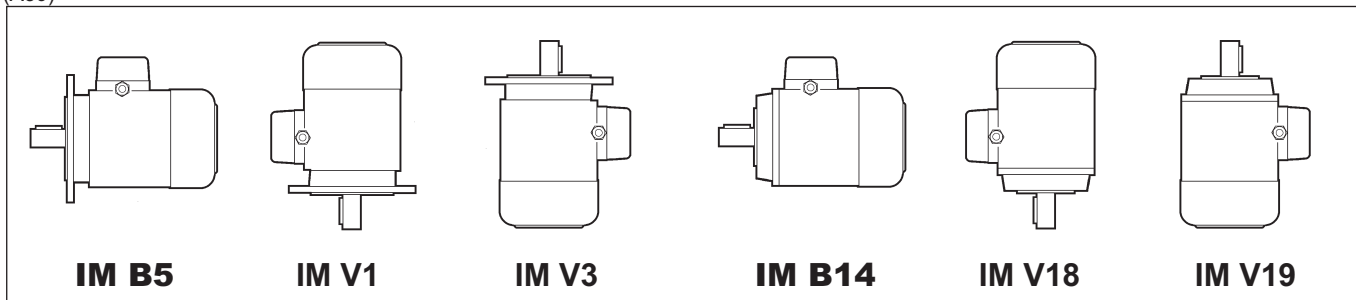
**IM B14** (base)  
IM V18, IM V19 (dérivées)

Les moteurs en forme de construction IM B5 peuvent être installés dans les positions IM V1 et IM V3; les moteurs en forme de construction IM B14 peuvent être installés dans les positions IM V18 et IM V19.

Dans ces cas, la forme de construction base IM B5 ou IM B14 sera indiquée sur la plaque du moteur. Dans les formes de construction où le moteur présente une position verticale avec arbre vers le bas, nous conseillons de demander l'exécution avec capot de protection contre la pluie (à prévoir toujours dans le cas de moteurs freins). Cette exécution, prévue dans les options, doit être expressément demandée en phase de commande étant donné qu'elle n'est pas prévue dans la version de base.



(A30)



I motori in forma flangiata possono essere forniti con dimensioni di accoppiamento ridotte, come riportato in tabella (A31) - esecuzioni **B5R**, **B14R**.

*Flanged motors can be supplied with a reduced mounting interface, as shown in chart (A31) below.*

Die Motoren in der Auslegung mit Flansch können mit reduzierten Passmassen gemäß Tabelle (A31) - Versionen **B5R**, **B14R** geliefert werden.

*Les moteurs avec forme à bride peuvent être fournis avec des tailles d'accouplement réduites, comme indiqué dans le tableau (A31) - exécutions **B5R**, **B14R**.*

(A31)

	BN 71	BN 80	BN 90	BN 100	BN 112	BN 132
	DxE - Ø					
<b>B5R</b> <sup>(1)</sup>	11x23 - 140	14x30 - 160	19x40 - 200	24x50 - 200	24x50 - 200	28x60 - 250
<b>B14R</b> <sup>(2)</sup>	11x23 - 90	14x30 - 105	19x40 - 120	24x50 - 140	—	—

<sup>(1)</sup> flangia con fori passanti

<sup>(1)</sup> flange with through holes

<sup>(1)</sup> Flansch mit durchgehenden Bohrungen

<sup>(1)</sup> bride avec orifices passants

<sup>(2)</sup> flangia con fori filettati

<sup>(2)</sup> flange with threaded holes

<sup>(2)</sup> Flansch mit Gewindebohrungen

<sup>(2)</sup> bride avec orifices filetés

## IP..

### Grado di protezione

### Degree of protection

### Schutzart

### Degré de protection

La tabella sottostante riassume la disponibilità dei vari gradi di protezione.

Indipendentemente dal grado di protezione specificato, per installazione all'aperto i motori devono essere protetti dall'irraggiamento diretto e, nel caso d'installazione con l'albero rivolto verso il basso, è necessario specificare ulteriormente il tettuccio di protezione contro l'ingresso di acqua e corpi solidi (opzione **RC**).

*The following chart provides an overview of the degrees of protection available.*

*In addition to the degree of protection specified when ordering, motors to be installed outdoors require protection against direct sunlight and also – when they are to be installed vertically down – a drip cover to prevent the ingress of water and solid particles (option **RC**).*

In der nachstehenden Tabelle werden die jeweils zur Verfügung stehenden Schutzarten zusammengefasst.

Unabhängig von der spezifischen Schutzart müssen die im Freien installierten Motoren vor direkten Strahlungen geschützt werden. Im Fall einer senkrechten Montage, in der die Welle nach unten gerichtet ist, sollte darüber hinaus das Schutzdach bestellt werden, das vor dem Eindringen von Wasser und festen Fremdkörpern schützt (Option **RC**).

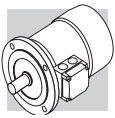
*Le tableau ci-dessous résume la disponibilité des différents degrés de protection.*

*Indépendamment du degré de protection spécifié, en cas d'installation en plein air, les moteurs doivent être protégés des rayons directs du soleil et, en cas d'installation avec l'arbre dirigé vers le bas, il est nécessaire de spécifier ultérieurement le capot de protection contre la pénétration de l'eau et des corps solides (option **RC**).*

(A32)

		IP 54	IP 55	IP 56
<b>BN</b>	<b>M</b>		standard	
<b>BN_FD</b> <b>BN_FA</b>	<b>M_FD</b> <b>M_FA</b>	standard		
<b>BN_BA</b>	—		standard	





## Ventilazione

I motori sono raffreddati mediante ventilazione esterna (IC 411 secondo CEI EN 60034-6) e sono provvisti di ventola radiale in plastica che funziona in entrambi i sensi di rotazione. L'installazione deve assicurare una distanza minima dalla calotta copriventola alla parete in modo da non avere impedimenti all'ingresso aria e permettere la possibilità di eseguire l'opportuna manutenzione del motore e, se previsto, del freno. Su richiesta è possibile prevedere una ventilazione forzata indipendente (opzione U1). Questa soluzione consente di aumentare il fattore di utilizzo del motore nel caso di alimentazione da inverter e funzionamento a giri ridotti.

## Senso di rotazione

È possibile il funzionamento in entrambi i sensi di rotazione. Con collegamento dei morsetti U1, V1, W1 alle fasi di linea L1, L2, L3 si ha rotazione oraria vista dal lato accoppiamento, mentre la marcia antioraria si ottiene scambiando fra loro due fasi.

## Rumorosità

I valori di rumorosità, rilevati secondo il metodo previsto dalle Norme ISO 1680, sono contenuti entro i livelli massimi previsti dalle Norme CEI EN 60034-9.

## Vibrazioni ed equilibratura

Tutti i rotori sono equilibrati con mezza linguetta e rientrano nei limiti di intensità di vibrazione previsti dalle Norme CEI EN 60034-14. Per particolari esigenze di silenziosità potrà essere previsto, a richiesta, un'esecuzione antivibrante in grado ridotto R. La tabella seguente riporta i valori della velocità efficace di vibrazione per equilibratura standard (N) e incrementata (R).

(A33)

Grado di vibrazione Vibration class Schwingungsklasse Degré de vibration	Velocità di rotazione Angular velocity Drehungsgeschwindigkeit Vitesse de rotation	Limiti della velocità di vibrazione Limits of the vibration velocity Grenzen der Schwingungsgeschwindigkeit Limites de la vitesse de vibration [mm/s]	
		BN 56...BN 132 M05...M4	BN 160MR...BN 200 M5
N	600 ≤ n ≤ 3600	1.8	2.8
	1800 < n ≤ 3600	1.12	1.8
R	600 ≤ n ≤ 1800	0.71	1.12
	1800 < n ≤ 3600	1.12	1.8

I valori si riferiscono a misure con motore liberamente sospeso e funzionamento a vuoto.

## Cooling

The motors are externally ventilated (IC 411 to CEI EN 60034-6) and are equipped with a plastic fan working in both directions. The motors must be installed allowing sufficient space between fan cowl and the nearest wall to ensure free air intake and allow access for maintenance purposes on motor and brake, if supplied. Independent, forced air ventilation (IC 416) can be supplied on request (option U1). This solution enables to increase the motor duty factor when driven by an inverter and operating at reduced speed.

## Direction of rotation

Rotation is possible in both directions. If terminals U1, V1, and W1 are connected to line phases L1, L2 and L3, clockwise rotation (looking from drive end) is obtained. For counterclockwise rotation, switch two phases.

## Noise

Noise levels, measured using the method prescribed by ISO 1680 Standards, are within the maximum levels specified by Standards CEI EN 60034-9.

## Vibrations and balancing

Rotor shafts are balanced with half key fitted and fall within the vibration class N, as per Standard CEI EN 60034-14. If a further reduced noise level is required improved balancing can be optionally requested (class R). Table below shows the value for the vibration velocity for standard (N) and improved (R) balancing.

## Lüftung

Die Motoren sind eigenbelüftet (IC 411 gemäß CEI EN 60034-6) und verfügen über ein Radiallüfterrad aus Kunststoff, das in beiden Drehrichtungen arbeiten kann. Bei der Installation muß sichergestellt werden, daß die Lüfterradabdeckung soweit von der Wand entfernt ist, daß der Lufttritt nicht behindert wird, und daß der Motor und (falls vorhanden) die Bremse problemlos gewartet werden können. Auf Wunsch können die Motoren mit Fremdbelüftung geliefert werden (Option U1). Diese Lösung ermöglicht das Motorbetriebsfaktor zu erhöhen, wenn vom Frequenzumrichter gesteuert und zu niedrigen Geschwindigkeit betrieben.

## Drehrichtung

Der Betrieb in beiden Drehrichtungen ist möglich. Schließt man die Klemmen U1, V1, W1 an die Phasen L1, L2, L3 an, dreht sich der Motor im Uhrzeigersinn (von der Verbindungsseite her betrachtet); die Drehung im Gegenuhrzeigersinn erhält man, indem man zwei Phasen vertauscht.

## Geräuschpegel

Die mit der von der ISO-Norm 1680 vorgesehenen Methoden gemessenen Lärmstärkewerte liegen innerhalb der gemäß den Normen CEI EN 60034-9 zulässigen Höchstgrenzen.

## Schwingungen und Ausgleich

Alle Rotoren werden durch einen halben Federkeil ausgeglichen und fallen somit unter die, von den Normen CEI EN 60034-14 vorgesehenen Schwingungsgradgrenzen. Bei besonderen Anforderungen an die Laufruhe kann auf Anfrage eine schwingungsdämpfende Ausführung in der reduzierten Klasse (R) geliefert werden. Die folgende Tabelle führt die Werte der Ist-Schwingungsgeschwindigkeit für einen normalen (N) und verbesserten (R) Ausgleich auf.

## Ventilation

Les moteurs sont refroidis à l'aide d'une ventilation extérieure (IC 411 selon CEI EN 60034-6) et sont dotés d'un ventilateur à ailettes en plastique qui fonctionne dans les deux sens de rotation. L'installation doit assurer une distance minimum entre le capot de protection du ventilateur et la paroi afin de permettre une bonne circulation de l'air et rendre plus aisé l'entretien du moteur et si prévu, du frein. Sur demande, il est possible de prévoir une ventilation forcée indépendante (option U1). Cette solution permet d'augmenter le facteur d'utilisation du moteur en cas d'alimentation, via un variateur de fréquence, et pour un fonctionnement à faible vitesse.

## Sens de rotation

Un fonctionnement dans les deux sens de rotation est possible. Avec raccordement des bornes U1, V1, W1 aux phases de ligne L1, L2, L3, on a la rotation dans le sens des aiguilles d'une montre vue du côté liaison alors que le sens inverse s'obtient en intervertissant les deux phases entre elles.

## Niveau de bruit

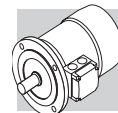
Les valeurs relevées selon la méthode prévue par les normes ISO 1680 sont situées sous les niveaux maximums prévus par les normes CEI EN 60034-9.

## Vibrations et équilibrage

Tous les rotors sont équilibrés avec une demi languette et rentrent dans les limites d'intensité de vibration prévues par les Normes CEI EN 60034-14. En cas d'exigences particulière concernant le niveau de bruit, sur demande, il est possible de réaliser une exécution anti-vibrante, de degré réduit (R). Le tableau ci-dessous indique les valeurs de la vitesse efficace de vibration pour un équilibrage standard (N) et amélioré (R).

Die Werte beziehen sich auf die Abmessungen mit stehendem Motor, ohne Getriebe und Leerlauf.

Les valeurs se réfèrent à des mesures avec moteur librement suspendu et fonctionnement à vide.



### Morsettiera motore

La morsettiera principale è a sei morsetti per collegamento con capicorda. All'interno della scatola è previsto un morsetto per il conduttore di terra.

Le dimensioni dei perni di attacco sono riportate nella tabella seguente.

Nel caso di motori autofrenanti, il raddrizzatore per l'alimentazione del freno è fissato all'interno della scatola e provvisto di adeguati morsetti di collegamento.

Eseguire i collegamenti secondo gli schemi riportati all'interno della scatola coprimorsetti o nei manuali d'uso.

### Terminal box

*Terminal board features 6 studs for eyelet terminal connection. A ground terminal is also supplied for earthing of the equipment.*

*Terminals number and type are shown in the following table.*

*Brakemotors house the a.c./d.c. rectifier (factory pre-wired) inside the terminal box.*

*Wiring instructions are provided either in the box or in the user manual.*

### Motorklemmenkasten

Die Hauptklemmleiste hat 6 Klemmen für den Anschluß mit Kabelschuhen. Im Innern des Klemmenkastens befindet sich eine Klemme für den Erdleiter.

Die Abmessungen der Ausschüsse sind in der folgenden Tabelle angegeben.

Bei den Bremsmotoren befindet sich auch der mit den erforderlichen Anschlußklemmen ausgestattete Gleichrichter für die Stromversorgung der Bremse im Klemmenkasten.

Die Anschlüsse müssen gemäß den Diagrammen im Klemmkasten oder in den Betriebsanweisungen durchgeführt werden.

### Bornier moteur



*Le bornier principal prévoit six bornes pour raccordement avec cosses. Dans le boîtier se trouve une borne pour le conducteur de terre.*

*Les dimensions des axes de fixation sont reportées dans le tableau ci-dessous.*

*Dans le cas de moteurs freins, le redresseur pour l'alimentation du frein est fixé à l'intérieur du boîtier et est doté de bornes de raccordement.*

*Effectuer les connexions selon les schémas indiqués à l'intérieur du bornier, ou dans les manuels d'utilisation.*

(A34)

		N° terminali No. of terminals Klemmen N° bornes	Filettatura terminali Terminal threads Gewinde Filetage bornes	Sezione max del conduttore Wire max cross section area Max. leiterquerschnitt Section max du conducteur mm <sup>2</sup>
BN 56...BN 71	M05, M1	6	M4	2.5
BN 80, BN 90	M2	6	M4	2.5
BN 100...BN 112	M3	6	M5	6
BN 132...BN 160MR	M4	6	M5	6
BN 160M...BN 180M	M5	6	M6	16
BN 180L...BN 200L	—	6	M8	25

### Ingresso cavi

Nel rispetto della Norma EN 50262, i fori di ingresso cavi nelle scatole morsettiera presentano filettature metriche della misura indicata nella tabella seguente.

### Cable entry

*The holes used to bring cables to terminal boxes use metric threads in accordance with standard EN 50262 as indicated in the table here after.*



### Kabeleingang

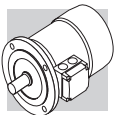
Unter Berücksichtigung der Norm EN 50262 verfügen die Kabeleingänge in die Klemmenkästen über metrische Gewinde, deren Maße, der nachstehenden Tabelle entnommen werden können.

### Entrée câbles

*Dans le respect de la Norme EN 50262, les orifices d'entrée câbles dans les boîtes à bornes présentent des filetages métriques de la taille indiquée dans le tableau ci-dessous.*

(A35)

		Ingresso cavi / Cable entry kabeldurchführung / Entrée câbles	Diametro max. cavo allacciabile / Max. cable diameter allowed Max. zulässiger Kabeldurchmesser / Diam. maxi câble [mm]
BN 63	M05	2 x M20 x 1.5	13
BN 71	M1	2 x M25 x 1.5	17
BN 80 - BN 90	M2	2 x M25 x 1.5	17
BN 100	M3	2 x M32 x 1.5	21
		2 x M25 x 1.5	17
BN 112	—	2 x M32 x 1.5 4 x M25 x 1.5	17
BN 132...BN 160MR	M4	4 x M32 x 1.5	21
BN 160M...BN 200L	M5	2 x M40 x 1.5	29



### Cuscinetti

I cuscinetti previsti sono del tipo radiale a sfere con lubrificazione permanente precaricati assialmente.

I tipi utilizzati sono indicati nelle tabelle seguenti. La durata nominale a fatica  $L_{10h}$  dei cuscinetti, in assenza di carichi esterni applicati è superiore a 40.000 ore, calcolata secondo ISO 281.

**DE** = lato comando

**NDE** = lato opposto comando

### Bearings

*Life lubricated preloaded radial ball bearings are used, types are shown in the chart here under.*

*Calculated endurance lifetime  $L_{10h}$ , as per ISO 281, in unloaded condition, exceeds 40000 hrs.*

**DE** = drive end

**NDE** = non drive end

### Lager

Bei den Lagern handelt es sich um Radialkugellager mit Dauerschmierung.

Die verwendeten Typen sind in den folgenden Tabellen angegeben.

Die Lebensdauer der Lager bei einer Beanspruchung  $L_{10h}$  ist, sofern keine externen Kräfte wirken, über 40.000 Stunden (Berechnung gemäß ISO 281).

**DE** = Wellenseite

**NDE** = Lüfterseite

### Roulements

*Les roulements prévus sont du type radial à billes avec lubrification permanente.*


*Les types utilisés sont indiqués dans les tableaux ci-dessous.*

*La résistance à la déformation  $L_{10h}$  des roulements en absence de charges extérieures appliquées est supérieure à 40.000 heures calculée selon ISO 281.*


**DE** = sortie arbre

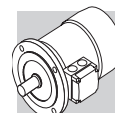
**NDE** = côté ventilateur

(A36)

	DE	NDE	
	M, M_FD, M_FA	M	M_FD; M_FA
<b>M05</b>	6004 2Z C3	6201 2Z C3	6201 2RS C3
<b>M1</b>	6004 2Z C3	6202 2Z C3	6202 2RS C3
<b>M2</b>	6007 2Z C3	6204 2Z C3	6204 2RS C3
<b>M3</b>	6207 2Z C3	6206 2Z C3	6206 2RS C3
<b>M4</b>	6309 2Z C3	6308 2Z C3	6308 2RS C3
<b>M5</b>	6309 2Z C3	6309 2Z C3	6309 2RS C3

(A37)

	DE	NDE	
	BN, BN_FD, BN_FA, BN_BA	BN, BN_BA	BN_FD; BN_FA
<b>BN 56</b>	6201 2Z C3	6201 2Z C3	-
<b>BN 63</b>	6201 2Z C3	6201 2Z C3	6201 2RS C3
<b>BN 71</b>	6202 2Z C3	6202 2Z C3	6202 2RS C3
<b>BN 80</b>	6204 2Z C3	6204 2Z C3	6204 2RS C3
<b>BN 90</b>	6205 2Z C3	6205 2Z C3	6305 2RS C3
<b>BN 100</b>	6206 2Z C3	6206 2Z C3	6206 2RS C3
<b>BN 112</b>	6306 2Z C3	6306 2Z C3	6306 2RS C3
<b>BN 132</b>	6308 2Z C3	6308 2Z C3	6308 2RS C3
<b>BN 160MR</b>	6309 2Z C3	6308 2Z C3	6308 2RS C3
<b>BN 160M/L</b>	6309 2Z C3	6309 2Z C3	6309 2RS C3
<b>BN 180M</b>	6310 2Z C3	6309 2Z C3	6309 2RS C3
<b>BN 180L</b>	6310 2Z C3	6310 2Z C3	6310 2RS C3
<b>BN 200L</b>	6312 2Z C3	6310 2Z C3	6310 2RS C3



#### M4 - CARATTERISTICHE ELETTRICHE

##### Tensione

I motori a una velocità sono previsti nell'esecuzione normale per tensione nominale 230V Δ / 400V Y, 50 Hz con tolleranza di tensione ± 10% (escluso i tipi M3LC4 e M3LC6).

In targa sono indicati oltre alla tensione nominale i campi di funzionamento consentiti, p.e.:

220 - 240V Δ

380 - 415V Y / 50 Hz.

In accordo alle Norme CEI EN 60034-1 i motori possono funzionare alle tensioni sopra indicate con tolleranza del ± 5%.

Per funzionamento ai limiti di tolleranza la temperatura può superare di 10 K il limite previsto dalla classe di isolamento adottata.

Ad eccezione dei motori autofrenanti tipo BN\_FD in targa vengono indicati anche i valori corrispondenti al funzionamento a 60 Hz (p.e. 460Y, 60 Hz) ed il relativo campo di tensione: 440 - 480VY, 60 Hz.

Per i motori autofrenanti con freno tipo FD le tensioni standard sono:

220V - 240V Δ - 50 Hz

380V - 415V Y - 50 Hz

con tensione di alimentazione freno 230V ± 10%.

La tabella seguente riporta le tensioni previste per i motori.

#### M4 - ELECTRICAL CHARACTERISTICS

##### Voltage

Single speed motors are rated for 230/400 V - 50 Hz.

A tolerance of ±10% applies to nominal voltage, with the exception of motors type M3LC4 and M3LC6.

In addition to nominal voltage-frequency values the name plate also shows voltage ranges the motor can operate under, e.g.:

220-240V Δ - 50 Hz

380-415V Y - 50 Hz

As per Norms CEI EN 60034-1 on above voltage values the ±5% tolerance applies.

When operating close to the tolerance limit values the winding temperature can exceed by 10 K the rated temperature for the given insulation class.

With the exception of BN\_FD brakemotors, the rated voltage values for operation under 60 Hz mains are also shown on the nameplate, e.g. 460Y-60 Hz along with related tolerance field, e.g. 440-480V Y-60 Hz.

For brakemotors, FD type, rated voltage is:

220-240V Δ - 50 Hz

380-415V Y - 50 Hz

Brake supply is a.c. 230V ±10% single phase.

Chart below shows standard and optional wiring of motors.

#### M4 - ELEKTRISCHE EIGENSCHAFTEN

##### Spannung

Die eintourigen Motoren müssen in der Standardausführung mit einer Spannung von 230 V Δ / 400 V Y, 50 Hz mit einer Toleranz von ± 10% gespeist werden (Type M3LC4 und M3LC6 ausgenommen).

Auf dem Schild werden die Nennspannung hinaus, auch die zulässigen Ansprechbereiche angegeben, z.B.:

220-240V Δ

380-415V Y/50 Hz.

Gemäß den Normen CEI EN 60034-1 können die Motoren auf die oben genannten Spannungen mit Toleranzen von ± 5% arbeiten. Bei Betrieb an den Spannungsgrenzen, kann die Temperatur bis zum 10K die für die verwendeten Isolierstoffklasse angegebenen Grenze überschreiten.

Darüber hinaus wird auf den Typenschild die dem 60 Hz-Betrieb entsprechenden Werte angegeben (d.h. 460 Y, 60 Hz) und das entsprechende Spannungsfeld, 440-480VY, 60 Hz.

Für die selbstbremsenden Motoren mit dem Bremstyp FD sind die Standardspannungen folgende:

220V - 240V Δ - 50 Hz

380V - 415V Y - 50 Hz

mit Bremsspannungsversorgung von 230V ± 10%.

Die folgende Tabelle für die Motoren vorgesehenen Spannungen auf.

#### M4 - CARACTERISTIQUES ELECTRIQUES

##### Tension

Les moteurs à polarité unique sont prévus dans l'exécution normale pour tension 230V Δ / 400V Y, 50 Hz avec tolérance de tension ± 10% (sauf les types M3LC4 et M3LC6).

Outre la tension nominale, les plages de fonctionnement permises sont indiquées sur la plaque signalétique, à savoir:

220-240V Δ

380-415V Y/50 Hz.

Selon les normes CEI EN 60034-1 les moteurs peuvent fonctionner aux tension indiquées ci-dessus avec une tolérance de ± 5%.

Pour un fonctionnement à la limite de tolérance, la température peut dépasser les 10K, la limite prévue de la classe d'isolation choisie.

Sur la plaque marque sont de plus indiqués les valeurs correspondantes au fonctionnement en 60 Hz (ex. 460Y, 60 Hz) et la relative plage de tension: 440 - 480VY, 60 Hz.

En ce qui concerne les moteurs autofrenants avec frein de type FD, les tensions standard sont les suivantes :



220V - 240V Δ - 50 Hz

380V - 415V Y - 50 Hz

avec tension d'alimentation du frein 230V ± 10%.

La tableau ci-dessous indique les tensions prévues pour les moteurs.

(A38)

		BN M	BN_FD M_FD		BN_FA/BN_BA M_FA		Esecuzione Configuration Version Execution
		V <sub>mot</sub> ± 10 % 3~	V <sub>mot</sub> ± 10 % 3~	V <sub>B</sub> ± 10 % 1~	V <sub>mot</sub> ± 10 % 3~	V <sub>B</sub> ± 10 % 3~	
BN 56 - BN 132	M05...M4	230/400 - 50Hz 460 - 60Hz	230/400V ΔY- 50 Hz	230V	230/400V ΔY- 50 Hz 460V Y - 60Hz	230/400V ΔY- 50 Hz 460V Y - 60Hz	Standard
BN 100 - BN 132	M3 - M4	400/690 - 50Hz 460 - 60Hz	400/690V ΔY- 50 Hz	400V	400/690V ΔY- 50 Hz 460V Y - 60Hz	400/690V ΔY- 50 Hz 460V Y - 60Hz	A richiesta, senza sovrapprezzo On request at no extra charge Auf Anfrage, ohne Aufpreis Sur demande, sans majoration de prix

I motori a due velocità 400V/50Hz, sono previsti per tensione nominale standard 400V; tolleranze applicabili secondo CEI EN 60034-1.

The only rated voltage for motors type 400V/50Hz and all double speed motors is 400V.

Applicable tolerances as per CEI EN 60034-1.

Alle polumschaltbaren Motoren, die Typen 400V/50Hz, sind nicht umschaltbar, standard-mäßig nur für ein Spannung 400V vorgesehen; geltenden Toleranzen gemäß CEI EN 60034-1.

Tous les moteur à deux vitesses, les types 400V/50Hz, sont prévus pour une tension nominale standard de 400V; tolérances applicables selon CEI EN 60034-1.



Nella tabella seguente sono indicati i vari tipi di collegamenti previsti per i motori in funzione della polarità.

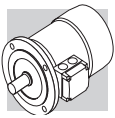
The table below shows the wiring options available.

Auf die folgende Tabelle werden die verschiedenen für die Motoren vorgesehenen Anschlußtypen angegeben.

Dans le tableau ci-dessous sont indiqués les différents types de connexion prévus pour les moteurs.

(A39)

		Poli / Pole / Polig / Pôles	Collegamento avvolgimento / Wiring options Wicklungsanschluß / Connexion du bobinage
		BN 56...BN 200	M05...M5



## Frequenza

I motori ad una velocità nell'esecuzione standard riportano in targa oltre alle tensioni del funzionamento a 50 Hz il campo di tensione 440 - 480V 60 Hz (escluso motori autofrenanti con freno FD) con potenza aumentata di circa il 20%

La potenza di targa dei motori a 60Hz corrisponde a quanto riportato nella tabella (A40) seguente:

## Frequency

*With the exception of brakemotors, name plate of standard single speed motors shows, besides the 50 Hz voltage ratings, also the rated power output for 60 Hz operation in the 440-480 V range.*

*Power output is increased by approx 20%.*

*Rated output power for 60 Hz operation is shown in the following diagram.*

## Frequenz

Bei eintourigen Motoren in der Standardausführung wird außer den 50 Hz-Betriebsspannungen auch den Spannungsfeld 440 - 480V 60 Hz angegeben (mit Ausnahme von Bremsmotoren mit Bremsentyp FD) mit einer erhöhten Leistung von ungefähr 20%.



Die Leistung auf das Namensschild von 60 Hz-Motoren entspricht den Daten aus der folgenden Tabelle (A40):

## Fréquence

*Les moteurs à une vitesse en exécution standard reportent sur la plaque marque en plus des tension du fonctionnement à 50 Hz la plage de tension 440 - 480V 60 Hz (moteurs freins avec frein FD exclus) avec puissance augmentée de 20% env.*

*La puissance sur la plaque marque des moteurs à 60 Hz correspond à celle indiquée au tableau (A40) suivant:*

(A40)

		2P	4P	6P
		P <sub>n</sub> [kW]		
BN 56A	–	–	0.06	–
BN 56B	M0B	–	0.10	–
BN 63A	M05A	0.21	0.14	0.10
BN 63B	M05B	0.30	0.21	0.14
BN 71A	M05C	0.45	0.30	0.21
BN 71B	M1SD	0.65	0.45	0.30
BN 80A	M1LA	0.90	0.65	0.45
BN 80B	M2SA	1.30	0.90	0.65
BN 90S	M2SB	–	1.30	0.90
BN 90SA	M2SB	1.8	–	–
BN 90L	M3SA	2.5	–	1.3
BN 90LA	M3SA	–	1.8	–
BN 100L	M3LA	3.5	–	–
BN 100LA	M3LA	–	2.5	1.8
BN 100LB	M3LB	4.7	3.5	2.2
BN 112M	M3LB	4.7	4.7	2.5
	M3LC	–	4.7	2.5
BN 132S	M4SA	–	6.5	3.5
BN 132SA	M4SA	6.3	–	–
BN 132SB	M4SB	8.7	–	–
BN 132M	M4LA	11	–	–
BN 132MA	M4LA	–	8.7	4.6
BN 132MB	M4LB	–	11	6.5
BN 160MR	M4LC	12.5	12.5	–
BN 160MB	M5SB	17.5	–	–
BN 160M	M5SA	–	–	8.6
BN 160L	M5S	21.5	17.5	12.6
BN 180M	M5LA	24.5	21.5	–
BN 180L	–	–	25.3	17.5
BN 200L	–	34	34	22

Motori a doppia polarità alimentati a 60 Hz avranno un aumento della potenza nominale, riferita a 50 Hz, pari al 15%.

Qualora sulla targhetta di un motore destinato ad essere alimentato a 60 Hz sia richiesto un valore di potenza nominale pari a quello normalizzato a 50 Hz specificare in designazione l'opzione PN.

*For two-speed motors operated under 60 Hz supply the rated power output is increased by 15% as compared to same motor with 50 Hz supply.*

*If same IEC-normalised 50 Hz power rating value is desired on name plate of a 60 Hz operated motor specify option PN in the ordering code.*

*Standard motors wound for 50*

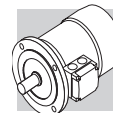
Für polumschaltbare Motoren mit 60 Hz Spannungsversorgung ist die vorgesehene Leistungserhöhung gemäß den Datenblätter von 15%.

Wenn die angefragte 60 Hz-Leistung der normierten 50 Hz-Leistung entspricht, geben bei der Bezeichnung das Option PN an. Die Motoren mit einer Wicklung für eine Frequenz von 50 Hz

*Pour les moteurs à deux vitesses avec alimentation 60 Hz l'augmentation de puissance prévue per rapport aux valeurs indiquées dans les tableaux techniques, sera de 15%.*

*Si la puissance requise à 60 Hz correspond à la puissance normalisée à 50 Hz on devra indiquer l'option PN.*

*Les moteurs bobinés pour fré-*



I motori normalmente avvolti per frequenza 50 Hz possono essere usati in reti a 60 Hz con i loro dati che saranno corretti come da tabella seguente.  
I freni, se presenti, dovranno sempre essere alimentati alla tensione  $V_b$ , riportata in targa.

*Hz supply can be operated under 60 Hz with main data corrected as per chart below: Brakes, if fitted, must be supplied with the voltage value  $V_b$  that is stated on the nameplate.*

können entsprechend den Angaben von Tabelle (A41) an Netze mit 60 Hz angeschlossen werden.  
Die Bremse muss, falls angebaut, mit der auf dem Typenschild angegebenen Spannung  $V_b$  betrieben werden.

*quence 50 Hz peuvent être utilisés sur réseau à 60 Hz selon les indications du tableau (A41). Les freins, si présents, devront toujours être alimentés avec la tension  $V_b$  rapportée sur la plaque.*

(A41)

50 Hz	60 Hz			
V - 50 Hz	V - 60 Hz	P <sub>n</sub> - 60 Hz	M <sub>n</sub> , M <sub>2</sub> /M <sub>n</sub> - 60 Hz	n [min <sup>-1</sup> ] - 60 Hz
230/400 Δ/Y	220 - 240 Δ 380 - 415 Y	1	0.83	1.2
400/690 Δ/Y	380 - 415 Δ			
230/400 Δ/Y	265 - 280 Δ 440 - 480 Y	1.15	1	1.2
400/690 Δ/Y	440 - 480 Δ			

#### Potenza nominale

Le tabelle dei dati tecnici del catalogo riportano le caratteristiche funzionali a 50 Hz in condizioni ambientali standard secondo le Norme CEI EN 60034-1 (temperatura 40 °C e altitudine <1000 m s.l.m.).  
I motori possono essere impiegati a temperature comprese tra 40 °C e 60 °C applicando i declassamenti di potenza indicati nelle tabelle seguenti.

#### Rated power

*Catalogue rating values are calculated for 50 Hz operation and for standard ambient conditions (temperature 40 °C; elevation <1000 m a.s.l.) as per the CEI EN 60034-1 Standards. The motors can be used within the 40 - 60 °C temperature range with rated power output adjusted by factors given in the following charts.*

#### Nennleistung

Die Betriebsdatentabellen des Katalogs enthalten die technischen Daten bei einer Frequenz von 50 Hz bei normalen Umgebungsbedingungen gemäß den Normen CEI EN 60034-1 (Temperatur 40°C und Höhe <1000 m ü.d.M.). Die Motoren können in größeren Temperaturen zwischen 40°C und 60°C betrieben werden, wenn man die in den Tabellen (A41) angegebenen Rückstufungen anwendet.

#### Puissance nominale

*Les tableaux fonctionnels du catalogue présentent les caractéristiques techniques à 50 Hz dans des conditions ambiantes standard selon les normes CEI EN 60034-1 (température 40°C et altitude <1000 m). Les moteurs peuvent être employés à des températures comprises entre 40°C et 60°C en appliquant les déclassements de puissance indiqués dans les tableaux suivantes.*

(A42)

Temperatura ambiente / Ambient temperature / Umgebungstemperatur / Température ambiante(°C)	40°	45°	50°	55°	60°
Potenza ammissibile in % della potenza nominale / Permitted power as a % of rated power Zulässige Leistung in % der Nennleistung / Puissance admissible en % de la puissance nominale	100%	95%	90%	85%	80%

Quando è richiesto un declassamento del motore superiore al 15%, contattare il ns. Servizio Tecnico.

*Should a derating factor higher than 15% apply please consult factory.*

Wenn eine Motordeklassierung höher als 15% gefragt ist, wir bitten um Rückfrage.

*Si un déclassement du moteur supérieur à 15% est requis, on devra contacter notre Service Technique.*

#### Classe d'isolamento

#### Insulation class

#### Isolationsklasse

#### Classes d'isolation

### CL F

I motori di produzione Bonfiglioli impiegano, di serie, materiali isolanti (filo smaltato, isolanti, resine d'impregnazione) in classe F.

*Bonfiglioli motors use class F insulating materials (enamelled wire, insulators, impregnation resins) as compare to the standard motor.*

Die Motoren von Bonfiglioli sind serienmäßig mit Isolierstoffen (Emaildraht, Isolierstoffen, Imprägnierharzen) der Klasse F ausgestattet.

*De série, les moteurs fabriqués par Bonfiglioli utilisent des matériaux isolants (fil émaillé, isolants, résines d'impregnation) en classe F.*

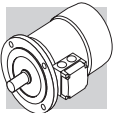
### CL H

Su richiesta può venire specificata la classe di isolamento H.  
In genere, per i motori in esecuzione standard la sovratemperatura dell'avvolgimento statore è contenuta entro il limite di 80 K, corrispondente alla sovratemperatura di classe B.

*Motors manufactured in insulation class H are available at request. In standard motors, stator windings over temperature normally stays below the 80 K limit corresponding to class B over temperature.*

Auf Anfrage können sie auch in der Klasse H geliefert werden.  
Allgemein hält sich die Übertemperatur der Motoren in der Standardausführung innerhalb des Grenzwerts von 80 K, der einer Übertemperatur der Klasse B entspricht.

*Sur demande, la classe d'isolation H peut être spécifiée. En général, pour les moteurs en exécution standard, l'échauffement de l'enroulement du stator se situe dans la limite de 80 K, correspondant à un échauffement de classe B.*



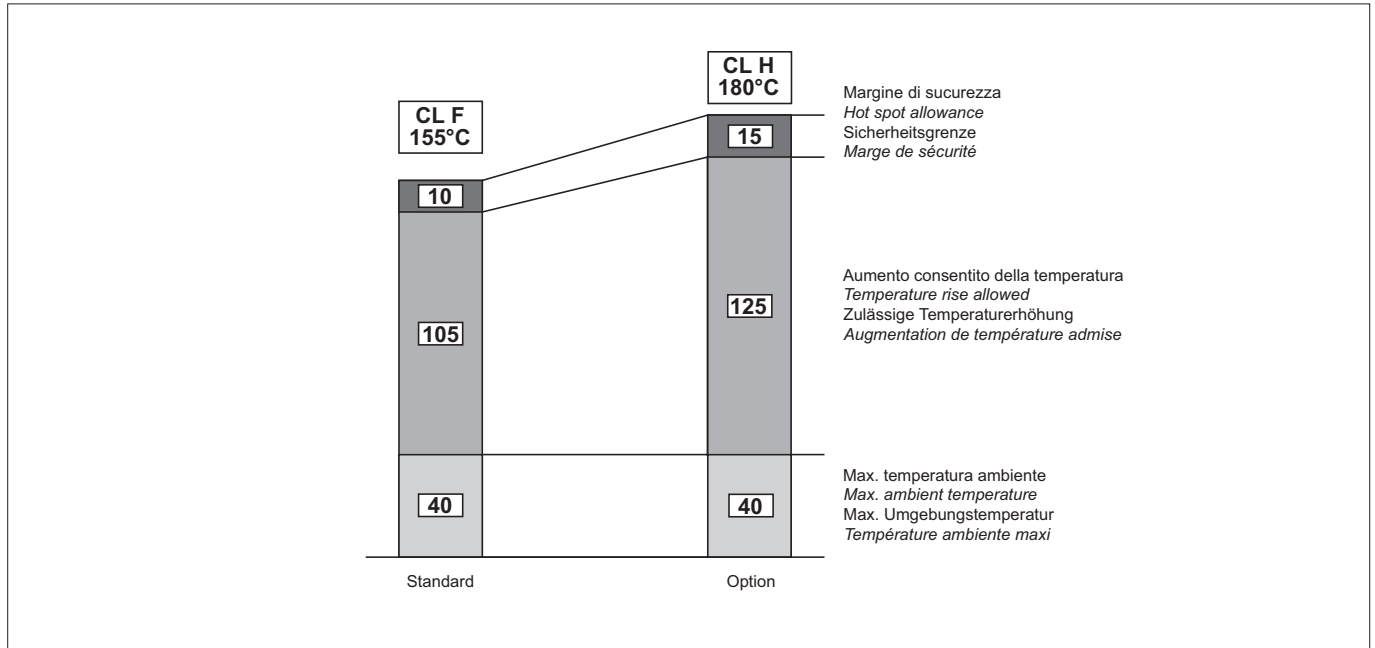
L'accurata scelta dei componenti del sistema isolante consente l'impiego dei motori anche in climi tropicali ed in presenza di vibrazioni normali. Per applicazioni in presenza di sostanze chimiche aggressive, o di elevata umidità, è consigliabile contattare il Servizio Tecnico Bonfiglioli per la selezione del prodotto più idoneo.

*A careful selection of insulating components makes the motors compatible with tropical climates and normal vibration. For applications involving the presence of aggressive chemicals or high humidity, contact Bonfiglioli Engineering for assistance with product selection.*

Die sorgfältig Wahl der Komponenten des Isoliersystem gestalten den Einsatz dieser Motoren auch unter tropischen Klimabedingungen und bei Vorliegen normaler Schwingungen. Für den Einsatz in in der Nähe aggressiv wirkenden chemischen Substanzen oder bei hoher Luftfeuchtigkeit, wird empfohlen sich zur Wahl eines passenden Produktes mit unserem Technischen Kundendienst in Verbindung zu setzen.

*Le choix soigné des composants du système d'isolation permet d'utiliser également les moteurs dans des climats tropicaux et en présence de vibrations normales. Pour des applications en présence de substances chimiques agressives, ou d'humidité élevée, il est conseillé de contacter le Service Technique Bonfiglioli pour sélectionner le produit le plus adapté.*

(A43)



**Tipo di servizio**

Se non indicato diversamente la potenza dei motori riportata a catalogo si riferisce al servizio continuo S1. Per i motori utilizzati in condizioni diverse da S1 sarà necessario identificare il tipo di servizio previsto con riferimento alle Norme CEI EN 60034-1. In particolare, per i servizi S2 ed S3, è possibile ottenere una maggiorazione della potenza termica rispetto a quella prevista per il servizio continuo secondo quanto indicato nella tabella (A44) valida per motori ad una velocità. Per motori a doppia polarità interpellare il nostro Servizio Tecnico.

**Type of duty**

*Unless otherwise indicated, the power of motors specified in the catalogue refers to continuous duty S1. For motors used under conditions other than S1, the type of duty required must be adjusted with reference to CEI EN 60034-1 Standards. In particular, for duties S2 and S3, power can be adjusted with respect to continuous duty according to data in table (A44) applicable to single speed motors. For double speed motors, contact our Technical Service.*

**Betriebsart**

Sofern nicht anders angegeben, bezieht sich die im Katalog angegebene Motorleistung auf den Dauerbetrieb S1. Bei den Motoren, die für eine andere Betriebsart als S1 vorgesehen sind, muß man die Betriebsart unter Bezugnahme auf die Normen CEI EN 60034-1 identifizieren. Insbesondere kann man für die Betriebsarten S2 und S3 nach der für Motoren mit einer Drehzahl. Gültigen Tabelle (A44) eine Überdimensionierung der Leistung für den Dauerbetrieb im Vergleich zur vorgesehenen Betriebsart erreichen. Für polumschaltbaren Motoren, bitte Rückfrage.

**Type de service**

*Sauf indication contraire, la puissance des moteurs reportée dans le catalogue se réfère au service continu S1. Pour les moteurs utilisés dans des conditions différentes de S1, il sera nécessaire d'identifier le type de service prévu en se référant aux normes CEI EN 60034-1. En particulier, pour les services S2 et S3, il est possible d'obtenir une majoration de la puissance par rapport à celle prévue pour le service continu selon ce qui est indiqué dans le tableau (A44) valable pour les moteurs à une vitesse. Pour les moteurs à double polarité, contacter notre Service Technique.*

(A44)

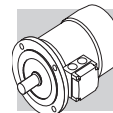
	Servizio / Duty / Betriebsart / Service						
	S2			S3 *			S4 - S9
	Durata del ciclo (min) / Cycle duration (min) Zyklusdauer (min) / Durée du cycle (min)			Rapporto di intermittenza (I) / Cyclic duration factor (I) Relative Einschaltdauer (I) / Rapport d'intermittence (I)			
	10	30	60	25%	40%	60%	Interpellarci Consult factory Rückfrage Nous contacter
f <sub>m</sub>	1.35	1.15	1.05	1.25	1.15	1.1	

\* La durata del ciclo dovrà comunque essere uguale o inferiore a 10 minuti; se superiore interpellare il nostro Servizio Tecnico.

*\* Cycle duration must, in any event, be equal to or less than 10 minutes; if this time is exceeded, please contact our Technical Service.*

\* Die Zyklusdauer muß in jedem Fall kleiner oder gleich 10 Minuten sein. Wenn sie darüber liegt, unseren Technischen Kundendienst zu Rate ziehen.

*\* La durée du cycle devra être inférieure ou égale à 10 minutes. Si supérieure, contacter notre Service Technique.*



Rapporto di intermittenza:

Cyclic duration factor:

Relative Einschaltdauer:

Rapport d'intermittence:

$$I = \frac{t_f}{t_f + t_r} \cdot 100 \quad (23)$$

$t_f$  = tempo di funzionamento a carico costante  
 $t_r$  = tempo di riposo

$t_f$  = work time under constant load  
 $t_r$  = rest time

$t_f$  = Betriebszeit mit konstanter Last  
 $t_r$  = Aussetzzeit

$t_f$  = temps de fonctionnement à charge constante  
 $t_r$  = temps de repos

**Servizio di durata limitata S2**

**Limited duration duty S2**

**Kurzzeitbetrieb S2**

**Service de durée limitée S2**

Caratterizzato da un funzionamento a carico costante per un periodo di tempo limitato, inferiore a quello richiesto per raggiungere l'equilibrio termico, seguito da un periodo di riposo di durata sufficiente a ristabilire, nel motore, la temperatura ambiente.

*This type of duty is characterized by operation at constant load for a limited time, which is shorter than the time required to reach thermal equilibrium, followed by a rest period of sufficient duration to restore ambient temperature in the motor.*

Betrieb mit konstanter Last für eine begrenzte Zeit, die unter der Zeit liegt, die zum Erreichen des thermischen Gleichgewichts benötigt wird, gefolgt von einer Aussetzzeit, die so lang ist, daß der Motor wieder auf die Umgebungstemperatur abkühlen kann.

*Caractérisé par un fonctionnement à charge constante pour une période de temps limitée, inférieure à celle nécessaire pour atteindre l'équilibre thermique, suivie par une période de repos de durée suffisante pour rétablir, dans le moteur, la température ambiante.*

**Servizio intermittente periodico S3:**

**Periodical intermittent duty S3:**

**Periodische Einschaltdauer S3:**

**Service intermittent périodique S3**

Caratterizzato da una sequenza di cicli di funzionamento identici, ciascuno comprendente un periodo di funzionamento a carico costante ed un periodo di riposo. In questo servizio, la corrente di avviamento non influenza la sovratemperatura in modo significativo.

*This type of duty is characterized by a sequence of identical operation cycles, each including a constant load operation period and a rest period. For this type of duty, the starting current does not significantly influence overtemperature.*

Betrieb mit aufeinanderfolgenden identischen Betriebszyklen, die alle einen kurzzeitigen Betrieb mit konstanter Belastung und eine Aussetzzeit einschließen. Bei dieser Betriebsart beeinflusst der Anlaufstrom die Überetemperatur nicht in signifikanter Weise.

*Caractérisé par une séquence de cycles de fonctionnement identiques, comprenant chacun une période de fonctionnement à charge constante et une période de repos. Dans ce service, le courant de démarrage n'influence pas l'excès de température de façon significative.*

**Funzionamento con alimentazione da inverter**

**Inverter-controlled motors**

**Betrieb mit Versorgung über Inverter**

**Fonctionnement avec alimentation par variateur de vitesse**

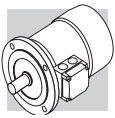
I motori elettrici della serie BN ed M possono essere utilizzati con alimentazione da inverter PWM, e tensione nominale all'ingresso del convertitore fino a 500 V. Il sistema isolante sui motori di serie prevede l'isolamento di fase con separatori, l'utilizzo di filo smaltato in grado 2 e resine d'impregnazione in classe H (limite di tenuta all'impulso di tensione 1600V picco-picco e fronte di salita  $t_s > 0.1\mu s$  ai morsetti motore). Le caratteristiche tipiche coppia/velocità in servizio S1 per motore con frequenza base  $f_b = 50$  Hz sono riportate in tab. (A54). Per frequenze di funzionamento inferiori a circa 30 Hz, a causa della diminuzione della ventilazione, i motori standard autoventilati (IC411) devono essere opportunamente declassati in coppia o, in alternativa, devono essere provvisti di servoventilatore indipendente. Per frequenze maggiori alla frequenza base, raggiunto il valore massimo di tensione di uscita dell'inverter, il motore lavora in un

*The electric motors of series BN and M may be used in combination with PWM inverters with rated voltage at transformer input up to 500 V. Standard motors use a phase insulating system with separators, class 2 enamelled wire and class H impregnation resins (1600V peak-to-peak voltage pulse capacity and rise edge  $t_s > 0.1\mu s$  at motor terminals). Table (A54) shows the typical torque/speed curves referred to S1 duty for motors with base frequency  $f_b = 50$  Hz. Because ventilation is somewhat impaired in operation at lower frequencies (about 30 Hz), standard motors with incorporated fan (IC411) require adequate torque derating or - alternately - the addition of a separate supply fan cooling. Above base frequency, upon reaching the maximum output voltage of the inverter, the motor enters a steady-power field of operation, and shaft torque drops with ratio  $(f/f_b)$ .*

Die Elektromotoren der Serie BN und M können über einen Inverter PWM und mit einer Nennspannung am Wandlereingang bis zu 500 V versorgt werden. Das an den Serienmotoren angewendete System sieht eine Phasenisolierung mittels Trennvorrichtungen vor, ebenso wie einen Emailldraht mit Grad 2 und Imprägnierharze in der Klasse H vor (Abdichtungsgrenze bei Spannungsimpuls 1600V Spitze-Spitze und Anstiegsfront  $t_s > 0.1\mu s$  an den Motorklemmen). Die typischen Merkmale von Drehmoment/Geschwindigkeit im Betrieb S1 für Motoren mit einer Grundfrequenz  $f_b = 50$  Hz werden in der Tab. (A54) angegeben. Bei Betriebsfrequenzen unter ungefähr 30 Hz müssen die selbstlüftenden Standardmotoren (IC411) aufgrund der in diesem Fall abnehmenden Belüftung entsprechend paarweise deklassiert, oder in Alternative, mit unabhängigen Servoventilatoren ausgestattet werden. Bei über der Grundfrequenz liegenden Frequenzen arbeitet der Motor,

*Les moteurs électriques de la série BN et M peuvent être utilisés avec alimentation par variateur PWM, et tension nominale en entrée du convertisseur jusqu'à 500V. Le système adopté sur les moteurs de série prévoit l'isolation de phase avec des séparateurs, l'utilisation de fil émaillé niveau 2 et résines d'impregnation de classe H (limite de maintien à l'impulsion de tension 1600V pic-pic et front de montée  $t_s > 0.1\mu s$  aux bornes moteur). Les caractéristiques typiques couple/vitesse en service S1 pour moteur avec fréquence de base  $f_b = 50$  Hz sont indiquées dans le tab. (A54). Pour des fréquences de fonctionnement inférieures à environ 30 Hz, à cause de la diminution de la ventilation, les moteurs standards autoventilés (IC411) doivent être opportunément déclassés au niveau du couple ou, en alternative, doivent être équipés de servoventilateur indépendant. Pour des fréquences supérieures à la fréquence de base, une fois*





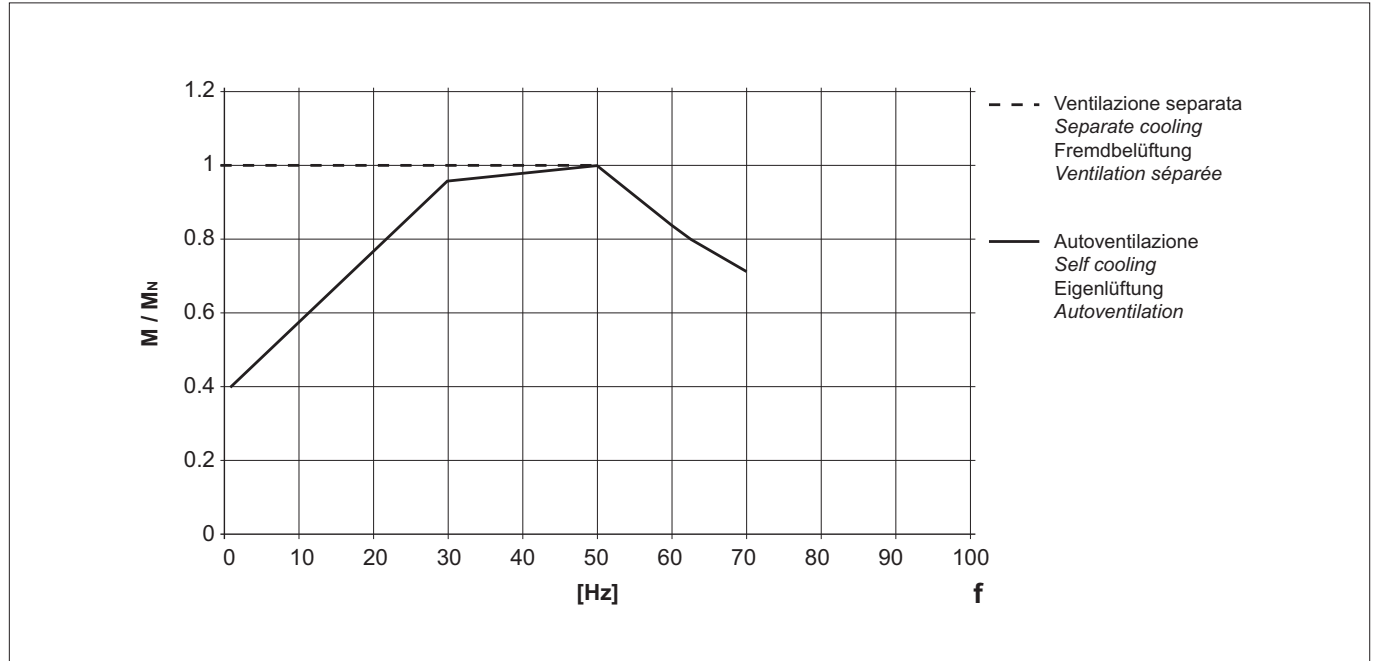
campo di funzionamento a potenza costante, con coppia all'albero che si riduce ca. con il rapporto  $(f/f_b)$ . Poiché la coppia massima del motore decresce ca. con  $(f/f_b)^2$ , il margine di sovraccarico ammesso dovrà essere progressivamente ridotto.

*As motor maximum torque decreases with  $(f/f_b)^2$ , the allowed overloading must be reduced progressively.*

nach Erreichen des max. Spannungswerts am Inverterausgang in einem Betriebsbereich unter konstanter Leistung mit einem Drehmoment an der Welle, der sich ungefähr im Verhältnis  $(f/f_b)$  reduziert. Da das max. Drehmoment des Motors mit ungefähr  $(f/f_b)^2$  abnimmt, muss auch der zulässige Überbelastungsgrenzwert progressiv reduziert werden.

*la valeur maximale de tension de sortie du variateur atteinte, le moteur fonctionne dans une plage de fonctionnement à puissance constante, avec couple à l'arbre qui se réduit avec le rapport  $(f/f_b)$ . Dans la mesure où le couple maximal du moteur diminue avec  $(f/f_b)^2$ , la marge de surcharge admise doit être progressivement réduite.*

(A45)



Per funzionamento oltre la frequenza nominale, la velocità limite meccanica dei motori è riportata in tabella (A46):

*Table (A46) reports the mechanical limit speed for motor operation above rated frequency:*

Für einen Betrieb, der über die Nennfrequenz hinausgeht, wird die Geschwindigkeitsbegrenzung der Motoren in der Tabelle (A46) angegeben:

*En cas de fonctionnement au-delà de la fréquence nominale, la vitesse limite mécanique des moteurs est indiquée dans le tableau (A46):*

(A46)

		n [min <sup>-1</sup> ]		
		2p	4p	6p
≤ BN 112	M05...M3	5200	4000	3000
BN 132...BN 200L	M4, M5	4500	4000	3000

A velocità superiori alla nominale i motori presentano maggiori vibrazioni meccaniche e rumorosità di ventilazione; è consigliabile, per queste applicazioni, un bilanciamento del rotore in grado R e l'eventuale montaggio del servoventilatore indipendente.

*Above rated speed, motors generate increased mechanical vibration and fan noise. Class R rotor balancing is highly recommended in these applications. Installing a separate supply fan cooling may also be advisable.*

Bei Geschwindigkeiten über die Nennwerte hinaus, weisen die Motoren höhere mechanische Schwingungen und mehr Funktionsgeräusche bei der Belüftung auf. Bei diesen Applikationen wird ein Auswuchten des Rotors im Grad R und eine eventuelle Montage des unabhängig funktionierenden Servoventilators empfohlen.

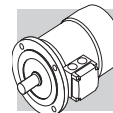
*A des vitesses supérieures à la vitesse nominale, les moteurs présentent plus de vibrations mécaniques et de bruit de ventilation ; pour ces applications, il est conseillé d'effectuer un équilibrage du rotor en niveau R et de monter éventuellement un servoventilateur indépendant.*

Il servoventilatore e, se presente, il freno elettromagnetico devono sempre essere alimentati direttamente da rete.

*Remote-controlled fan and brake (if fitted) must always be connected direct to mains power supply.*

Der Servoventilator und, falls vorhanden, die elektromagnetische Bremse müssen immer direkt über das Netz gespeist werden.

*Le servoventilateur et, si présent, le frein électromagnétique doivent toujours être alimentés directement par le réseau.*



### Frequenza massima di avviamento Z

Nelle tabelle dei dati tecnici motori è indicata la max frequenza di inserzione a vuoto  $Z_0$  con  $I = 50\%$  riferita alla versione autofrenante. Questo valore definisce il numero max di avviamenti orari a vuoto che il motore può sopportare senza superare la max temperatura ammessa dalla classe di isolamento F. Nel caso pratico di motore accoppiato ad un carico esterno con potenza assorbita  $P_r$ , massa inerziale  $J_c$  e coppia resistente media durante l'avviamento  $M_L$ , il numero di avviamenti ammissibile si può calcolare in modo approssimato con la seguente formula:

### Permissible starts per hour, Z

The rating charts of brakemotors lend the permitted number of starts  $Z_0$ , based on 50% intermittence and for unloaded operation.

The catalogue value represents the maximum number of starts per hour for the motor without exceeding the rated temperature for the insulation class F.

To give a practical example for an application characterized by inertia  $J_c$ , drawing power  $P_r$  and requiring mean torque at start-up  $M_L$  the actual number of starts per hour for the motor can be calculated approximately through the following equation:

### Maximale Schaltungshäufigkeit Z

In den Tabellen mit den Technischen Daten der Motoren ist die maximale Schaltungshäufigkeit im Leerlauf  $Z_0$  bei relativer Einschaltdauer  $I = 50\%$  bezüglich auf die Bremsausführung. Dieser Wert definiert die maximale Anzahl von Anfahrten im Leerlauf pro Stunde, die der Motor ertragen kann, ohne die durch die Isolierstoffklasse F festgelegte maximal zulässige Temperatur zu überschreiten.

Im praktischen Fall eines mit einer externen Last verbundenen Motors mit einer Leistungsaufnahme von  $P_r$ , Trägheitsmasse  $J_c$  und mittlerem Gegenmoment während des Anfahrens von  $M_L$  kann die zulässige Anzahl Anfahrten mit folgender Formel approximativ berechnet werden:

### Fréquence maximum de démarrage Z

Dans les tableaux des caractéristiques techniques des moteurs se trouve la fréquence maximum d'insertion à vide  $Z_0$  avec intermittence  $I = 50\%$  référée à la version frein. Cette valeur définit un nombre maximum de démarrages horaires à vide que le moteur peut supporter sans dépasser la température maximum admise par la classe d'isolation F.

Dans le cas pratique de moteur accouplé à une charge extérieure avec puissance absorbée  $P_r$ , masse inertielle  $J_c$  et couple résistant moyen pendant le démarrage  $M_L$ , le nombre de démarrages admissible peut se calculer de façon approximative avec la formule suivante:

$$Z = \frac{Z_0 \cdot K_c \cdot K_d}{K_J}$$

dove:

$$K_J = \frac{J_m + J_c}{J_m} = \text{fattore di inerzia}$$

$$K_c = \frac{M_a - M_L}{M_a} = \text{fattore di coppia}$$

$$K_d = \text{fattore di carico}$$

vedi tabella (A47)

where:

$$K_J = \frac{J_m + J_c}{J_m} = \text{inertia factor}$$

$$K_c = \frac{M_a - M_L}{M_a} = \text{torque factor}$$

$$K_d = \text{load factor}$$

see table (A47)

wobei gilt:

$$K_J = \frac{J_m + J_c}{J_m} = \text{Trägheitsfaktor}$$

$$K_c = \frac{M_a - M_L}{M_a} = \text{Drehmomentsfaktor}$$

$$K_d = \text{Lastfaktor}$$

siehe Tabelle (A47)

où:

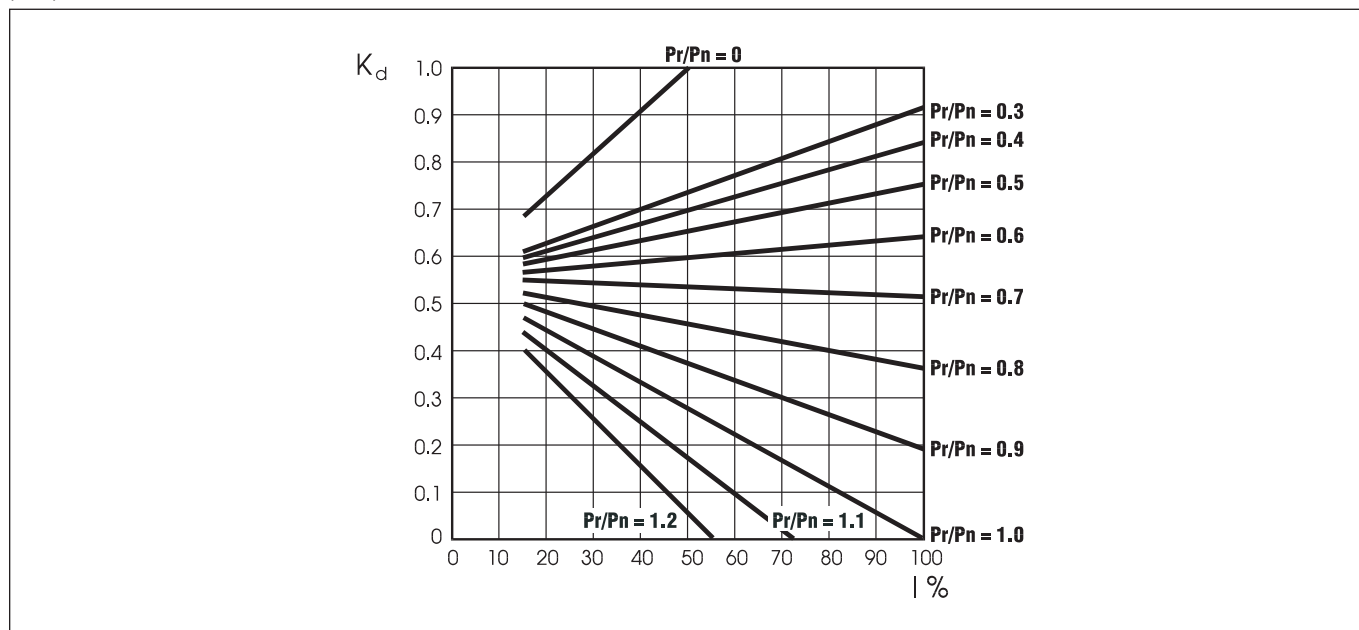
$$K_J = \frac{J_m + J_c}{J_m} = \text{facteur d'inertie}$$

$$K_c = \frac{M_a - M_L}{M_a} = \text{facteur de couple}$$

$$K_d = \text{facteur de charge}$$

voir tableau (A47)

(A47)

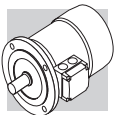


Con il numero di avviamenti così ottenuto si dovrà in seguito verificare che il massimo lavoro di frenatura sia compatibile con la capacità termica del freno  $W_{max}$  indicata nella tabella (A54).

If actual starts per hour is within permitted value (Z) it may be worth checking that braking work is compatible with brake (thermal) capacity  $W_{max}$  also given in table (A54) and dependent on the number of switches (c/h).

Auf Grundlage der so berechneten Anzahl Schaltungen muß man dann prüfen, ob die maximale Bremsarbeit mit der Wärmegrenzleistung der Bremse  $W_{max}$  kompatibel ist, die in die Tabelle (A54) angegeben ist.

Avec le nombre de démarrages ainsi obtenu, il faudra ensuite vérifier que le travail maximum de freinage soit compatible avec la capacité thermique du frein  $W_{max}$  indiquée dans la table (A54).



## M5 - MOTORI ASINCRONI AUTOFRENANTI

### Funzionamento

L'esecuzione autofrenante prevede l'impiego di freni a pressione di molle alimentati in c.c. (tipo FD) o in c.a. (tipo FA, BA). Tutti i freni funzionano secondo il principio di sicurezza, ossia intervengono in seguito alla pressione esercitata dalle molle, in mancanza di alimentazione.

## M5 - ASYNCHRONOUS BRAKE MOTORS

### Operation

*Versions with incorporated brake use spring-applied DC (FD option) or AC (FA, BA options) brakes. All brakes are designed to provide fail-safe operation, meaning that they are applied by spring-action in the event of power failure.*

## M5 - DREHSTROMBREMSMOTOREN

### Betriebsweise

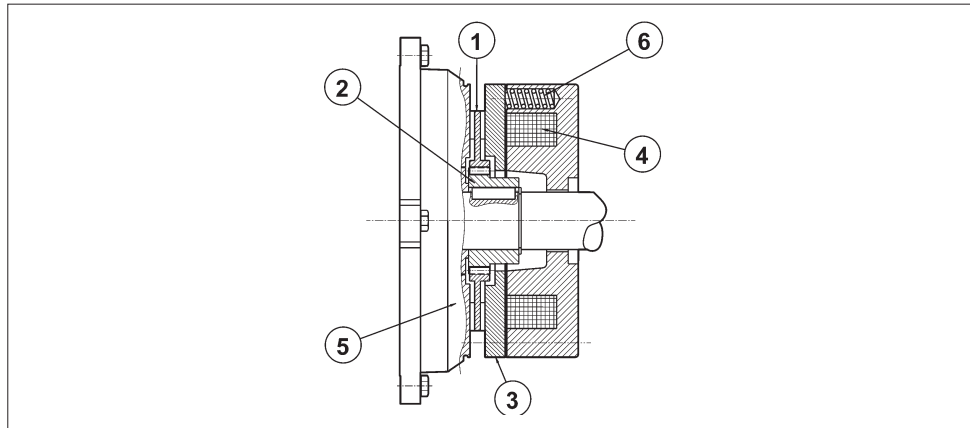
Die selbstbremsende Ausführung der Motoren sieht den Einsatz von Federdruckbremsen vor, die mit Gleichstrom (Typ FD) oder mit Wechselstrom (Typ FA, BA) gespeist werden. Alle Bremsen arbeiten gemäß dem Sicherheitsprinzip, d.h. sie greifen, im Fall eines Stromausfalls in Folge eines auf die Feder ausgeübten Drucks ein.

## M5 - MOTEURS FREIN ASYNCHRONES

### Fonctionnement

*L'exécution avec frein prévoit l'utilisation de freins à pression de ressorts alimentés en c.c. (type FD) ou en c.a. (type FA, BA). Tous les freins fonctionnent selon le principe de sécurité, c'est-à-dire qu'ils interviennent suite à la pression exercée par les ressorts, en cas de coupure d'alimentation.*

(A48)



#### Legenda:

- ① disco
- ② mozzo
- ③ ancora mobile
- ④ bobina
- ⑤ scudo post.motore
- ⑥ molle

#### Key:

- ① brake disc
- ② disc carrier
- ③ pressure plate
- ④ brake coil
- ⑤ motor rear shield
- ⑥ brake springs

#### Zeichenerklärung:

- ① Brems scheinbe
- ② Nabe
- ③ Beweglicher Anker
- ④ Ringspule
- ⑤ Motorschild
- ⑥ Schußfedern

#### Légende:

- ① disque
- ② moyeu d'entraînement
- ③ disque de freinage
- ④ bobine de frein
- ⑤ flasque-frein
- ⑥ ressort de frein

In mancanza di tensione, l'ancora mobile spinta dalle molle di pressione blocca il disco freno tra la superficie dell'ancora stessa e lo scudo motore impedendo la rotazione dell'albero. Quando la bobina viene eccitata, l'attrazione magnetica esercitata sull'ancora mobile vince la reazione elastica delle molle e libera il disco freno, e conseguentemente l'albero motore con esso solidale.

*When voltage is interrupted, pressure springs push the armature plate against the brake disc. The disc becomes trapped between the armature plate and motor shield and stops the shaft from rotation. When the coil is energized, a magnetic field strong enough to overcome spring action attracts the armature plate, so that the brake disc – which is integral with the motor shaft – is released.*

Wenn die Spannungsversorgung abfällt, sorgt der bewegliche, von den Druckfedern geschobene Anker für die Blockierung der Bremsscheibe zwischen der Ankerfläche und dem Motorschild und blockiert damit den Rotor. Wird die Spule erregt, kommt es durch den magnetischen auf den beweglichen Anker wirkenden Anzug zur Überwindung der elastischen Federkraft und zum Lösen der Bremsscheibe, wodurch der rotor wieder freigegeben wird.

*En cas de coupure de courant, l'armature mobile, poussée par les ressorts, bloque le disque de frein entre la surface de l'armature et le bouclier moteur en empêchant la rotation de l'arbre. Lorsque la bobine est excitée, l'attraction magnétique exercée sur l'armature mobile annule la réaction élastique des ressorts et libère le disque de frein, et par conséquent l'arbre moteur, qui est solidaire.*

### Caratteristiche generali

- Coppie frenanti elevate (generalmente  $M_b \approx 2 M_n$ ) e regolabili.
- Disco freno con anima in acciaio a doppia guarnizione d'attrito (materiale a bassa usura, senza amianto).
- Cava esagonale sull'albero motore, lato ventola (NDE), per rotazione manuale (non prevista quando sono presenti le opzioni PS, RC, TC, U1, U2, EN1, EN2, EN3).
- Sblocco meccanico manuale.
- Trattamento anticorrosivo di tutte la superfici del freno.
- Isolamento in classe F

### Most significant features

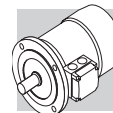
- High braking torques (normally  $M_b \approx 2 M_n$ ), braking torque adjustment.
- Steel brake disc with double friction lining (low-wear, asbestos-free lining).
- Hexagonal seat on motor shaft fan end (N.D.E.) for manual rotation (not compatible with options PS, RC, TC, U1, U2, EN1, EN2, EN3).
- Manual release lever.
- Corrosion-proof treatment on all brake surfaces.
- Insulation class F

### Allgemeine Eigenschaften

- Hohe und regulierbare Bremsmomente (allgemein  $M_b \approx 2 M_n$ ).
- Bremsscheibe mit Stahlkern und doppeltem Bremsbelag (Material mit geringem Verschleiß, asbestfrei).
- Sechskant hinten an der Motorwelle, auf Lüfterradseite (N.D.E.), für eine manuelle Drehung des Rotors mit einem Inbusschlüssel. (nicht lieferbar, wenn die Optionen PS, RC, TC, U1, U2, EN1, EN2, EN3) bestellt wurden.
- Manuell zu betätigende, mechanische Bremslüftvorrichtung.
- Korrosionsschutzbehandlung an allen Flächen der Bremse.
- Isolierung in Klasse F

### Caractéristiques générales

- Couples de freinage élevés (généralement  $M_b \approx 2 M_n$ ) et réglables.
- Disque de frein avec structure en acier à double garniture de frottement (matière à faible usure, sans amiante).
- Empreinte hexagonale sur l'arbre moteur, côté ventilateur (N.D.E.), pour la rotation manuelle (non prévue en cas de présence des options PS, RC, TC, U1, U2, EN1, EN2, EN3).
- Déblocage mécanique manuel.
- Traitement anticorrosion sur toute la surface du frein.
- Isolation en classe F



**M6 - MOTORI AUTOFRENANTI  
IN C.C., TIPO BN\_FD**

**M6 - DC BRAKE MOTORS  
TYPE BN\_FD**

**M6 - DREHSTROMBREMSMO-  
TOREN MIT GLEICH-  
STROMBREMSE: TYP  
BN\_FD**

**M6 - MOTEURS FREIN EN C.C.,  
TYPE BN\_FD**

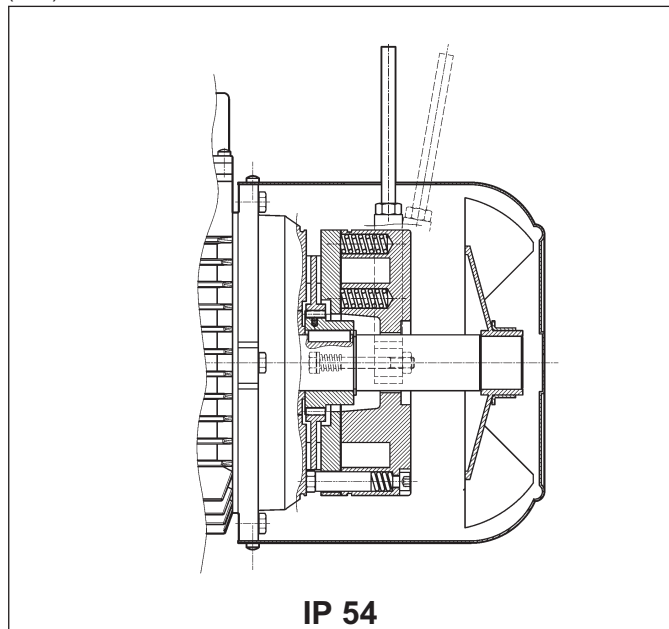
Grandezze: BN 63 ... BN 200L

Frame sizes: BN 63 ... BN 200L

Baugrößen: BN 63 ... BN 200L

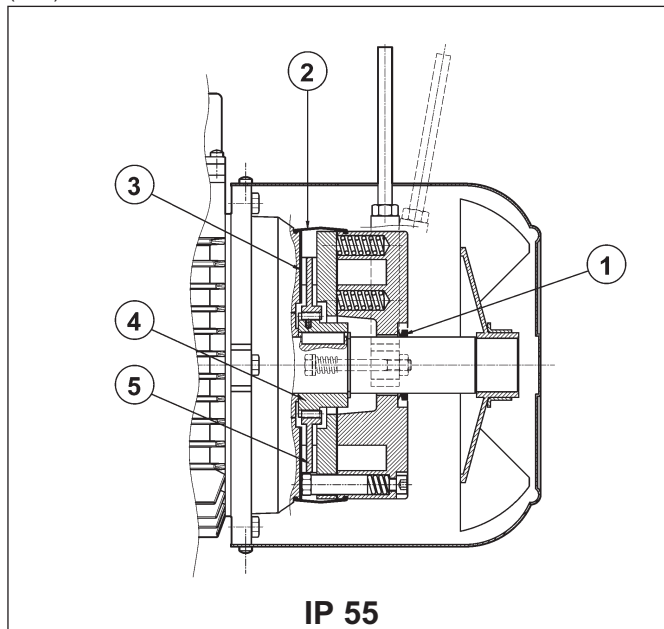
Tailles : BN 63 ... BN 200L

(A49)



**IP 54**

(A50)



**IP 55**

Freno elettromagnetico con bobina toroidale in **corrente continua** fissato con viti allo scudo motore; le molle di precarico realizzano il posizionamento assiale del corpo magnete.

Il disco freno è scorrevole sul mozzo trascinate in acciaio calettato sull'albero e previsto di molle antivibrazione.

I motori sono forniti con freno tarato in fabbrica al valore di coppia riportato nelle tabelle dati tecnici; la coppia frenante può essere regolata modificando il tipo e/o il numero delle molle.

A richiesta, i motori possono essere previsti di leva per lo sblocco manuale con ritorno automatico (**R**) o con mantenimento della posizione di rilascio freno (**RM**); per la posizione angolare della leva di sblocco vedi descrizione della relativa variante alla pag. 426.

Il freno FD garantisce elevate prestazioni dinamiche e bassa rumorosità; le caratteristiche d'intervento del freno in corrente continua possono essere ottimizzate in funzione dell'applicazione, utilizzando i vari tipi di alimentatore disponibili e/o realizzando l'opportuno cablaggio.

**Direct current toroidal-coil electromagnetic brake bolted onto motor shield. Preloading springs provide axial positioning of magnet body.**

*Brake disc slides axially on steel hub shrunk onto motor shaft with anti-vibration spring.*

*Brake torque factory setting is indicated in the corresponding motor rating charts. Braking torque may be modified by changing the type and/or number of springs.*

*At request, motors may be equipped with manual release lever with automatic return (**R**) or system for holding brake in the released position (**RM**).*

*See variant at page 426 for available release lever locations.*

*FD brakes ensure excellent dynamic performance with low noise. DC brake operating characteristics may be optimized to meet application requirements by choosing from the various rectifier/power supply and wiring connection options available.*

Elektromagnetische Bremse mit Ringwicklungsspule für **Gleichstromspannung**, die mittels Schrauben am hinteren Motorschild befestigt ist. Die Federn sorgen für die axiale Ausrichtung des Magnetkörpers.

Die Bremsscheibe gleitet axial auf der Mitnehmernabe aus Stahl, die über eine Paßfeder mit der Motorwelle verbunden und mit einer Schwingungsdämpfung ausgestattet ist.

Die Motoren werden vom Hersteller auf den in der Tabelle der technischen Daten angegebenen Bremsmoment eingestellt; das Bremsmoment kann durch das Ändern des Typs und/oder der Anzahl der Federn reguliert werden.

Auf Anfrage können die Motoren mit einem Bremslüfthebel für die manuelle Lüftung der Bremse mit selbstständiger Rückstellung (**R**) ohne Arretierung oder mit arretierbarem Lüfthebel (**RM**) geliefert werden. Die Festlegung der Position des Bremslüfthebel in Abhängigkeit von der Klemmkastenlage erfolgt durch die Option auf Seite 426.

Die Bremse vom Typ FD garantiert hohe dynamische Leistungen und niedrige Laufgeräusche. Die Ansprechigenschaften der Bremse unter Gleichstrom können in Abhängigkeit zur jeweiligen Anwendung durch den Einsatz der verschiedenen verfügbaren Gleichrichter oder durch eine entsprechenden Anschluß der Bremse optimiert werden.

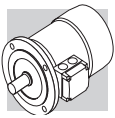
**Frein électromagnétique avec bobine toroïdale en courant continu**, fixé avec des vis au bouclier moteur; les ressorts de précharge réalisent le positionnement axial de la bobine.

Le disque frein coulisse de façon axiale sur le moyeu d'entraînement en acier calé sur l'arbre et doté de ressort antivibration.

Les moteurs sont fournis avec frein pré réglé en usine à la valeur de couple indiquée dans les tableaux des caractéristiques techniques; le couple de freinage peut être réglé en modifiant le type et/ou le nombre de ressorts.

Sur demande, les moteurs peuvent être équipés de levier pour le déblocage manuel avec retour automatique (**R**) ou avec maintien de la position de déblocage frein (**RM**); pour la position angulaire du levier de déblocage, voir description de la variante correspondante à la page 426.

Le frein FD garantit des performances dynamiques élevées et un faible niveau de bruit; les caractéristiques d'intervention du frein en courant continu peuvent être optimisées en fonction de l'application en utilisant les différents types de dispositifs d'alimentation disponibles et/ou en réalisant un câblage approprié.



## Grado di protezione

L'esecuzione standard prevede il grado di protezione IP54. In opzione il motore autofrenante tipo FD viene fornito con grado di protezione **IP 55**, prevedendo le seguenti varianti costruttive:

- ① anello V-ring posizionato sull'albero motore N.D.E.
- ② fascia di protezione in gomma
- ③ anello in acciaio inox interposto tra scudo motore e disco freno
- ④ mozzo trascinatore in acciaio inox
- ⑤ disco freno in acciaio inox

## Degree of protection

Standard protection class is IP54. Brake motor FD is also available in protection class **IP 55**, which mandates the following variants:

- ① V-ring at N.D.E. of motor shaft
- ② dust and water-proof rubber boot
- ③ stainless steel ring placed between motor shield and brake disc
- ④ stainless steel hub
- ⑤ stainless steel brake disc

## Schutzart

Die Standardausführung ist Schutzart IP54 vor. Optional kann der Bremsmotor vom Typ FD in der Schutzart **IP 55** geliefert werden, wobei sind folgende Komponenten eingesetzt werden:

- ① V-Ring an der Motorwelle N.D.E.
- ② Schutzring aus Gummi
- ③ Ring aus rostfreiem Stahl zwischen Motorschild und
- ④ Bremsscheibe Mitnehmer-nabe aus rostfreiem Stahl
- ⑤ Bremsscheibe aus rostfreiem Stahl

## Degré de protection

L'exécution standard prévoit le degré de protection IP54. En option, le moteur frein type FD est fourni avec degré de protection **IP 55**, en prévoyant les variantes de construction suivantes :

- ① bague V-ring positionnées sur l'arbre moteur N.D.E.
- ② bande de protection en caoutchouc
- ③ bague en acier inox interposée entre le bouclier moteur et le disque de frein
- ④ moyeu d'entraînement en acier inox
- ⑤ disque frein en acier inox

## Alimentazione freno FD

L'alimentazione della bobina freno in c.c. è prevista per mezzo di opportuno raddrizzatore montato all'interno della scatola coprimorsetti e già cablato alla bobina del freno.

Per motori a singola polarità è inoltre previsto di serie il collegamento del raddrizzatore alla morsettiera motore.

Indipendentemente dalla frequenza di rete, la tensione standard di alimentazione del raddrizzatore  $V_B$  ha il valore indicato nella tabella (A51) qui di seguito:

## FD brake power supply

A rectifier accommodated inside the terminal box feeds the DC brake coil. Wiring connection across rectifier and brake coil is performed at the factory. On all single-pole motors, rectifier is connected to the motor terminal board.

Rectifier standard power supply voltage  $V_B$  is as indicated in the following table (A51), regardless of mains frequency:

## Spannungsversorgung der Bremse FD

Die Versorgung der Gleichstrombremsspule erfolgt über einen Gleichrichter im Klemmenkasten der bei Lieferung, wenn nicht anders bestellt, bereits mit der Bremsspule verkabelt ist.

Bei den einpoligen Motoren ist serienmäßig der Anschluss des Gleichrichters an die Motorspannung vorgesehen. Unabhängig von der Netzfrequenz erfolgt die Versorgung des Gleichrichters  $V_B$  über die in der nachstehenden Tabelle (A51) angegebenen Standardspannung:

## Alimentation frein FD

L'alimentation de la bobine de frein en c.c. est prévue au moyen d'un redresseur approprié monté à l'intérieur de la boîte à bornes et déjà câblé à la bobine de frein.

De plus, pour les moteurs à simple polarité, le raccordement du redresseur au bornier moteur est prévu de série.

Indépendamment de la fréquence du réseau, la tension standard d'alimentation du redresseur  $V_B$  correspond à la valeur indiquée dans le tableau (A51) ci-dessous :

(A51)

2, 4, 6 P				1 speed	
		<b>BN_FD / M_FD</b> $V_{mot} \pm 10\%$ 3 ~		$V_B \pm 10\%$ 1 ~	alimentazione freno da morsettiera brake connected to terminal board power supply Bremsversorgung über die Motorspannung Alimentation frein depuis boîte à bornes
alimentazione separata separate power supply Separate Versorgung Alimentation séparée					
<b>BN 63...BN 132</b>	<b>M05...M4LB</b>	230/400 V – 50 Hz	230 V	standard	specificare $V_B SA$ o $V_B SD$ specify $V_B SA$ or $V_B SD$ $V_B SA$ oder $V_B SD$ angeben spécifier $V_B SA$ ou $V_B SD$
<b>BN 160...BN 200</b>	<b>M4LC...M5</b>	400/690 V – 50 Hz	400 V	standard	specificare $V_B SA$ o $V_B SD$ specify $V_B SA$ or $V_B SD$ $V_B SA$ oder $V_B SD$ angeben spécifier $V_B SA$ ou $V_B SD$

Per i motori a doppia polarità l'alimentazione standard del freno è da linea separata con tensione d'ingresso al raddrizzatore  $V_B$  come indicato in tabella (A52):

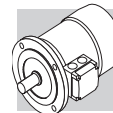
Switch-pole motors feature a separate power supply line for the brake with rectifier input voltage  $V_B$  as indicated in the table (A52):

Die polumschaltbaren Motoren müssen immer mit separater Bremsversorgungsspannung betrieben werden, deshalb erfolgt die Lieferung standardmäßig ohne Anschluß der Bremse an die Motorspannung, da diese mit einer am Eingang des Gleichrichters  $V_B$  anliegenden Spannung versorgt werden muß, entsprechend Werte in der nachstehenden Tabelle (A52):

Pour les moteurs à double polarité, l'alimentation standard du frein dérive d'une ligne séparée avec tension d'entrée au redresseur  $V_B$  comme indiqué dans le tableau (A52):

(A52)

2/4, 2/6, 2/8, 2/12, 4/6, 4/8 P				2 speed	
		<b>BN_FD / M_FD</b> $V_{mot} \pm 10\%$ 3 ~		$V_B \pm 10\%$ 1 ~	alimentazione freno da morsettiera brake powered via terminal board Bremsversorgung über die Motorspannung Alimentation frein depuis boîte à bornes
					alimentazione separata separate power supply Separate Versorgung Alimentation séparée
<b>BN 63...BN 132</b>	<b>M05...M4LB</b>	400 V – 50 Hz	230 V		specificare $V_B SA$ o $V_B SD$ specify $V_B SA$ or $V_B SD$ $V_B SA$ oder $V_B SD$ angeben spécifier $V_B SA$ ou $V_B SD$



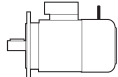


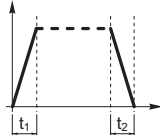
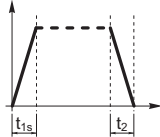
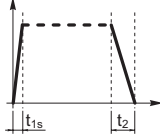
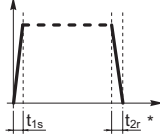
Il raddrizzatore è del tipo a diodi a semionda (Vc.c ≈ 0,45 x Vc.a.) ed è disponibile nelle versioni **NB**, **SB**, **NBR** e **SBR**, come dettagliato nella tabella (A53) seguente:

The diode half-wave rectifier (VDC ≈ 0,45 x VAC) is available in versions **NB**, **SB**, **NBR** e **SBR**, as detailed in the table (A53) below:

Bei dem Gleichrichter handelt es sich um einen Typ mit Halbwelendiolen (Vc.c ≈ 0,45 Vc.a.). Er ist in den Versionen **NB**, **SB**, **NBR** und **SBR**, gemäß den Details in der nachstehenden Tabelle (A53), verfügbar:

Le redresseur est du type à diodes à demi-onde (Vc.c ≈ 0,45 x Vc.a.) et il est disponible dans les versions **NB**, **SB**, **NBR** et **SBR**, comme indiqué de façon détaillée dans le tableau (A53) suivant :

(A53)

		freno brake Bremsse frein				
			standard	a richiesta at request auf Anfrage Sur demande		
<b>BN 63</b>	<b>M05</b>	<b>FD 02</b>				
<b>BN 71</b>	<b>M1</b>	<b>FD 03</b>			<b>SB</b>	
		<b>FD 53</b>				
<b>BN 80</b>	<b>M2</b>	<b>FD 04</b>			<b>NB</b>	<b>SBR</b>
<b>BN 90S</b>	—	<b>FD 14</b>				
<b>BN 90L</b>	—	<b>FD 05</b>				
<b>BN 100</b>	<b>M3</b>	<b>FD 15</b>				<b>NBR</b>
—		<b>FD 55</b>				
<b>BN 112</b>	—	<b>FD 06S</b>				
<b>BN 132...160MR</b>	<b>M4</b>	<b>FD 56</b>				
<b>BN 160L - BN 180M</b>	<b>M5</b>	<b>FD 06</b>				
<b>BN 180L - NM 200L</b>	—	<b>FD 07</b>				

(\*)  $t_{2c} < t_{2r} < t_2$

Il raddrizzatore **SB** a controllo elettronico dell'eccitazione, riduce i tempi di sblocco del freno sovraccitando l'elettromagnete nei primi istanti d'inserzione, per passare poi al normale funzionamento a semionda a distacco del freno avvenuto.

Rectifier **SB** with electronic energizing control over-energizes the electromagnet upon power-up to cut brake release response time and then switches to normal half-wave operation once the brake has been released.

Der Gleichrichter **SB** mit elektronischer Kontrolle der Erregung reduziert die Bremslösezeiten, indem er die Bremsspule in den ersten Momenten der Einschaltung übermäßig erregt, um dann, nach erfolgter Bremslösung, in die normale Halbwellenfunktion umzuschalten.

Le redresseur **SB** à contrôle électronique de l'excitation réduit les temps de déblocage du frein en surexcitant l'électro-aimant durant les premiers instants d'enclenchement pour passer ensuite au fonctionnement normal à demi-onde une fois le frein désactivé.

L'impiego del raddrizzatore tipo **SB** è sempre da prevedere nei casi di:

Use of the **SB** rectifier is mandatory in the event of:

Der Einsatz eines Gleichrichters vom Typ **SB** wird in folgenden Fällen empfohlen:

L'utilisation du redresseur type **SB** doit toujours être prévue dans les cas suivants :

- elevato numero di interventi orari
- tempi di sblocco freno ridotti
- elevate sollecitazioni termiche del freno

- high number of operations per hour
- reduced brake release response time
- brake is exposed to extreme thermal stress

- hohe Anzahl von Schaltungen pro Stunde
- schnelle Bremsansprechzeiten
- starke thermische Beanspruchungen der Bremse

- nombre d'interventions horaires élevé
- temps de déblocage frein réduits
- sollicitations thermiques du frein élevées

Per applicazioni dove è richiesto un rapido rilascio del freno sono disponibili a richiesta i raddrizzatori **NBR** o **SBR**.

Rectifiers **NBR** or **SBR** are available for applications requiring quick brake release response.

Für die Anwendungen, bei denen eine schnelle Ansprechzeit der Bremse gefordert wird, können auf Anfrage die Gleichrichter **NBR** oder **SBR** geliefert werden.

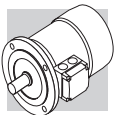
Pour les applications nécessitant un déblocage rapide du frein, sur demande les redresseurs **NBR** ou **SBR** sont disponibles.

Questi raddrizzatori completano i tipi **NB** e **SB**, integrando nel cir-

These rectifiers complement the **NB** and **SB** types as their elec-

Diese Gleichrichter erweitern die

ces redresseurs complètent les types **NB** et **SB**, en intégrant



cuito elettronico un interruttore statico che interviene disaccoppiando rapidamente il freno in caso di mancanza di tensione. Questa soluzione consente di ridurre i tempi di rilascio del freno evitando ulteriori cablaggi e contatti esterni. Per il migliore utilizzo dei raddrizzatori **NBR** e **SBR** è richiesta l'alimentazione separata del freno. Tensioni disponibili: 230V ± 10%, 400V ± 10%, 50/60 Hz.

*tronic circuit incorporates a static switch that de-energizes the brake quickly in the event voltage is missing. This arrangement ensures short brake release response time with no need for additional external wiring and contacts. Optimum performance of rectifiers **NBR** and **SBR** is achieved with separate brake power supply. Available voltages: 230V ± 10%, 400V ± 10%, 50/60 Hz.*

Funktion der Typen **NB** und **SB**, indem in dem elektronischen Schaltkreis ein statischen Schalter integriert ist, durch dessen Auslösen die Bremse im Fall eines Spannungsausfalls schnell abgeregt wird. Diese Lösung ermöglicht eine Verringerung der Ansprechzeiten der Bremse, wodurch weitere Schaltungen und externe Sensoren vermieden werden können. Im Hinblick auf einen besseren Einsatz der Gleichrichter **NBR** und **SBR** ist bei der Bremse eine separate Versorgung erforderlich. Verfügbare Spannungen: 230V ± 10%, 400V ± 10%, 50/60 Hz.

*dans le circuit électronique un interrupteur statique qui intervient en désactivant rapidement le frein en cas de coupure de tension. Cette solution permet de réduire les temps de déblocage du frein en évitant d'autres câblages et contacts extérieurs. Pour une meilleure utilisation des redresseurs **NBR** et **SBR** l'alimentation séparée du frein est nécessaire. Tensions disponibles : 230V ± 10%, 400V ± 10%, 50/60 Hz.*

### Dati tecnici freni FD

Nella tabella (A54) sottostante sono riportati i dati tecnici dei freni in c.c. tipo FD.

(A54)

### FD brake technical specifications

The table (A54) below reports the technical specifications of DC brakes FD.

### Technische Daten - Bremstyp FD

In der nachstehenden Tabelle (A54) werden die technischen Daten der Gleichstrombremsen vom Typ FD angegeben.

### Caractéristiques techniques freins FD

Le tableau (A54) suivant indique les caractéristiques techniques des freins en c.c. type FD.

Freno Brake Frein	Coppia frenante $M_b$ [Nm] Brake torque $M_b$ [Nm] Couple de freinage $M_b$ [Nm]			Rilascio Release Ansprchzeit Déblocage		Frenatura Braking Bremsung Freinage		Wmax per frenata Wmax per brake operation Wmax pro Bremsung Wmax par freinage			W [MJ]	P [W]
	molle / springs feder / ressorts			$t_1$	$t_{1s}$	$t_2$	$t_{2c}$	[ J ]				
	6	4	2	[ms]	[ms]	[ms]	[ms]	10 s/h	100 s/h	1000 s/h		
FD02	–	3.5	1.75	30	15	80	9	4500	1400	180	15	17
FD03	5	3.5	1.75	50	20	100	12					
FD53	7.5	5	2.5	60	30	100	12	7000	1900	230	25	24
FD04	15	10	5	80	35	140	15	10000	3100	350	30	33
FD14												
FD05	40	26	13	130	65	170	20	18000	4500	500	50	45
FD15	40	26	13	130	65	170	20					
FD55	55	37	18	–	65	170	20	20000	4800	550	70	55
FD06S	60	40	20	–	80	220	25					
FD56	–	75	37	–	90	150	20	29000	7400	800	80	65
FD06		100	50		100	150	20					
FD07	150	100	50	–	120	200	25	40000	9300	1000	130	65
FD08*	250	200	170	–	140	350	30	60000	14000	1500	230	100
FD09**	400	300	200	–	200	450	40	70000	15000	1700	230	120

\* valori di coppia frenante ottenuti con n° 9, 7, 6 molle rispettivamente

\* *brake torque values obtained with 9, 7 and 6 springs, respectively*

\* Werte, der durch den Einsatz von jeweils 9, 7, 6 Federn erreichten Bremsmomente

\* *valeurs de couple de freinage obtenues respectivement avec n° 9, 7, 6 ressorts*

\*\* valori di coppia frenante ottenuti con n° 12, 9, 6 molle rispettivamente

\*\* *brake torque values obtained with 12, 9 and 6 springs, respectively*

\*\* Werte, der durch den Einsatz von jeweils 12, 9, 6 Federn erreichten Bremsmomente

\*\* *valeurs de couple de freinage obtenues respectivement avec n° 12, 9, 6 ressorts*

#### Legenda:

$t_1$  = tempo di rilascio del freno con alimentatore a semionda  
 $t_{1s}$  = tempo di rilascio del freno con alimentatore a controllo elettronico dell'eccitazione  
 $t_2$  = ritardo di frenatura con interruzione lato c.a. e alimentazione separata  
 $t_{2c}$  = ritardo di frenatura con interruzione lato c.a.e c.c. – I valori di  $t_1$ ,  $t_{1s}$ ,  $t_2$ ,  $t_{2c}$  indicati nella tab. (A54) sono riferiti al freno tarato alla coppia massima, trafero medio e tensione nominale  
 $W_{max}$  = energia max per frenata  
 $W$  = energia di frenatura tra due regolazioni successive del trafero  
 $P_b$  = potenza assorbita dal freno a 20°C  
 $M_b$  = coppia frenante statica (±15%)  
s/h = avviamenti orari

#### Key:

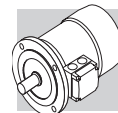
$t_1$  = *brake release time with half-wave rectifier*  
 $t_{1s}$  = *brake release time with over-energizing rectifier*  
 $t_2$  = *brake engagement time with AC line interruption and separate power supply*  
 $t_{2c}$  = *brake engagement time with AC and DC line interruption – Values for  $t_1$ ,  $t_{1s}$ ,  $t_2$ ,  $t_{2c}$  indicated in the tab. (A54) are referred to brake set at maximum torque, medium air gap and rated voltage*  
 $W_{max}$  = *max energy per brake operation*  
 $W$  = *braking energy between two successive air gap adjustments*  
 $P_b$  = *brake power absorption at 20 °C*  
 $M_b$  = *static braking torque (±15%)*  
s/h = *starts per hour*

#### Zeichenerklärung:

$t_1$  = *Ansprchzeit der Bremse mit Halwellengleichrichter*  
 $t_{1s}$  = *Ansprchzeit der Bremse mit elektronisch gesteuerten Erregungsgleichrichter*  
 $t_2$  = *Bremsverzögerung mit Unterbrechung auf Wechselstromseite und Fremdversorgung*  
 $t_{2c}$  = *Bremsverzögerung mit Unterbrechung auf Wechselstrom- und Gleichstromseite – Die in der Tab. (A54) angegebenen Werte  $t_1$ ,  $t_{1s}$ ,  $t_2$ ,  $t_{2c}$  beziehen sich auf eine auf das max. Bremsmoment geeichte Bremse, mit mittlerem Luftspalt und Nennspannung*  
 $W_{max}$  = *max. Energie pro Bremsung*  
 $W$  = *Bremsenergie zwischen zwei Einstellungen des Luftspalts*  
 $P_b$  = *bei 20 °C von der Bremse aufgenommene Leistung (50 Hz)*  
 $M_b$  = *statisches Bremsmoment (±15%)*  
s/h = *Einschaltungen pro stunde*

#### Légende:

$t_1$  = *temps de déblocage du frein avec dispositif d'alimentation à demi-onde*  
 $t_{1s}$  = *temps de déblocage du frein avec dispositif d'alimentation à contrôle électronique de l'excitation*  
 $t_2$  = *retard de freinage avec interruption côté c.a. et alimentation séparée*  
 $t_{2c}$  = *retard de freinage avec interruption côté c.a. et c.c. – Les valeurs de  $t_1$ ,  $t_{1s}$ ,  $t_2$ ,  $t_{2c}$  indiquées dans le tab. (A54) se réfèrent au frein étalonné au couple maximal, entrefer moyen et tension nominale*  
 $W_{max}$  = *énergie max. par freinage*  
 $W$  = *énergie de freinage entre deux réglages successifs de l'entrefer*  
 $P_b$  = *puissance absorbée par le frein à 20 °C*  
 $M_b$  = *couple de freinage statique (±15%)*  
s/h = *démarrages horaires*



## Collegamenti freno FD

I motori standard ad una velocità sono forniti con il collegamento del raddrizzatore alla morsetteria motore già realizzato in fabbrica. Per motori a 2 velocità, e dove è richiesta l'alimentazione del freno separata, prevedere il collegamento al raddrizzatore in accordo alla tensione freno  $V_B$  indicata nella targhetta del motore. **Data la natura induttiva del carico, per il comando del freno e per l'interruzione lato corrente continua devono essere utilizzati contatti con categoria d'impiego AC-3 secondo IEC 60947-4-1.**

Tabella (A55) - Alimentazione freno dai morsetti motore ed interruzione lato a.c.

Tempo di arresto  $t_2$  ritardato e funzione delle costanti di tempo del motore. Da prevedere quando sono richiesti avviamenti/arresti progressivi.

Tabella (A56) - Bobina freno con alimentazione separata ed interruzione lato c.a.

Tempo di arresto normale ed indipendente dal motore. Si realizzano i tempi di arresto  $t_2$  indicati nella tabella (A54).

Tabella (A57) - Bobina freno con alimentazione dai morsetti motore ed interruzione lato c.a. e c.c.

Arresto rapido con i tempi d'intervento  $t_{2c}$  indicati in tabella (A54).

Tabella (A58) - Bobina freno con alimentazione separata ed interruzione lato c.a. e c.c.

Tempo di arresto ridotto secondo i valori  $t_{2c}$  indicati in tabella (A54).

## FD brake connections

On standard single-pole motors, the rectifier is connected to the motor terminal board at the factory.

For switch-pole motors and where a separate brake power supply is required, connection to rectifier must comply with brake voltage  $V_B$  stated in motor name plate.

**Because the load is of the inductive type, brake control and DC line interruption must use contacts from the usage class AC-3 to IEC 60947-4-1.**

Table (A55) - Brake power supply from motor terminals and AC line interruption

Delayed stop time  $t_2$  and function of motor time constants. Mandatory when soft-start/stops are required.

Table (A56) - Brake coil with separate power supply and AC line interruption

Normal stop time independent of motor.

Achieved stop times  $t_2$  are indicated in the table (A54).

Table (A57) - Brake coil power supply from motor terminals and AC/DC line interruption.

Quick stop with operation times  $t_{2c}$  as per table (A54).

Table (A58) - Brake coil with separate power supply and AC/DC line interruption.

Stop time decreases by values  $t_{2c}$  indicated in the table (A54).

## Anschlüsse - Bremstyp FD

Die einpoligen Motoren werden vom Werk ab mit an die Motorspannung angeschlossenen Gleichrichters geliefert.

Für die polumschaltbaren Motoren, und Bremse mit separater Versorgung, wird in Übereinstimmung mit der auf dem Typenschild des Motors angegebenen Bremsspannung  $V_B$  der Anschluss an den Gleichrichter vorgesehen.

Da es sich bei der Bremsleistung um eine induktive Kraft handelt, müssen gemäß IEC 60947-4-1 für die Steuerung der Bremse und die Unterbrechung der Gleichstromseite Kontakte der Kategorie AC-3 verwendet werden.

Tabelle (A55) - Bremsversorgung über die Motorspannung und Unterbrechung der Wechselstromseite.

Verzögerter und von den Zeitkonstanten des Motors abhängige Haltezeit  $t_2$ .

Vorzusehen, wenn progressive Starts/Stops erforderlich sind.

Tabelle (A56) - Bremsspule mit separater Spannungsversorgung und Unterbrechung der Wechselstromseite.

Normale und vom Motor unabhängige Stoppzeiten. Es werden die in der Tabelle (A54) angegebenen Stoppzeiten  $t_2$  realisiert.

Tabelle (A57) - Bremsspule mit Versorgung über die Motorspannung und Unterbrechung der Gleich- und der Wechselstromseite. Schneller Stopp mit den in der Tabelle (A54) angegebenen Ansprechzeiten  $t_{2c}$ .

Tabelle (A58) - Bremsspule mit separater Spannungsversorgung und Unterbrechung der Gleich- und der Wechselstromseite. Reduzierte Stoppzeiten der in der Tabelle (A54) angegebenen Werte  $t_{2c}$ .

## Raccordements frein FD

Les moteurs standard à une vitesse sont fournis avec le raccordement du redresseur au bornier moteur déjà réalisé en usine.

Pour les moteurs à 2 vitesses, et lorsqu'une alimentation séparée du frein est requise, prévoir le raccordement au redresseur conformément à la tension frein  $V_B$  indiquée sur la plaque signalétique du moteur.

**Etant donné la nature inductive de la charge, pour la commande du frein et l'interruption côté courant continu, il est nécessaire d'utiliser des contacts avec catégorie d'utilisation AC-3 selon la norme IEC 60947-4-1.**

Tableau (A55) - Alimentation frein depuis bornes moteur et interruption côté c.a.

Temps d'arrêt  $t_2$  retardé et fonction des constantes de temps du moteur.

A prévoir lorsque des démarrages/arrests progressifs sont requis.

Tableau (A56) - Bobine de frein avec alimentation séparée et interrupteur côté c.a.

Temps d'arrêt normal et indépendant du moteur.

Les temps d'arrêts  $t_2$  sont ceux indiqués dans le tableau (A54).

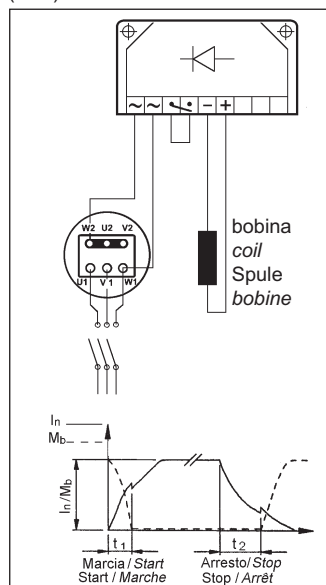
Tableau (A57) - Bobine de frein avec alimentation depuis les bornes moteur et interruption côté c.a. et c.c.

Arrêt rapide avec les temps d'intervention  $t_{2c}$  indiqués dans le tableau (A54).

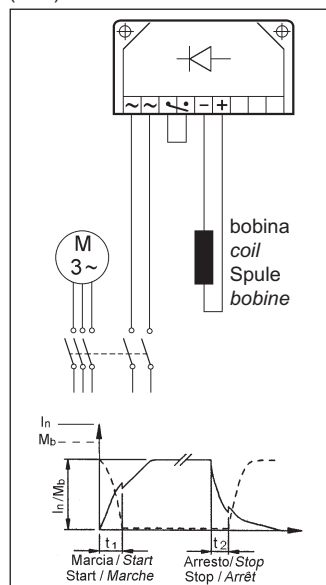
Tableau (A58) - Bobine de frein avec alimentation séparée et interruption côté c.a. et c.c.

Temps d'arrêt réduit selon les valeurs  $t_{2c}$  indiqués dans le tableau (A54).

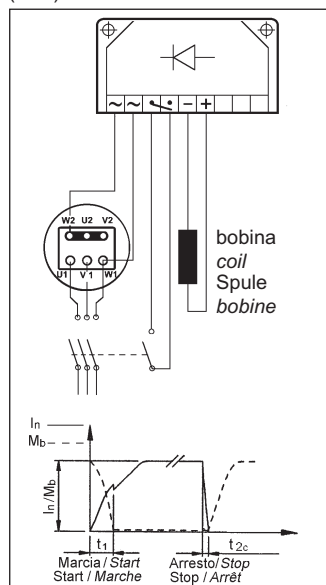
(A55)



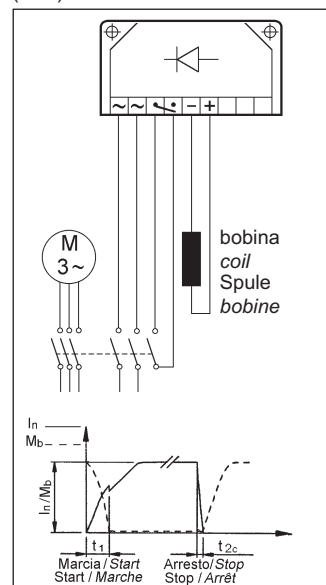
(A56)



(A57)



(A58)



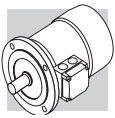
Le tabelle da (A55) a (A58) riportano gli schemi tipici di collegamento per alimentazione 400 V, motori 230/400V collegati a stella e freno 230 V.

Tables (A55) through (A58) show the typical connection diagrams for 400 V power supply, star-connected 230/400V motors and 230 V brake.

In den Tabellen (A55) bis (A58) werden die typischen Schaltungen für Versorgung mit 400 V, Motoren 230/400V mit Sternschaltung und einer Bremsspannung von 230 V wiedergegeben.

Les tableaux de (A55) à (A58) indiquent les schémas typiques de branchement pour une alimentation de 400 V, moteurs 230/400V raccordés en étoile et frein 230 V.





**M7 - MOTORI AUTOFRENANTI  
IN C.A., TIPO BN\_FA**

**M7 - AC BRAKE MOTORS  
TYPE BN\_FA**

**M7 - WECHSELSTROM-  
BREMSMOTOREN-TYP  
BN\_FA**

**M7 - MOTEURS FREIN EN C.A.,  
TYPE BN\_FA**

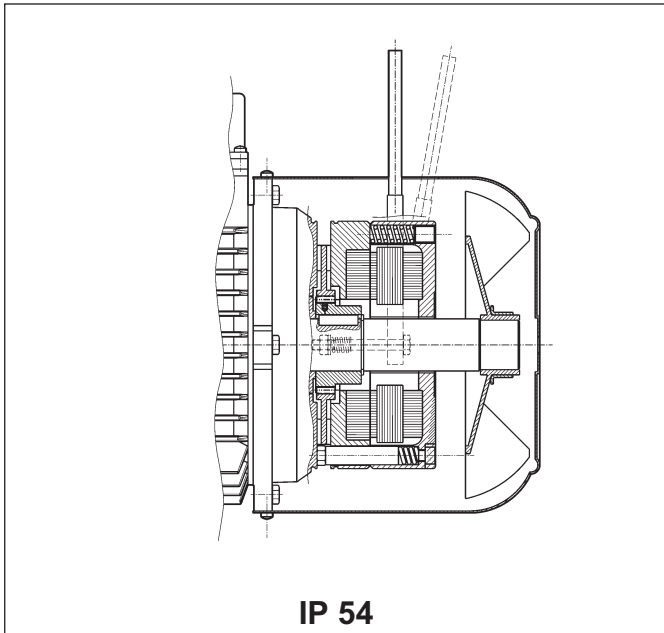
**Grandezze:** BN 63 ... BN 180M

**Frame sizes:** BN 63 ... BN 180M

**Baugrößen:** BN 63 ... BN 180M

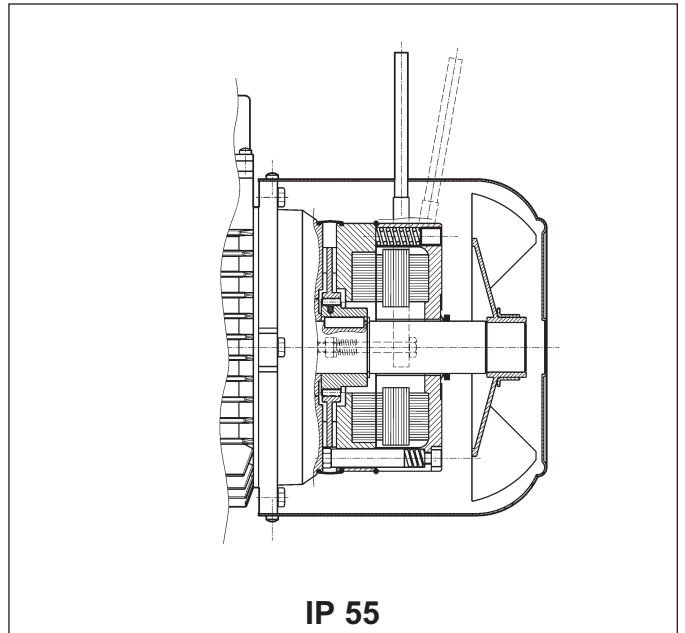
**Tailles :** BN 63 ... BN 180M

(A59)



**IP 54**

(A60)



**IP 55**

Freno elettromagnetico con alimentazione in **corrente alternata** trifase, fissato con viti allo scudo motore; le molle di precarico realizzano il posizionamento assiale del corpo magnete.

Il disco freno è scorrevole assialmente sul mozzo trascinatore in acciaio calettato sull'albero e provvisto di molle antivibrazione. La coppia frenante è pre-impostata in fabbrica su valori che sono indicati nelle tabelle dati tecnici dei relativi motori.

L'azione del freno è inoltre modulabile, regolando con continuità la coppia frenante, tramite le viti che realizzano il precarico delle molle; il campo di regolazione della coppia è:  $30\% M_{bMAX} < M_b < M_{bMAX}$  ( $M_{bMAX}$  è il momento frenante max riportato in tab. (A62).

Il freno tipo FA presenta dinamiche molto elevate che lo rendono idoneo in applicazioni dove sono richieste frequenze di avviamento elevate con tempi d'intervento molto rapidi.

A richiesta, i motori possono essere previsti di leva per lo sblocco manuale con ritorno automatico (R). Per la specifica della posizione angolare della leva vedi relativa variante alla pag. 426.

*Electromagnetic brake operates from three-phase **alternated current** power supply and is bolted onto conveyor shield. Preloading springs provide axial positioning of magnet body.*

*Steel brake disc slides axially on steel hub shrunk onto motor shaft with anti-vibration spring. Brake torque factory setting is indicated in the corresponding motor rating charts.*

*Spring preloading screws provide stepless braking torque adjustment.*

*Torque adjustment range is  $30\% M_{bMAX} < M_b < M_{bMAX}$  (where  $M_{bMAX}$  is maximum braking torque as shown in tab. (A62).*

*Thanks to their high dynamic characteristics, FA brakes are ideal for heavy-duty applications as well as applications requiring frequent stop/starts and very fast response time.*

*Motors may be equipped with manual release lever with automatic return (R) at request. See variants at page 426 for available lever locations.*

Elektromagnetische Bremse mit **Drehstromversorgung**, die mittels Schrauben am hinteren Motorschild befestigt ist. Die Federn sorgen dabei für die axiale Ausrichtung des Magnetkörpers.

Die Bremsscheibe (Stahl) gleitet axial auf dem sich auf dem Rotor befindlichen Mitnehmer, der über eine Paßfeder mit Motorwelle verbunden und mit einer Schwingungsdämpffeder ausgestattet ist.

Das Bremsmoment wird auf das entsprechende Motormoment eingestellt (siehe Tabelle der technischen Daten der entsprechenden Motoren).

Das Bremsmoment ist stufenlos durch über die Schrauben die die Federvorspannung einstellbar. Der Einstellbereich beträgt  $30\% M_{bMAX} < M_b < M_{bMAX}$  ( $M_{bMAX}$  steht für den max. Bremsmoment, der in der Tab (A62) angegeben wird).

Die Bremse vom Typ FA zeichnet sich durch ihre hohen Dynamik aus, weshalb sie für Anwendungen geeignet sind, in denen hohe Schaltfrequenzen und schnelle Ansprechzeiten gefordert werden.

Auf Anfrage können die Motoren mit einem Lüfterhebel für die manuelle Lüftung der Bremse mit automatischer Rückstellung (R) geliefert werden. Die Angabe der Montageposition erfolgt über die Angabe der Option auf Seite 426.

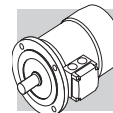
*Frein électromagnétique avec alimentation en **courant alternatif** triphasé, fixé avec des vis au bouclier; les ressorts de précharge réalisent le positionnement axial de la bobine.*

*Le disque frein coulisse de façon axiale sur le moyeu d'entraînement en acier, calé sur l'arbre et doté de ressort antivibration.*

*Le couple de freinage est pré-réglé en usine aux valeurs qui sont indiquées dans les tableaux des caractéristiques techniques des moteurs correspondants. De plus, l'action du frein est modulable, en réglant le couple de freinage en continu au moyen des vis qui réalisent la précharge des ressorts; la plage de réglage du couple est de  $30\% M_{bMAX} < M_b < M_{bMAX}$  ( $M_{bMAX}$  est le couple de freinage maximum indiqué dans le tab. (A62).*

*Le frein type FA présente des caractéristiques dynamiques très élevées, il est donc adapté pour des applications nécessitant des fréquences de démarrage élevées et des temps d'intervention très rapides.*

*Sur demande, les moteurs peuvent être prévus avec levier pour le déblocage manuel avec retour automatique (R). Pour la spécification de la position angulaire du levier, voir variante page 426.*



Grado di protezione	Degree of protection	Schutzart	Degré de protection
<p>L'esecuzione standard prevede il grado di protezione IP54. In opzione, il motore autofrenante BN_FA viene fornito con grado di protezione <b>IP 55</b> prevedendo le seguenti varianti costruttive:</p> <ul style="list-style-type: none"> <li>- anello V-ring posizionato sull'albero motore NDE.</li> <li>- fascia di protezione in gomma</li> <li>- anello O-ring</li> </ul>	<p>Standard protection class is IP54. Brake motor BN_FA is also available in protection class <b>IP 55</b>, which mandates the following variants:</p> <ul style="list-style-type: none"> <li>- V-ring at N.D.E. of motor shaft</li> <li>- rubber protection sleeve</li> <li>- O-ring</li> </ul>	<p>Die Standardausführung ist Schutzart IP54 vor. Optional kann der Bremsmotor BN_FA auch in der Schutzart <b>IP 55</b> geliefert werden, was durch die folgenden zusätzlichen Bauteile erreicht wird:</p> <ul style="list-style-type: none"> <li>- V-Ring an der Motorwelle N.D.E.</li> <li>- Schutzring aus Gummi</li> <li>- O-Ring</li> </ul>	<p>L'exécution standard prévoit le degré de protection IP54. En option, le moteur frein BN_FA est fourni avec degré de protection <b>IP 55</b>, les variations de construction suivantes sont prévues :</p> <ul style="list-style-type: none"> <li>- bague V-ring positionné sur l'arbre moteur N.D.E.</li> <li>- bande de protection en caoutchouc</li> <li>- joint torique</li> </ul>

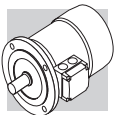
Alimentazione freno FA	FA brake power supply	Stromversorgung - Bremstyp FA	Alimentation frein FA
<p>Nei motori a singola polarità l'alimentazione della bobina freno è derivata direttamente dalla morsettiera motore e la tensione del freno quindi coincide con la tensione del motore. In questo caso la tensione del freno può essere omessa dalla designazione Per i motori a doppia polarità, e per i motori con alimentazione separata del freno, è presente una morsettiera ausiliaria con 6 terminali per il collegamento alla linea del freno. In entrambi i casi il valore di tensione del freno dovrà essere specificato in designazione. Nella tabella seguente sono riportate le condizioni di alimentazione standard del freno in c.a. per i motori a singola e doppia polarità:</p>	<p>In single speed motors, power supply is brought to the brake coil direct from the motor terminal box. As a result, brake voltage and motor voltage are the same. In this case, brake voltage indication may be omitted in the designation. Switch-pole motors and motors with separate brake power supply feature an auxiliary terminal board with 6 terminals for connection to brake line. In both cases, brake voltage indication in the designation is mandatory. The following table reports standard AC brake power supply ratings for single- and switch-pole motors:</p>	<p>Bei den einpoligen Motoren wird die Versorgung der Bremsspule direkt vom Motorklemmenkasten abgenommen, das bedeutet, dass die Spannung der Bremse mit der Motorspannung übereinstimmt. In diesem Fall braucht die Bremsenspannung nicht extra angegeben werden. Für die polumschaltbaren Motoren und für eine separate Bremsversorgung ist eine Hilfsklemmenleiste mit 6 Anschlüssen vorgesehen, die einen Anschluß der Bremse ermöglichen. In beiden Fällen muss die Bremsenspannung in der Bestellung angegeben werden. In der nachstehenden Tabelle werden für die einpoligen und die polumschaltbaren Motoren die Standardspannungen der Wechselstrombremsen angegeben.</p>	<p>Sur les moteurs à simple polarité, l'alimentation de la bobine frein dérive directement du bornier moteur, par conséquent, la tension du frein coïncide avec la tension du moteur. Dans ce cas, la tension du frein peut être omise de la désignation. Pour les moteurs à double polarité et les moteurs avec alimentation séparée du frein, une boîte à bornes auxiliaire avec 6 bornes pour le raccordement à la ligne du frein, est présente. Dans les deux cas, la valeur de tension du frein doit être spécifiée dans la désignation. Le tableau suivant indique les conditions d'alimentation standard du frein en c.a. pour les moteurs à simple et double polarité :</p>

(A61)

motori a singola polarità single-pole motor Einpolige Motoren Moteurs à simple polarité	BN 63...BN 132	BN 160...BN 180
	M05...M4LB	M4LC...M5
	230Δ / 400Y V ±10% – 50 Hz	400Δ/ 690Y V ±10% – 50 Hz
	265Δ / 460Y ±10% - 60 Hz	460Y – 60 Hz

motori a doppia polarità (alimentazione da linea separata) switch-pole motors (separate power supply line) Polumschaltbare Motoren (separate Versorgung) Moteurs à double polarité (alimentation depuis ligne séparée)	BN 63...BN 132
	M05...M4
	230Δ / 400Y V ±10% – 50 Hz
	460Y - 60 Hz

Se non diversamente specificato, l'alimentazione standard del freno è 230Δ/400Y V - 50 Hz.	Unless otherwise specified, standard brake power supply is 230Δ/400Y V - 50 Hz.	Falls nicht anderweitig angegeben, beträgt die Standardversorgung der Bremse 230Δ/400Y V - 50 Hz.	Sauf spécification contraire, l'alimentation standard du frein est 230Δ/400Y V - 50 Hz.
Su richiesta, sono disponibili tensioni speciali, nel campo 24...690 V, 50-60 Hz.	Special voltages in the 24...690 V, 50-60 Hz range are available at request.	Auf Anfrage können Sonderspannungen von 24...690 V, 50-60 Hz geliefert werden.	Sur demande, des tensions spéciales sont disponibles dans la plage 24...690 V, 50-60 Hz.



**Dati tecnici freni FA**

**Technical specifications of FA brakes**

**Technische Daten der Bremsen vom Typ FA**

**Caractéristiques techniques freins FA**

(A62)

Freno Brake Bremse Frein	Coppia frenante Brake torque Bremsmoment Couple de freinage  $M_b$ [Nm]	Rilascio Release Ansprechzeit Déblocage  $t_1$ [ms]	Frenatura Braking Bremsung Freinage  $t_2$ [ms]	Wmax			W [MJ]	$P_b$ [VA]
				[ J ]				
				10 s/h	100 s/h	1000 s/h		
FA 02	3.5	4	20	4500	1400	180	15	60
FA 03	7.5	4	40	7000	1900	230	25	80
FA 04	15	6	60	10000	3100	350	30	110
FA 14								
FA 05								
FA 15	40	8	90	18000	4500	500	50	250
FA 06S	60	16	120	20000	4800	550	70	470
FA 06	75	16	140	29000	7400	800	80	550
FA 07	150	16	180	40000	9300	1000	130	600
FA 08	250	20	200	60000	14000	1500	230	1200

**Legenda:**

$M_b$  = max coppia frenante statica ( $\pm 15\%$ )  
 $t_1$  = tempo di rilascio freno  
 $t_2$  = ritardo di frenatura  
 $W_{max}$  = energia max per frenata (capacità termica del freno)  
 $W$  = energia di frenatura tra due regolazioni successive del traferro  
 $P_b$  = potenza assorbita dal freno a 20° (50 Hz)  
 s/h = avviamenti orari

**Key:**

$M_b$  = max static braking torque ( $\pm 15\%$ )  
 $t_1$  = brake release time  
 $t_2$  = brake engagement time  
 $W_{max}$  = max energy per brake operation (brake thermal capacity)  
 $W$  = braking energy between two successive air gap adjustments  
 $P_b$  = power drawn by brake at 20° (50 Hz)  
 s/h = starts per hour

**Legende:**

$M_b$  = statisches max. Bremsmoment ( $\pm 15\%$ )  
 $t_1$  = Bremsenansprechzeit  
 $t_2$  = Bremsverzögerung  
 $W_{max}$  = max. Energie pro Bremsung (Wärmeleistung der Bremse)  
 $W$  = Bremsenergie zwischen zwei Einstellungen des Luftspalts  
 $P_b$  = bei 20° von der Bremse aufgenommene Leistung (50 Hz)  
 s/h = Einschaltungen pro Stunde

**Légende:**

$M_b$  = couple de freinage statique max ( $\pm 15\%$ )  
 $t_1$  = temps de déblocage frein  
 $t_2$  = retard de freinage  
 $W_{max}$  = énergie max par freinage (capacité thermique du frein)  
 $W$  = énergie de freinage entre deux réglages successifs de l'entrefer  
 $P_b$  = puissance absorbée par le frein à 20° (50 Hz)  
 s/h = démarrages horaires

**N.B.**

I valori di  $t_1$  e  $t_2$  riportati in tabella sono riferiti al freno tarato alla coppia nominale, traferro medio e tensione nominale.

**NOTE**

Values  $t_1$  and  $t_2$  in the table refer to a brake set at rated torque, medium air gap and rated voltage.

**HINWEIS:**

Die in der Tabelle angegebenen Werte  $t_1$  und  $t_2$  beziehen sich auf eine Bremse, die auf das Nenndrehmoment, einen mittleren Luftspalt und die Standardspannung eingestellt ist.

**N.B.**

Les valeurs de  $t_1$  et  $t_2$  indiquées dans le tableau se réfèrent au frein étalonné au couple nominal, entrefer moyen et tension nominale.

**Collegamenti freno FA**

**FA brake connections**

**Abschlüsse - Bremstyp FA**

**Raccordements frein FA**

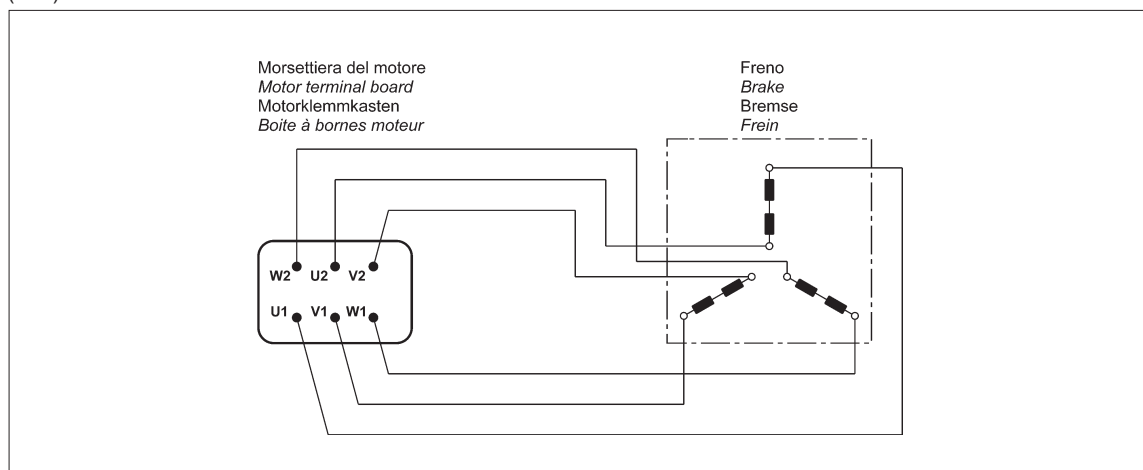
Per i motori con alimentazione del freno derivata direttamente dall'alimentazione motore i collegamenti alla morsetteria corrispondono a quanto riportato nello schema (A63):

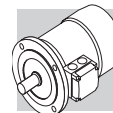
The diagram (A63) shows the wiring when brake is connected directly to same power supply of the motor:

Bei den Motoren mit direkter Bremsspannungsversorgung müssen die Anschlüsse im Klemmenkasten entsprechend den Angaben im Schema (A63) angeschlossen werden:

Pour les moteurs avec alimentation du frein dérivant directement de l'alimentation moteur, les raccordements à la boîte à bornes correspondent aux indications du schéma (A63) :

(A63)





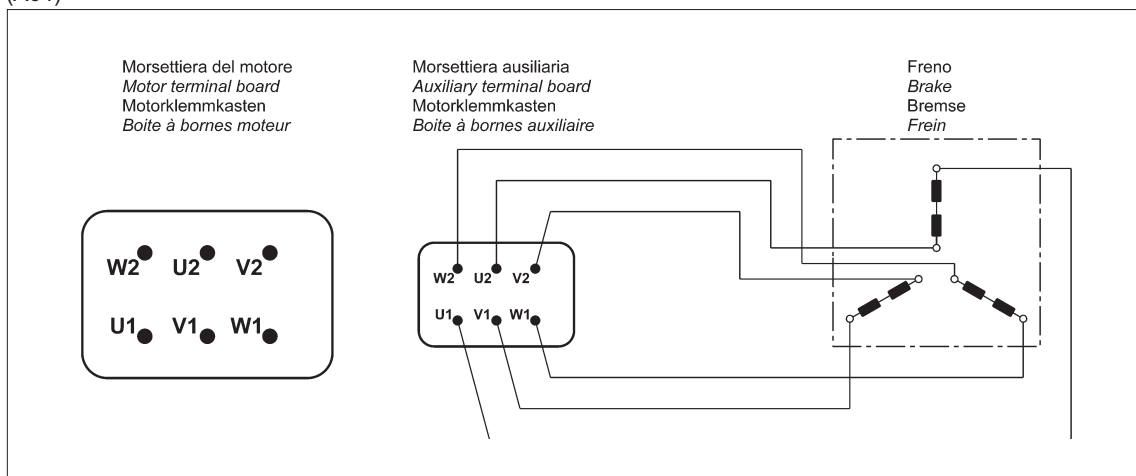
Per i motori a doppia polarità e, quando richiesto, per i motori ad una velocità con alimentazione da linea separata è prevista una morsettiera ausiliaria a 6 morsetti per il collegamento del freno; in questa esecuzione i motori prevedono la scatola coprimorsetti maggiorata. Vedi schema (A64):

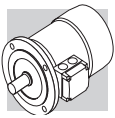
*Switch-pole motors and, at request, single-pole motors with separate power supply are equipped with an auxiliary terminal board with 6 terminals for brake connection. In this version, motors feature a larger terminal box. See diagram (A64):*

Bei den polumschaltbaren Motoren und, auf Anfrage, auch bei den einpoligen Motoren mit separater Bremsversorgung ist für den Anschluss der Bremse ein Hilfsklemmenkasten mit 6 Klemmen vorgesehen. In diesen Ausführungen haben die Motoren einen größeren Klemmenkasten. Siehe Schema (A64):

*Pour les moteurs à double polarité et, lorsque cela est requis, pour les moteurs à une vitesse avec alimentation depuis ligne séparée, une boîte à bornes auxiliaire à 6 bornes est prévue pour le raccordement du frein ; dans cette exécution les moteurs prévoient un couvercle bornier majoré. Voir schéma (A64) :*

(A64)





**M8 - MOTORI AUTOFRENANTI  
IN C.A., TIPO BN\_BA**

**M8 - AC BRAKE MOTORS  
TYPE BN\_BA**

**M8 - DREHSTROM-BREMS-  
MOTOREN MIT WECH-  
SELS-TROMBREMSE  
VOM TYP BN\_BA**

**M8 - MOTEURS FREIN EN C.A.,  
TYPE BN\_BA**

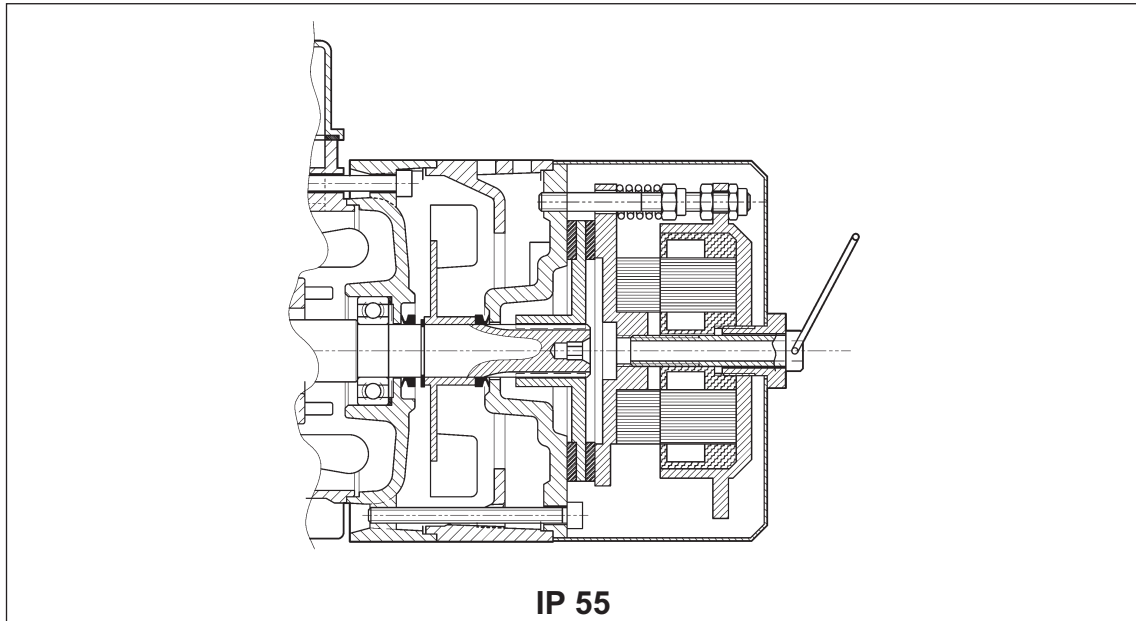
**Grandezze: BN 63 ... BN 132M**

**Frame sizes: BN 63 ... BN 132M**

**Baugrößen: BN 63 ... BN 132M**

**Tailles : BN 63 ... BN 132M**

(A65)



Freno elettromagnetico con alimentazione in **corrente alternata** trifase, fissato con viti allo scudo convogliatore.

Disco freno in acciaio scorrevole assialmente sull'albero motore scanalato (mozzo trascinatore in acciaio calettato sull'albero per grandezza 244).

I motori sono forniti con freno tarato alla massima coppia.

La coppia freno è regolabile con continuità agendo sulle viti di compressione delle molle; il campo di regolazione consentito è  $30\% M_{bMAX} < M_b < M_{bMAX}$  ( $M_{bMAX}$  è il momento frenante massimo riportato in tab. (A66)). Di serie i motori sono forniti completi di vite per lo sblocco manuale del freno, con mantenimento della posizione di rilascio per consentire la rotazione dell'albero motore.

La vite di sblocco deve essere smontata dopo l'utilizzo per assicurare il corretto funzionamento del freno, ed evitare situazioni potenzialmente pericolose.

Il freno BA, oltre alle elevate caratteristiche dinamiche tipiche dei freni in corrente alternata, presenta una costruzione robusta con energia di frenatura aumentata che lo rendono particolarmente idoneo a servizi pesanti, oltre che in applicazioni dove sono richieste frequenze di manovra elevate e tempi d'intervento molto rapidi.

*Electromagnetic brake operates from three-phase **alternated current** power supply and is bolted onto conveyor shield.*

*Steel brake disc slides axially on splined motor shaft (steel drive hub is shrunk onto shaft on frame size 244).*

*Factory setting is maximum brake torque.*

*Step less braking torque adjustment by screws which compress the brake springs. Allowed adjustment range is  $30\% M_{bMAX} < M_b < M_{bMAX}$  (where  $M_{bMAX}$  is maximum braking torque as shown in tab. (A66)).*

*Motors are supplied complete with manual brake release screw as standard. Screw may be locked in the release position to allow for motor shaft rotation.*

*The brake release screw must be removed after use to ensure proper brake operation and avoid potentially dangerous conditions.*

*In addition to the high dynamic characteristics typical of AC brakes, a sturdy design and increased braking energy make the BA brake ideal for heavy-duty applications as well as applications requiring frequent stop/starts and very fast response time.*

Elektromagnetische Bremse mit **Drehstromversorgung**, die mittels Schrauben am Motorschild des Motors befestigt ist.

Die Brems Scheibe (Stahl) gleitet axial auf der Rotorwelle (bei Baugröße 244 über einem auf die Welle aufgezogenem Mitnehmer aus Stahl).

Die Motoren werden mit einer auf das maximale Drehmoment des Motors eingestellten Bremse geliefert.

Das Bremsdrehmoment ist durch Betätigen der Federdruckschrauben stufenlos regelbar. Der zulässige Einstellbereich beträgt  $30\% M_{bMAX} < M_b < M_{bMAX}$  ( $M_{bMAX}$  steht für den max. Bremsmoment, das in der Tab. (A66) angegeben wird.

Die Motoren werden serienmäßig mit einer Schraube zur manuelle Bremslüftung geliefert; die arretierbar ist, um ein Drehen der Motorwelle zu ermöglichen.

Diese Schraube muss im Betrieb des Motors wieder abmontiert werden, damit die korrekte Funktion der Bremse gesichert ist.

Die Bremse vom Typ BA zeichnet sich durch ihre dynamischen Eigenschaften und die robuste Bauweise aus, durch die sie eine erhöhte Bremsenergie abzugeben kann. Diese Bremstypen eignen sich besonders für einen Einsatz unter harten Bedingungen und überall dort, wo häufige Schaltfrequenzen und schnelle Ansprechzeiten gefordert werden.

Frein électromagnétique avec alimentation en **courant alternatif** triphasé, fixé avec des vis au bouclier.

Disque frein en acier coulissant de façon axiale sur l'arbre moteur rainuré (moyeu d'entraînement en acier calé sur l'arbre pour la taille 244).

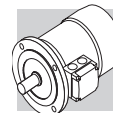
Les moteurs sont fournis avec frein étalonné au couple maximal.

Le couple de freinage est réglable en continu en intervenant sur les vis de compression des ressorts ; la plage de réglage autorisé est de  $30\% M_{bMAX} < M_b < M_{bMAX}$  ( $M_{bMAX}$  étant le couple de freinage maximum indiqué dans le tab. (A66)).

De série, les moteurs sont fournis avec vis de déblocage manuel du frein, avec maintien de la position de relâchement afin de permettre la rotation de l'arbre moteur.

La vis de déblocage doit être démontée après utilisation afin de garantir le fonctionnement correct du frein et d'éviter les situations potentiellement dangereuses.

Le frein BA, outre les caractéristiques dynamiques élevées typiques des freins en courant alternatif, est de fabrication robuste avec énergie de freinage majeure, ce qui le rend particulièrement adapté pour les services difficiles ainsi que pour les applications nécessitant des fréquences de manœuvre élevées et des temps d'intervention très rapides.



### Grado di protezione

È disponibile un'unica esecuzione, con grado di protezione IP55.

### Protection class

Only available in protection class IP55.

### Schutzart

Es ist eine nur die Ausführung in Schutzklasse IP55 verfügbar.

### Degré de protection

Il est disponible en une exécution unique, avec degré de protection IP55.

### Alimentazione freno BA

Nei motori a singola polarità l'alimentazione della bobina freno è derivata direttamente dalla morsettiera motore e la tensione del freno quindi coincide con la tensione del motore. In questo caso la tensione del freno può essere omessa dalla designazione

Per i motori a doppia polarità, e per i motori con alimentazione separata del freno, è presente una morsettiera ausiliaria con 6 terminali per il collegamento alla linea del freno. In entrambi i casi il valore di tensione del freno dovrà essere specificato in designazione.

Nella tabella seguente sono riportate le condizioni di alimentazione standard del freno in c.a. per i motori a singola e doppia polarità:

### BA brake power supply

In single speed motors, power supply is brought to the brake coil direct from the motor terminal box. As a result, brake voltage and motor voltage are the same. In this case, brake voltage indication may be omitted in the designation.

Switch-pole motors and motors with separate brake power supply feature an auxiliary terminal board with 6 terminals for connection to brake line. In both cases, brake voltage indication in the designation is mandatory. The following table reports standard AC brake power supply ratings for single- and switch-pole motors:

### Stromversorgung - Bremstyp BA

Bei den einpoligen Motoren wird die Versorgung der Bremsspule direkt vom Motorklemmenkasten abgezweigt, das bedeutet also, dass die Spannung der Bremse mit der Motorspannung übereinstimmt. In diesem Fall braucht die Bremsenspannung nicht extra angegeben werden.

Für polumschaltbaren Motoren und für eine separate Bremsversorgung ist eine Hilfsklemmenleiste mit 6 Anschlüssen vorgesehen, die einen Anschluss der Bremse ermöglichen. In beiden Fällen muss die Bremsspannung bei der Bestellung angegeben werden.

In der nachstehenden Tabelle werden für die einpoligen und die polumschaltbaren Motoren die Standardversorgung der Wechselstrombremsen angegeben.

### Alimentation frein BA

Sur les moteurs à simple polarité, l'alimentation de la bobine frein dérive directement du bornier moteur, par conséquent, la tension du frein coïncide avec la tension du moteur. Dans ce cas, la tension du frein peut être omise de la désignation.

Pour les moteurs à double polarité et les moteurs avec alimentation séparée du frein, un boîte à bornes auxiliaire avec 6 bornes pour le raccordement au réseau du frein, est présente. Dans les deux cas, la valeur de tension du frein doit être spécifiée dans la désignation.

Le tableau suivant indique les conditions d'alimentation standard du frein en c.a. pour les moteurs à simple et double polarité :

(A65)

	BN 63 ... BN 132
<b>motori a singola polarità</b> <b>single-pole motor</b> <b>Einpolige Motoren</b> <b>Moteurs à simple polarité</b>	230Δ / 400Y V ±10% – 50 Hz
	265Δ / 460Y ±10% - 60 Hz
<b>motori a doppia polarità</b> (alimentazione da linea separata) <b>switch-pole motors</b> (separate power supply line) <b>Polumschaltbare Motoren</b> (separate Versorgung) <b>Moteurs à double polarité</b> (alimentation depuis ligne séparée)	BN 63 ... BN 132
	230Δ / 400Y V ±10% – 50 Hz
	460Y - 60 Hz

Se non diversamente specificato, l'alimentazione standard del freno è 230Δ / 400Y V - 50 Hz.

Unless otherwise specified, standard brake power supply is 230Δ / 400Y V - 50 Hz.

Falls nicht anderweitig angegeben, beträgt die Standardversorgung der Bremse 230Δ / 400Y V - 50 Hz.

Sauf spécification contraire, l'alimentation standard du frein est 230Δ / 400Y V - 50 Hz.

Su richiesta, sono disponibili tensioni speciali, nel campo 24...690 V, 50-60 Hz.

Special voltages in the 24...690 V, 50-60 Hz range are available at request.

Auf Anfrage können Sonderspannungen von 24...690 V, 50-60 Hz geliefert werden.

Sur demande, des tensions spéciales sont disponibles dans la plage 24...690 V, 50-60 Hz.

### Dati tecnici freni BA

Nella tabella (A66) sottostante sono riportati i dati tecnici dei freni in c.a., tipo BA.

### BA brake technical specifications

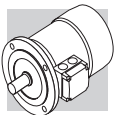
The table (A66) below reports the technical specifications for AC brakes type BA.

### Technische Daten der Bremsen vom Typ BA

In der nachstehenden Tabelle (A66) werden die technischen Daten der Wechselstrombremsen vom Typ BA angegeben:

### Caractéristiques techniques freins BA

Le tableau (A66) ci-dessous indique les caractéristiques techniques des freins en c.a., type BA.



(A66)

Freno Brake Bremsen Frein	Coppia frenante Brake torque Bremsmoment Couple de freinage  $M_b$ [Nm]	Rilascio Release Ansprechzeit Déblocage  $t_1$ [ms]	Frenatura Braking Bremsung Freinage  $t_2$ [ms]	Wmax			W [MJ]	$P_b$ [VA]
				[ J ]				
				10 s/h	100 s/h	1000 s/h		
BA 60	5	5	20	4000	1500	180	30	60
BA 70	8	6	25	7000	2700	300	60	75
BA 80	18	6	25	10000	3100	350	80	110
BA 90	35	8	35	13000	3600	400	88	185
BA 100	50	8	35	18000	4500	500	112	225
BA 110	75	8	35	28000	6800	750	132	270
BA 140	150	15	60	60000	14000	1500	240	530

Legenda:

$M_b$  = max coppia frenante statica ( $\pm 15\%$ )

$t_1$  = tempo di rilascio freno

$t_2$  = ritardo di frenatura

$W_{max}$  = energia max per frenata (capacità termica del freno)

W = energia di frenatura tra due regolazioni successive del traferro

$P_b$  = potenza assorbita dal freno a 20° (50 Hz)

s/h = avviamenti orari

N.B.

I valori di  $t_1$  e  $t_2$  riportati in tabella sono riferiti al freno tarato alla coppia nominale, traferro medio e tensione nominale.

Key:

$M_b$  = max static braking torque ( $\pm 15\%$ )

$t_1$  = brake release time

$t_2$  = brake engagement time

$W_{max}$  = max energy per brake operation (brake thermal capacity)

W = braking energy between two successive air gap adjustments

$P_b$  = brake power absorption at 20° (50 Hz)

s/h = starts per hour

NOTE

Values  $t_1$  and  $t_2$  in the table refer to a brake set at rated torque, medium air gap and rated voltage.

Legende:

$M_b$  = statisches max. Bremsmoment ( $\pm 15\%$ )

$t_1$  = Bremsenansprechzeit

$t_2$  = Bremsverzögerung

$W_{max}$  = max. Energie pro Bremsung (Wärmeleistung der Bremse)

W = Bremsenergie zwischen zwei Einstellungen des Luftspalts

$P_b$  = bei 20° von der Bremse aufgenommene Leistung (50 Hz)

s/h = Einschaltungen pro stunde

HINWEIS:

Die in der Tabelle angegebenen Werte  $t_1$  und  $t_2$  beziehen sich auf eine Bremse, die auf das Nenndrehmoment, einen mittleren Luftspalt und die Standardspannung eingestellt ist.

Légende:

$M_b$  = couple de freinage statique max ( $\pm 15\%$ )

$t_1$  = temps de déblocage frein

$t_2$  = retard de freinage

$W_{max}$  = énergie max par freinage (capacité thermique du frein)

W = énergie de freinage entre deux réglages successifs de l'entrefer

$P_b$  = puissance absorbée par le frein à 20° (50 Hz)

s/h = démarrages horaires

N.B.

Les valeurs de  $t_1$  et  $t_2$  indiquées dans le tableau se réfèrent au frein étalonné au couple nominal, entrefer moyen et tension nominale.

### Collegamenti freno BA

Per i motori con alimentazione del freno derivata direttamente dall'alimentazione motore i collegamenti alla morsettiera corrispondono a quanto riportato nello schema (A67):

### BA brake connections

The diagram (A67) shows the required connections to terminal box when brake is to be connected directly to motor power supply:

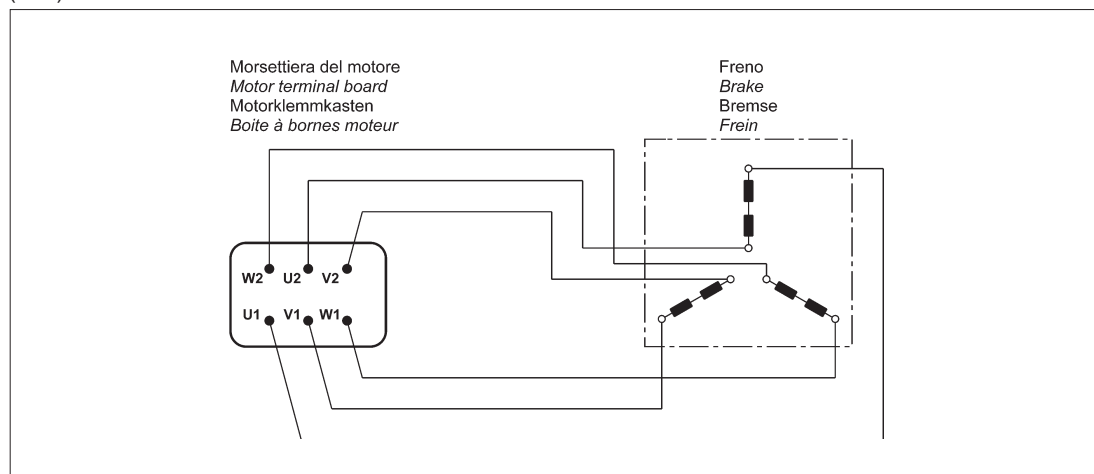
### Abschlüsse - Bremstyp BA

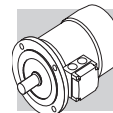
Bei den Motoren mit direkter Bremsspannungsversorgung müssen die Anschlüsse im Klemmenkasten entsprechend den Angaben im Schema (A67) angeschlossen werden:

### Raccordements frein BA

Pour les moteurs avec alimentation du frein dérivant directement de l'alimentation moteur, les raccordements à la boîte à bornes correspondent aux indications du schéma (A67) :

(A67)





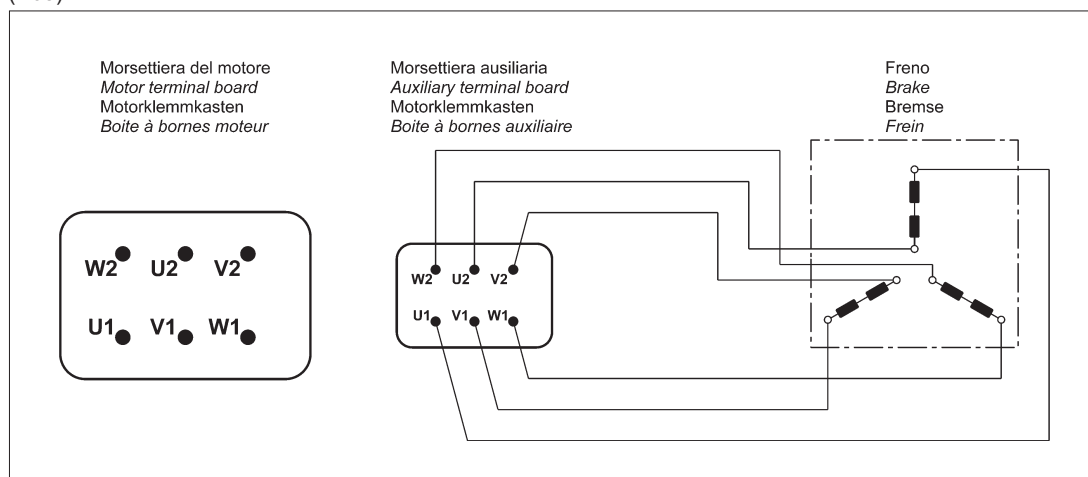
Per i motori a doppia polarità e, quando richiesto, per i motori ad una velocità con alimentazione da linea separata è prevista una morsettiera ausiliaria a 6 morsetti per il collegamento del freno; in questa esecuzione i motori prevedono la scatola coprimorsetti maggiorata. Vedi schema (A68):

*Switch-pole motors and, at request, single-pole motors with separate power supply line are equipped with an auxiliary terminal board with 6 terminals for brake connection. In this version, motors feature a larger terminal box. See diagram (A68):*

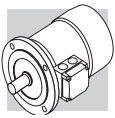
Bei den polumschaltbaren Motoren und, auf Anfrage, auch bei den einpoligen Motoren mit separater Bremsversorgung ist für den Anschluss der Bremse ein Hilfsklemmenkasten mit 6 Klemmen vorgesehen. In diesen Ausführungen haben die Motoren einen größeren Klemmenkasten. Siehe Schema (A68):

*Pour les moteurs à double polarité et, lorsque cela est requis, pour les moteurs à une vitesse avec alimentation depuis ligne séparée, une boîte à bornes auxiliaire à 6 bornes est prévue pour le raccordement du frein ; dans cette exécution les moteurs prévoient un couvercle bornier majoré. Voir schéma (A68) :*

(A68)







### M9 - SISTEMI DI SBLOCCO FRENO

I freni a pressione di molle tipo **FD** e **FA** possono essere dotati opzionalmente di dispositivi per lo sblocco manuale del freno, normalmente utilizzati per condurre interventi di manutenzione sulle parti di macchina, o dell'impianto, comandate dal motore.

### M9 - BRAKE RELEASE SYSTEMS

*Spring-applied brakes type **FD** and **FA** may be equipped with optional manual release devices. These are typically used for manually releasing the brake before servicing any machine or plant parts operated by the motor.*

### M9 - BREMSLÜFTHEBEL

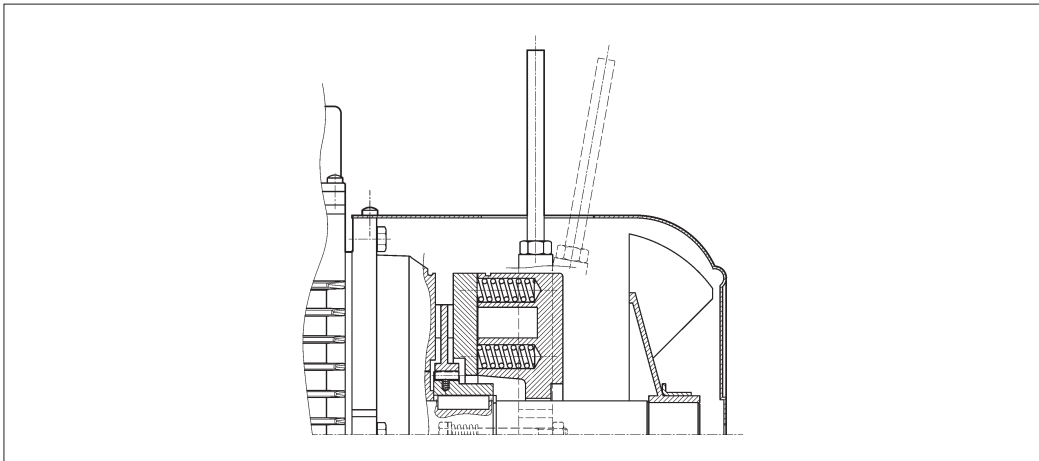
Die Federdruckbremsen vom Typ **FD** und **FA** können Optional mit Bremslüfthebeln geliefert werden, die ein manuelles Lüften der Bremse ermöglichen. Diese Lüftungseinrichtungen können bei Instandhaltungsarbeiten an vom Motor betriebenen Maschinen- oder Anlagenteilen verwendet werden.

### M9 - SYSTEMES DE DEBLOCAGE FREIN

*Les freins à pression de ressorts type **FD** et **FA** peuvent, en option, être dotés de dispositifs de déblocage manuel du frein, normalement utilisés pour effectuer des interventions d'entretien sur les composants de la machine, ou de l'installation commandée par le moteur.*

(A69)

**R**



La leva di sblocco è dotata di ritorno automatico, tramite dispositivo a molla.

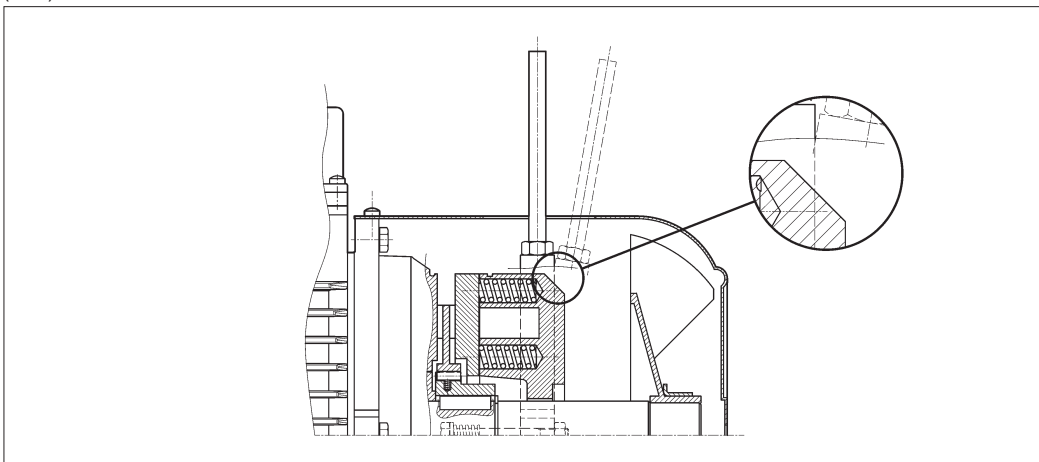
*A return spring brings the release lever back in the original position.*

Bremslüfthebel mit automatischer Rückstellung durch Federkraft.

*Le levier de déblocage est doté de retour automatique, au moyen d'un dispositif à ressort.*

(A70)

**RM**

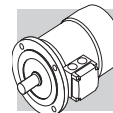


Sui motori tipo **BN\_FD** la leva di sblocco può essere temporaneamente bloccata in posizione di rilascio del freno, avvitando la stessa fino ad impegnarne l'estremità in un risalto del corpo del freno.

*On motors type **BN\_FD**, if the option **RM** is specified, the release device may be locked in the "release" position by tightening the lever until its end becomes engaged with a brake housing projection.*

Der Bremslüfthebel kann zeitweise in der Bremslüfthebel position arretiert werden, indem man ihn so lange einschraubt, bis die Bremse arretiert ist. Für die unterschiedlichen Motor-

*Levier de déblocage peut être temporairement bloqué en position de déblocage du frein en le vissant jusqu'à engager l'extrémité dans une saillie du corps du frein. La disponibilité des systèmes de*

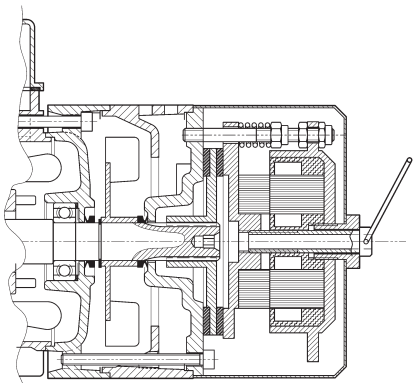


La disponibilità dei sistemi di sblocco freno è diversa per i vari tipi di motore, ed è descritta dalla tabella seguente:

The availability for the various disengagement devices is charted here below:

typen sind ebenso verschiedene Bremslüftsyste me verfügbar, die Sie der folgenden Tabelle entnehmen können:

débloccage du frein est différente en fonction des types de moteur et figure dans le tableau suivant :

(A71)	R	RM
<b>BN_FD</b>	<b>BN 63...BN 200</b>	<b>2p 63A2 ≤ H ≤ 132M2</b> <b>4p 63A4 ≤ H ≤ 132MA4</b> <b>6p 63A6 ≤ H ≤ 132MA6</b>
<b>M_FD</b>	<b>M 05...M 5</b>	<b>M 05...M 4LA</b>
<b>BN_FA</b>	<b>BN 63...BN 180M</b>	
<b>M_FA</b>	<b>M 05...M 5</b>	
<b>BN_BA</b>	 <p>di serie std. supply serienmäßig de série</p>	

**Orientamento della leva di sblocco**

**Release lever orientation**

**Ausrichtung des Bremslüfthebels**

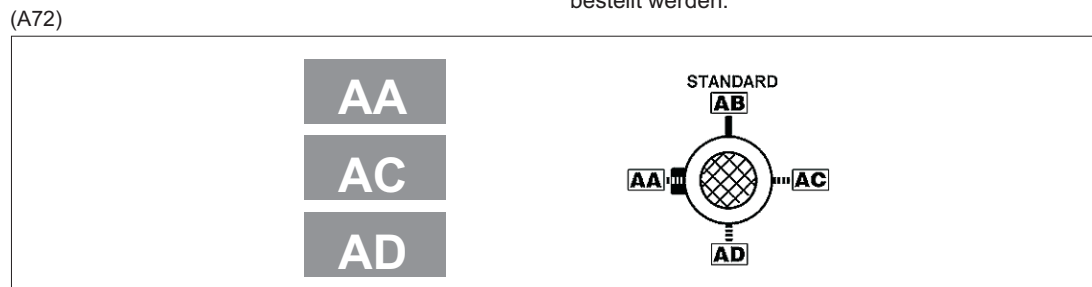
**Orientation du levier de déblocage**

Per entrambe le opzioni **R** e **RM**, la leva di sblocco del freno viene collocata, se non diversamente specificato, con orientamento di 90° in senso orario, rispetto alla posizione della morsettiera - riferimento **[AB]** nel disegno sottostante. Orientamenti alternativi, tipo **[AA]**, **[AC]** e **[AD]** possono essere richiesti citandone la relativa specifica:

Unless otherwise specified, the release lever is located 90° away from the terminal box – identified by letters **[AB]** in the diagram below – in a clockwise direction on both options **R** and **RM**. Alternative lever positions **[AA]**, **[AC]** and **[AD]** are also possible when the corresponding option is specified:

Bei beiden Optionen **R** und **RM**, wird der Bremslüfthebel, falls nicht anderweitig festgelegt, um 90° im Uhrzeigersinn zur Position des Klemmenkastens montiert (Position **[AB]** in der nachfolgenden Zeichnung). Andere Positionen: **AA** (0° zum Klemmenkasten), **AC** (180° zum Klemmenkasten) oder **AD** (270° zum Klemmenkasten, im Uhrzeigersinn vom Lüfter aus gesehen) können unter Angabe der entsprechenden Spezifikation bestellt werden:

Pour les deux options **R** et **RM**, le levier de déblocage du frein est positionné, sauf spécification contraire, avec une orientation de 90° dans le sens des aiguilles d'une montre par rapport à la position de la boîte à bornes - référence **[AB]** sur le dessin ci-dessous. Des orientations différentes, type **[AA]**, **[AC]** et **[AD]** peuvent être demandées à condition de préciser la position correspondante :



**Caratteristiche volani (F1)**

**Fly-wheel data (F1)**

**Eigenschaften der Schwungräder (F1)**

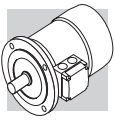
**Caractéristiques volants (F1)**

La tabella seguente riporta il peso e l'inerzia aggiuntiva del volani che possono essere richiesti tramite l'opzione F1. Le dimensioni complessive rimangono invariate.

The table below shows values of weight and inertia of flywheel (option F1). Overall dimensions of motors remain unchanged.



Die folgende Tabelle gibt das Gewicht und das Trägheitsmoment der Zusatzschwungräder an (Option F1). Die Gesamtabmessungen bleiben unverändert.

Le tableau suivante indique le poids et l'inertie des volants supplémentaires sans variations de l'encombrement moteur.



(A73)

Dati tecnici volano per motori tipo: / Main data for flywheel of motore type: / Eigenschaften der Schwungräder für Motoren typ: / Données volant pour moteurs type: BN\_FD, M\_FD

		Peso volano / Fly-wheel weight Gewicht Schwungrad / Poids volant [Kg]	Inerzia volano / Fly-wheel inertia Trägheitsmoment Schwungrad / Inertie volant [Kgm <sup>2</sup> ]
<b>BN 63</b>	<b>M05</b>	0.69	0.00063
<b>BN 71</b>	<b>M1</b>	1.13	0.00135
<b>BN 80</b>	<b>M2</b>	1.67	0.00270
<b>BN 90 S - BN 90 L</b>	–	2.51	0.00530
<b>BN 100</b>	<b>M3</b>	3.48	0.00840
<b>BN 112</b>	–	4.82	0.01483
<b>BN 132 S - BN 132 M</b>	<b>M4</b>	6.19	0.02580

**M10 - OPZIONI****M10 - OPTIONS****M10 - OPTIONEN****M10 - OPTIONS****Protezioni termiche****Thermal protective devices****Thermische Schutzeinrichtungen****Protections thermiques**

Oltre alla protezione garantita dall'interruttore magnetotermico, i motori possono essere provvisti di sonde termiche incorporate per proteggere l'avvolgimento da eccessivo riscaldamento dovuto a scarsa ventilazione o servizio intermittente. Questa protezione dovrebbe sempre essere prevista per motori servoventilati (IC416).

In addition to the standard protection provided by the magneto-thermal device, motors can be supplied with built-in thermal probes to protect the winding against overheating caused, by insufficient ventilation or by an intermittent duty. This additional protection should always be specified for servoventilated motors (IC416).

Abgesehen von den Motorschutzschaltern mit thermischem und elektromagnetischem Auslöser können die Motoren mit integrierten Temperaturfühlern zum Schutz der Wicklung vor Überhitzung z.B. wegen unzureichender Lüftung oder Aussetzbetriebs ausgestattet werden. Diese Schutzeinrichtung muß bei fremdbelüfteten Motoren stets vorgesehen werden (IC416).

Outre la protection garantie par l'interrupteur magnétothermique, les moteurs peuvent être équipés de sondes thermiques incorporées pour protéger le bobinage contre une surchauffe excessive due par exemple à une ventilation insuffisante ou un service intermittent. Cette protection devrait toujours être prévue pour les moteurs servoventilés (IC416).

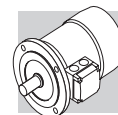
**E3****Sonde termiche a termistori****Thermistors****Temperaturfühler und Thermistoren****Sondes thermométriques**

Sono dei semiconduttori che presentano una rapida variazione di resistenza in prossimità della temperatura nominale di intervento (150 °C). L'andamento della caratteristica  $R = f(T)$  è normalizzato dalle Norme DIN 44081, IEC 34-11. Questi sensori presentano il vantaggio di avere ingombri ridotti, un tempo di risposta molto contenuto e, dato che il funzionamento avviene senza contatti, sono completamente esenti da usura. In genere vengono impiegati termistori a coefficiente di temperatura positivo denominati anche "resistori a conduttore freddo" PTC. A differenza delle sonde termiche bimetalliche, non possono intervenire direttamente sulle correnti delle bobine di eccitazione e devono pertanto essere collegati ad una speciale unità di controllo (apparecchio di sgancio) da interfacciare alle connessioni esterne. Con questa protezione vengono inseriti tre PTC, (collegati in serie), nell'avvolgimento con terminali disponibili in morsettiera ausiliaria.

These are semi-conductors having rapid resistance variation when they are close to the rated switch off temperature (150 °C). Variations of the  $R = f(T)$  characteristic are specified under DIN 44081, IEC 34-11 Standards. These elements feature several advantages: compact dimensions, rapid response time and, being contact-free, absolutely no wear. Positive temperature coefficient thermistors are normally used (also known as PTC "cold conductor resistors"). Contrary to bimetallic thermostats, they cannot directly intervene on currents of energizing coils, and must therefore be connected to a special control unit (triggering apparatus) to be interfaced with the external connections. Thus protected, three PTCs connected in series are installed in the winding, the terminals of which are located on the auxiliary terminal-board.

Hierbei handelt es sich um Halbleiter, die eine schnelle Änderung des Widerstands in der Nähe der Nennansprechtemperatur (150 °C) zeigen. Der Verlauf der Kennlinie  $R = f(T)$  ist durch die DIN-Normen 44081 und IEC 34-11 festgelegt. Diese Sensoren haben folgende Vorteile: sie weisen geringe Außenmaße und eine äußerst kurze Ansprechzeit auf und sind vollkommen verschleißfrei, da sie berührungslos arbeiten. Im allgemeinen werden Thermistoren mit positivem Temperaturkoeffizienten verwendet, die auch als "Kaltleiter" (PTC-Widerstände) bezeichnet werden. Im Unterschied zu Bimetall-Temperaturfühlern können sie nicht direkt auf die Erregungsströme der Spulen wirken, sondern müssen an eine spezielle Steuereinheit (Auslösegerät) angeschlossen werden, die mit den externen Anschlüssen kompatibel ist. Mit dieser Schutzeinrichtung werden drei in Reihe geschaltete PTC-Widerstände in die Wicklung eingesetzt, deren Endanschlüsse an einer Zusatzklemmleiste verfügbar sind.

Ce sont des semiconducteurs qui présentent une variation rapide de résistance à proximité de la température nominale d'intervention (150 °C). L'évolution de la caractéristique  $R = f(T)$  est défini par les Normes DIN 44081, IEC 34-11. Ces capteurs présentent l'avantage d'avoir des encombrements réduits, un temps de réponse très bref et, du fait que le fonctionnement a lieu sans contact, il sont exempts d'usure. En général, on utilise des thermistors à coefficient de température positif dénommés également "résistors à conducteur froid" PTC. Contrairement aux sondes thermiques bimétalliques, ils ne peuvent intervenir directement sur les courants des bobines d'excitation et doivent par conséquent être reliés à une unité spéciale de contrôle (appareil de déconnexion) à interfacer aux connexions extérieures. Avec cette protection, trois sondes, (reliées en série), sont insérées dans le bobinage avec extrémités disponibles dans le bornier auxiliaire.



## D3

### Sonde termiche bimetalliche

### Bimetallic thermostates

I protettori di questo tipo contengono all'interno di un involucro un disco bimetallico che, raggiunta la temperatura nominale di intervento (150 °C), commuta i contatti dalla posizione di riposo. Con la diminuzione della temperatura, il disco e i contatti riprendono automaticamente la posizione di riposo. Normalmente si impiegano tre sonde bimetalliche in serie con contatti normalmente chiusi e terminali disponibili in una morsettiere ausiliaria.

These types of protective devices house a bimetal disk. When the rated switch off temperature (150 °C) is reached, the disk switches the contacts from their initial rest position. As temperature falls, the disk and the contacts automatically return to rest position. Three bimetallic thermostates connected in series are usually employed, with normally closed contacts. The terminals are located on an auxiliary terminal-board.

### Bimetall-Temperaturfühler

Diese Schutzeinrichtungen bestehen aus einer Kapsel, in der sich eine Bimetallscheibe befindet, die bei Erreichen der Nennansprechtemperatur (150 °C) anspricht. Nach Absenkung der Temperatur geht der Schaltkontakt automatisch in Ruhestellung zurück. Normalerweise werden drei in Reihe geschaltete Bimetallfühler mit Öffnern verwendet, deren Endverschlüsse an einer Zusatzklemmleiste verfügbar sind.

### Sondes thermiqes bimétalliques

Les protecteurs de ce type contiennent, dans une enveloppe interne, un disque bimétallique qui, lorsque la température nominale d'intervention (150 °C) est atteinte, commute les contacts de la position de repos. Avec la diminution de la température, le disque et les contacts reprennent automatiquement la position de repos. Normalement, on utilise trois sondes bimétalliques en série avec contacts normalement fermés et extrémités disponibles dans un bornier auxiliaire.

## H1

### Riscaldatori anticondensa

### Anti-condensation heaters

I motori funzionanti in ambienti molto umidi e/o in presenza di forti escursioni termiche, possono essere equipaggiati con una resistenza anti-condensa. L'alimentazione monofase è prevista da morsettiere ausiliaria posta nella scatola principale. Le potenze assorbite dalla resistenza elettrica sono elencate qui di seguito:

Where an application involves high humidity or extreme temperature fluctuation, motors may be equipped with an anti-condensate heater. A single-phase power supply is available in the auxiliary terminal board inside the main terminal box. Values for the absorbed power are listed here below:



### Wicklungsheizung

Die Motoren, die in besonders feuchten Umgebungen und/oder unter starken Temperaturschwankungen eingesetzt werden, können mit einem Heizelement als Kondenswasserschutz ausgestattet werden. Die einphasige Versorgung erfolgt über eine Zusatzklemmleiste, die sich im Klemmenkasten befindet. Werte fuer die Leistungsaufnahme sind in folgender Tabelle aufgeführt.

### Rechauffeurs anticondensation

Les moteurs fonctionnant dans des milieux très humides et/ou en présence de fortes plages thermiques peuvent être équipés d'une résistance anticondensation. L'alimentation monophasée est prévue par l'intermédiaire d'une boîte à bornes auxiliaire située dans la boîte principale. Les puissances absorbées sont indiqués de suite :

(A74)

		H1
		1~ 230V ± 10% P [W]
BN 56...BN 80	M0...M2	10
BN 90...BN 160MR	M3 - M4	25
BN 160M...BN 180M	M5	50
BN 180L...BN 200L	—	65

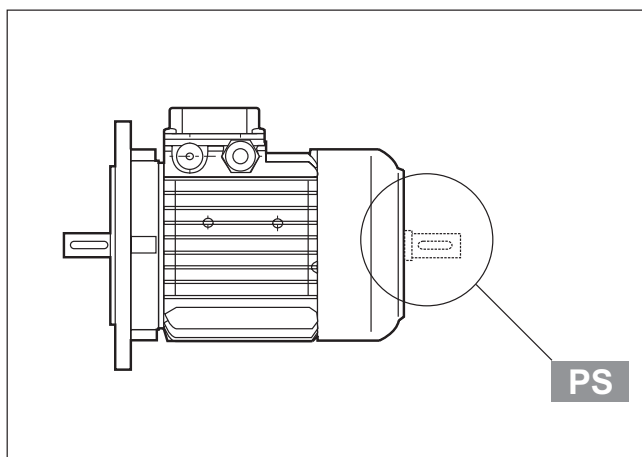
**Importante!**  
Durante il funzionamento del motore la resistenza anticondensa non deve mai essere inserita.

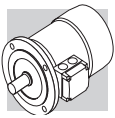
**Warning!**  
Always remove power supply to the anti-condensate heater before operating the motor.

**Warnung!**  
Während des Motorbetriebs darf die Wicklungsheizung nie gespeist werden.

**Avertissement!**  
Durant le fontionnement du moteur, la résistance anticondensation ne doit jamais être alimentée.

## PS





## Seconda estremità d'albero

L'opzione esclude le varianti RC, TC, U1, U2, EN1, EN2, EN3 – non applicabile ai motori con freno tipo BA. Le dimensioni sono reperibili nelle tavole dimensionali dei motori.

## Second shaft extension

*This option is not compatible with variants RC, TC, U1, U2, EN1, EN2, EN3 – and is not feasible on motors equipped with BA brake. For shaft dimensions please see motor dimensions tables.*

## Zweites Wellenende

Diese Option schließt die Optionen RC, TC, U1, U2, EN1, EN2, EN3 aus – sie kann nicht außerdem nicht an Motoren, die mit einer Bremse vom Typ BA ausgestattet sind, angebaut werden. Die entsprechenden Maße können den Maßtabellen der Motoren entnommen werden.

## Arbre à double extrémité

*L'option exclut les variantes RC, TC, U1, U2, EN1, EN2, EN3 – non applicables aux moteurs avec frein type BA. Les dimensions figurent sur les planches de dimensions des moteurs.*

AL

AR

## Dispositivo antiritorno

Nelle applicazioni dove è necessario impedire la rotazione inversa del motore dovuta all'azione del carico, è possibile impiegare motori provvisti di un dispositivo antiritorno (disponibile solo sulla serie M). Questo dispositivo, pur consentendo la libera rotazione nel senso di marcia, interviene istantaneamente in caso di mancanza di alimentazione bloccando la rotazione dell'albero nel senso inverso.

Il dispositivo antiritorno è lubrificato a vita con grasso specifico per questa applicazione.

In fase di ordine dovrà essere indicato chiaramente il senso di marcia previsto.

In nessun caso il dispositivo antiritorno dovrà essere utilizzato per impedire la rotazione inversa nel caso di collegamento elettrico errato.

Nella tabella (A75) sono indicate le coppie nominale e massima di bloccaggio attribuite ai dispositivi antiritorno utilizzati, mentre la raffigurazione schematica del dispositivo è inserita nella tabella (A76).

Le dimensioni sono le stesse del motore autofrenante.

## Backstop device

*For applications where backdriving must be avoided, motors equipped with an anti run-back device can be used (available for the M series only). While allowing rotation in the direction required, this device operates instantaneously in case of a power failure, preventing the shaft from running back.*

*The anti run-back device is life lubricated with special grease for this specific application.*

*When ordering, customers should indicate the required rotation direction, AL or AR.*

*Never use the anti run-back device to prevent reverse rotation caused by faulty electrical connection.*

*Table (A75) shows rated and maximum locking torques for the anti run-back devices.*

*A diagram of the device can be seen in Table (A76).*

*Overall dimensions are same as the corresponding brake motor.*

## Rücklaufsperr

Für Anwendungen, bei denen ein durch die Last verursachtes Rücklaufen des Motors verhindert werden soll, können Motoren installiert werden, die über eine Rücklaufsperr verfügen (nur bei Serie M verfügbar).

Diese Vorrichtung, die eine völlig unbehinderte Drehung des Motors in Laufrichtung gestattet, greift sofort ein, wenn die Spannung fehlt, und verhindert die Drehung der Welle in die Gegenrichtung.

Die Rücklaufsperr verfügt über eine Dauer - Schmierung mit einem speziell für diese Anwendung geeigneten Fett.

Bei der Bestellung muß die vorgesehene Drehrichtung des Motors genau angegeben werden.

Die Rücklaufsperr darf keinesfalls verwendet werden, um im Falle eines fehlerhaften elektrischen Anschlusses die Drehung in die Gegenrichtung zu verhindern. In Tabelle (A75) sind die Nenndrehmomente und Höchstdrehmomente für die verwendeten Rücklaufsperr angegeben; Abbildung (A76) zeigt eine schematische Darstellung der Vorrichtung.

Die abmessungen sind ähnlich denen der Brems motoren.

## Dispositif anti-retour

*Pour les applications où il est nécessaire d'empêcher la rotation inverse du moteur à cause de l'action de la charge, il est possible d'utiliser des moteurs dotés d'un dispositif anti-retour (disponible seulement sur la série M).*

*Ce dispositif, bien que permettant la libre rotation dans le sens de marche, intervient instantanément en cas de manque d'alimentation en bloquant la rotation de l'arbre dans le sens inverse.*


*Le dispositif anti-retour est lubrifié à vie avec une graisse spécifique pour cette application.*

*En phase de commande, il faudra indiquer clairement le sens de marche prévu. En aucun cas, le dispositif anti-retour ne devra être utilisé pour empêcher la rotation inverse en cas de branchement électrique erroné.*

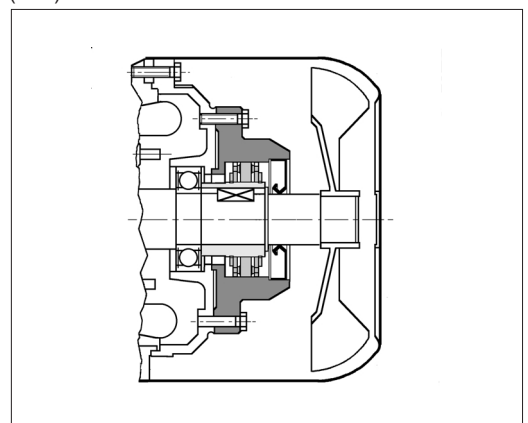
*Le tableau (A75) indique le couple nominal et le couple maximum de blocage attribués aux dispositifs anti-retour utilisés alors que la représentation schématique du dispositif se trouve dans le tableau (A76).*

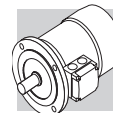
*Les dimensions sont le même du moteur frein.*

(A75)

	Coppia nominale di bloccaggio <i>Rated locking torque</i> Nenn Drehmoment der Sperre <i>Couple nominal de blocage</i>	Coppia max. di bloccaggio <i>Max. locking torque</i> Max. Drehmoment der Sperre <i>Couple maxi. de blocage</i>	Velocità di distacco <i>Release speed</i> Ausrückgeschwindigkeit <i>Vitesse de décollement</i>
	[Nm]	[Nm]	[min <sup>-1</sup> ]
<b>M1</b>	6	10	750
<b>M2</b>	16	27	650
<b>M3</b>	54	92	520
<b>M4</b>	110	205	430

(A76)





## Ventilazione

I motori sono raffreddati mediante ventilazione esterna (IC 411 secondo CEI EN 60034-6) e sono provvisti di ventola radiale in plastica, funzionante in entrambi i versi di rotazione.

L'installazione dovrà assicurare una distanza minima della calotta copriventola dalla parete più vicina, in modo da non creare impedimento alla circolazione dell'aria, oltre che permettere l'esecuzione della manutenzione ordinaria del motore e, se presente, del freno.

Su richiesta, a partire dalle grandezze BN 71, oppure M1, i motori possono essere forniti con ventilazione forzata ad alimentazione indipendente. Il raffreddamento è realizzato per mezzo di un ventilatore assiale con alimentazione indipendente, montato sulla calotta copriventola (metodo di raffreddamento IC 416).

Questa esecuzione è utilizzata in caso di alimentazione del motore tramite inverter allo scopo di estendere il campo di funzionamento a coppia costante anche a bassa velocità, o quando per lo stesso sono richieste elevate frequenze di avviamento.

Da questa opzione sono esclusi i motori autofrenanti tipo BN\_BA e tutti i motori con doppia sporgenza d'albero (opzione PS).

## Ventilation

*Motors are cooled through outer air blow (IC 411 according to CEI EN 60034-6) and are equipped with a plastic radial fan, which operates in both directions. Ensure that fan cover is installed at a suitable distance from the closest wall so to allow air circulation and servicing of motor and brake, if fitted.*

*On request, motors can be supplied with independently power-supplied forced ventilation system starting from BN 71 or M1 size.*

*Motor is cooled by an axial fan with independent power supply and fitted on the fan cover (IC 416 cooling system). This version is used in case of motor driven by inverter so that steady torque operation is possible even at low speed or when high starting frequencies are needed.*

*Brake motors of BN\_BA type and all motors with rear shaft projection (PS option) are excluded.*

*Brake motors of BN\_BA type and all motors with rear shaft projection (PS option) are excluded.*

## Belüftung

Die Motoren werden mittels Fremdbelüftung gekühlt (IC 411 gemäß CEI EN 60034-6) und sind mit einem Radiallüfterrad aus Kunststoff ausgestattet, das in beide Richtungen dreht.

Die Installation muss zwischen Lüfterradkappe und der nächstliegenden Wand einen Mindestabstand berücksichtigen, so dass der Luftumlauf nicht behindert werden kann. Dieser Abstand ist jedoch ebenso für die regelmäßige Instandhaltung des Motors und, falls vorhanden, der Bremse erforderlich.

Ab der Baugröße BN 71 oder M1 können die Motoren auf Anfrage mit einer unabhängig gespeisten Zwangsbelüftung geliefert werden. Die Kühlung erfolgt hierdurch einen unabhängig gespeisten Axialventilator, der auf die Lüfterradkappe (Kühlmethode IC 416) montiert wird.

Diese Ausführung wird im Fall eines über einen Frequenzumrichter versorgten Motor verwendet, so dass der Betriebsbereich bei konstantem Drehmoment auch auf die niedrige Drehzahl ausgedehnt wird, oder im Fall von hohen Anlauffrequenzen.

Von dieser Option ausgeschlossen sind die Bremsmotoren BN\_BA und Motoren mit beidseitig herausragender Welle (Option PS).

## Ventilation

*Les moteurs sont refroidis par ventilation externe (IC 411 selon CEI EN 60034-6) et sont équipés de ventilateur radial en plastique fonctionnant dans les deux sens de rotation.*



*L'installation doit garantir une distance minimum de la calotte cache-ventilateur par rapport au mur le plus proche de façon à ne pas créer d'empêchement à la circulation de l'air ainsi que pour permettre les interventions d'entretien ordinaire du moteur et, si présent, du frein.*

*Sur demande, à partir de la taille BN 71, ou M1, les moteurs peuvent être fournis avec ventilation forcée à alimentation indépendante. Le refroidissement est réalisé au moyen d'un ventilateur axial avec alimentation indépendante monté sur la calotte cache-ventilateur (méthode de refroidissement IC 416).*

*Cette exécution est utilisée en cas d'alimentation du moteur par variateur dans le but d'étendre aussi la plage de fonctionnement à couple constant aux faibles vitesses ou lorsque des fréquences de démarrage élevées sont nécessaire à celui-ci.*

*Les moteurs frein type BN\_BA et les moteurs avec arbre sortant des deux côtés (option PS) SP sont exclus de cette option.*

(A77)

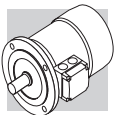
Dati di alimentazione / Power supply / Daten der Stromversorgung / Données d'alimentation					
		V a.c. ± 10%	Hz	P [W]	I [A]
<b>BN 71</b>	<b>M1</b>	1~ 230	50 / 60	22	0.14
<b>BN 80</b>	<b>M2</b>			22	0.14
<b>BN 90</b>	—			40	0.25
<b>BN 100 (*)</b>	<b>M3</b>			50	0.25
<b>BN 112</b>	—	3~ 230 Δ / 400Y	50	50	0.26 / 0.15
<b>BN 132S</b>	<b>M4S</b>			110	0.38 / 0.22
<b>BN 132M...BN 160MR</b>	<b>M4L</b>				
<b>BN 160...BN 180M</b>	<b>M5</b>		50	180	1.25 / 0.72

Per la variante sono disponibili due esecuzioni alternative, denominate **U1** e **U2**, aventi lo stesso ingombro in senso longitudinale. Per entrambe le esecuzioni, la maggiore lunghezza della calotta copriventola ( $\Delta L$ ) è riportata nella tabella che segue. Dimensioni complessive ricavabili dalle tavole dimensionali dei motori.



*This variant has two different models, called **U1** and **U2**, having the same longitudinal size. Longer side of fan cover ( $\Delta L$ ) is specified for both models in the table below. Overall dimension can be reckoned from motor size table.*

Für die Varianten sind als Alternative zwei Ausführungen verfügbar: **U1** und **U2** mit dem gleichen Längsmaßen. Für beide Ausführungen wird die Verlängerung der Lüfterradkappe ( $\Delta L$ ) in der nachstehenden Tabelle wiedergegeben. Gesamtmaße können den Tabellen entnommen werden, in denen die Motormaße angegeben werden.

*Pour la variante sont disponibles deux exécutions alternatives, dénommées **U1** et **U2**, ayant le même encombrement dans le sens longitudinal. Pour les deux exécutions, la majoration de la longueur de la calotte cache-ventilateur ( $\Delta L$ ) est indiquée dans le tableau suivant. Dimensions totales à calculer d'après les planches de dimensions des moteurs.*



(A78)

Tabella maggiorazione lunghezze motore / Extra length for servoveilated motors Tabelle - Motorverlängerung / Tableau majoration longueurs moteur			
		$\Delta L_1$	$\Delta L_2$
<b>BN 71</b>	<b>M1</b>	93	32
<b>BN 80</b>	<b>M2</b>	127	55
<b>BN 90</b>	—	131	48
<b>BN 100</b>	<b>M3</b>	119	28
<b>BN 112</b>	—	130	31
<b>BN 132S</b>	<b>M4S</b>	161	51
<b>BN 132M</b>	<b>M4L</b>	161	51

$\Delta L_1$  = variazione dimensionale rispetto alla quota LB del motore standard corrispondente

$\Delta L_1$  = extra length to LB value of corresponding standard motor

$\Delta L_1$  = Maßänderung gegenüber Maß LB des entsprechenden Standardmotors

$\Delta L_1$  = variation de dimension par rapport à la cote LB du moteur standard correspondant

$\Delta L_2$  = variazione dimensionale rispetto alla quota LB del motore autofrenante corrispondente

$\Delta L_2$  = extra length to LB value of corresponding brake motor

$\Delta L_2$  = Maßänderung gegenüber Maß LB des entsprechenden Bremsmotors

$\Delta L_2$  = variation de dimension par rapport à la cote LB du moteur frein correspondant

**U1**



Terminali di alimentazione del ventilatore in scatola morsetti separata.

Nei motori autofrenanti grandezza BN 71...BN 160MR, con variante **U1**, la leva di sblocco non è collocabile nella posizione AA. L'opzione non è disponibile per i motori conformi alle norme CSA e UL (opzione CUS).

*Fan wiring terminals are housed in a separate terminal box.*

*In brake motors of size BN 71...BN 160MR, with **U1** model, the release lever cannot be positioned to AA. The option is not applicable to motors compliant with the CSA and UL norms (option CUS).*

Versorgungsanschlüsse des Ventilators im Zusatzklemmenkasten.

Bei den Bremsmotoren in der Baugröße BN 71...BN 160MR, mit Variante **U1** kann der Bremslösehebel nicht in der Position AA. Die Option ist nicht anwendbar für die Motoren entsprechend den Normen CSA und UL (Option CUS).

Bornes d'alimentation du ventilateur dans un bornier séparé.

Pour les moteurs frein taille BN 71...BN 160MR, avec variante **U1**, le levier de déblocage ne peut être installé en position AA. L'option n'est pas disponible pour les moteurs conformes aux normes CSA et UL (option CUS).

**U2**



I terminali del ventilatore sono collocati nella scatola morsettiera principale del motore.

L'opzione U2 non è applicabile ai motori da BN 160 a BN 200L, con eccezione dei motori BN 160MR, per i quali l'opzione è disponibile e ai motori con opzione CUS (conformi alle norme CSA e UL).

*Fan terminals are wired in the motor terminal box.*

*The U2 option does not apply to motors BN 160 through BN 200L, with the only exception of motor BN 160MR for which the option is available instead and to motors with option CUS (compliant to norms CSA and UL).*



Versorgungsanschlüsse des Ventilators befinden sich im Hauptklemmenkasten des Motors.

Die Option U2 ist nicht anwendbar bei den Motoren BN160M...BN200L, außer den Motoren BN160MR wofür die Option verfügbar ist, und bei den Motoren mit der CUS-Option (entsprechend den Normen CSA und UL).

Bornes d'alimentation du ventilateur dans le bornier principal du moteur.

L'option n'est pas applicable aux moteurs BN 160...BN 200L, sauf pour les moteurs BN 160MR, pour lesquels l'option est disponible et aux moteurs avec l'option CUS (conforme aux normes CSA et UL).

(A79)

(*)			V a.c. $\pm$ 10%	Hz	P [W]	I [A]
	<b>BN 100_U2</b>	<b>M3</b>	3~ 230 $\Delta$ / 400Y	50 / 60	40	0.24 / 0.14

**RC**

**Tettuccio parapigioggia**

Il dispositivo parapigioggia, che è raccomandato quando il motore è montato verticalmente con l'albero verso il basso, serve a proteggere il motore stesso dall'ingresso di corpi solidi e dallo stitillicidio.

**Drip cover**

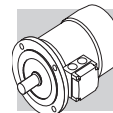
*The drip cover protects the motor from dripping and avoids the ingress of solid bodies. It is recommended when motor is installed in a vertical position with the shaft downwards.*

**Schutzdach**

Das Schutzdach, dessen Montage dann empfohlen wird, wenn der Motor senkrecht mit einer nach unten gerichteten Welle ausgerichtet wird, dient dem Schutz des Motors vor einem Eindringen von festen Fremdkörpern und Tropfwasser.

**Capot de protection anti-pluie**

*Le capot de protection anti-pluie est recommandé lorsque le moteur est monté verticalement avec l'arbre vers le bas, il sert à protéger le moteur contre l'introduction de corps solides et le suintement.*





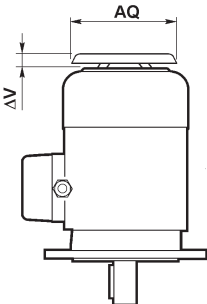
Le dimensioni aggiuntive sono indicate nella tabella (A80). Il tettuccio esclude le varianti PS, EN1, EN2, EN3 e non è applicabile ai motori con freno tipo BA

*Relevant dimensions are indicated in the table (A80). The drip cover is not compatible with variants PS, EN1, EN2, EN3 and will not fit motors equipped with a BA brake.*

Die Maßerweiterungen werden in der Tabelle (A80) angegeben. Das Schutzdach schließt die Möglichkeit der Varianten PS, EN1, EN2, EN3 und kann bei Motoren mit dem Bremstyp BA nicht montiert werden.

*Les dimensions à ajouter sont indiquées dans le tableau (A80). Le capot antipluie exclue les variantes PS, EN1, EN2, EN3 et n'est pas applicable aux moteurs avec frein type BA.*

(A80)

		AQ	ΔV	
BN 63	M05	118	24	
BN 71	M1	134	27	
BN 80	M2	152	25	
BN 90	—	168	30	
BN 100	M3	190	28	
BN 112	—	211	32	
BN 132...BN 160MR	M4	254	32	
BN 160M...BN 180M	M5	302	36	
BN 180L...BN 200L	—	340	36	

## TC

### Tettuccio tessile

La variante del tettuccio tipo TC è da specificare quando il motore è installato in ambienti dell'industria tessile, dove sono presenti filamenti che potrebbero ostruire la griglia del copriventola, impedendo il regolare flusso dell'aria di raffreddamento. L'opzione esclude le varianti EN1, EN2, EN3 e non è applicabile ai motori con freno tipo BA. L'ingombro complessivo è lo stesso del tettuccio tipo RC.

### Textile canopy

Option TC is a cover variant for textile industry environments, where lint may obstruct the fan grid and prevent a regular flow of cooling air. This option is not compatible with variants EN1, EN2, EN3 and will not fit motors equipped with a BA brake. Overall dimensions are the same as drip cover type RC.

### Schutzdach

Die Variante des Schutzdachs vom Typ TC muss dann spezifiziert werden, wenn der Motor in Bereichen der Textilindustrie installiert wird, in denen Stofffusseln das Lüfterradgitter verstopfen und so einen regulären Kühlluftfluss verhindern könnten. Diese Option schließt die Möglichkeit der Varianten EN1, EN2, EN3 aus und kann bei Motoren mit einer Bremse vom Typ BA nicht appliziert werden. Die Gesamtmaße entsprechen denen des Schutzdachs vom Typ RC.

### Capot textile

*La variante du capot type TC est à spécifier lorsque le moteur est installé dans des sites de l'industrie textile, où sont présents des filaments qui pourraient obstruer la grille du cache-ventilateur et empêcher le flux régulier de l'air de refroidissement. L'option exclue les variantes EN1, EN2, EN3 et n'est pas applicable aux moteurs avec frein type BA. L'encombrement total est identique à celui du capot type RC.*

### Dispositivi di retroazione

I motori possono essere dotati di tre diversi tipi di encoder, qui di seguito descritti. Il montaggio dell'encoder esclude le esecuzioni con doppia estremità d'albero (PS) e tettuccio di protezione (RC, TC). Il dispositivo non è applicabile ai motori dotati del freno in c.a., tipo BA.

### Feedback units

*Motors may be combined with three different types of encoders to achieve feedback circuits. Configurations with double-extended shaft (PS) and rain canopy (RC, TC) are not compatible with encoder installation. Also not compatible are motors equipped with a.c. brakes, type BA.*

### Geber-anschluß

Die Motoren können mit drei unterschiedlichen Encodertypen ausgestattet werden. Nachstehend finden Sie die entsprechenden Beschreibungen. Die Montage des Encoders schließt die Version mit zweitem Wellenende (PS) und Schutzdach (RC, TC) aus. Die Vorrichtung kann an Motoren mit Bremse vom Typ BA nicht angebaut werden.

### Dispositifs de retroaction

*Pour moteurs peuvent être dotés de trois types de codeurs différents, décrits ci-après. Le montage du codeur exclu les exécutions avec arbre à double extrémité (PS) et le capot de protection (RC, TC). Le dispositif n'est pas applicable aux moteurs avec frein en c.a., type BA.*

## EN1

Encoder incrementale,  $V_{IN}=5V$ , uscita line-driver RS 422.

*Incremental encoder,  $V_{IN}=5V$ , line-driver output RS 422.*

Inkremental-Encoder,  $V_{IN}=5V$ , Ausgang „line-driver“ RS 422.

*Codeur incrémental,  $V_{IN}=5V$ , sortie line-driver RS 422.*

## EN2

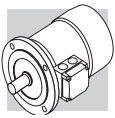
Encoder incrementale,  $V_{IN}=10-30V$ , uscita line driver RS 422.

*Incremental encoder,  $V_{IN}=10-30V$ , line-driver output RS 422.*

Inkremental-Encoder,  $V_{IN}=10-30V$ , Ausgang „line driver“ RS 422.

*Codeur incrémental,  $V_{IN}=10-30V$ , sortie line-driver RS 422.*





## EN3

Encoder incrementale,  $V_{IN}=12-30$  V, uscita push-pull 12-30 V

Incremental encoder,  $V_{IN}=12-30$  V, push-pull output 12-30 V

Inkremental-Encoder,  $V_{IN}=12-30$  V, Ausgang „push-pull“ 12-30 V

Codeur incrémental,  $V_{IN}=12-30$  V, sortie push-pull 12-30 V

(A81)

		EN1	EN2	EN3
interfaccia / Interface Schnittstelle / interface		RS 422	RS 422	push-pull
tensione alimentazione / Power supply voltage Versorgungsspannung / tension d'alimentation	[V]	4...6	10...30	12...30
tensione di uscita / Output voltage Ausgangsspannung / tension de sortie	[V]	5	5	12...30
corrente di esercizio senza carico / No-load operating current Betriebsstrom ohne Belastung / courant d'utilisation sans charge	[mA]	120	100	100
n° di impulsi per giro / No. of pulses per revolution Impulse pro Drehung / nbre d'impulsions par tour		1024		
n° segnali / No. of signals Signale / nbre de signaux		6 (A, B, C + segnali invertiti / inverted signals invertierte Signale / signaux inversés)		
max. frequenza di uscita / Max. output frequency Max. Ausgangsfrequenz / fréquence max. de sortie	[kHz]	300	300	200
max. velocità / Max. speed Max. Drehzahl / vitesse max.	[min <sup>-1</sup> ]	6000 (9000 min <sup>-1</sup> ) x 10s		
campo di temperatura / Temperature range Temperaturbereich / plage de température	[°C]	-20...+70		
grado di protezione / Protection class Schutzgrad / degré de protection		IP 65		

EN1, EN2, EN3	
BN 63...BN 200L	M05...M5
BN 63_FD...BN 200L_FD	M05_FD...M5_FD
BN 63_FA...BN 200L_FA	M05_FA...M5_FA

Se l'opzione EN<sub>1</sub> è richiesta per motori di grandezza BN71...BN160MR e M1...M4, contemporaneamente all'opzione U1/U2, le variazioni dimensionali coincidono con quelle dell'opzione U1/U2.


If the encoder device (options EN1, EN2, EN3) is specified on motors BN71...BN160MR and M1...M4, along with the independent fan cooling (options U1, U2), the extra length of motor is coincident with that of the correspondent U1 and U2 execution.

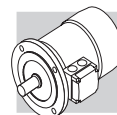
EN <sub>1</sub> + U1		
		<b>L3</b>
BN 160M...BN 180M	M5	72
BN 180L...BN 200L	-	82
BN 160M_FD...BN 180M_FD	M5_FD	35
BN 180L_FD...BN 200L_FD	-	41

Wenn der Encoder (Optionen EN1, EN2, EN3) für Motoren der Baugrößen BN71...BN160MR und M1...M4 zusammen mit Fremdlüftung (Optionen U1, U2) ausgelegt ist, stimmen die Maßänderungen des Motors mit jenen der entsprechenden Ausführungen U1 und U2 überein.






Si un codeur (option EN1, EN2, EN3) est nécessaire sur les moteurs de tailles BN71...BN160MR et M1...M4, en association avec la ventilation forcée (options U1, U2), la variation de dimensions du moteur coïncide avec celle des exécutions U1 et U2 correspondantes.

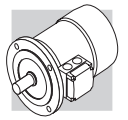
**2 P****3000 min<sup>-1</sup> - S1****50 Hz**

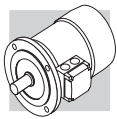
Pn kW		n min <sup>-1</sup>	Mn Nm	$\text{EFF2}$	$\eta$ (100%) %	$\eta$ (75%) %	cos $\varphi$ [400V] A	In A	Is In	Ms Mn	Ma Mn	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B5 $\frac{\text{kg}}{\text{kg}}$	freno c.c. / d.c. brake G.S.-bremse / frein c.c.				freno c.a. / a.c. brake W.S.-bremse / frein c.a.											
														FD		FA		BA		FA		BA							
														Mod.	Mb Nm	Z <sub>0</sub> 1/h NB SB	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B5 $\frac{\text{kg}}{\text{kg}}$	Mod.	Mb Nm	Z <sub>0</sub> 1/h	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B5 $\frac{\text{kg}}{\text{kg}}$	Mod.	Mb max Nm	Z <sub>0</sub> 1/h	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B5 $\frac{\text{kg}}{\text{kg}}$	
0.18	BN 63A	2	2730	0.63	59.9	56.9	0.77	0.56	3.0	2.1	2	2.0	3.5	FD 02	1.75	3900	4800	2.6	5.2	FA 02	1.75	4800	2.6	5.0	BA 60	5	3500	4.0	5.8
0.25	BN 63B	2	2740	0.87	66.0	64.8	0.76	0.72	3.3	2.3	2.3	2.3	3.9	FD 02	1.75	3900	4800	3.0	5.6	FA 02	1.75	4800	3.0	5.4	BA 60	5	3600	4.3	6.2
0.37	BN 63C	2	2800	1.26	69.1	66.8	0.78	0.99	3.9	2.6	2.6	3.3	5.1	FD 02	3.5	3600	4500	3.9	6.8	FA 02	3.5	4500	3.9	6.6	BA 60	5	3500	5.3	7.4
0.37	BN 71A	2	2820	1.25	73.8	73.0	0.76	0.95	4.8	2.8	2.6	3.5	5.4	FD 03	3.5	3000	4100	4.6	8.1	FA 03	3.5	4200	4.6	7.8	BA 70	8	3500	5.5	9.3
0.55	BN 71B	2	2820	1.86	76.0	75.8	0.76	1.37	5.0	2.9	2.8	4.1	6.2	FD 03	5	2900	4200	5.3	8.9	FA 03	5	4200	5.3	8.6	BA 70	8	3600	6.1	10.1
0.75	BN 71C	2	2810	2.6	76.6	76.2	0.76	1.86	5.1	3.1	2.8	5.0	7.3	FD 03	5	1900	3300	6.1	10	FA 03	5	3600	6.1	9.7	BA 70	8	3200	7.0	11.2
0.75	BN 80A	2	2810	2.6	76.2	75.5	0.81	1.75	4.8	2.6	2.2	7.8	8.6	FD 04	5	1700	3200	9.4	12.5	FA 04	5	3200	9.4	12.4	BA 80	18	2800	10.8	13.9
1.1	BN 80B	2	2800	3.8	76.4	76.2	0.81	2.57	4.8	2.8	2.4	9.0	9.5	FD 04	10	1500	3000	10.6	13.4	FA 04	10	3000	10.6	13.3	BA 80	18	2700	12.0	14.8
1.5	BN 80C	2	2800	5.1	79.1	79.5	0.81	3.4	4.9	2.7	2.4	11.4	11.3	FD 04	15	1300	2600	13.0	15.2	FA 04	15	2600	13.0	15.1	BA 80	18	2400	14.4	16.6
1.5	BN 90SA	2	2870	5.0	82.0	81.5	0.80	3.3	5.9	2.7	2.6	12.5	12.3	FD 14	15	900	2200	14.1	16.5	FA 14	15	2200	14.1	16.4	BA 90	35	1600	19.5	19.6
1.85	BN 90SB	2	2880	6.1	82.5	82.0	0.80	4.0	6.2	2.9	2.6	16.7	14	FD 14	15	900	2200	18.3	18.2	FA 14	15	2200	18.3	18.1	BA 90	35	1700	23.7	21.3
2.2	BN 90L	2	2880	7.3	82.7	82.1	0.80	4.8	6.3	2.9	2.7	16.7	14	FD 05	26	900	2200	21	20	FA 05	26	2200	21	20.7	BA 90	35	1700	24	21.3
3	BN 100L	2	2860	10.0	82.8	82.6	0.79	6.6	5.7	2.6	2.2	31	20	FD 15	26	700	1600	35	26	FA 15	26	1600	35	27	BA 100	50	1300	43	30
4	BN 100LB	2	2870	13.3	84.3	84.4	0.80	8.6	5.9	2.7	2.5	39	23	FD 15	40	450	900	43	29	FA 15	40	1000	43	30	BA 100	50	850	51	33
4	BN 112M	2	2900	13.2	85.5	84.5	0.82	8.2	6.9	3	2.9	57	28	FD 06S	40	—	950	66	39	FA 06S	40	950	66	40	BA 110	75	850	73	41
5.5	BN 132SA	2	2890	18.2	86.1	85.7	0.84	11.0	6	2.6	2.2	101	35	FD 06	50	—	600	112	48	FA 06	50	600	112	49	BA 140	150	500	151	67
7.5	BN 132SB	2	2900	25	87.2	87.1	0.85	14.6	6.4	2.6	2.2	145	42	FD 06	50	—	550	154	55	FA 06	50	550	154	56	BA 140	150	450	195	74
9.2	BN 132M	2	2930	30	89.0	88.5	0.86	17.3	6.9	2.8	2.3	178	53	FD 56	75	—	430	189	66	FA 06	75	430	189	67	BA 140	150	400	228	85
11	BN 160MR	2	2920	36	89.1	88.9	0.88	20.2	7.0	2.9	2.5	210	65																
15	BN 160MB	2	2930	49	89.6	89.4	0.86	28.1	7.1	2.6	2.3	340	84																
18.5	BN 160L	2	2930	60	90.4	90.1	0.86	34	7.6	2.7	2.3	420	97																
22	BN 180M	2	2930	72	91.3	91.3	0.88	40	7.8	2.6	2.4	490	109																
30	BN 200LA	2	2930	98	91.9	91.4	0.89	53	7.9	2.7	2.9	770	140																





Pn kW		n min <sup>-1</sup>	Mn Nm	η %	cos φ [400V] A	In A	Is In	Ms Mn	Ma Mn	Jm <sup>4</sup> x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B5 	freno c.c. / d.c. brake G.S.-bremse / frein c.c.				freno c.a. / a.c. brake W.S.-bremse / frein c.a.											
												Mod.	Mb Nm	Z <sub>0</sub> 1/h	NB SB	Jm <sup>4</sup> x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B5 	Mod.	Mb Nm	Z <sub>0</sub> 1/h	Jm <sup>4</sup> x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B5 	Mod.	Mb Nm	Z <sub>0</sub> 1/h	Jm <sup>4</sup> x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B5 
0.09	<b>BN 63A</b>	6	0.98	41	0.53	0.60	2.1	2.1	1.8	3.4	4.6	<b>FD 02</b>	3.5	9000	14000	4.0	6.3	<b>FA 02</b>	3.5	14000	4.0	6.1	<b>BA 60</b>	5	12000	5.4	6.9
0.12	<b>BN 63B</b>	6	1.32	45	0.60	0.64	2.1	1.9	1.7	3.7	4.9	<b>FD 02</b>	3.5	9000	14000	4.3	6.6	<b>FA 02</b>	3.5	14000	4.3	6.4	<b>BA 60</b>	5	12000	5.7	7.2
0.18	<b>BN 71A</b>	6	1.91	56	0.69	0.67	2.6	1.9	1.7	8.4	5.5	<b>FD 03</b>	5.0	8100	13500	9.5	8.2	<b>FA 03</b>	5.0	13500	9.5	7.9	<b>BA 70</b>	8	12300	10.4	9.4
0.25	<b>BN 71B</b>	6	2.7	62	0.71	0.82	2.6	1.9	1.7	10.9	6.7	<b>FD 03</b>	5.0	7800	13000	12	9.4	<b>FA 03</b>	5.0	13000	12	9.1	<b>BA 70</b>	8	12000	12.9	10.6
0.37	<b>BN 71C</b>	6	3.9	66	0.69	1.17	3	2.4	2.0	12.9	7.7	<b>FD 53</b>	7.5	5100	9500	14	10.4	<b>FA 03</b>	7.5	9500	14	10.1	<b>BA 70</b>	8	8900	14.9	11.6
0.37	<b>BN 80A</b>	6	3.9	68	0.68	1.15	3.2	2.2	2.0	21	9.9	<b>FD 04</b>	10	5200	8500	23	13.8	<b>FA 04</b>	10	8500	23	13.7	<b>BA 80</b>	18	8000	24	15.2
0.55	<b>BN 80B</b>	6	5.7	70	0.69	1.64	3.9	2.6	2.2	25	11.3	<b>FD 04</b>	15	4800	7200	27	15.2	<b>FA 04</b>	15	7200	27	15.1	<b>BA 80</b>	18	6800	28	16.6
0.75	<b>BN 80C</b>	6	7.8	70	0.65	2.38	3.8	2.5	2.2	28	12.2	<b>FD 04</b>	15	3400	6400	30	16.1	<b>FA 04</b>	15	6400	30	16.0	<b>BA 80</b>	18	6100	31	17.5
0.75	<b>BN 90S</b>	6	7.8	69	0.68	2.31	3.8	2.4	2.2	26	12.6	<b>FD 14</b>	15	3400	6500	28	16.8	<b>FA 14</b>	15	6500	28	16.7	<b>BA 90</b>	35	5500	33	19.9
1.1	<b>BN 90L</b>	6	11.4	72	0.69	3.2	3.9	2.3	2.0	33	15	<b>FD 05</b>	26	2700	5000	37	21	<b>FA 05</b>	26	5000	37	22	<b>BA 90</b>	35	4600	40	22
1.5	<b>BN 100LA</b>	6	15.2	73	0.72	4.1	4	2.1	2.0	82	22	<b>FD 15</b>	40	1900	4100	86	28	<b>FA 15</b>	40	4100	86	29	<b>BA 100</b>	50	3800	94	32
1.85	<b>BN 100LB</b>	6	19.0	75	0.73	4.9	4.5	2.1	2.0	95	24	<b>FD 15</b>	40	1700	3600	99	30	<b>FA 15</b>	40	3600	99	31	<b>BA 100</b>	50	3400	107	34
2.2	<b>BN 112M</b>	6	22	78	0.73	5.6	4.8	2.2	2.0	168	32	<b>FD 06S</b>	60	—	2100	177	42	<b>FA 06S</b>	60	2100	177	44	<b>BA 110</b>	75	2000	184	45
3	<b>BN 132S</b>	6	30	76	0.76	7.5	4.8	1.9	1.8	216	36	<b>FD 56</b>	75	—	1400	226	49	<b>FA 06</b>	75	1400	226	50	<b>BA 140</b>	150	1200	266	68
4	<b>BN 132MA</b>	6	40	78	0.77	9.6	5.5	2.0	1.8	295	45	<b>FD 06</b>	100	—	1200	305	58	<b>FA 07</b>	100	1200	318	63	<b>BA 140</b>	150	1050	345	77
5.5	<b>BN 132MB</b>	6	56	80	0.78	12.7	5.9	2.1	1.9	383	56	<b>FD 07</b>	150	—	1050	406	72	<b>FA 07</b>	150	1050	406	74	<b>BA 140</b>	150	1000	433	88
7.5	<b>BN 160M</b>	6	75	84	0.81	15.9	5.9	2.2	2.0	740	83	<b>FD 08</b>	170	—	900	815	112	<b>FA 08</b>	170	900	815	113					
11	<b>BN 160L</b>	6	109	87	0.81	22.5	6.5	2.5	2.3	970	103	<b>FD 08</b>	200	—	800	1045	133	<b>FA 08</b>	200	800	1045	133					
15	<b>BN 180L</b>	6	148	88	0.82	30	6.2	2.0	2.4	1550	130	<b>FD 09</b>	300	—	600	1750	170										
18.5	<b>BN 200LA</b>	6	184	88	0.81	37	5.9	2.0	2.3	1700	145	<b>FD 09</b>	400	—	450	1900	185										















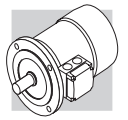
# 2/4 P

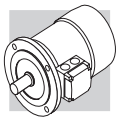
## 3000/1500 min<sup>-1</sup> - S1

## 50 Hz

Pn kW		n min <sup>-1</sup>	Mn Nm	η %	cos φ	In [400V] A	Is In	Ms Mn	Ma Mn	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B5 	freno c.c. / d.c. brake G.S.-bremse / frein c.c.				freno c.a. / a.c. brake W.S.-bremse / frein c.a.												
												FD		FA		BA		FA		BA								
												Mod.	Mb Nm	Z <sub>0</sub> 1/h NB SB	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B5 	Mod.	Mb Nm	Z <sub>0</sub> 1/h	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B5 	Mod.	Mb max Nm	Z <sub>0</sub> 1/h	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B5 		
0.20	<b>BN 63B</b>	2	0.71	55	0.82	0.64	3.5	2.1	1.9	2.9	4.4	<b>FD 02</b>	3.5	2200	2600	3.5	2600	3.5	5.9	<b>FA 02</b>	3.5	2000	5	2000	4.9	6.7	IM B5	
0.15		4	1.06	49	0.67	0.66	2.6	1.8	1.7	4.7	4.4		4000	5100	5100	5100	5100	5100	6.1			4000	4000	4.9	6.7			
0.28	<b>BN 71A</b>	2	0.99	56	0.82	0.88	2.9	1.9	1.7	4.7	4.4	<b>FD 03</b>	3.5	2100	2400	5.8	2400	5.8	7.1	<b>FA 03</b>	3.5	8	2100	8	2100	5.6	8.3	IM B5
0.20		4	1.39	59	0.72	0.68	3.1	1.8	1.7	5.8	5.1		3800	4800	4800	4800	4800	7.1			4800	4200	4200	5.6	8.3			
0.37	<b>BN 71B</b>	2	1.29	56	0.82	1.16	3.5	1.8	1.8	6.9	5.1	<b>FD 03</b>	5	1400	2100	6.9	2100	6.9	7.8	<b>FA 03</b>	5	8	1800	8	1800	7.8	9.0	IM B5
0.25		4	1.72	60	0.73	0.82	3.3	2.0	1.9	6.9	5.9		2900	4200	4200	4200	4200	7.8			4200	3600	3600	7.8	9.0			
0.45	<b>BN 71C</b>	2	1.55	63	0.85	1.21	3.8	1.8	1.8	6.9	5.9	<b>FD 03</b>	5	1400	2100	8.0	2100	8.0	8.6	<b>FA 03</b>	5	8	1800	8	1800	8.9	9.8	IM B5
0.30		4	2.0	63	0.73	0.94	3.6	2.0	1.9	15	8.2		2900	4200	4200	4200	4200	8.6			4200	3600	3600	8.9	9.8			
0.55	<b>BN 80A</b>	2	1.9	63	0.85	1.48	3.9	1.7	1.7	15	8.2	<b>FD 04</b>	5	1600	2300	16.6	2300	16.6	12.1	<b>FA 04</b>	5	18	2100	18	2100	18	13.5	IM B5
0.37		4	2.5	67	0.79	1.01	4.1	1.8	1.9	20	9.9		3000	4000	4000	4000	4000	12.1			4000	3700	3700	18	13.5			
0.75	<b>BN 80B</b>	2	2.6	65	0.85	1.96	3.8	1.9	1.8	20	9.9	<b>FD 04</b>	10	1400	1600	22	1600	22	13.8	<b>FA 04</b>	10	18	1500	18	1500	22	15.2	IM B5
0.55		4	3.8	68	0.81	1.44	3.9	1.7	1.7	20	12.2		2700	3600	3600	3600	3600	13.8			3600	3300	3300	22	15.2			
1.1	<b>BN 90S</b>	2	3.8	71	0.82	2.73	4.7	2.3	2.0	21	12.2	<b>FD 14</b>	10	1500	1600	23	1600	23	16.4	<b>FA 14</b>	10	35	1300	35	1300	28	19.5	IM B5
0.75		4	5.2	66	0.79	2.08	4.6	2.4	2.2	28	14.0		2300	2800	2800	2800	2800	16.4			2800	2300	2300	28	19.5			
1.5	<b>BN 90L</b>	2	5.2	70	0.85	3.64	4.5	2.4	2.1	28	14.0	<b>FD 05</b>	26	1050	1200	32	1200	32	20	<b>FA 05</b>	26	35	1100	35	1100	35	21	IM B5
1.1		4	7.6	73	0.81	2.69	4.7	2.5	2.2	40	18.3		1600	2000	2000	2000	2000	20			2000	1800	1800	35	21			
2.2	<b>BN 100LA</b>	2	7.5	72	0.85	5.2	4.5	2.0	1.9	40	18.3	<b>FD 15</b>	26	600	900	44	900	44	25	<b>FA 15</b>	26	50	750	50	750	51	29	IM B5
1.5		4	10.2	73	0.79	3.8	4.7	2.0	2.0	61	25		1300	2300	2300	2300	2300	25			2300	1900	1900	51	29			
3.5	<b>BN 100LB</b>	2	11.7	80	0.84	7.5	5.4	2.2	2.1	61	25	<b>FD 15</b>	40	500	900	65	900	65	31	<b>FA 15</b>	40	50	750	50	750	72	35	IM B5
2.5		4	16.8	82	0.80	5.5	5.2	2.2	2.2	98	30		1000	2100	2100	2100	2100	31			2100	1800	1800	72	35			
4	<b>BN 112M</b>	2	13.3	79	0.83	8.8	6.1	2.4	2.0	98	30	<b>FD 06S</b>	60	—	700	107	107	40	40	<b>FA 06S</b>	60	75	600	75	600	114	43	IM B5
3.3		4	22.2	80	0.80	7.4	5.1	2.1	2.0	213	44		—	—	1200	1200	1200	40			1200	1100	1100	114	43			
5.5	<b>BN 132S</b>	2	18.2	80	0.87	11.4	5.9	2.4	2.0	213	44	<b>FD 56</b>	75	—	350	223	223	57	57	<b>FA 06</b>	75	150	150	150	263	76	IM B5	
4.4		4	29	82	0.84	9.2	5.3	2.2	2.0	270	53		—	—	900	900	900	57			900	750	750	263	76			
7.5	<b>BN 132MA</b>	2	25	82	0.87	15.2	6.5	2.4	2.0	270	53	<b>FD 06</b>	100	—	350	280	280	66	66	<b>FA 07</b>	100	150	150	150	320	85	IM B5	
6		4	40	84	0.85	12.1	5.8	2.3	2.1	319	59		—	—	900	900	900	66			900	800	800	320	85			
9.2	<b>BN 132MB</b>	2	30	83	0.86	18.6	6.0	2.6	2.2	319	59	<b>FD 07</b>	150	—	300	342	342	75	75	<b>FA 07</b>	150	150	150	150	369	91	IM B5	
7.3		4	48	85	0.85	14.6	5.5	2.3	2.1	319	59		—	—	800	800	800	75			800	750	750	369	91			

Pn kW		n min <sup>-1</sup>	Mn Nm	η %	cos φ	In A	Is In	Ms Mn	Ma Mn	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B5 	freno c.c. / d.c. brake G.S.-bremse / frein c.c.						freno c.a. / a.c. brake W.S.-bremse / frein c.a.											
												FD			FA			BA			FD			FA			BA		
												Mod.	Mb Nm	Z <sub>0</sub> 1/h NB SB	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B5 	Mod.	Mb Nm	Z <sub>0</sub> 1/h kgm <sup>2</sup>	IM B5 	Mod.	Mb Nm	Z <sub>0</sub> 1/h kgm <sup>2</sup>	IM B5 					
0.25	<b>BN 71A</b>	2	0.84	60	0.82	0.73	4.3	1.9	1.8	6.9	5.9	<b>FD 03</b>	1.75	1500	1700	8.0	8.6	<b>FA 03</b>	2.5	1700	13000	8.0	8.3	<b>BA 70</b>	8	1500	11000	8.9	9.8
0.08		6	0.84	43	0.70	0.38	2.1	1.4	1.5	10000	10000																		
0.37	<b>BN 71B</b>	2	1.23	62	0.80	1.08	4.4	1.9	1.8	9.1	7.3	<b>FD 03</b>	3.5	1000	1300	10.2	10.0	<b>FA 03</b>	3.5	1300	10.2	10.2	9.7	<b>BA 70</b>	8	1200	10000	11.1	11.2
0.12		6	1.27	44	0.73	0.54	2.4	1.4	1.5	9000	11000																		
0.55	<b>BN 80A</b>	2	1.88	63	0.86	1.47	4.5	1.9	1.7	20	9.9	<b>FD 04</b>	5	1500	1800	22	13.8	<b>FA 04</b>	5	1800	22	13.7	<b>BA 80</b>	18	1700	6000	23	15.2	
0.18		6	1.85	52	0.65	0.77	3.3	2	1.9	4100	6300																		
0.75	<b>BN 80B</b>	2	2.6	66	0.87	1.89	4.3	1.8	1.6	25	11.3	<b>FD 04</b>	5	1700	1900	27	15.2	<b>FA 04</b>	5	1900	27	15.1	<b>BA 80</b>	18	1800	5600	28	16.6	
0.25		6	2.6	54	0.67	1.00	3.2	1.7	1.8	3800	6000																		
1.1	<b>BN 90L</b>	2	3.7	67	0.84	2.82	4.7	2.1	1.9	28	14.0	<b>FD 05</b>	13	1400	1600	32	20	<b>FA 05</b>	13	1600	32	21	<b>BA 90</b>	35	1500	4700	35	21	
0.37		6	3.8	59	0.71	1.27	3.3	1.6	1.6	3400	5200																		
1.5	<b>BN 100LA</b>	2	5.0	73	0.84	3.53	5.1	1.9	2.0	40	18.3	<b>FD 15</b>	13	1000	1200	44	24	<b>FA 15</b>	13	1200	44	25	<b>BA 100</b>	50	1050	3500	51	29	
0.55		6	5.6	64	0.67	1.85	3.5	1.7	1.8	2900	4000																		
2.2	<b>BN 100LB</b>	2	7.2	77	0.85	4.9	5.9	2.0	2.0	61	25	<b>FD 15</b>	26	700	900	65	31	<b>FA 15</b>	26	900	65	32	<b>BA 100</b>	50	800	2700	72	36	
0.75		6	7.5	67	0.64	2.5	3.3	1.9	1.8	2100	3000																		
3	<b>BN 112M</b>	2	9.9	78	0.87	6.4	6.3	2.0	2.1	98	30	<b>FD 06S</b>	40	—	1000	107	40	<b>FA 06S</b>	40	1000	107	32	<b>BA 110</b>	75	930	2400	114	43	
1.1		6	11.1	72	0.64	3.4	3.9	1.8	1.8	—	—																		
4.5	<b>BN 132S</b>	2	14.8	78	0.84	9.9	5.8	1.9	1.8	213	44	<b>FD 56</b>	37	—	500	223	57	<b>FA 06</b>	37	500	223	58	<b>BA 140</b>	150	400	263	263	76	
1.5		6	14.9	74	0.67	4.4	4.2	1.9	2.0	—	—																		
5.5	<b>BN 132M</b>	2	18.0	78	0.87	11.7	6.2	2.1	1.9	270	53	<b>FD 56</b>	50	—	400	280	66	<b>FA 06</b>	50	400	280	67	<b>BA 140</b>	150	350	320	320	85	
2.2		6	22	77	0.71	5.8	4.3	2.1	2.0	—	—																		















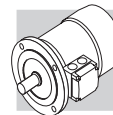
**2/8 P**

**3000/750 min<sup>-1</sup> - S3 60/40%**

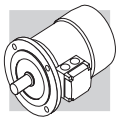
**50 Hz**

Pn kW		n min <sup>-1</sup>	Mn Nm	η %	cos φ	In [400V] A	Is In	Ms Mn	Ma Mn	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B5 	freno c.c. / d.c. brake G.S.-bremse / frein c.c.						freno c.a. / a.c. brake W.S.-bremse / frein c.a.											
												FD			FA			BA			FD			FA			BA		
												Mod.	Nm	Zo 1/h NB SB	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B5 	Mod.	Nm	Zo 1/h	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B5 	Mod.	Nm	Zo 1/h	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B5 	Mod.	Nm	Zo 1/h
0.25	<b>BN 71A</b>	2	0.86	61	0.87	0.68	3.9	1.8	1.9	10.9	6.7	<b>FD 03</b>	1.75	1300	1400	12	9.4	<b>FA 03</b>	2.5	1400	12	9.1	<b>BA 70</b>	8	1300	12.9	10.6		
0.06		8	0.84	31	0.61	0.46	2	1.8	1.9				10000	13000											12000				
0.37	<b>BN 71B</b>	2	1.26	63	0.86	0.99	3.9	1.8	1.9	12.9	7.7	<b>FD 03</b>	3.5	1200	1300	14	10.4	<b>FA 03</b>	3.5	1300	14	10.1	<b>BA 70</b>	8	1200	14.9	11.6		
0.09		8	1.28	34	0.75	0.51	1.8	1.4	1.5				9500	13000											12000				
0.55	<b>BN 80A</b>	2	1.86	66	0.86	1.40	4.4	2.1	2.0	20	9.9	<b>FD 04</b>	5	1500	1800	22	13.8	<b>FA 04</b>	5	1800	22	13.7	<b>BA 80</b>	18	1700	23	15.2		
0.13		8	1.80	41	0.64	0.72	2.3	1.6	1.7				5600	8000											7500				
0.75	<b>BN 80B</b>	2	2.6	68	0.88	1.81	4.6	2.1	2.0	25	11.3	<b>FD 04</b>	10	1700	1900	27	15.2	<b>FA 04</b>	10	1900	27	15.1	<b>BA 80</b>	18	1800	28	16.6		
0.18		8	2.5	43	0.66	0.92	2.3	1.6	1.7				4800	7300											7000				
1.1	<b>BN 90L</b>	2	3.7	63	0.84	3.00	4.5	2.1	1.9	28	14	<b>FD 05</b>	13	1400	1600	32	20	<b>FA 05</b>	13	1600	32	21	<b>BA 90</b>	35	1400	35	21		
0.28		8	3.9	48	0.63	1.34	2.4	1.8	1.9				3400	5100											4500				
1.5	<b>BN 100LA</b>	2	5.0	69	0.85	3.69	4.7	1.9	1.8	40	18.3	<b>FD 15</b>	13	1000	1200	44	25	<b>FA 15</b>	13	1200	44	25	<b>BA 100</b>	50	1000	52	29		
0.37		8	5.1	46	0.63	1.84	2.1	1.6	1.6				3300	5000											4200				
2.4	<b>BN 100LB</b>	2	7.9	75	0.82	5.6	5.4	2.1	2.0	61	25	<b>FD 15</b>	26	550	700	65	31	<b>FA 15</b>	26	700	65	32	<b>BA 100</b>	50	600	72	36		
0.55		8	7.5	54	0.58	2.5	2.6	1.8	1.8				2000	3500											3100				
3	<b>BN 112M</b>	2	9.9	76	0.87	6.5	6.3	2.1	1.9	98	30	<b>FD 06S</b>	40	—	900	107	40	<b>FA 06S</b>	40	900	107	42	<b>BA 110</b>	75	800	114	43		
0.75		8	10.4	60	0.65	2.8	2.5	1.6	1.6				—	2900											2700				
4	<b>BN 132S</b>	2	13.3	73	0.84	9.4	5.6	2.3	2.4	213	44	<b>FD 56</b>	37	—	500	223	57	<b>FA 06</b>	37	500	223	58	<b>BA 140</b>	150	400	263	76		
1		8	13.8	66	0.62	3.5	2.9	1.9	1.8				—	3500											3000				
5.5	<b>BN 132M</b>	2	18.3	75	0.84	12.6	6.1	2.4	2.5	270	53	<b>FD 06</b>	50	—	400	280	66	<b>FA 06</b>	50	400	280	67	<b>BA 140</b>	150	350	320	85		
1.5		8	21	68	0.63	5.1	2.9	1.9	1.9				—	2400											2100				

Pn kW		n min <sup>-1</sup>	Mn Nm	η %	cos φ	In [400V] A	Is In	Ms Mn	Ma Mn	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B5 	freno c.c. / d.c. brake G.S.-bremse / frein c.c.				freno c.a. / a.c. brake W.S.-bremse / frein c.a.												
												FD		FA		BA		FA		BA								
												Mod.	Mb Nm	Z <sub>0</sub> 1/h NB SB	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B5 	Mod.	Mb Nm	Z <sub>0</sub> 1/h	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B5 	Mod.	Mb max Nm	Z <sub>0</sub> 1/h	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B5 		
0.55	<b>BN 80B</b>	2820	1.86	64	0.89	1.39	4.2	1.6	1.7	25	11.3	<b>FD 04</b>	5	1000	1300	27	15.2	<b>FA 04</b>	5	1300	27	15.1	<b>BA 80</b>	18	1200	28	16.6	
0.09	<b>12</b>	430	2.0	30	0.63	0.69	1.8	1.9	1.8	8000	12000	8000	8000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000	12000
0.75	<b>BN 90L</b>	2790	2.6	56	0.89	2.17	4.2	1.8	1.7	26	12.6	<b>FD 05</b>	13	1000	1150	30	18.6	<b>FA 05</b>	13	1150	30	19.3	<b>BA 90</b>	35	1050	33	19.9	
0.12	<b>12</b>	430	2.7	26	0.63	1.06	1.7	1.4	1.6	4600	6300	4600	4600	6300	6300	6300	6300	6300	6300	6300	6300	6300	6300	6300	6300	6300	6300	6300
1.1	<b>BN 100LA</b>	2850	3.7	65	0.85	2.87	4.5	1.6	1.8	40	18.3	<b>FD 15</b>	13	700	900	44	25	<b>FA 15</b>	13	900	44	25	<b>BA 100</b>	50	750	52	29	
0.18	<b>12</b>	430	4.0	26	0.54	1.85	1.5	1.3	1.5	4000	6000	4000	4000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000
1.5	<b>BN 100LB</b>	2900	4.9	67	0.86	3.76	5.6	1.9	1.9	54	22	<b>FD 15</b>	13	700	900	58	28	<b>FA 15</b>	13	900	58	29	<b>BA 100</b>	50	800	66	32	
0.25	<b>12</b>	440	5.4	36	0.46	2.18	1.8	1.7	1.8	3800	5000	3800	3800	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000	5000
2	<b>BN 112M</b>	2900	6.6	74	0.88	4.43	6.5	2.1	2	98	30	<b>FD 06S</b>	20	—	800	107	40	<b>FA 06S</b>	20	800	107	42	<b>BA 110</b>	75	750	114	43	
0.3	<b>12</b>	460	6.2	46	0.43	2.19	2	2.1	2	—	—	—	—	—	3400	3400	3400	3400	3400	3400	3400	3400	3400	3400	3400	3400	3400	3400
3	<b>BN 132S</b>	2920	9.8	74	0.87	6.7	6.8	2.3	1.9	213	44	<b>FD 56</b>	37	—	450	223	57	<b>FA 06</b>	37	450	223	58	<b>BA 140</b>	150	380	263	76	
0.5	<b>12</b>	470	10.2	51	0.43	3.3	2	1.7	1.6	—	—	—	—	—	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000	3000
4	<b>BN 132M</b>	2920	13.1	75	0.89	8.6	5.9	2.4	2.3	270	53	<b>FD 56</b>	37	—	400	280	66	<b>FA 06</b>	37	400	280	67	<b>BA 140</b>	150	350	320	85	
0.7	<b>12</b>	460	14.5	53	0.44	4.3	1.9	1.7	1.6	—	—	—	—	—	2800	2800	2800	2800	2800	2800	2800	2800	2800	2800	2800	2800	2800	2800

















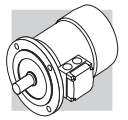
# 4/6 P

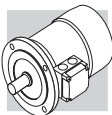
## 1500/1000 min<sup>-1</sup> - S1
















## 50 Hz

Pn kW		n min <sup>-1</sup>	Mn Nm	η %	cos φ	In [400V] A	Is In	Ms Mn	Ma Mn	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B5 	freno c.c. / d.c. brake G.S.-bremse / frein c.c.						freno c.a. / a.c. brake W.S.-bremse / frein c.a.									
												FD			FA			BA			FA			BA			
												Mod.	Mb Nm	Z <sub>o</sub> 1/h NB SB	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B5 	Mod.	Mb Nm	Z <sub>o</sub> 1/h	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B5 	Mod.	Mb max Nm	Z <sub>o</sub> 1/h	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B5 	
0.22	<b>BN 71B</b>	4	1.5	64	0.74	0.67	3.9	1.8	1.9	9.1	7.3	<b>FD 03</b>	3.5	2500	3500	10	10	<b>FA 03</b>	3.5	3500	10.2	9.7	<b>BA 70</b>	8	3200	11.1	11.2
0.13	<b>BN 80A</b>	6	1.4	43	0.67	0.65	2.3	1.6	1.7	15	8.2	<b>FD 04</b>	5	5000	9000	12.1	12.1	<b>FA 04</b>	5	3100	16.6	12.0	<b>BA 80</b>	18	8200	18	13.5
0.30	<b>BN 80A</b>	4	2.0	61	0.82	0.87	3.5	1.3	1.5	20	9.9	<b>FD 04</b>	10	2500	3100	13.8	13.8	<b>FA 04</b>	10	6000	22	13.7	<b>BA 80</b>	18	5500	23	15.2
0.20	<b>BN 80B</b>	6	2.1	54	0.66	0.81	3.2	1.9	2.0	20	9.9	<b>FD 04</b>	10	4000	6000	16.1	16.1	<b>FA 14</b>	10	2300	23	16.3	<b>BA 90</b>	35	5200	28	19.5
0.40	<b>BN 80B</b>	4	2.7	63	0.75	1.22	3.9	1.8	1.8	21	12.2	<b>FD 14</b>	10	1800	2300	20	20	<b>FA 05</b>	13	5500	32	21	<b>BA 90</b>	35	3300	35	21
0.26	<b>BN 90S</b>	6	2.7	55	0.70	0.97	2.7	1.5	1.6	28	14	<b>FD 05</b>	13	3600	5500	23	23	<b>FA 15</b>	26	2100	23	16.3	<b>BA 90</b>	35	3300	35	21
0.55	<b>BN 90S</b>	4	3.7	70	0.78	1.45	4.5	2.0	1.9	28	14	<b>FD 05</b>	13	1500	2100	32	32	<b>FA 15</b>	26	4100	32	21	<b>BA 90</b>	35	3300	35	21
0.33	<b>BN 90L</b>	6	3.4	62	0.70	1.10	3.7	2.3	2.0	82	22	<b>FD 15</b>	26	2500	4100	20	20	<b>FA 15</b>	26	2000	32	21	<b>BA 90</b>	35	3300	35	21
0.75	<b>BN 90L</b>	4	5.0	74	0.78	1.88	4.3	1.9	1.8	82	22	<b>FD 15</b>	26	1400	2000	86	86	<b>FA 15</b>	26	2000	86	29	<b>BA 100</b>	50	1800	94	32
0.45	<b>BN 90L</b>	6	4.7	66	0.71	1.39	3.3	2.0	1.9	95	25	<b>FD 15</b>	26	2300	3600	28	28	<b>FA 15</b>	26	3600	32	21	<b>BA 100</b>	50	3000	35	21
1.1	<b>BN 100LA</b>	4	7.2	74	0.79	2.72	5.0	1.7	1.9	82	22	<b>FD 15</b>	26	1400	2000	86	86	<b>FA 15</b>	26	2000	86	29	<b>BA 100</b>	50	1800	94	32
0.8	<b>BN 100LA</b>	6	8.0	65	0.69	2.57	4.1	1.9	2.1	95	25	<b>FD 15</b>	26	2100	3300	31	31	<b>FA 15</b>	26	3300	32	21	<b>BA 100</b>	50	3000	35	21
1.5	<b>BN 100LB</b>	4	9.9	75	0.79	3.65	5.1	1.7	1.9	168	32	<b>FD 15</b>	26	1300	1800	99	99	<b>FA 15</b>	26	1800	99	32	<b>BA 100</b>	50	1600	107	34
1.1	<b>BN 100LB</b>	6	11.1	72	0.68	3.24	4.3	2.0	2.1	168	32	<b>FD 15</b>	26	2000	3000	42	42	<b>FA 15</b>	26	3000	177	44	<b>BA 100</b>	50	2800	184	45
2.3	<b>BN 112M</b>	4	15.2	75	0.78	5.7	5.2	1.8	1.9	213	44	<b>FD 06S</b>	40	—	1600	177	177	<b>FA 06S</b>	40	1600	177	44	<b>BA 110</b>	75	1500	184	45
1.5	<b>BN 112M</b>	6	14.9	73	0.72	4.1	4.9	2.0	2.0	213	44	<b>FD 06S</b>	40	—	2400	223	223	<b>FA 06S</b>	40	2400	223	58	<b>BA 110</b>	75	2300	263	76
3.1	<b>BN 132S</b>	4	20	83	0.83	6.5	5.9	2.1	2.0	270	53	<b>FD 06</b>	50	—	1200	223	223	<b>FA 06</b>	50	1200	223	58	<b>BA 140</b>	150	1000	263	76
2	<b>BN 132S</b>	6	20	77	0.75	4.9	4.5	2.1	2.1	270	53	<b>FD 06</b>	50	—	1900	1900	1900	<b>FA 06</b>	50	1900	1900	67	<b>BA 140</b>	150	1600	320	85
4.2	<b>BN 132MA</b>	4	27	84	0.82	8.8	5.9	2.1	2.2	270	53	<b>FD 06</b>	50	—	900	280	280	<b>FA 06</b>	50	900	280	67	<b>BA 140</b>	150	800	320	85
2.6	<b>BN 132MA</b>	6	26	79	0.72	6.6	4.3	2.0	2.0	270	53	<b>FD 06</b>	50	—	1500	1500	1500	<b>FA 06</b>	50	1500	1500	67	<b>BA 140</b>	150	1300	320	85

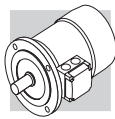
Pn kW		n min <sup>-1</sup>	Mn Nm	η %	cos φ	In [400V] A	Is In	Ms Mn	Ma Mn	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B5 	freno c.c. / d.c. brake G.S.-bremse / frein c.c.						freno c.a. / a.c. brake W.S.-bremse / frein c.a.											
												FD			FA			BA			FD			FA			BA		
												Mod.	Mb Nm	Z <sub>0</sub> 1/h	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B5 	Mod.	Mb Nm	Z <sub>0</sub> 1/h	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B5 	Mod.	Mb Nm	Z <sub>0</sub> 1/h	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B5 			
0.37	<b>BN 80A</b>	4	2.5	63	0.82	1.03	3.3	1.4	1.4	15	8.2	FD 04	10	2300	3500	16.6	12.1	FA 04	10	3500	7000	16.6	12.0	BA 80	18	3200	18	13.5	
0.18	<b>BN 80B</b>	8	2.5	44	0.60	0.98	2.2	1.5	1.6	20	9.9	FD 04	10	4500	7000	16.6	13.8	FA 04	10	7000	7000	16.6	13.7	BA 80	18	6500	23	15.2	
0.55	<b>BN 90S</b>	4	3.8	65	0.86	1.42	3.8	1.7	1.6	28	13.6	FD 14	15	2200	2900	22	17.8	FA 14	15	2900	6500	22	17.7	BA 90	35	2500	35	21	
0.30	<b>BN 90S</b>	8	4.3	49	0.65	1.36	2.3	1.7	1.8	30	15.1	FD 14	15	4200	6500	22	17.8	FA 14	15	6500	6500	22	17.7	BA 90	35	5600	21		
0.65	<b>BN 90S</b>	4	4.5	73	0.85	1.51	4.0	1.9	1.9	28	13.6	FD 14	15	2300	2800	30	17.8	FA 14	15	2800	30	17.7	BA 90	35	2400	35	21		
0.35	<b>BN 90L</b>	8	4.8	49	0.57	1.81	2.5	2.1	2.2	30	15.1	FD 05	26	3500	6000	34	21	FA 05	26	6000	6000	34	22	BA 90	35	5100	37	22	
0.9	<b>BN 90L</b>	4	6.3	73	0.87	2.05	3.8	1.8	1.8	30	15.1	FD 05	26	1700	2100	34	21	FA 05	26	2100	34	22	BA 90	35	1900	37	22		
0.5	<b>BN 90L</b>	8	7.1	57	0.62	2.04	2.4	2.1	2	30	15.1	FD 05	26	2500	4200	34	21	FA 05	26	4200	34	22	BA 90	35	3800	37	22		
1.3	<b>BN 100LA</b>	4	8.7	72	0.83	3.14	4.3	1.7	1.8	82	22	FD 15	40	1300	1700	86	28	FA 15	40	1700	86	29	BA 100	50	1500	94	32		
0.7	<b>BN 100LA</b>	8	9.6	58	0.64	2.72	2.8	1.8	1.8	82	22	FD 15	40	2000	3400	86	28	FA 15	40	3400	86	29	BA 100	50	3100	94	32		
1.8	<b>BN 100LB</b>	4	12.1	69	0.87	4.3	4.2	1.6	1.7	95	25	FD 15	40	1200	1700	99	31	FA 15	40	1700	99	32	BA 100	50	1500	107	34		
0.9	<b>BN 100LB</b>	8	12.3	62	0.63	3.3	3.2	1.7	1.8	95	25	FD 15	40	1600	2600	99	31	FA 15	40	2600	99	32	BA 100	50	2400	107	34		
2.2	<b>BN 112M</b>	4	14.6	77	0.85	4.9	5.3	1.8	1.8	168	32	FD 06S	60	—	—	177	42	FA 06S	60	1200	177	43	BA 110	75	1100	184	45		
1.2	<b>BN 112M</b>	8	16.1	70	0.63	3.9	3.3	1.9	1.8	168	32	FD 06S	60	—	—	177	42	FA 06S	60	2000	177	43	BA 110	75	1900	184	45		
3.6	<b>BN 132S</b>	4	24	80	0.82	7.9	6.5	2.1	1.9	295	45	FD 56	75	—	—	305	58	FA 06	75	1000	305	59	BA 140	150	900	345	77		
1.8	<b>BN 132S</b>	8	24	72	0.55	6.6	4.6	1.9	2	295	45	FD 56	75	—	—	305	58	FA 06	75	1400	305	59	BA 140	150	1200	345	77		
4.6	<b>BN 132M</b>	4	30	81	0.83	9.9	6.5	2.2	1.9	383	56	FD 06	100	—	—	393	69	FA 07	100	1000	406	74	BA 140	150	900	433	88		
2.3	<b>BN 132M</b>	8	31	73	0.54	8.4	4.4	2.3	2	383	56	FD 06	100	—	—	393	69	FA 07	100	1300	406	74	BA 140	150	1200	433	88		







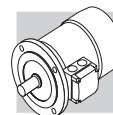





		freno c.c. / d.c. brake G.S.-bremse / frein c.c.											freno c.a. / a.c. brake W.S.-bremse / frein c.a.										
		FD											FA										
Pn		n	Mn		$\eta$ (100%)	$\eta$ (75%)	cos $\phi$	In	$\frac{I_s}{I_n}$	$\frac{M_s}{M_n}$	$\frac{J_m}{M_n}$	IM B9 	Mod.	Mb	Zo	NB	SB	Zo	Mb	Mod.	Zo	Jm x 10 <sup>-4</sup>	IM B9 
kW		min <sup>-1</sup>	Nm		%	%	A				kgm <sup>2</sup>	Kg		Nm	1/h			1/h	Nm		1/h	kgm <sup>2</sup>	Kg
0.18	<b>M 05A</b> 2	2730	0.63		59.9	56.9	0.77	0.56	3.0	2.1	2.0	3.2	<b>FD 02</b>	1.75	3900	4800	4800	4800	1.75	<b>FA 02</b>	4800	2.6	4.9
0.25	<b>M 05B</b> 2	2740	0.87		66.0	64.8	0.76	0.72	3.3	2.3	2.3	3.6	<b>FD 02</b>	1.75	3900	4800	4800	4800	1.75	<b>FA 02</b>	4800	3.0	5.3
0.37	<b>M 05C</b> 2	2800	1.26		69.1	66.8	0.78	0.99	3.9	2.6	2.6	4.8	<b>FD 02</b>	3.5	3600	4500	4500	4500	3.5	<b>FA 02</b>	4500	3.9	6.5
0.55	<b>M 1SD</b> 2	2820	1.86		76.0	75.8	0.76	1.37	5	2.9	2.8	5.8	<b>FD 03</b>	5	2900	4200	4200	4200	5	<b>FA 03</b>	4200	5.3	8.5
0.75	<b>M 1LA</b> 2	2810	2.6		76.6	76.2	0.76	1.86	5.1	3.1	2.8	6.9	<b>FD 03</b>	5	1900	3300	3300	3300	5	<b>FA 03</b>	3300	6.1	9.6
1.1	<b>M 2SA</b> 2	2800	3.8		76.4	76.2	0.81	2.57	4.8	2.8	2.4	8.8	<b>FD 04</b>	10	1500	3000	3000	3000	10	<b>FA 04</b>	3000	10.6	11.9
1.5	<b>M 2SB</b> 2	2800	5.1		79.1	79.5	0.81	3.4	4.9	2.7	2.4	10.6	<b>FD 04</b>	15	1300	2600	2600	2600	15	<b>FA 04</b>	2600	13.0	9.9
2.2	<b>M 3SA</b> 2	2850	7.4		80.2	80.9	0.78	5.1	5.2	2.1	1.8	15.5	<b>FD 15</b>	26	1100	2400	2400	2400	26	<b>FA 15</b>	2400	28	22
3	<b>M 3LA</b> 2	2860	10.0		82.8	82.6	0.79	6.6	5.7	2.6	2.2	18.7	<b>FD 15</b>	26	700	1600	1600	1600	26	<b>FA 15</b>	1600	35	25
4	<b>M 3LB</b> 2	2870	13.3		84.3	84.4	0.80	8.6	5.9	2.7	2.5	22	<b>FD 15</b>	40	450	900	900	900	40	<b>FA 15</b>	900	43	28
5.5	<b>M 4SA</b> 2	2890	18.2		86.1	85.7	0.84	11.0	6	2.6	2.2	33	<b>FD 06</b>	50	—	600	600	600	50	<b>FA 06</b>	600	112	46
7.5	<b>M 4SB</b> 2	2900	25		87.2	87.1	0.85	14.6	6.4	2.6	2.2	40	<b>FD 06</b>	50	—	550	550	550	50	<b>FA 06</b>	550	154	53
9.2	<b>M 4LA</b> 2	2930	30		89.0	88.5	0.86	17.3	6.9	2.8	2.3	51	<b>FD 56</b>	75	—	430	430	430	75	<b>FA 06</b>	430	189	64
11	<b>M 4LC</b> 2	2920	36		89.1	88.9	0.88	20.2	7	2.9	2.5	60											
15	<b>M 5SB</b> 2	2930	49		89.6	89.4	0.86	28.1	7.1	2.6	2.3	70											
18.5	<b>M 5SC</b> 2	2930	60		90.4	90.1	0.86	34	7.6	2.7	2.3	83											
22	<b>M 5LA</b> 2	2930	72		91.3	91.3	0.88	40	7.8	2.6	2.4	95											

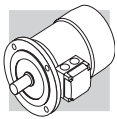




Pn kW		n min <sup>-1</sup>	Mn Nm	η %	cos φ	In [400V] A	Is In	Ms Mn	Ma Mn	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B9 	freno c.c. / d.c. brake G.S.-bremse / frein c.c.				freno c.a. / a.c. brake W.S.-bremse / frein c.a.						
												FD		FA		FD		FA				
												Mod.	Mb Nm	Z <sub>0</sub> 1/h	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B9 	Mod.	Mb Nm	Z <sub>0</sub> 1/h	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B9 	
0.09	<b>M 05A</b>	860	0.98	41	0.53	0.60	2.1	2.1	1.8	3.4	4.3	<b>FD 02</b>	3.5	9000	14000	4.0	6.0	<b>FA 02</b>	3.5	14000	4.0	5.8
0.12	<b>M 05B</b>	870	1.32	45	0.60	0.64	2.1	1.9	1.7	3.7	4.6	<b>FD 02</b>	3.5	9000	14000	4.3	6.3	<b>FA 02</b>	3.5	14000	4.3	6.1
0.18	<b>M 15C</b>	900	1.91	56	0.69	0.67	2.6	1.9	1.7	8.4	5.1	<b>FD 03</b>	5	8100	13500	9.5	7.8	<b>FA 03</b>	5	13500	9.5	7.5
0.25	<b>M 15D</b>	900	2.7	62	0.71	0.82	2.6	1.9	1.7	10.9	6.3	<b>FD 03</b>	5	7800	13000	12	9	<b>FA 03</b>	5	13000	12	8.7
0.37	<b>M 15A</b>	910	3.9	66	0.69	1.17	3	2.4	2	12.9	7.3	<b>FD 53</b>	7.5	5100	9500	14	10	<b>FA 03</b>	7.5	9500	14	9.7
0.55	<b>M 25A</b>	920	5.7	70	0.69	1.64	3.9	2.6	2.2	25	10.6	<b>FD 04</b>	15	4800	7200	27	14.5	<b>FA 04</b>	15	7200	27	14.4
0.75	<b>M 25B</b>	920	7.8	70	0.65	2.38	3.8	2.5	2.2	28	11.5	<b>FD 04</b>	15	3400	6400	30	15.4	<b>FA 04</b>	15	6400	30	15.3
1.1	<b>M 35A</b>	920	11.4	72	0.69	3.2	3.9	2.3	2	33	17	<b>FD 05</b>	26	2700	5000	37	23	<b>FA 15</b>	26	5000	37	24
1.5	<b>M 35A</b>	940	15.2	73	0.72	4.1	4	2.1	2	82	21	<b>FD 15</b>	40	1900	4100	86	27	<b>FA 15</b>	40	4100	86	28
1.85	<b>M 35B</b>	930	19.0	75	0.73	4.9	4.5	2.1	2	95	23	<b>FD 15</b>	40	1700	3600	99	29	<b>FA 15</b>	40	3600	99	30
2.2	<b>M 35C</b>	930	23	75	0.71	6.0	4.6	2	1.9	95	23	<b>FD 55</b>	55	—	1900	99	29	<b>FA 15</b>	55	1900	99	30
3	<b>M 45A</b>	940	30	76	0.76	7.5	4.8	1.9	1.8	216	34	<b>FD 56</b>	75	—	1400	226	47	<b>FA 06</b>	75	1400	226	48
4	<b>M 45A</b>	950	40	78	0.77	9.6	5.5	2	1.8	295	43	<b>FD 06</b>	100	—	1200	305	56	<b>FA 07</b>	100	1200	305	57
5.5	<b>M 45B</b>	945	56	80	0.78	12.7	5.9	2.1	1.9	383	54	<b>FD 07</b>	150	—	1050	406	70	<b>FA 07</b>	150	1050	406	72
7.5	<b>M 55A</b>	955	75	84	0.81	15.9	5.9	2.2	2	740	69	<b>FD 08</b>	170	—	900	815	98	<b>FA 08</b>	170	900	800	98
11	<b>M 55B</b>	960	109	87	0.81	22.5	6.5	2.5	2.3	970	89	<b>FD 08</b>	200	—	800	1045	119	<b>FA 08</b>	200	800	1030	118







Pn kW		n min <sup>-1</sup>	Mn Nm	η %	cos φ	In [400V] A	Is In	Ms Mn	Ma Mn	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B9 	freno c.c. / d.c. brake G.S.-bremse / frein c.c.				freno c.a. / a.c. brake W.S.-bremse / frein c.a.			
												Mod.	Mb Nm	Zo 1/h NB SB	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B9 	Mod.	Mb Nm	Zo 1/h
0.20	<b>M 05A</b>	2 2700	0.71	55	0.82	0.64	3.5	2.1	1.9	2.9	4.1	FD 02	3.5	2200	2600	3.5	2600	3.5	5.6
0.15	<b>M 05A</b>	4 1350	1.06	49	0.67	0.66	2.6	1.8	1.7	4.7	4	FD 03	3.5	4000	5100	5.8	5100	5.8	6.4
0.28	<b>M 15B</b>	2 2700	0.99	56	0.82	0.88	2.9	1.9	1.7	5.8	4.7	FD 03	5	2100	2400	5.8	2400	5.8	7.1
0.20	<b>M 15B</b>	4 1370	1.39	59	0.68	1.02	3.1	1.8	1.7	6.9	4.7	FD 03	5	3800	4800	6.7	4800	6.7	7.9
0.37	<b>M 15C</b>	2 2740	1.29	56	0.82	1.16	3.5	1.8	1.8	6.9	4.7	FD 03	5	1400	2100	6.9	2100	6.9	9.3
0.25	<b>M 15C</b>	4 1390	1.72	60	0.73	0.82	3.3	2	1.9	9.1	6.9	FD 03	5	2900	4200	9.6	4200	9.6	13
0.45	<b>M 15D</b>	2 2780	1.55	63	0.85	1.21	3.8	1.8	1.8	20	9.2	FD 03	10	1400	2100	13.1	2100	13.1	14.5
0.30	<b>M 15D</b>	4 1400	2.0	63	0.74	0.93	3.8	2.1	1.9	25	10.7	FD 03	10	2900	4200	14.5	4200	14.5	23
0.55	<b>M 15A</b>	2 2800	1.9	73	0.79	1.38	4.2	2	1.8	34	15.5	FD 03	5	1600	2200	10.2	2200	10.2	30
0.37	<b>M 15A</b>	4 1400	2.5	68	0.72	1.09	3.9	2.2	2	40	17	FD 03	5	3300	4600	10.2	4600	10.2	36
0.75	<b>M 25A</b>	2 2780	2.6	65	0.85	1.96	3.8	1.9	1.8	20	9.2	FD 04	10	1400	1600	22	1600	22	23
0.55	<b>M 25A</b>	4 1400	3.8	68	0.81	1.44	3.9	1.7	1.7	25	10.7	FD 04	10	2700	3600	22	3600	22	23
1.1	<b>M 25B</b>	2 2730	3.9	65	0.86	2.84	3.9	2	1.9	34	15.5	FD 04	10	1200	1500	27	1500	27	30
0.75	<b>M 25B</b>	4 1410	5.1	75	0.81	1.78	4.5	2.1	2	40	17	FD 04	10	2300	3100	31.00	3100	31.00	36
1.5	<b>M 35A</b>	2 2830	5.1	74	0.83	3.5	4.7	2.1	2	34	15.5	FD 15	26	700	1000	38	1000	38	44
1.1	<b>M 35A</b>	4 1420	7.4	77	0.78	2.6	4.3	2.1	2	40	17	FD 15	26	1600	2600	38	2600	38	44
2.2	<b>M 35A</b>	2 2800	7.5	72	0.85	5.2	4.5	2	1.9	40	17	FD 15	26	600	900	44	900	44	56
1.5	<b>M 35A</b>	4 1410	10.2	73	0.79	3.8	4.7	2	2	61	23	FD 15	40	1300	2300	44	2300	44	56
3.5	<b>M 35B</b>	2 2850	11.7	80	0.84	7.5	5.4	2.2	2.1	61	23	FD 15	40	500	900	65	900	65	65
2.5	<b>M 35B</b>	4 1420	16.8	82	0.80	5.5	5.2	2.2	2.2	213	42	FD 15	40	1000	2100	65	2100	65	75
4.8	<b>M 45A</b>	2 2900	15.8	81	0.88	9.7	6	2	1.9	213	42	FD 06	50	—	400	233	400	233	56
3.8	<b>M 45A</b>	4 1430	25.4	81	0.84	8.1	5.2	2.1	2.1	213	42	FD 06	50	—	950	950	950	950	56
5.5	<b>M 45B</b>	2 2890	18.2	80	0.87	11.4	5.9	2.4	2	213	42	FD 06	75	—	350	223	350	223	65
4.4	<b>M 45B</b>	4 1440	29	82	0.84	9.2	5.3	2.2	2	270	51	FD 06	100	—	900	280	900	280	75
7.5	<b>M 45A</b>	2 2900	25	82	0.87	15.2	6.5	2.4	2	319	57	FD 06	150	—	350	342	350	342	75
6	<b>M 45A</b>	4 1430	40	84	0.85	12.1	5.8	2.3	2.1	319	57	FD 07	150	—	950	300	950	300	800
9.2	<b>M 45B</b>	2 2920	30	83	0.86	18.6	6	2.6	2.2	319	57	FD 07	150	—	300	800	300	800	800
7.3	<b>M 45B</b>	4 1440	48	85	0.85	14.6	5.5	2.3	2.1	319	57	FD 07	150	—	800	800	800	800	800







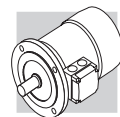
# 2/6 P

## 3000/1000 min<sup>-1</sup> - S3 60/40%

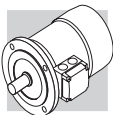
### 50 Hz

Pn kW		n min <sup>-1</sup>	Mn Nm	η %	cos φ	In [400V] A	Is In	Ms Mn	Ma Mn	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B9 	freno c.c. / d.c. brake G.S.-bremse / frein c.c.						freno c.a. / a.c. brake W.S.-bremse / frein c.a.					
												FD			FA								
		Mod.	Mb Nm	Z <sub>0</sub> 1/h	NB SB	Z <sub>0</sub> 1/h	Mb Nm	Mod.	Mb Nm	Z <sub>0</sub> 1/h	IM B9 	Mod.	Mb Nm	Z <sub>0</sub> 1/h	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B9 							
0.25	<b>M 1SA</b>	2850	0.84	60	0.82	0.73	4.3	1.9	1.8	6.9	5.5	FD 03	1.75	1500	1700	8	8.2	FA 03	1.75	1700	8	7.9	
0.08	<b>6</b>	910	0.84	43	0.70	0.38	2.1	1.4	1.5				10000	13000						13000			
0.37	<b>M 1LA</b>	2880	1.23	62	0.80	1.08	4.4	1.9	1.8	9.1	6.9	FD 03	3.5	1000	1300	10.2	9.6	FA 03	3.5	1300	10.2	9.3	
0.12	<b>6</b>	900	1.27	44	0.73	0.54	2.4	1.4	1.5				9000	11000						11000			
0.55	<b>M 2SA</b>	2800	1.88	63	0.86	1.47	4.5	1.9	1.7	20	9.2	FD 04	5	1500	1800	22	13.1	FA 04	5	1800	22	13	
0.18	<b>6</b>	930	1.85	52	0.65	0.77	3.3	2.0	1.9				4100	6300						6300			
0.75	<b>M 2SB</b>	2800	2.6	66	0.87	1.89	4.3	1.8	1.6	25	10.6	FD 04	5	1700	1900	27	14.5	FA 04	5	1900	27	14.4	
0.25	<b>6</b>	930	2.6	54	0.67	1.00	3.2	1.7	1.8				3800	6000						6000			
1.1	<b>M 3SA</b>	2870	3.7	71	0.82	2.73	4.9	1.8	1.9	34	15.5	FD 15	13	1000	1300	38	22	FA 15	13	1300	38	23	
0.37	<b>6</b>	930	3.8	63	0.70	1.21	3.1	1.5	1.8				3500	5000						5000			
1.5	<b>M 3LA</b>	2880	5.0	73	0.84	3.53	5.1	1.9	2.0	40	17	FD 15	13	1000	1200	44	24	FA 15	13	1200	44	24	
0.55	<b>6</b>	940	5.6	64	0.67	1.85	3.5	1.7	1.8				2900	4000						4000			
2.2	<b>M 3LB</b>	2900	7.2	77	0.85	4.9	5.9	2.0	2.0	61	23	FD 15	26	700	900	65	29	FA 15	26	900	65	30	
0.75	<b>6</b>	950	7.5	67	0.64	2.5	3.3	1.9	1.8				2100	3000						3000			
3	<b>M 4SA</b>	2910	9.9	74	0.88	6.6	5.6	2.0	2.1	170	36	FD 56	37	—	600	182	48	FA 06	37	600	182	50	
1.1	<b>6</b>	960	10.9	73	0.68	3.2	4.5	2.2	2				—	—	—	—				2200			
4.5	<b>M 4SB</b>	2910	14.8	78	0.84	9.9	5.8	1.9	1.8	213	42	FD 56	37	—	500	223	55	FA 06	37	500	223	56	
1.5	<b>6</b>	960	14.9	74	0.67	4.4	4.2	1.9	2.0				—	—	—	—				2100			
5.5	<b>M 4LA</b>	2920	18.0	78	0.87	11.7	6.2	2.1	1.9	270	51	FD 06	50	—	400	280	64	FA 06	50	400	280	65	
2.2	<b>6</b>	960	22	77	0.71	5.8	4.3	2.1	2.0				—	—	—	—				1900			

Pn kW		n min <sup>-1</sup>	Mn Nm	η %	cos φ	In [400V] A	Is In	Ms Mn	Ma Mn	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B9 	freno c.c. / d.c. brake G.S.-bremse / frein c.c.						freno c.a. / a.c. brake W.S.-bremse / frein c.a.					
												FD			FA								
												Mod.	Mb Nm	Z <sub>o</sub> 1/h	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B9 	Mod.	Mb Nm	Z <sub>o</sub> 1/h	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B9 		
0.37	<b>M 1LA</b>	2800	1.26	63	0.86	0.99	3.9	1.8	1.9	12.9	7.3	FD 03	3.5	1200	14	10	FA 03	3.5	1300	14	14	9.7	
0.09		8 670	1.28	34	0.75	0.51	1.8	1.4	1.5					9500	13000				13000				
0.55	<b>M 2SA</b>	2830	1.86	66	0.86	1.40	4.4	2.1	2	20	9.2	FD 04	5	1500	22	13.1	FA 04	5	1800	22	22	13	
0.13		8 690	1.80	41	0.64	0.72	2.3	1.6	1.7					5600	8000				8000				
0.75	<b>M 2SB</b>	2800	2.6	68	0.88	1.81	4.6	2.1	2	25	10.6	FD 04	10	1700	27	14.5	FA 04	10	1900	27	27	14.4	
0.18		8 690	2.5	43	0.66	0.92	2.3	1.6	1.7					4800	7300				7300				
1.1	<b>M 3SA</b>	2870	3.7	69	0.84	2.74	4.6	1.8	1.7	34	15.5	FD 15	13	1000	38	22	FA 15	13	1300	38	38	23	
0.28		8 690	3.9	44	0.56	1.64	2.3	1.4	1.7					3400	5000				5000				
1.5	<b>M 3LA</b>	2880	5.0	69	0.85	3.69	4.7	1.9	1.8	40	17	FD 15	13	1000	44	24	FA 15	13	1200	44	44	24	
0.37		8 690	5.1	46	0.63	1.84	2.1	1.6	1.6					3300	5000				5000				
2.4	<b>M 3LB</b>	2900	7.9	75	0.82	5.6	5.4	2.1	2	61	23	FD 15	26	550	65	29	FA 15	26	700	65	65	30	
0.55		8 700	7.5	54	0.58	2.5	2.6	1.8	1.8					2000	3500				3500				
3	<b>M 4SA</b>	2920	9.8	72	0.85	7.1	5.6	2	1.8	162	36	FD 56	37	—	182	48	FA 06	37	600	182	182	50	
0.75		8 710	10.1	61	0.64	2.8	3	1.7	1.8					—	3400				3400				
4	<b>M 4SB</b>	2870	13.3	73	0.84	9.4	5.6	2.3	2.4	213	42	FD 56	37	—	223	55	FA 06	37	500	223	223	56	
1		8 690	13.8	66	0.62	3.5	2.9	1.9	1.8					—	3500				3500				
5.5	<b>M 4LA</b>	2870	18.3	75	0.84	12.6	6.1	2.4	2.5	270	51	FD 06	50	—	280	64	FA 06	50	400	280	280	65	
1.5		8 690	21	68	0.63	5.1	2.9	1.9	1.9					—	2400				2400				









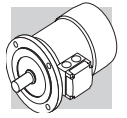


# 2/12 P

## 3000/500 min<sup>-1</sup> - S3 60/40%

### 50 Hz

Pn kW		n min <sup>-1</sup>	Mn Nm	η %	cos φ	In [400V] A	Is In	Ms Mn	Ma Mn	Jm x 10 <sup>-4</sup> kgm <sup>2</sup>	IM B9 	freno c.c. / d.c. brake G.S.-bremse / frein c.c.						freno c.a. / a.c. brake W.S.-bremse / frein c.a.							
												FD			FA										
		Mod.	Mb Nm	Z <sub>0</sub> 1/h	NB SB	Z <sub>0</sub> 1/h	SB	Mod.	Mb Nm	Z <sub>0</sub> 1/h	IM B9 	Mod.	Mb Nm	Z <sub>0</sub> 1/h	IM B9 										
0.55	<b>M 2SA</b>	2820	1.86	64	0.89	1.39	4.2	1.6	1.7	25	10.6	<b>FD 04</b>	5	1000	1300	<b>FA 04</b>	5	1300	27	14.5	<b>FA 04</b>	5	1300	27	14.4
0.09		430	2.0	30	0.63	0.69	1.8	1.9	1.8				8000	12000				12000							
0.75	<b>M 3SA</b>	2900	2.5	65	0.81	2.06	5.2	1.9	2.1	34	15.5	<b>FD 15</b>	13	700	900	<b>FA 15</b>	13	900	38	22	<b>FA 15</b>	13	900	38	23
0.12		460	2.5	33	0.43	1.22	1.9	1.3	1.6				5000	7000				7000							
1.1	<b>M 3LA</b>	2850	3.7	65	0.85	2.87	4.5	1.6	1.8	40	17	<b>FD 15</b>	13	700	900	<b>FA 15</b>	13	900	44	24	<b>FA 15</b>	13	900	44	24
0.18		430	4.0	26	0.54	1.85	1.5	1.3	1.5				4000	6000				6000							
1.5	<b>M 3LB</b>	2900	4.9	67	0.86	3.76	5.6	1.9	1.9	54	21	<b>FD 15</b>	13	700	900	<b>FA 15</b>	13	900	58	27	<b>FA 15</b>	13	900	58	28
0.25		440	5.4	36	0.46	2.18	1.8	1.7	1.8				3800	5000				5000							
2	<b>M 3LC</b>	2850	6.7	70	0.84	4.9	4.9	1.8	1.7	61	23	<b>FD 55</b>	18	—	700	<b>FA 15</b>	18	700	65	29	<b>FA 15</b>	18	700	65	30
0.3		450	6.4	38	0.47	2.4	1.7	1.6	1.7				—	—	3500		3500								
3	<b>M 4SA</b>	2920	9.8	74	0.87	6.7	6.8	2.3	1.9	213	42	<b>FD 56</b>	37	—	450	<b>FA 06</b>	37	450	223	55	<b>FA 06</b>	37	450	223	56
0.5		470	10.2	51	0.43	3.3	2	1.7	1.6				—	—	3000		3000								
4	<b>M 4LA</b>	2920	13.1	75	0.89	8.6	5.9	2.4	2.3	270	51	<b>FD 56</b>	37	—	400	<b>FA 06</b>	37	400	280	64	<b>FA 06</b>	37	400	280	65
0.7		460	14.5	53	0.44	4.3	1.9	1.7	1.6				—	—	2800		2800								



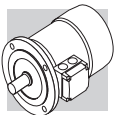
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M12 - DIMENSIONI MOTORI

M12 - MOTORS DIMENSIONS

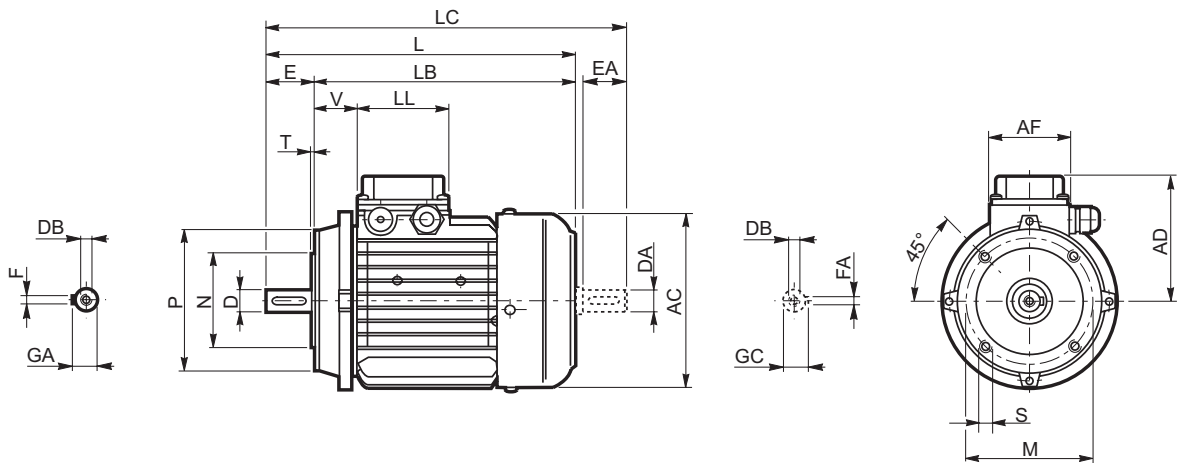
M12 - MOTORENABMESSUN-  
GEN

M12 - DIMENSIONS  
MOTEURS



**BN**

**IM B14**



	Albero / Shaft / Welle / Arbre					Flangia / Flange / Flansch / Bride					Motore / Motor / Motor / Moteur								
	D DA	E EA	DB	GA GC	F FA	M	N	P	S	T	AC	L	LB	LC	AD	AF	LL	V	
<b>BN 56</b>	9	20	M3	10.2	3	65	50	80	M5	2.5	110	185	165	207	91	74	80	34	
<b>BN 63</b>	11	23	M4	12.5	4	75	60	90	M5	2.5	121	207	184	232	95	74	80	26	
<b>BN 71</b>	14	30	M5	16	5	85	70	105	M6	2.5	138	249	219	281	108	74	80	37	
<b>BN 80</b>	19	40	M6	21.5	6	100	80	120	M6	3	156	274	234	315	119	74	80	38	
<b>BN 90</b>	24	50	M8	27	8	115	95	140	M8	3	176	326	276	378	133	98	98	44	
<b>BN 100</b>	28	60	M10	31	8	130	110	160	M8	3.5	195	366	306	429	142	98	98	50	
<b>BN 112</b>	28	60	M10	31	8	130	110	160	M8	3.5	219	385	325	448	157	98	98	52	
<b>BN 132</b>	38	80	M12	41	10	165	130	200	M10	4	258	493	413	576	193	118	118	58	

N.B.:

1) Queste dimensioni sono riferite alla seconda estremità d'albero.

NOTE:

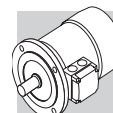
1) These values refer to the rear shaft end.

HINWEIS:

1) Diese Maße betreffen das zweite Wellenende.

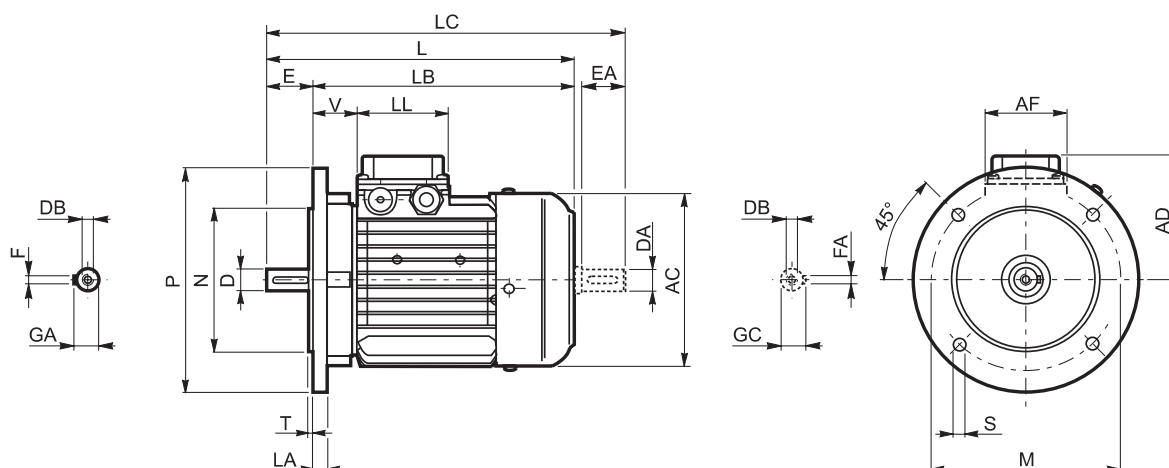
REMARQUE :

1) Ces dimensions se réfèrent à la deuxième extrémité de l'arbre.



**BN**

**IM B5**



	Albero / Shaft / Welle / Arbre					Flangia / Flange / Flansch / Bride						Motore / Motor / Motor / Moteur							
	D DA	E EA	DB	GA GC	F FA	M	N	P	S	T	LA	AC	L	LB	LC	AD	AF	LL	V
<b>BN 56</b>	9	20	M3	10.2	3	100	80	120	7	3	8	110	185	165	207	91	74	80	34
<b>BN 63</b>	11	23	M4	12.5	4	115	95	140	9.5	3	10	121	207	184	232	95	74	80	26
<b>BN 71</b>	14	30	M5	16	5	130	110	160	9.5	3	10	138	249	219	281	108	74	80	37
<b>BN 80</b>	19	40	M6	21.5	6	165	130	200	11.5	3.5	11.5	156	274	234	315	119	74	80	38
<b>BN 90</b>	24	50	M8	27	8	165	130	200	11.5	3.5	11.5	176	326	276	378	133	98	98	44
<b>BN 100</b>	28	60	M10	31	8	215	180	250	14	4	14	195	367	307	429	142	98	98	50
<b>BN 112</b>	28	60	M10	31	8	215	180	250	14	4	15	219	385	325	448	157	98	98	52
<b>BN 132</b>	38	80	M12	41	10	265	230	300	14	4	16	258	493	413	576	193	118	118	58
<b>BN 160 MR</b>	42 38 (1)	110 80 (1)	M16 M12 (1)	45 41 (1)	12 10 (1)	300	250	350	18.5	5	15	258	562	452	645	193	118	118	218
<b>BN 160 M</b>	42 38 (1)	110 80 (1)	M16 M12 (1)	45 41 (1)	12 10 (1)	300	250	350	18.5	5	15	310	596	486	680	245	187	187	51
<b>BN 160 L</b>	42 38 (1)	110 80 (1)	M16 M12 (1)	45 41 (1)	12 10 (1)	300	250	350	18.5	5	15	310	596	486	680	245	187	187	51
<b>BN 180 M</b>	48 38 (1)	110 110 (1)	M16 M12 (1)	51.5 41 (1)	14 10 (1)	300	250	350	18.5	5	15	310	640	530	724	245	187	187	51
<b>BN 180 L</b>	48 42 (1)	110 110 (1)	M16 M16 (1)	51.5 45 (1)	14 12 (1)	300	250	350	18.5	5	18	348	708	598	823	261	187	187	52
<b>BN 200 L</b>	55 42 (1)	110 110 (1)	M20 M16 (1)	59 45 (1)	16 12 (1)	350	300	400	18.5	5	18	348	722	612	837	261	187	187	66

N.B.:

1) Queste dimensioni sono riferite alla seconda estremità d'albero.

NOTE:

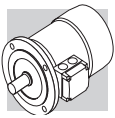
1) These values refer to the rear shaft end.

HINWEIS:

1) Diese Maße betreffen das zweite Wellenende.

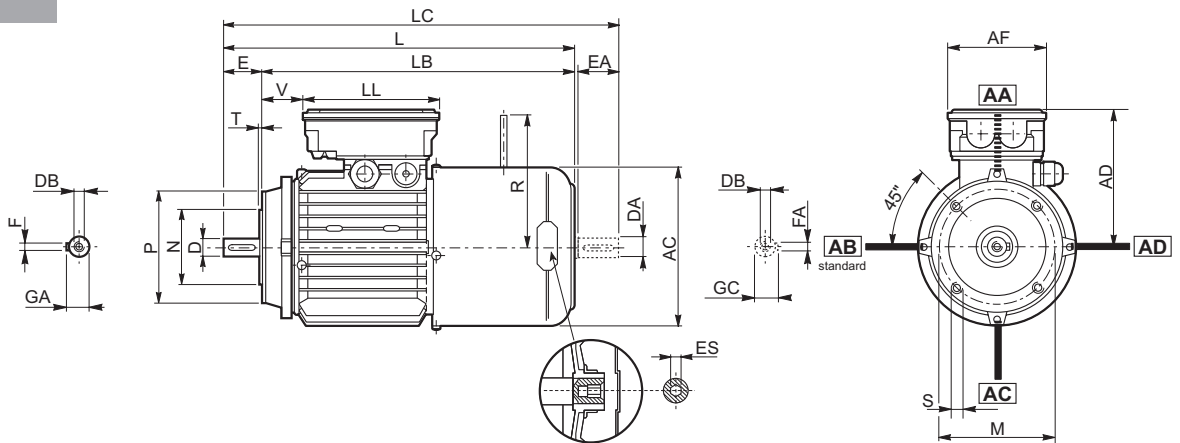
REMARQUE :

1) Ces dimensions se réfèrent à la deuxième extrémité de l'arbre.



# BN\_FD

## IM B14



	Albero / Shaft / Welle / Arbre					Flangia / Flange / Flansch / Bride					Motore / Motor / Motor / Moteur									
	D DA	E EA	DB	GA GC	F FA	M	N	P	S	T	AC	L	LB	LC	AD	AF	LL	V	R	ES
<b>BN 63</b>	11	23	M4	12.5	4	75	60	90	M5	2.5	121	272	249	297	119	98	133	14	96	5
<b>BN 71</b>	14	30	M5	16	5	85	70	105	M6	2.5	138	310	280	342	132	98	133	30	103	5
<b>BN 80</b>	19	40	M6	21.5	6	100	80	120	M6	3	156	346	306	388	143	98	133	41	129	5
<b>BN 90</b>	24	50	M8	27	8	115	95	140	M8	3	176	409	359	461	146	110	165	39	160	6
<b>BN 100</b>	28	60	M10	31	8	130	110	160	M8	3.5	195	458	398	521	155	110	165	62	160	6
<b>BN 112</b>	28	60	M10	31	8	130	110	160	M8	3.5	219	484	424	547	170	110	165	73	199	6
<b>BN 132</b>	38	80	M12	41	10	165	130	200	M10	4	258	603	523	686	193	118	118	180	204 (2)	6

N.B.:

- 1) Queste dimensioni sono riferite alla seconda estremità d'albero.
- 2) Per freno FD07 quota R=226.

NOTE:

- 1) These values refer to the rear shaft end.
- 2) For FD07 brake value R=226.

HINWEIS:

- 1) Diese Maße betreffen das zweite Wellenende.
- 2) Für Bremse FD07, Maß R=226.

REMARQUE :

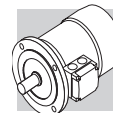
- 1) Ces dimensions se réfèrent à la deuxième extrémité de l'arbre.
- 2) Pour frein FD07 valeur R=226.

L'esagono ES non è presente con l'opzione PS.

ES hexagon is not supplied with PS option.

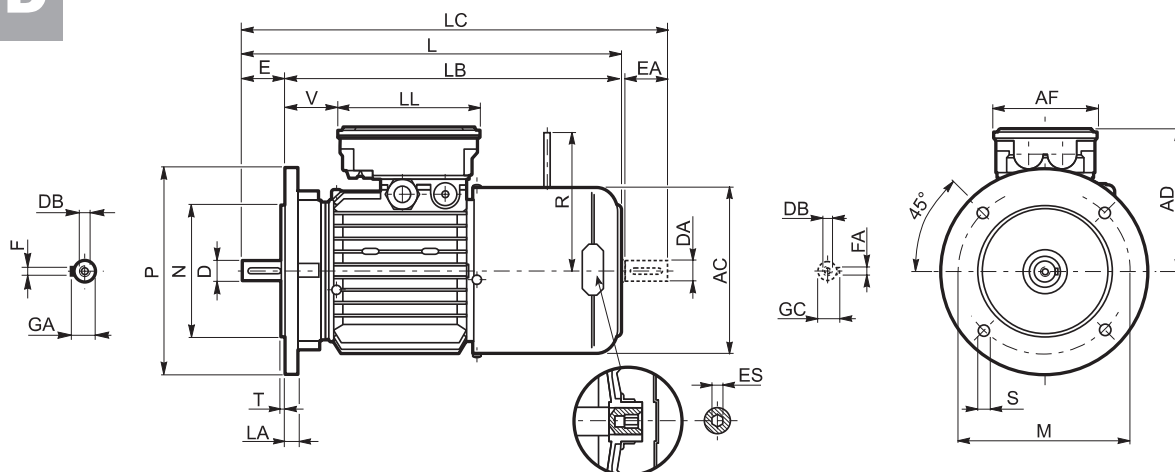
Der Sechskant ES ist bei der Option PS nicht vorhanden.

L'hexagone ES n'est pas disponible avec l'option PS.



# BN\_FD

## IM B5



	Albero / Shaft / Welle / Arbre					Flangia / Flange / Flansch / Bride						Motore / Motor / Motor / Moteur									
	D DA	E EA	DB	GA GC	F FA	M	N	P	S	T	LA	AC	L	LB	LC	AD	AF	LL	V	R	ES
<b>BN 63</b>	11	23	M4	12.5	4	115	95	140	9.5	3	10	121	272	249	297	119	98	133	14	96	5
<b>BN 71</b>	14	30	M5	16	5	130	110	160	9.5	3.5	10	138	310	280	342	132	98	133	30	103	5
<b>BN 80</b>	19	40	M6	21.5	6	165	130	200	11.5	3.5	11.5	156	346	306	388	143	98	133	41	129	5
<b>BN 90</b>	24	50	M8	27	8	165	130	200	11.5	3.5	11.5	176	409	359	461	146	110	165	39	160	6
<b>BN 100</b>	28	60	M10	31	8	215	180	250	14	4	14	195	458	398	521	155	110	165	62	160	6
<b>BN 112</b>	28	60	M10	31	8	215	180	250	14	4	15	219	484	424	547	170	110	165	73	199	6
<b>BN 132</b>	38	80	M12	41	10	265	230	300	14	4	16	258	603	523	686	193	118	118	180	204 (2)	6
<b>BN 160 MR</b>	42 38 (1)	110 80 (1)	M16 M12 (1)	45 41 (1)	12 10 (1)	300	250	350	18.5	5	15	258	672	562	755	193	118	118	218	226	6
<b>BN 160 M</b>	42 38 (1)	110 80 (1)	M16 M12 (1)	45 41 (1)	12 10 (1)	300	250	350	18.5	5	15	310	736	626	820	245	187	187	51	266	
<b>BN 160 L</b>	42 38 (1)	110 80 (1)	M16 M12 (1)	45 41 (1)	12 10 (1)	300	250	350	18.5	5	15	310	736	626	820	245	187	187	51	266	
<b>BN 180 M</b>	48 38 (1)	110 110 (1)	M16 M12 (1)	51.5 41 (1)	14 10 (1)	300	250	350	18.5	5	15	310	780	670	864	245	187	187	51	266	
<b>BN 180 L</b>	48 42 (1)	110 110 (1)	M16 M16 (1)	51.5 45 (1)	14 12 (1)	300	250	350	18.5	5	18	348	866	756	981	261	187	187	52	305	
<b>BN 200 L</b>	55 42 (1)	110 110 (1)	M20 M16 (1)	59 45 (1)	16 12 (1)	350	300	400	18.5	5	18	348	878	768	993	261	187	187	64	305	

N.B.:

- 1) Queste dimensioni sono riferite alla seconda estremità d'albero.
- 2) Per freno FD07 quota R=226.

NOTE:

- 1) These values refer to the rear shaft end.
- 2) For FD07 brake value R=226.

HINWEIS:

- 1) Diese Maße betreffen das zweite Wellenende.
- 2) Für Bremse FD07, Maß R=226.

REMARQUE :

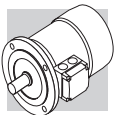
- 1) Ces dimensions se réfèrent à la deuxième extrémité de l'arbre.
- 2) Pour frein FD07 valeur R=226.

L'esagono ES non è presente con l'opzione PS.

ES hexagon is not supplied with PS option.

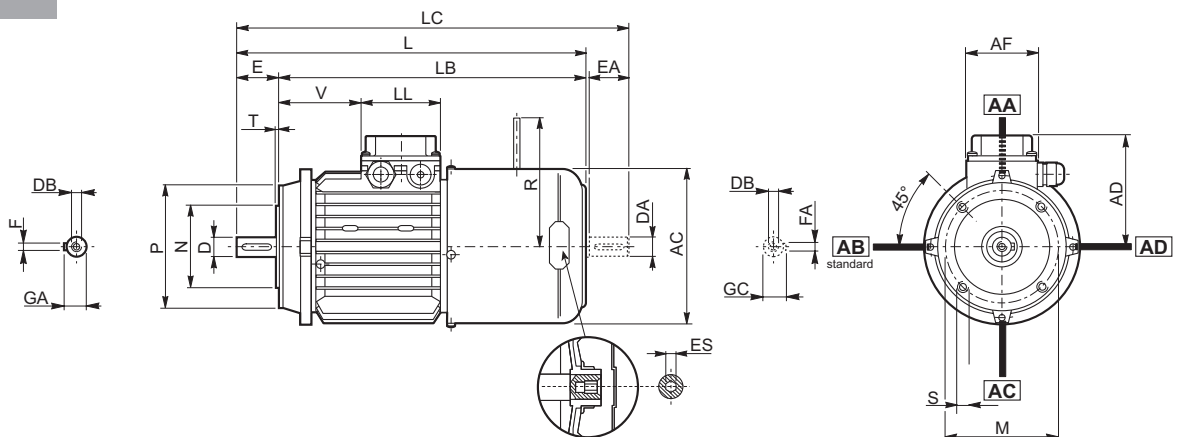
Der Sechskant ES ist bei der Option PS nicht vorhanden.

L'hexagone ES n'est pas disponible avec l'option PS.



# BN\_FA

## IM B14



	Albero / Shaft / Welle / Arbre					Flangia / Flange / Flansch / Bride					Motore / Motor / Motor / Moteur									
	D DA	E EA	DB	GA GC	F FA	M	N	P	S	T	AC	L	LB	LC	AD	AF	LL	V	R	ES
<b>BN 63</b>	11	23	M4	12.5	4	75	60	90	M5	2.5	121	272	249	119	95	74	80	26	116	5
<b>BN 71</b>	14	30	M5	16	5	85	70	105	M6	2.5	138	310	280	342	108	74	80	68	124	5
<b>BN 80</b>	19	40	M6	21.5	6	100	80	120	M6	3	156	346	306	388	119	74	80	83	134	5
<b>BN 90</b>	24	50	M8	27	8	115	95	140	M8	3	176	409	359	461	133	98	98	95	160	6
<b>BN 100</b>	28	60	M10	31	8	130	110	160	M8	3.5	195	458	398	521	142	98	98	119	160	6
<b>BN 112</b>	28	60	M10	31	8	130	110	160	M8	3.5	219	484	424	547	157	98	98	128	198	6
<b>BN 132</b>	38	80	M12	41	10	165	130	200	M10	4	258	603	523	686	193	118	118	180	200 (2)	6

**N.B.:**

- 1) Queste dimensioni sono riferite alla seconda estremità d'albero.
- 2) Per freno FD07 quota R=226.

**NOTE:**

- 1) These values refer to the rear shaft end.
- 2) For FD07 brake value R=226.

**HINWEIS:**

- 1) Diese Maße betreffen das zweite Wellenende.
- 2) Für Bremse FD07, Maß R=226.

**REMARQUE :**

- 1) Ces dimensions se réfèrent à la deuxième extrémité de l'arbre.
- 2) Pour frein FD07 valeur R=226.

Per la versione BN..FA le dimensioni della scatola morsettieria AD, AF, LL, V sono uguali al tipo BN..FD.

For motors type BN..FA, the terminal box sizes AD, AF, LL, V are the same as for BN..FD.

Bei der Motor typ BN..FA sind die Maße des Klemmenkastens AD, AF, LL, V denen der Version BN..FD gleich.

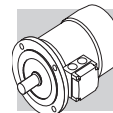
Pour moteurs type BN..FA les dimensions de la boîte à bornes AD, AF, LL, V sont les mêmes de BN..FD.

L'esagono ES non è presente con l'opzione PS.

ES hexagon is not supplied with PS option.

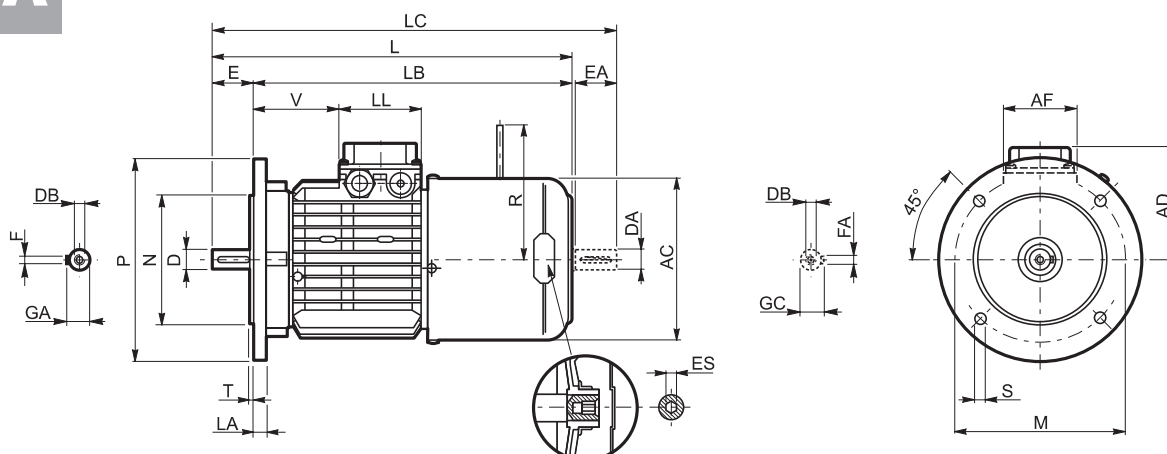
Der Sechskant ES ist bei der Option PS nicht vorhanden.

L'hexagone ES n'est pas disponible avec l'option PS.



# BN\_FA

## IM B5



	Albero / Shaft / Welle / Arbre					Flangia / Flange / Flansch / Bride						Motore / Motor / Motor / Moteur									
	D DA	E EA	DB	GA GC	F FA	M	N	P	S	T	LA	AC	L	LB	LC	AD	AF	LL	V	R	ES
<b>BN 63</b>	11	23	M4	12.5	4	115	95	140	9.5	3	10	121	272	249	297	95	74	80	26	116	5
<b>BN 71</b>	14	30	M5	16	5	130	110	160	9.5	3.5	10	138	310	280	342	108	74	80	68	124	5
<b>BN 80</b>	19	40	M6	21.5	6	165	130	200	11.5	3.5	11.5	156	346	306	388	119	74	80	83	134	5
<b>BN 90</b>	24	50	M8	27	8	165	130	200	11.5	3.5	11.5	176	409	359	461	133	98	98	95	160	6
<b>BN 100</b>	28	60	M10	31	8	215	180	250	14	4	14	195	458	398	521	142	98	98	119	160	6
<b>BN 112</b>	28	60	M10	31	8	215	180	250	14	4	15	219	484	424	547	157	98	98	128	198	6
<b>BN 132</b>	38	80	M12	41	10	265	230	300	14	4	16	258	603	523	686	193	118	118	180	200 (2)	6
<b>BN 160 MR</b>	42 38 (1)	110 80 (1)	M16 M12 (1)	45 41 (1)	12 10 (1)	300	250	350	18.5	5	15	258	672	562	755	193	118	118	218	217	6
<b>BN 160 M</b>	42 38 (1)	110 80 (1)	M16 M12 (1)	45 41 (1)	12 10 (1)	300	250	350	18.5	5	15	310	736	626	820	245	187	187	51	247	—
<b>BN 160 L</b>	42 38 (1)	110 80 (1)	M16 M12 (1)	45 41 (1)	12 10 (1)	300	250	350	18.5	5	15	310	736	626	820	245	187	187	51	247	—
<b>BN 180 M</b>	48 38 (1)	110 80 (1)	M16 M12 (1)	51.5 41 (1)	14 10 (1)	300	250	350	18.5	5	15	310	780	670	864	245	187	187	51	247	—

N.B.:

- 1) Queste dimensioni sono riferite alla seconda estremità d'albero.
- 2) Per freno FD07 quota R=226.

NOTE:

- 1) These values refer to the rear shaft end.
- 2) For FD07 brake value R=226.

HINWEIS:

- 1) Diese Maße betreffen das zweite Wellenende.
- 2) Für Bremse FD07, Maß R=226.

REMARQUE :

- 1) Ces dimensions se réfèrent à la deuxième extrémité de l'arbre.
- 2) Pour frein FD07 valeur R=226.

Le dimensioni AD, AF, LL e V relative alla scatola morsetteria dei motori BN...FA dotati di alimentazione separata del freno (opzione SA) coincidono con quelle dei motori BN...FD di pari taglia.

Dimensions AD, AF, LL and V, relevant to terminal box of motors BN...FA featuring the separate brake supply (option SA), are coincident with corresponding dimensions of same-size BN...FD motors.

Die Abmessungen des Klemmenkastens der Motoren BN ... FA AD, AF, LL und V in bezug auf die separate Spannungsversorgung (Option SA) stimmen mit den Abmessungen der entsprechenden Motoren BN...FD überein.

Les dimensions AD, AF, LL et V relatives à la boîte à borne des moteurs BN...FA équipés d'alimentation séparée du frein (option SA) sont identiques à celles des moteurs BN...FD de la même taille.

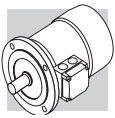
L'esagono ES non è presente con l'opzione PS.

ES hexagon is not supplied with PS option.

Der Sechskant ES ist bei der Option PS nicht vorhanden.

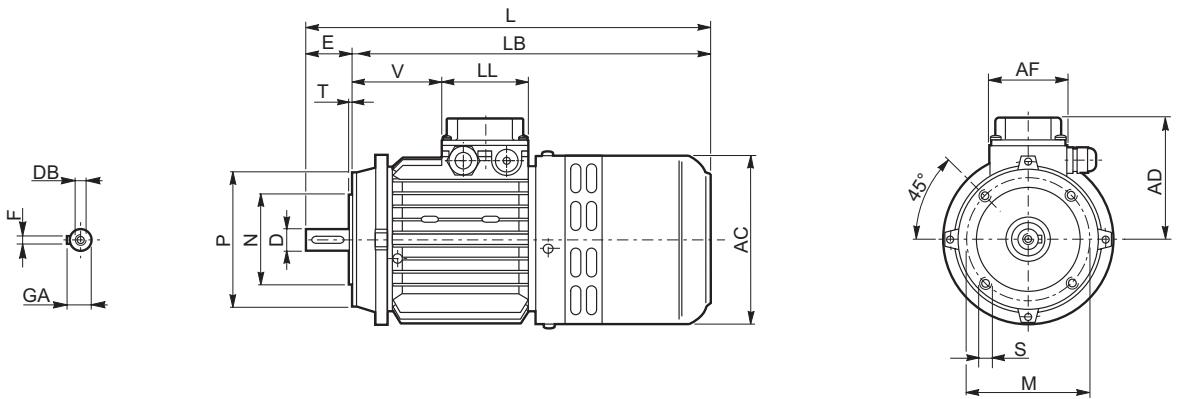
L'hexagone ES n'est pas disponible avec l'option PS.





# BN\_BA

## IM B14



	Albero / Shaft / Welle / Arbre					Flangia / Flange / Flansch / Bride					Motore / Motor / Motor / Moteur						
	D DA	E EA	DB	GA GC	F FA	M	N	P	S	T	AC	L	LB	AD	AF	LL	V
<b>BN 63</b>	11	23	M4	12.5	4	75	60	90	M5	2.5	124	298	275	95	74	80	28
<b>BN 71</b>	14	30	M5	16	5	85	70	105	M6	2.5	138	327	297	108	74	80	68
<b>BN 80</b>	19	40	M6	21.5	6	100	80	120	M6	3	156	372	332	119	74	80	83
<b>BN 90</b>	24	50	M8	27	8	115	95	140	M8	3	176	425	375	133	98	98	95
<b>BN 100</b>	28	60	M10	31	8	130	110	160	M8	3.5	195	477	417	142	98	98	119
<b>BN 112</b>	28	60	M10	31	8	130	110	160	M8	3.5	219	500	440	157	98	98	128
<b>BN 132</b>	38	80	M12	41	10	165	130	200	M10	4	258	638	558	193	118	118	180

**N.B.:**

Le dimensioni AD, AF, LL e V relative alla scatola morsetteria dei motori BN...BA dotati di alimentazione separata del freno (opzione SA) coincidono con quelle dei motori BN...FD di pari taglia.

**NOTE:**

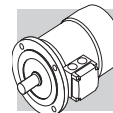
Dimensions AD, AF, LL and V, relevant to terminal box of motors BN...BA featuring the separate brake supply (option SA), are coincident with corresponding dimensions of same-size BN...FD motors

**HINWEIS:**

Die Abmessungen des Klemmenkastens der Motoren BN ... BA AD, AF, LL und V in bezug auf die separate Spannungsversorgung (Option SA) stimmen mit den Abmessungen der entsprechenden Motoren BN...FD überein.

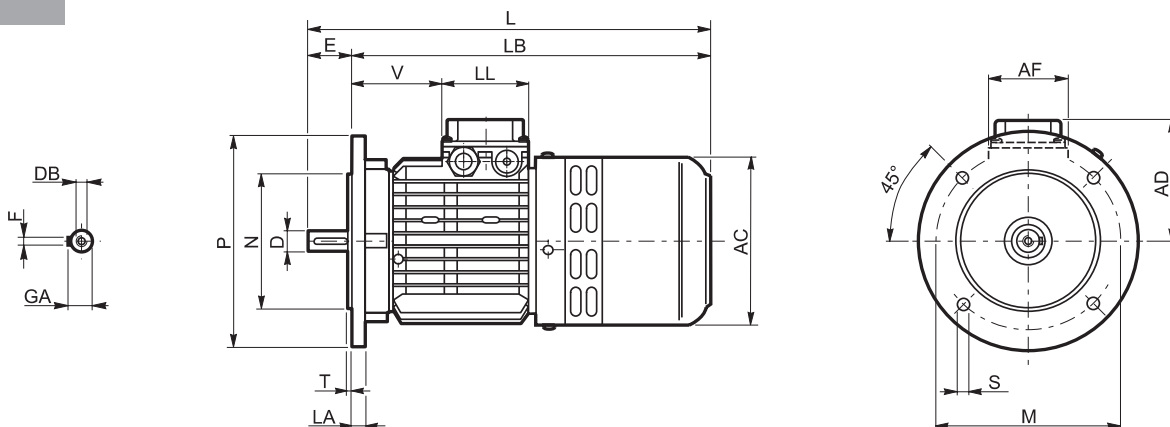
**REMARQUE :**

Les dimensions AD, AF, LL et V relatives à la boîte à borne des moteurs BN...BA équipés d'alimentation séparée du frein (option SA) sont identiques à celles des moteurs BN...FD de la même taille.



# BN\_BA

## IM B5



	Albero / Shaft / Welle / Arbre					Flangia / Flange / Flansch / Bride						Motore / Motor / Motor / Moteur						
	D DA	E EA	DB	GA GC	F FA	M	N	P	S	T	LA	AC	L	LB	AD	AF	LL	V
<b>BN63</b>	11	23	M4	12.5	4	115	95	140	9.5	3	10	124	298	275	95	74	80	28
<b>BN 71</b>	14	30	M5	16	5	130	110	160	9.5	3.5	10	138	327	297	108	74	80	68
<b>BN 80</b>	19	40	M6	21.5	6	165	130	200	11.5	3.5	11.5	156	372	332	119	74	80	83
<b>BN 90</b>	24	50	M8	27	8	165	130	200	11.5	3.5	11.5	176	425	375	133	98	98	95
<b>BN 100</b>	28	60	M10	31	8	215	180	250	14	4	14	195	477	417	142	98	98	119
<b>BN 112</b>	28	60	M10	31	8	215	180	250	14	4	15	219	500	440	157	98	98	128
<b>BN 132</b>	38	80	M12	41	10	265	230	300	14	4	16	258	638	558	193	118	118	180

**N.B.:**

Le dimensioni AD, AF, LL e V relative alla scatola morsetti dei motori BN...BA dotati di alimentazione separata del freno (opzione SA) coincidono con quelle dei motori BN...FD di pari taglia.

**NOTE:**

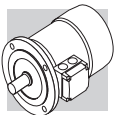
Dimensions AD, AF, LL and V, relevant to terminal box of motors BN...BA featuring the separate brake supply (option SA), are coincident with corresponding dimensions of same-size BN...FD motors

**HINWEIS:**

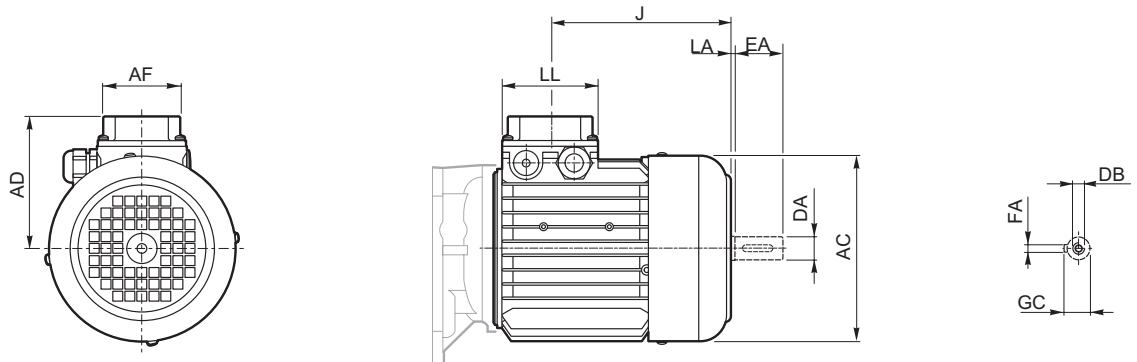
Die Abmessungen des Klemmenkastens der Motoren BN ... BA AD, AF, LL und V in bezug auf die separate Spannungsversorgung (Option SA) stimmen mit den Abmessungen der entsprechenden Motoren BN...FD überein.

**REMARQUE :**

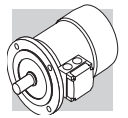
Les dimensions AD, AF, LL et V relatives à la boîte à borne des moteurs BN...BA équipés d'alimentation séparée du frein (option SA) sont identiques à celles des moteurs BN...FD de la même taille.



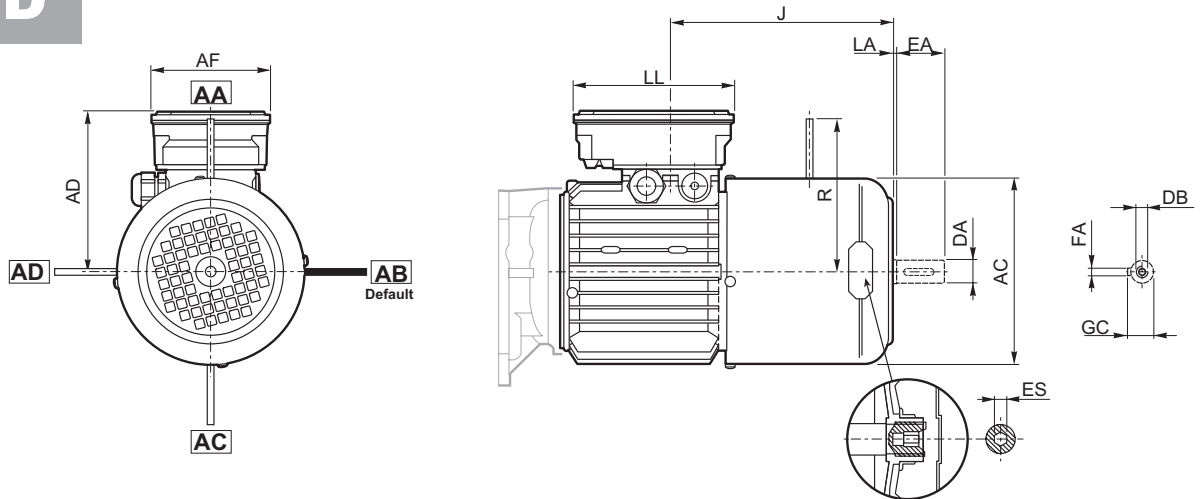
# M



	AC	AD	AF	LL	J	DA	EA	LA	DB	GC	FA
<b>M 0</b>	110	91	74	80	91	9	20	2	M3	10.2	3
<b>M 05</b>	121	95	74	80	117	11	23	3	M4	12.5	4
<b>M 1S</b>	138	108	74	80	118	14	30	2	M5	16	5
<b>M 1L</b>	138	108	74	80	142	14	30	2	M5	16	5
<b>M 2S</b>	156	119	74	80	152	19	40	3	M6	21.5	6
<b>M 3S</b>	195	142	98	98	176.5	28	60	3	M10	31	8
<b>M 3L</b>	195	142	98	98	208.5	28	60	3	M10	31	8
<b>M 4</b>	258	193	118	118	296.5	38	80	3	M12	41	10
<b>M 4LC</b>	258	193	118	118	331.5	38	80	3	M12	41	10
<b>M 5S</b>	310	245	187	187	341.5	38	80	4	M12	41	10
<b>M 5L</b>	310	245	187	187	385	38	80	4	M12	41	10



# M\_FD



	AC	AD	AF	LL	J	R	DA	EA	LA	DB	GC	FA	ES
<b>M 05</b>	121	119	98	133	183	96	11	23	2	M4	12.5	4	5
<b>M 1S</b>	138	132	98	133	153	103	14	30	2	M5	16	5	5
<b>M 1L</b>	138	132	98	133	175	103	14	30	2	M5	16	5	5
<b>M 2S</b>	156	143	98	133	184	129	19	40	2	M6	21.5	6	5
<b>M 3S</b>	195	155	110	165	202	160	28	60	3	M10	31	8	6
<b>M 3L</b>	195	155	110	165	229	160	28	60	3	M10	31	8	6
<b>M 4</b>	258	193	118	118	285	226	38	80	3	M12	41	10	6
<b>M 4LC</b>	258	193	118	118	431	226	38	80	3	M12	41	10	6
<b>M 5S</b>	310	245	187	187	481	266	38	80	4	M12	41	10	—
<b>M 5L</b>	310	245	187	187	525	266	38	80	4	M12	41	10	—

N.B.:

L'esagono ES non è presente con l'opzione PS.

NOTE:

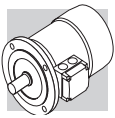
The hexagonal socket "ES" is not available with the PS option.

HINWEIS:

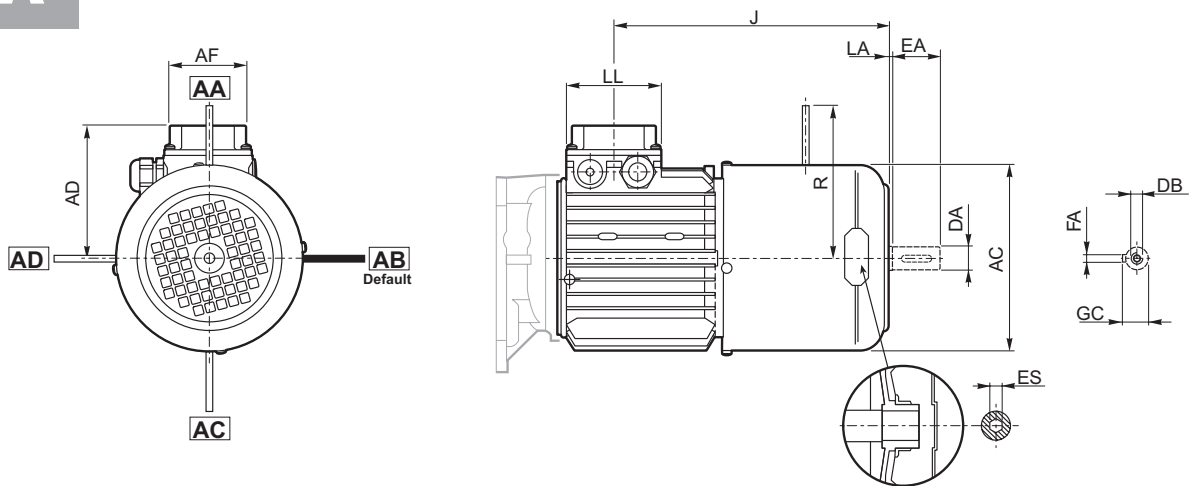
Der Sechskant ES ist bei der Option PS nicht vorhanden.

REMARQUE :

L'hexagone ES n'est pas disponible avec l'option PS.



# M\_FA



	AC	AD	AF	LL	J	R	DA	EA	LA	DB	GC	FA	ES
<b>M 05</b>	121	95	74	80	183	116	11	23	2	M4	12.5	4	5
<b>M 1S</b>	138	108	74	80	153	124	14	30	2	M5	16	5	5
<b>M 1L</b>	138	108	74	80	175	124	14	30	2	M5	16	5	5
<b>M 2S</b>	156	119	74	80	184	134	19	40	2	M6	21.5	6	5
<b>M 3S</b>	195	142	98	98	202	160	28	60	3	M10	31	8	6
<b>M 3L</b>	195	142	98	98	229	160	28	60	3	M10	31	8	6
<b>M 4</b>	258	193	118	118	285	217	38	80	3	M14	41	10	6
<b>M 4LC</b>	258	193	118	118	431	217	38	80	3	M14	41	10	6
<b>M 5S</b>	310	245	187	187	481	247	38	80	4	M12	41	10	—
<b>M 5L</b>	310	245	187	187	525	247	38	80	4	M12	41	10	—

N.B.:

L'esagono ES non è presente con l'opzione PS.

NOTE:

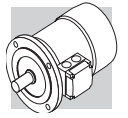
The hexagonal socket "ES" is not available with the PS option.

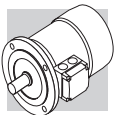
HINWEIS:

Der Sechskant ES ist bei der Option PS nicht vorhanden.

REMARQUE :

L'hexagone ES n'est pas disponible avec l'option PS.





R5			
Descrizione	Description	Beschreibung	Description
Aggiornato dati tecnici riduttori e motoriduttori.	<i>Revised ratings of gearboxes and gear motors.</i>	Aenderung von technischen Daten von den Getrieben und Getriebemotoren.	<i>Mise à jour des données techniques des réducteurs et des motoréducteurs.</i>
Aggiunto taglie riduttori 304 e 314.	<i>Frame sizes 304 and 314 newly added.</i>	Baugrößen 304 und 314 neu hinzugefügte.	<i>Tailles 304 et 314 ajoutés.</i>
Eliminato versioni angolari tipo "A" dalla taglia 310 fino alla taglia 321.	<i>Dropped right angle inputs type "A" for frame sizes 310 and larger.</i>	Die Eingangswinkelstufen Typ "A" für die Baugrößen 310 und größer werden nicht mehr verwendet.	<i>Elimination des versions angulaires de type "A" pour les tailles supérieures à 310.</i>
Aggiunto configurazione albero veloce con ventola.	<i>Fan cooled input shaft newly added.</i>	Lüfter gekühlt Eingangswelle neu hinzugefügt.	<i>Arbre d'entrée avec ventilateur de refroidissement ajoutés.</i>
Aggiunto versioni uscita FZB su taglie 311 e 313.	<i>Hollow splined shaft type FZB newly added for frame sizes 311 and 313.</i>	Vielkeilhohlwelle Typ FZB neu bei den Baugrößen 311 und 313.	<i>Ajout de la version de sortie FZB pour les tailles 311 et 313.</i>
Aggiornato dati e dimensioni centraline di raffreddamento.	<i>Revised capacity and dimensions of independent cooling units.</i>	Überarbeitete technische Daten und Abmessungen für separate Kühlsysteme.	<i>Mise à jour des données techniques et des dimensions des centrales de refroidissement.</i>

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