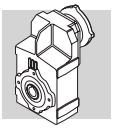
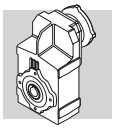


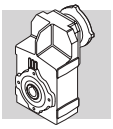
F 10

	i	J (•10-4) [kgm2]									
											
		60A		60B 80A		95A		80C 95B 110A		95C 110B	
		SK	SC	SK	SC	SK	SC	SK	SC	SK	SC
F 10 2_7.4	7.4	1.3	1.5	1.3	1.7	3.8	4.3	3.8	4.3	3.7	4.7
F 10 2_8.6	8.6	1.0	1.3	1.1	1.5	3.6	4.0	3.6	4.1	3.5	4.5
F 10 2_9.8	9.8	0.91	1.2	0.93	1.4	3.5	3.9	3.4	3.9	3.3	4.3
F 10 2_11.5	11.5	0.75	1.0	0.77	1.2	3.3	3.7	3.3	3.8	3.2	4.2
F 10 2_13.0	13.0	0.65	0.91	0.67	1.1	3.2	3.6	3.2	3.7	3.1	4.1
F 10 2_14.6	14.6	0.88	1.1	0.91	1.3	3.4	3.9	3.4	3.9	3.3	4.3
F 10 2_17.0	17.0	0.75	1.0	0.77	1.2	3.3	3.7	3.3	3.8	3.2	4.2
F 10 2_19.3	19.3	0.68	0.94	0.70	1.1	3.2	3.7	3.2	3.7	3.1	4.1
F 10 2_22.8	22.8	0.59	0.85	0.61	1.0	3.1	3.6	3.1	3.6	3.0	4.0
F 10 2_25.8	25.8	0.52	0.78	0.54	0.98	3.1	3.5	3.1	3.6	2.9	3.9
F 10 2_29.6	29.6	0.46	0.72	0.48	0.92	3.0	3.4	3.0	3.5	2.9	3.9
F 10 2_33.0	33.0	0.43	0.69	0.45	0.89	3.0	3.4	3.0	3.5	2.8	3.8
F 10 2_35.3	35.3	0.41	0.67	0.43	0.87	3.0	3.4	3.0	3.5	2.8	3.8
F 10 2_39.6	39.6	0.39	0.65	0.41	0.85	2.9	3.3	2.9	3.4	2.8	3.8
F 10 2_44.7	44.7	0.37	0.63	0.39	0.83	2.9	3.4	2.9	3.4	2.8	3.8
F 10 2_48.7	48.7	0.36	0.62	0.38	0.82	2.9	3.3	2.9	3.4	2.8	3.8
F 10 2_56.7	56.7	0.34	0.60	0.36	0.80	2.9	3.3	2.9	3.4	2.7	3.7
F 10 2_63.0	63.0	0.33	0.59	0.35	0.79	2.9	3.3	2.9	3.4	2.7	3.7
F 10 2_71.1	71.1	0.32	0.58	0.34	0.78	2.9	3.3	2.8	3.3	2.7	3.7
F 10 2_81.3	81.3	0.31	0.57	—	—	—	—	2.8	3.3	2.7	3.7
F 10 2_91.5	91.5	0.30	0.56	—	—	—	—	2.8	3.3	2.7	3.7
F 10 2_106.0	106.0	0.30	0.56	—	—	—	—	—	—	—	—
F 10 2_127.1	127.1	0.29	0.55	—	—	—	—	—	—	—	—



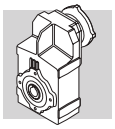
F 20

	i	J (•10-4) [kgm2]							
			IEC						
			63	71	80	90	100	112	
F 20 2_6.4	6.4	2.2	—	—	5.0	4.8	6.0	6.0	3.9
F 20 2_7.8	7.8	1.5	—	—	4.3	4.2	5.4	5.4	3.3
F 20 2_8.7	8.7	1.3	2.0	2.0	4.1	3.9	5.2	5.2	3.0
F 20 2_10.0	10.0	1.0	1.8	1.7	3.8	3.7	4.9	4.9	2.7
F 20 2_11.2	11.2	0.88	1.6	1.6	3.6	3.5	4.7	4.7	2.6
F 20 2_14.8	14.8	1.2	—	—	4.0	3.9	5.1	5.1	2.9
F 20 2_18.1	18.1	0.90	—	—	3.7	3.5	4.7	4.7	2.6
F 20 2_20.2	20.2	0.78	1.5	1.5	3.5	3.4	4.6	4.6	2.5
F 20 2_23.1	23.1	0.64	1.4	1.3	3.4	3.3	4.5	4.5	2.4
F 20 2_25.9	25.9	0.57	1.3	1.3	3.3	3.2	4.4	4.4	2.3
F 20 2_30.4	30.4	0.41	1.1	1.1	3.2	3.0	4.3	4.3	2.1
F 20 2_33.1	33.1	0.36	1.1	1.1	3.1	3.0	4.2	4.2	2.1
F 20 2_37.9	37.9	0.30	1.0	1.0	3.1	2.9	4.1	4.1	2.0
F 20 2_41.8	41.8	0.27	1.0	1.0	3.0	2.9	4.1	4.1	2.0
F 20 2_44.8	44.8	0.24	1.0	1.0	3.0	2.9	4.1	4.1	2.0
F 20 2_50.7	50.7	0.21	0.93	0.92	3.0	2.8	4.1	4.1	1.9
F 20 2_56.7	56.7	0.18	0.91	0.90	2.9	2.8	4.0	4.0	1.9
F 20 2_61.9	61.9	0.16	0.89	0.88	2.9	2.8	4.0	4.0	1.9
F 20 2_69.1	69.1	0.14	0.87	0.86	2.9	2.8	4.0	4.0	1.8
F 20 2_76.8	76.8	0.12	0.86	0.85	2.9	2.8	4.0	4.0	1.8
F 20 2_90.4	90.4	0.10	0.84	0.82	2.9	2.7	3.9	3.9	1.8
F 20 2_101.6	101.6	0.09	0.80	0.79	2.8	2.7	3.9	3.9	1.8
F 20 2_114.3	114.3	0.08	0.79	0.77	2.8	2.7	3.9	3.9	1.8
F 20 2_132.2	132.2	0.03	0.78	0.77	—	—	—	—	1.8
F 20 3_156.3	156.3	0.04	0.81	0.80	2.8	2.7	3.9	3.9	0.72
F 20 3_172.6	172.6	0.04	0.81	0.80	2.8	2.7	3.9	3.9	0.72
F 20 3_184.9	184.9	0.04	0.81	0.80	2.8	2.7	3.9	3.9	0.72
F 20 3_209.3	209.3	0.03	0.81	0.79	2.8	2.7	3.9	3.9	0.72
F 20 3_234.0	234.0	0.03	0.81	0.79	2.8	2.7	3.9	3.9	0.71
F 20 3_255.3	255.3	0.03	0.80	0.79	2.8	2.7	3.9	3.9	0.71
F 20 3_285.2	285.2	0.03	0.80	0.79	2.8	2.7	3.9	3.9	0.71
F 20 3_316.9	316.9	0.03	0.80	0.79	2.8	2.7	3.9	3.9	0.71
F 20 3_372.9	372.9	0.03	0.80	0.79	2.8	2.7	3.9	3.9	0.71
F 20 3_419.3	419.3	0.03	0.80	0.79	2.8	2.7	3.9	3.9	0.66
F 20 3_471.7	471.7	0.03	0.80	0.79	2.8	2.7	3.9	3.9	0.66
F 20 3_545.3	545.3	0.03	0.80	0.79	2.8	2.7	3.9	3.9	0.66



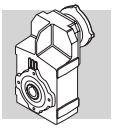
F 20

	i	J (•10-4) [kgm2]									
		SERVO									
		60A		60B 80A		95A		80C 95B 110A		95C 110B	
		SK	SC	SK	SC	SK	SC	SK	SC	SK	SC
F 20 2_6.4	6.4	—	—	—	—	—	—	5.0	5.5	4.8	5.8
F 20 2_7.8	7.8	—	—	—	—	—	—	4.3	4.8	4.2	5.2
F 20 2_8.7	8.7	1.6	1.8	1.6	2.0	4.1	4.6	4.1	4.6	3.9	4.9
F 20 2_10.0	10.0	1.3	1.5	1.3	1.7	3.8	4.3	3.8	4.3	3.7	4.7
F 20 2_11.2	11.2	1.2	1.4	1.2	1.6	3.7	4.1	3.6	4.1	3.5	4.5
F 20 2_14.8	14.8	—	—	—	—	—	—	4.0	4.5	3.9	4.9
F 20 2_18.1	18.1	—	—	—	—	—	—	3.7	4.2	3.5	4.5
F 20 2_20.2	20.2	1.1	1.3	1.1	1.5	3.6	4.0	3.5	4.0	3.4	4.4
F 20 2_23.1	23.1	0.91	1.2	0.93	1.4	3.5	3.9	3.4	3.9	3.3	4.3
F 20 2_25.9	25.9	0.84	1.1	0.86	1.3	3.4	3.8	3.3	3.8	3.2	4.2
F 20 2_30.4	30.4	0.68	0.94	0.70	1.1	3.2	3.7	3.2	3.7	3.0	4.0
F 20 2_33.1	33.1	0.63	0.89	0.65	1.1	3.2	3.6	3.1	3.6	3.0	4.0
F 20 2_37.9	37.9	0.47	0.83	0.59	1.0	3.1	3.6	3.1	3.6	2.9	3.9
F 20 2_41.8	41.8	0.44	0.80	0.56	1.0	3.1	3.5	3.0	3.5	2.9	3.9
F 20 2_44.8	44.8	0.41	0.77	0.53	0.97	3.1	3.5	3.0	3.5	2.9	3.9
F 20 2_50.7	50.7	0.48	0.74	0.50	0.94	3.0	3.5	3.0	3.5	2.8	3.8
F 20 2_56.7	56.7	0.45	0.71	0.47	0.91	3.0	3.4	2.9	3.4	2.8	3.8
F 20 2_61.9	61.9	0.43	0.69	0.45	0.89	3.0	3.4	2.9	3.4	2.8	3.8
F 20 2_69.1	69.1	0.41	0.67	0.43	0.87	3.0	3.4	2.9	3.4	2.8	3.8
F 20 2_76.8	76.8	0.39	0.65	0.41	0.85	2.9	3.4	2.9	3.4	2.8	3.8
F 20 2_90.4	90.4	0.37	0.63	0.39	0.83	2.9	3.4	2.9	3.4	2.7	3.7
F 20 2_101.6	101.6	0.36	0.62	—	—	—	—	2.8	3.3	2.7	3.7
F 20 2_114.3	114.3	0.35	0.61	—	—	—	—	2.8	3.3	2.7	3.7
F 20 2_132.2	132.2	0.30	0.56	—	—	—	—	—	—	—	—
F 20 3_156.3	156.3	0.31	0.57	0.33	0.77	2.9	3.3	2.8	3.3	2.7	3.7
F 20 3_172.6	172.6	0.31	0.57	0.33	0.77	2.9	3.3	2.8	3.3	2.7	3.7
F 20 3_184.9	184.9	0.31	0.57	0.33	0.77	2.9	3.3	2.8	3.3	2.7	3.7
F 20 3_209.3	209.3	0.30	0.56	0.32	0.76	2.9	3.3	2.8	3.3	2.7	3.7
F 20 3_234.0	234.0	0.30	0.56	0.32	0.76	2.9	3.3	2.8	3.3	2.7	3.7
F 20 3_255.3	255.3	0.30	0.56	0.32	0.76	2.9	3.3	2.8	3.3	2.7	3.7
F 20 3_285.2	285.2	0.30	0.56	0.32	0.76	2.9	3.3	2.8	3.3	2.7	3.7
F 20 3_316.9	316.9	0.30	0.56	0.32	0.76	2.9	3.3	2.8	3.3	2.7	3.7
F 20 3_372.9	372.9	0.30	0.56	0.32	0.76	2.9	3.3	2.8	3.3	2.7	3.7
F 20 3_419.3	419.3	0.30	0.56	0.32	0.76	2.9	3.3	2.8	3.3	2.7	3.7
F 20 3_471.7	471.7	0.30	0.56	0.32	0.76	2.9	3.3	2.8	3.3	2.7	3.7
F 20 3_545.3	545.3	0.30	0.56	0.32	0.76	2.9	3.3	2.8	3.3	2.7	3.7

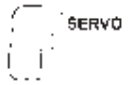


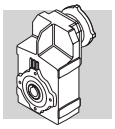
F 25

	i	J (•10-4) [kgm2]							
			IEC						
			63	71	80	90	100	112	
F 25 2_6.9	6.9	2.7	—	—	5.4	5.3	6.5	6.5	4.4
F 25 2_8.4	8.4	1.9	—	—	4.6	4.5	5.7	5.7	3.6
F 25 2_9.4	9.4	1.6	2.3	2.3	4.3	4.2	5.4	5.4	3.3
F 25 2_10.6	10.6	1.9	—	—	4.6	4.5	5.7	5.7	3.6
F 25 2_13.0	13.0	1.3	—	—	4.1	4.0	5.2	5.2	3.0
F 25 2_14.5	14.5	1.1	1.8	1.8	3.9	3.8	5.0	5.0	2.8
F 25 2_16.6	16.6	0.90	1.6	1.6	3.7	3.5	4.7	4.7	2.6
F 25 2_18.6	18.6	0.77	1.5	1.5	3.5	3.4	4.6	4.6	2.5
F 25 2_21.8	21.8	0.57	1.3	1.3	3.3	3.2	4.4	4.4	2.3
F 25 2_23.8	23.8	0.48	1.2	1.2	3.2	3.1	4.3	4.3	2.2
F 25 2_27.2	27.2	0.40	1.1	1.1	3.2	3.0	4.2	4.2	2.1
F 25 2_30.0	30.0	0.35	1.1	1.1	3.1	3.0	4.2	4.2	2.1
F 25 2_32.2	32.2	0.31	1.0	1.0	3.1	2.9	4.2	4.2	2.0
F 25 2_36.4	36.4	0.26	1.0	1.0	3.0	2.9	4.1	4.1	2.0
F 25 2_40.7	40.7	0.22	1.0	0.94	3.0	2.9	4.1	4.1	1.9
F 25 2_44.4	44.4	0.20	0.93	0.92	3.0	2.8	4.0	4.0	1.9
F 25 3_45.6	45.6	0.79	—	—	3.6	3.4	4.6	4.6	2.5
F 25 3_50.8	50.8	0.70	1.4	1.4	3.5	3.3	4.5	4.5	2.4
F 25 3_58.3	58.3	0.58	1.3	1.3	3.3	3.2	4.4	4.4	2.3
F 25 3_65.3	65.3	0.52	1.2	1.2	3.3	3.1	4.4	4.4	2.2
F 25 3_76.6	76.6	0.38	1.1	1.1	3.1	3.0	4.2	4.2	2.1
F 25 3_83.4	83.4	0.32	1.0	1.0	3.1	3.0	4.2	4.2	2.0
F 25 3_95.5	95.5	0.28	1.0	1.0	3.0	2.9	4.1	4.1	2.0
F 25 3_105.4	105.4	0.25	1.0	1.0	3.0	2.9	4.1	4.1	2.0
F 25 3_113.0	113.0	0.23	0.95	0.94	3.0	2.9	4.1	4.1	1.9
F 25 3_127.8	127.8	0.20	0.92	0.91	3.0	2.8	4.0	4.0	1.9
F 25 3_143.0	143.0	0.17	0.90	0.89	2.9	2.8	4.0	4.0	1.9
F 25 3_155.9	155.9	0.15	0.88	0.87	2.9	2.8	4.0	4.0	1.9
F 25 3_174.2	174.2	0.13	0.87	0.86	2.9	2.8	4.0	4.0	1.8
F 25 3_193.6	193.6	0.12	0.85	0.84	2.9	2.7	4.0	4.0	1.8
F 25 3_227.8	227.8	0.10	0.83	0.82	2.9	2.7	3.9	3.9	1.8
F 25 3_256.1	256.1	0.09	0.79	0.78	2.8	2.7	3.9	3.9	1.8
F 25 3_288.1	288.1	0.08	0.78	0.77	2.8	2.7	3.9	3.9	1.8
F 25 3_333.1	333.1	0.03	0.78	0.76	—	—	—	—	1.8
F 25 4_393.9	393.9	0.02	0.80	0.78	2.8	2.7	3.9	3.9	0.70
F 25 4_434.9	434.9	0.02	0.79	0.78	2.8	2.7	3.9	3.9	0.70
F 25 4_466.0	466.0	0.02	0.79	0.78	2.8	2.7	3.9	3.9	0.70
F 25 4_527.3	527.3	0.02	0.79	0.78	2.8	2.7	3.9	3.9	0.70
F 25 4_589.7	589.7	0.02	0.79	0.78	2.8	2.7	3.9	3.9	0.70
F 25 4_643.3	643.3	0.02	0.79	0.78	2.8	2.7	3.9	3.9	0.70
F 25 4_718.7	718.7	0.02	0.79	0.78	2.8	2.7	3.9	3.9	0.70
F 25 4_798.5	798.5	0.01	0.79	0.77	2.8	2.7	3.9	3.9	0.70
F 25 4_939.8	939.8	0.01	0.79	0.77	2.8	2.7	3.9	3.9	0.69
F 25 4_1057	1057	0.01	0.79	0.77	2.8	2.7	3.9	3.9	0.64
F 25 4_1189	1189	0.01	0.78	0.77	2.8	2.7	3.9	3.9	0.64
F 25 4_1374	1374	0.01	0.78	0.77	2.8	2.7	3.9	3.9	0.64



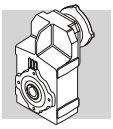
F 25

	i	J (•10-4) [kgm2]									
											
		60A		60B 80A		95A		80C 95B 110A		95C 110B	
		SK	SC	SK	SC	SK	SC	SK	SC	SK	SC
F 25 2_6.9	6.9	—	—	—	—	—	—	5.4	5.9	5.3	6.3
F 25 2_8.4	8.4	—	—	—	—	—	—	4.6	5.1	4.5	5.5
F 25 2_9.4	9.4	1.9	2.1	1.9	2.3	4.4	4.9	4.3	4.8	4.2	5.2
F 25 2_10.6	10.6	—	—	—	—	—	—	4.6	5.1	4.5	5.5
F 25 2_13.0	13.0	—	—	—	—	—	—	4.1	4.6	4.0	5.0
F 25 2_14.5	14.5	1.4	1.6	1.4	1.8	3.9	4.4	3.9	4.4	3.8	4.8
F 25 2_16.6	16.6	1.2	1.4	1.2	1.6	3.7	4.2	3.7	4.2	3.5	4.5
F 25 2_18.6	18.6	1.0	1.3	1.1	1.5	3.6	4.0	3.5	4.0	3.4	4.4
F 25 2_21.8	21.8	0.84	1.1	0.86	1.3	3.4	3.8	3.3	3.8	3.2	4.2
F 25 2_23.8	23.8	0.75	1.0	0.77	1.2	3.3	3.7	3.2	3.7	3.1	4.1
F 25 2_27.2	27.2	0.67	0.93	0.69	1.1	3.2	3.7	3.2	3.7	3.0	4.0
F 25 2_30.0	30.0	0.62	0.88	0.64	1.1	3.2	3.6	3.1	3.6	3.0	4.0
F 25 2_32.2	32.2	0.58	0.84	1.4	1.8	3.1	3.6	3.1	3.6	2.9	3.9
F 25 2_36.4	36.4	0.53	0.79	0.55	0.99	3.1	3.5	3.0	3.5	2.9	3.9
F 25 2_40.7	40.7	0.49	0.75	0.51	0.95	3.0	3.5	3.0	3.5	2.9	3.9
F 25 2_44.4	44.4	0.47	0.73	0.49	0.93	3.0	3.5	3.0	3.5	2.8	3.8
F 25 3_45.6	45.6	1.1	1.3	1.1	1.5	3.6	4.0	3.6	4.1	3.4	4.4
F 25 3_50.8	50.8	0.97	1.2	0.99	1.4	3.5	4.0	3.5	4.0	3.3	4.3
F 25 3_58.3	58.3	0.85	1.1	0.87	1.3	3.4	3.8	3.3	3.8	3.2	4.2
F 25 3_65.3	65.3	0.79	1.1	0.84	1.2	3.3	3.8	3.3	3.8	3.1	4.1
F 25 3_76.6	76.6	0.65	0.91	0.67	1.1	3.2	3.6	3.1	3.6	3.0	4.0
F 25 3_83.4	83.4	0.59	0.85	0.61	1.0	3.1	3.6	3.1	3.6	3.0	4.0
F 25 3_95.5	95.5	0.55	0.81	0.57	1.0	3.1	3.5	3.0	3.5	2.9	3.9
F 25 3_105.4	105.4	0.52	0.78	0.54	0.98	3.1	3.5	3.0	3.5	2.9	3.9
F 25 3_113.0	113.0	0.50	0.76	0.52	0.96	3.1	3.5	3.0	3.5	2.9	3.9
F 25 3_127.8	127.8	0.47	0.73	0.49	0.93	3.0	3.5	3.0	3.5	2.8	3.8
F 25 3_143.0	143.0	0.44	0.70	0.46	0.90	3.0	3.4	2.9	3.4	2.8	3.8
F 25 3_155.9	155.9	0.42	0.68	0.44	0.88	3.0	3.4	2.9	3.4	2.8	3.8
F 25 3_174.2	174.2	0.40	0.66	0.42	0.86	3.0	3.4	2.9	3.4	2.8	3.8
F 25 3_193.6	193.6	0.39	0.65	0.41	0.85	2.9	3.4	2.9	3.4	2.7	3.7
F 25 3_227.8	227.8	0.37	0.63	0.39	0.83	2.9	3.4	2.9	3.4	2.7	3.7
F 25 3_256.1	256.1	0.36	0.62	—	—	—	—	2.8	3.3	2.7	3.7
F 25 3_288.1	288.1	0.35	0.61	—	—	—	—	2.8	3.3	2.7	3.7
F 25 3_333.1	333.1	0.30	0.56	—	—	—	—	—	—	—	—
F 25 4_393.9	393.9	0.29	0.55	0.31	0.75	2.8	3.3	2.8	3.3	2.7	3.7
F 25 4_434.9	434.9	0.29	0.55	0.31	0.75	2.8	3.3	2.8	3.3	2.7	3.7
F 25 4_466.0	466.0	0.29	0.55	0.31	0.75	2.8	3.3	2.8	3.3	2.7	3.7
F 25 4_527.3	527.3	0.29	0.55	0.31	0.75	2.8	3.3	2.8	3.3	2.7	3.7
F 25 4_589.7	589.7	0.29	0.55	0.31	0.75	2.8	3.3	2.8	3.3	2.7	3.7
F 25 4_643.3	643.3	0.29	0.55	0.31	0.75	2.8	3.3	2.8	3.3	2.7	3.7
F 25 4_718.7	718.7	0.29	0.55	0.31	0.75	2.8	3.3	2.8	3.3	2.7	3.7
F 25 4_798.5	798.5	0.28	0.54	0.30	0.74	2.8	3.3	2.8	3.3	2.7	3.7
F 25 4_939.8	939.8	0.28	0.54	0.30	0.74	2.8	3.3	2.8	3.3	2.7	3.7
F 25 4_1057	1057	0.28	0.54	0.30	0.74	2.8	3.3	2.8	3.3	2.7	3.7
F 25 4_1189	1189	0.28	0.54	0.30	0.74	2.8	3.3	2.8	3.3	2.7	3.7
F 25 4_1374	1374	0.28	0.54	0.30	0.74	2.8	3.3	2.8	3.3	2.7	3.7



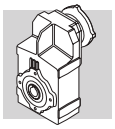
F 31

	i	J (•10-4) [kgm2]								
			IEC							
			63	71	80	90	100	112	132	
F 31 2_6.9	6.9	5.0	—	—	7.8	7.6	8.9	8.9	22	7.1
F 31 2_8.2	8.2	3.7	—	—	6.5	6.3	7.5	7.5	20	5.8
F 31 2_9.0	9.0	3.2	—	—	6.0	5.8	7.0	7.0	20	5.3
F 31 2_10.7	10.7	3.5	—	—	6.3	6.2	7.4	7.4	20	5.6
F 31 2_12.7	12.7	2.6	—	—	5.4	5.3	6.5	6.5	19	4.7
F 31 2_13.9	13.9	2.3	—	—	5.1	4.9	6.2	6.2	19	4.4
F 31 2_16.8	16.8	1.8	—	—	4.6	4.4	5.6	5.6	18	3.9
F 31 2_18.5	18.5	1.5	2.2	2.2	4.2	4.1	5.3	5.3	18	3.5
F 31 2_21.1	21.1	1.1	1.8	1.8	3.9	3.7	5.0	5.0	18	3.2
F 31 2_23.4	23.4	1.0	1.7	1.7	3.7	3.6	4.8	4.8	18	3.0
F 31 2_27.3	27.3	0.78	1.5	1.5	3.5	3.4	4.6	4.6	17	2.8
F 31 2_30.1	30.1	0.65	1.4	1.4	3.4	3.3	4.5	4.5	17	2.7
F 31 2_34.4	34.4	0.53	1.3	1.2	3.3	3.2	4.4	4.4	17	2.6
F 31 2_37.7	37.7	0.47	1.2	1.2	3.2	3.1	4.3	4.3	17	2.5
F 31 2_40.4	40.4	0.42	1.1	1.1	3.2	3.0	4.3	4.3	—	2.5
F 31 2_44.6	44.6	0.37	1.1	1.1	3.1	3.0	4.2	4.2	—	2.4
F 31 3_47.5	47.5	1.6	—	—	4.3	4.2	5.4	5.4	18	3.6
F 31 3_52.1	52.1	1.4	—	—	4.2	4.0	5.3	5.3	18	3.5
F 31 3_62.8	62.8	1.2	—	—	3.9	3.8	5.0	5.0	18	3.2
F 31 3_69.1	69.1	1.0	1.7	1.7	3.7	3.6	4.8	4.8	18	3.0
F 31 3_78.9	78.9	0.72	1.4	1.4	3.5	3.4	4.6	4.6	17	2.8
F 31 3_87.4	87.4	0.66	1.4	1.4	3.4	3.3	4.5	4.5	17	2.7
F 31 3_101.9	101.9	0.54	1.3	1.2	3.3	3.2	4.4	4.4	17	2.6
F 31 3_112.5	112.5	0.46	1.2	1.2	3.2	3.1	4.3	4.3	17	2.5
F 31 3_128.4	128.4	0.38	1.1	1.1	3.1	3.0	4.2	4.2	17	2.4
F 31 3_140.7	140.7	0.35	1.1	1.1	3.1	3.0	4.2	4.2	17	2.4
F 31 3_150.8	150.8	0.31	1.0	1.0	3.1	2.9	4.2	4.2	—	2.4
F 31 3_166.8	166.8	0.28	1.0	1.0	3.0	2.9	4.1	4.1	—	2.3
F 31 3_185.4	185.4	0.24	1.0	1.0	3.0	2.9	4.1	4.1	—	2.3
F 31 3_202.3	202.3	0.21	0.94	0.93	3.0	2.8	4.1	4.1	—	2.3
F 31 3_228.2	228.2	0.18	0.92	0.90	2.9	2.8	4.0	4.0	—	2.2
F 31 3_253.6	253.6	0.16	0.89	0.88	2.9	2.8	4.0	4.0	—	2.2
F 31 3_293.8	293.8	0.13	0.86	0.85	2.9	2.8	4.0	4.0	—	2.2
F 31 3_332.8	332.8	0.11	0.82	0.81	2.9	2.7	4.0	4.0	—	2.2
F 31 3_374.4	374.4	0.10	0.81	0.79	2.9	2.7	3.9	3.9	—	2.2
F 31 4_418.9	418.9	0.09	0.86	0.85	2.9	2.8	3.9	3.9	—	0.77
F 31 4_462.6	462.6	0.08	0.86	0.84	2.9	2.7	3.9	3.9	—	0.77
F 31 4_527.8	527.8	0.08	0.85	0.84	2.9	2.7	3.9	3.9	—	0.76
F 31 4_578.6	578.6	0.08	0.85	0.84	2.9	2.7	3.9	3.9	—	0.76
F 31 4_619.9	619.9	0.07	0.85	0.83	2.9	2.7	3.9	3.9	—	0.76
F 31 4_685.6	685.6	0.07	0.85	0.83	2.9	2.7	3.9	3.9	—	0.76
F 31 4_762.3	762.3	0.07	0.84	0.83	2.9	2.7	3.9	3.9	—	0.75
F 31 4_831.6	831.6	0.07	0.84	0.83	2.9	2.7	3.9	3.9	—	0.75
F 31 4_938.2	938.2	0.07	0.84	0.83	2.9	2.7	3.9	3.9	—	0.75
F 31 4_1042	1042	0.07	0.84	0.83	2.9	2.7	3.9	3.9	—	0.75
F 31 4_1208	1208	0.06	0.84	0.82	2.9	2.7	3.9	3.9	—	0.75
F 31 4_1368	1368	0.06	0.84	0.82	2.9	2.7	3.9	3.9	—	0.75
F 31 4_1539	1539	0.06	0.84	0.82	2.9	2.7	3.9	3.9	—	0.75



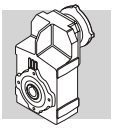
F 31

	i	J (•10-4) [kgm2]											
		SERVO											
		60A		60B 80A		95A		80C 95B 110A		95C 110B		130A	
		SK	SC	SK	SC	SK	SC	SK	SC	SK	SC	SK	SC
F 31 2_6.9	6.9	—	—	—	—	—	—	7.8	8.3	7.6	8.6	7.6	8.6
F 31 2_8.2	8.2	—	—	—	—	—	—	6.5	7.0	6.3	7.3	6.3	7.3
F 31 2_9.0	9.0	—	—	—	—	—	—	6.0	6.5	5.8	6.8	5.8	6.8
F 31 2_10.7	10.7	—	—	—	—	—	—	6.3	6.8	6.2	7.2	6.2	7.2
F 31 2_12.7	12.7	—	—	—	—	—	—	5.4	5.9	5.3	6.3	5.3	6.3
F 31 2_13.9	13.9	—	—	—	—	—	—	5.1	5.6	4.9	5.9	4.9	5.9
F 31 2_16.8	16.8	—	—	—	—	—	—	4.6	5.1	4.4	5.4	4.4	5.4
F 31 2_18.5	18.5	1.8	2.0	1.8	2.2	4.3	4.8	4.2	4.7	4.1	5.1	4.1	5.1
F 31 2_21.1	21.1	1.4	1.6	1.4	1.8	3.9	4.3	3.9	4.4	3.7	4.7	3.7	4.7
F 31 2_23.4	23.4	1.3	1.5	1.3	1.7	3.8	4.3	3.7	4.2	3.6	4.6	3.6	4.6
F 31 2_27.3	27.3	1.1	1.3	1.1	1.5	3.6	4.0	3.5	4.0	3.4	4.4	3.4	4.4
F 31 2_30.1	30.1	0.92	1.2	0.94	1.4	3.5	3.9	3.4	3.9	3.3	4.3	3.3	4.3
F 31 2_34.4	34.4	0.80	1.1	0.82	1.3	3.4	3.8	3.3	3.8	3.2	4.2	3.2	4.2
F 31 2_37.7	37.7	0.74	1.0	0.76	1.2	3.3	3.7	3.2	3.7	3.1	4.1	3.1	4.1
F 31 2_40.4	40.4	0.69	0.95	0.71	1.1	3.2	3.7	3.2	3.7	3.0	4.0	3.0	4.0
F 31 2_44.6	44.6	0.64	0.90	0.66	1.1	3.2	3.6	3.1	3.6	3.0	4.0	3.0	4.0
F 31 3_47.5	47.5	—	—	—	—	—	—	4.3	4.8	4.2	5.2	4.2	5.2
F 31 3_52.1	52.1	—	—	—	—	—	—	4.2	4.7	4.0	5.0	4.0	5.0
F 31 3_62.8	62.8	—	—	—	—	—	—	3.9	4.4	3.8	4.8	3.8	4.8
F 31 3_69.1	69.1	1.3	1.5	1.3	1.7	3.8	4.3	3.7	4.2	3.6	4.6	3.6	4.6
F 31 3_78.9	78.9	0.99	1.3	1.0	1.4	3.5	4.0	3.5	4.0	3.4	4.4	3.4	4.4
F 31 3_87.4	87.4	0.93	1.2	0.95	1.4	3.5	3.9	3.4	3.9	3.3	4.3	3.3	4.3
F 31 3_101.9	101.9	0.81	1.1	0.83	1.3	3.4	3.8	3.3	3.8	3.2	4.2	3.2	4.2
F 31 3_112.5	112.5	0.73	0.99	0.75	1.2	3.3	3.7	3.2	3.7	3.1	4.1	3.1	4.1
F 31 3_128.4	128.4	0.65	0.91	0.67	1.1	3.2	3.6	3.1	3.6	3.0	4.0	3.0	4.0
F 31 3_140.7	140.7	0.62	0.88	0.64	1.1	3.2	3.6	3.1	3.6	3.0	4.0	3.0	4.0
F 31 3_150.8	150.8	0.58	0.84	0.60	1.0	3.1	3.6	3.1	3.6	2.9	3.9	2.9	3.9
F 31 3_166.8	166.8	0.55	0.81	0.57	1.0	3.1	3.5	3.0	3.5	2.9	3.9	2.9	3.9
F 31 3_185.4	185.4	0.51	0.77	0.53	0.97	3.1	3.5	3.0	3.5	2.9	3.9	2.9	3.9
F 31 3_202.3	202.3	0.48	0.74	0.50	0.93	3.0	3.5	3.0	3.5	2.8	3.8	2.8	3.8
F 31 3_228.2	228.2	0.45	0.71	0.47	0.91	3.0	3.4	2.9	3.4	2.8	3.8	2.8	3.8
F 31 3_253.6	253.6	0.43	0.69	0.45	0.89	3.0	3.4	2.9	3.4	2.8	3.8	2.8	3.8
F 31 3_293.8	293.8	0.40	0.66	0.42	0.86	3.0	3.4	2.9	3.4	2.8	3.8	2.8	3.8
F 31 3_332.8	332.8	0.38	0.64	—	—	—	—	2.9	3.4	2.7	3.7	2.7	3.7
F 31 3_374.4	374.4	0.37	0.63	—	—	—	—	2.9	3.4	2.7	3.7	2.7	3.7
F 31 4_418.9	418.9	0.36	0.62	0.38	0.82	2.9	3.3	2.9	3.4	2.8	3.8	—	—
F 31 4_462.6	462.6	0.35	0.61	0.37	0.81	2.9	3.3	2.9	3.4	2.7	3.7	—	—
F 31 4_527.8	527.8	0.35	0.61	0.37	0.81	2.9	3.3	2.9	3.4	2.7	3.7	—	—
F 31 4_578.6	578.6	0.35	0.61	0.37	0.81	2.9	3.3	2.9	3.4	2.7	3.7	—	—
F 31 4_619.9	619.9	0.34	0.60	0.36	0.80	2.9	3.3	2.9	3.4	2.7	3.7	—	—
F 31 4_685.6	685.6	0.34	0.60	0.36	0.80	2.9	3.3	2.9	3.4	2.7	3.7	—	—
F 31 4_762.3	762.3	0.34	0.60	0.36	0.80	2.9	3.3	2.9	3.4	2.7	3.7	—	—
F 31 4_831.6	831.6	0.34	0.60	0.36	0.80	2.9	3.3	2.9	3.4	2.7	3.7	—	—
F 31 4_938.2	938.2	0.34	0.60	0.36	0.80	2.9	3.3	2.9	3.4	2.7	3.7	—	—
F 31 4_1042	1042	0.34	0.60	0.36	0.80	2.9	3.3	2.9	3.4	2.7	3.7	—	—
F 31 4_1208	1208	0.33	0.59	0.35	0.79	2.9	3.3	2.9	3.4	2.7	3.7	—	—
F 31 4_1368	1368	0.33	0.59	0.35	0.79	2.9	3.3	2.9	3.4	2.7	3.7	—	—
F 31 4_1539	1539	0.83	0.59	0.35	0.79	2.9	3.3	2.9	3.4	2.7	3.7	—	—



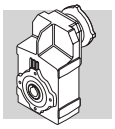
F 41

	i	J (•10-4) [kgm2]								
			IEC							
			63	71	80	90	100	112	132	
F 41 2_6.7	6.7	12	—	—	15	15	18	18	29	21
F 41 2_9.1	9.1	7.2	—	—	10	9.8	13	13	24	16
F 41 2_10.8	10.8	8.0	—	—	11	11	13	13	25	17
F 41 2_14.6	14.6	5.0	—	—	7.7	7.6	10	10	21	14
F 41 2_17.1	17.1	3.5	—	—	6.3	6.2	8.9	8.9	20	12
F 41 2_18.9	18.9	3.1	—	—	5.8	5.7	8.5	8.5	20	12
F 41 2_24.1	24.1	2.1	2.8	2.8	4.9	4.8	7.5	7.5	19	11
F 41 2_30.1	30.1	1.5	2.2	2.2	4.3	4.2	6.9	6.9	18	10
F 41 2_38.2	38.2	0.95	1.7	1.7	3.7	3.6	6.3	6.3	17	9.7
F 41 2_47.9	47.9	0.67	1.4	1.4	3.4	3.3	6.0	6.0	17	9.5
F 41 3_51.5	51.5	3.0	—	—	5.7	5.6	8.4	8.4	19	12
F 41 3_60.2	60.2	2.1	—	—	4.9	4.7	7.5	7.5	19	11
F 41 3_66.5	66.5	1.9	—	—	4.7	4.5	7.3	7.3	18	11
F 41 3_84.9	84.9	1.4	2.1	2.1	4.2	4.0	6.8	6.8	18	10
F 41 3_106.0	106.0	1.1	1.8	1.7	3.8	3.7	6.4	6.4	18	9.8
F 41 3_134.4	134.4	0.66	1.4	1.4	3.4	3.3	6.0	6.0	17	9.4
F 41 3_168.7	168.7	0.49	1.2	1.2	3.2	3.1	5.9	5.9	17	9.3
F 41 3_180.7	180.7	0.43	1.1	1.1	3.2	3.1	5.8	5.8	—	9.2
F 41 3_198.9	198.9	0.39	1.1	1.1	3.1	3.0	5.8	5.8	—	9.2
F 41 3_220.1	220.1	0.36	1.1	1.1	3.1	3.0	5.7	5.7	—	9.1
F 41 3_240.1	240.1	0.31	1.0	1.0	3.1	2.9	5.7	5.7	—	9.1
F 41 3_266.9	266.9	0.28	1.0	1.0	3.0	2.9	5.7	5.7	—	9.1
F 41 3_296.6	296.6	0.23	1.0	1.0	3.0	2.9	5.6	5.6	—	9.0
F 41 3_344.8	344.8	0.19	0.92	0.91	2.9	2.8	5.6	5.6	—	9.0
F 41 4_433.7	433.7	0.21	0.94	0.93	3.0	2.8	4.1	4.1	—	1.9
F 41 4_549.8	549.8	0.19	0.92	0.90	2.9	2.8	4.0	4.0	—	1.9
F 41 4_690.1	690.1	0.18	0.91	0.89	2.9	2.8	4.0	4.0	—	1.9
F 41 4_739.4	739.4	0.17	0.90	0.89	2.9	2.8	4.0	4.0	—	1.9
F 41 4_813.8	813.8	0.17	0.90	0.89	2.9	2.8	4.0	4.0	—	1.9
F 41 4_900.5	900.5	0.17	0.90	0.89	2.9	2.8	4.0	4.0	—	1.9
F 41 4_982.4	982.4	0.17	0.90	0.88	2.9	2.8	4.0	4.0	—	1.9
F 41 4_1092	1092	0.16	0.89	0.88	2.9	2.8	4.0	4.0	—	1.9
F 41 4_1213	1213	0.16	0.89	0.88	2.9	2.8	4.0	4.0	—	1.9
F 41 4_1411	1411	0.16	0.89	0.88	2.9	2.8	4.0	4.0	—	1.9



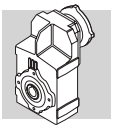
F 41

	i	J (•10-4) [kgm2]																	
		SERVO																	
		60A		60B 80A		80B		95A		80C 95B 110A		95C 110B		130A		130B 180A		180B	
		SK	SC	SK	SC	SK	SC	SK	SC	SK	SC	SK	SC	SK	SC	SK	SC	SK	SC
F 41 2_6.7	6.7	—	—	—	—	—	—	—	—	15	16	15	16	15	16	29	31	29	34
F 41 2_9.1	9.1	—	—	—	—	—	—	—	—	10	11	9.8	11	9.8	11	24	27	24	29
F 41 2_10.8	10.8	—	—	—	—	—	—	—	—	11	12	11	12	11	12	25	27	25	30
F 41 2_14.6	14.6	—	—	—	—	—	—	—	—	7.7	8.2	7.6	8.6	7.6	8.6	22	24	21	26
F 41 2_17.1	17.1	—	—	—	—	—	—	—	—	6.3	6.8	6.2	7.2	6.2	7.2	20	23	20	25
F 41 2_18.9	18.9	—	—	—	—	—	—	—	—	5.8	6.3	5.7	6.7	5.7	6.7	20	23	20	25
F 41 2_24.1	24.1	—	—	—	—	4.9	5.4	4.9	5.4	4.9	5.4	4.8	5.8	4.8	5.8	19	22	19	24
F 41 2_30.1	30.1	—	—	—	—	4.3	4.8	4.3	4.8	4.3	4.8	4.2	5.2	4.2	5.2	18	21	18	23
F 41 2_38.2	38.2	—	—	—	—	3.8	4.2	3.8	4.2	3.7	4.2	3.6	4.6	3.6	4.6	18	20	17	22
F 41 2_47.9	47.9	—	—	—	—	3.5	3.9	3.5	3.9	3.4	3.9	3.3	4.3	3.3	4.3	18	20	17	22
F 41 3_51.5	51.5	—	—	—	—	—	—	—	—	5.7	6.2	5.6	6.6	5.6	6.6	20	22	19	24
F 41 3_60.2	60.2	—	—	—	—	—	—	—	—	4.9	5.4	4.7	5.7	4.7	5.7	19	22	19	24
F 41 3_66.5	66.5	—	—	—	—	—	—	—	—	4.7	5.2	4.5	5.5	4.5	5.5	19	21	18	23
F 41 3_84.9	84.9	—	—	—	—	4.2	4.7	4.2	4.7	4.2	4.7	4.0	5.0	4.0	5.0	18	21	18	23
F 41 3_106.0	106.0	—	—	—	—	3.9	4.4	3.9	4.4	3.8	4.3	3.7	4.7	3.7	4.7	18	21	18	23
F 41 3_134.4	134.4	—	—	—	—	3.5	3.9	3.5	3.9	3.4	3.9	3.3	4.3	3.3	4.3	18	20	17	22
F 41 3_168.7	168.7	—	—	—	—	3.3	3.7	3.3	3.7	3.2	3.7	3.1	4.1	3.1	4.1	17	20	17	22
F 41 3_180.7	180.7	—	—	—	—	3.3	3.7	3.3	3.7	3.2	3.7	3.1	4.1	3.1	4.1	—	—	—	—
F 41 3_198.9	198.9	—	—	—	—	3.2	3.6	3.2	3.6	3.1	3.6	3.0	4.0	3.0	4.0	—	—	—	—
F 41 3_220.1	220.1	—	—	—	—	3.2	3.6	3.2	3.6	3.1	3.6	3.0	4.0	3.0	4.0	—	—	—	—
F 41 3_240.1	240.1	—	—	—	—	3.1	3.6	3.1	3.6	3.1	3.6	2.9	3.9	2.9	3.9	—	—	—	—
F 41 3_266.9	266.9	—	—	—	—	3.1	3.5	3.1	3.5	3.0	3.5	2.9	3.9	2.9	3.9	—	—	—	—
F 41 3_296.6	296.6	—	—	—	—	3.1	3.5	3.1	3.5	3.0	3.5	2.9	3.9	2.9	3.9	—	—	—	—
F 41 3_344.8	344.8	—	—	—	—	3.0	3.4	3.0	3.4	2.9	3.4	2.8	3.8	2.8	3.8	—	—	—	—
F 41 4_433.7	433.7	0.48	0.74	0.50	0.94	—	—	3.0	3.5	3.0	3.5	2.8	3.8	—	—	—	—	—	—
F 41 4_549.8	549.8	0.46	0.72	0.48	0.92	—	—	3.0	3.4	2.9	3.4	2.8	3.8	—	—	—	—	—	—
F 41 4_690.1	690.1	0.45	0.71	0.47	0.91	—	—	3.0	3.4	2.9	3.4	2.8	3.8	—	—	—	—	—	—
F 41 4_739.4	739.4	0.44	0.70	0.46	0.90	—	—	3.0	3.4	2.9	3.4	2.8	3.8	—	—	—	—	—	—
F 41 4_813.8	813.8	0.44	0.70	0.46	0.90	—	—	3.0	3.4	2.9	3.4	2.8	3.8	—	—	—	—	—	—
F 41 4_900.5	900.5	0.44	0.70	0.46	0.90	—	—	3.0	3.4	2.9	3.4	2.8	3.8	—	—	—	—	—	—
F 41 4_982.4	982.4	0.44	0.70	0.46	0.90	—	—	3.0	3.4	2.9	3.4	2.8	3.8	—	—	—	—	—	—
F 41 4_1092	1092	0.43	0.69	0.45	0.89	—	—	3.0	3.4	2.9	3.4	2.8	3.8	—	—	—	—	—	—
F 41 4_1213	1213	0.43	0.69	0.45	0.89	—	—	3.0	3.4	2.9	3.4	2.8	3.8	—	—	—	—	—	—
F 41 4_1411	1411	0.43	0.69	0.45	0.89	—	—	3.0	3.4	2.9	3.4	2.8	3.8	—	—	—	—	—	—



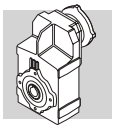
F 51

	i	J (•10-4) [kgm2]										
			IEC									
			63	71	80	90	100	112	132	160	180	
F 51 2_7.2	7.2	25	—	—	28	28	30	30	42	101	103	34
F 51 2_9.1	9.1	17	—	—	20	19	22	22	33	92	94	26
F 51 2_11.1	11.1	16	—	—	19	19	22	22	33	92	94	25
F 51 2_14.0	14.0	11	—	—	14	14	17	17	28	87	89	20
F 51 2_18.8	18.8	7.0	—	—	9.8	9.6	12	12	24	83	85	16
F 51 2_23.8	23.8	4.5	—	—	7.3	7.2	9.9	9.9	21	80	82	13
F 51 2_30.0	30.0	3.1	3.8	3.8	5.9	5.8	8.5	8.5	20	79	81	12
F 51 2_37.1	37.1	2.2	3.0	3.0	5.0	4.9	7.6	7.6	19	78	80	11
F 51 3_48.9	48.9	6.2	—	—	8.9	8.8	12	12	23	82	84	15
F 51 3_65.8	65.8	4.2	—	—	6.9	6.8	9.6	9.6	21	80	82	13
F 51 3_83.2	83.2	2.7	—	—	5.5	5.4	8.1	8.1	19	78	80	12
F 51 3_105.1	105.1	2.0	2.7	2.7	4.8	4.6	7.4	7.4	19	78	80	11
F 51 3_129.9	129.9	1.5	2.2	2.2	4.3	4.1	6.9	6.9	18	77	79	10
F 51 3_165.6	165.6	0.95	1.7	1.7	3.7	3.6	6.3	6.3	17	76	78	9.7
F 51 3_202.4	202.4	0.72	1.4	1.4	3.5	3.3	6.1	6.1	17	76	78	9.5
F 51 3_216.9	216.9	0.64	1.4	1.3	3.4	3.3	6.0	6.0	—	—	—	9.4
F 51 3_239.8	239.8	0.60	1.3	1.3	3.4	3.2	6.0	6.0	—	—	—	9.4
F 51 3_262.1	262.1	0.53	1.3	1.3	3.3	3.2	5.9	5.9	—	—	—	9.3
F 51 3_285.9	285.9	0.46	1.2	1.2	3.2	3.1	5.8	5.8	—	—	—	9.2
F 51 3_317.3	317.3	0.39	1.1	1.1	3.2	3.0	5.8	5.8	—	—	—	9.2
F 51 3_352.5	352.5	0.28	1.1	1.1	3.1	3.0	5.7	5.7	—	—	—	9.1
F 51 4_429.1	429.1	0.36	1.1	1.1	3.1	3.0	5.7	5.7	—	—	—	2.4
F 51 4_530.5	530.5	0.33	1.1	1.0	3.1	3.0	5.7	5.7	—	—	—	2.4
F 51 4_676.3	676.3	0.30	1.0	1.0	3.1	2.9	5.7	5.7	—	—	—	2.4
F 51 4_826.4	826.4	0.28	1.0	1.0	3.0	2.9	5.7	5.7	—	—	—	2.3
F 51 4_885.5	885.5	0.28	1.0	1.0	3.0	2.9	5.7	5.7	—	—	—	2.3
F 51 4_979.4	979.4	0.28	1.0	1.0	3.0	2.9	5.7	5.7	—	—	—	2.3
F 51 4_1070	1070	0.27	1.0	1.0	3.0	2.9	5.6	5.6	—	—	—	2.3
F 51 4_1168	1168	0.27	1.0	1.0	3.0	2.9	5.6	5.6	—	—	—	2.3
F 51 4_1296	1296	0.26	1.0	1.0	3.0	2.9	5.6	5.6	—	—	—	2.3
F 51 4_1439	1439	0.26	1.0	1.0	3.0	2.9	5.6	5.6	—	—	—	2.3



F 51

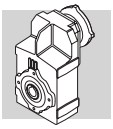
	i	J (•10-4) [kgm2]											
		SERVO											
		80B		95A		80C 95B 110A		95C 110B 130A		130B 180A		180B	
		SK	SC	SK	SC	SK	SC	SK	SC	SK	SC	SK	SC
F 51 2_7.2	7.2	—	—	—	—	28	29	28	23	42	44	42	47
F 51 2_9.1	9.1	—	—	—	—	20	21	19	20	34	36	33	38
F 51 2_11.1	11.1	—	—	—	—	19	20	19	20	33	35	33	38
F 51 2_14.0	14.0	—	—	—	—	14	15	14	15	28	30	28	33
F 51 2_18.8	18.8	—	—	—	—	9.8	10	9.6	11	24	26	24	29
F 51 2_23.8	23.8	—	—	—	—	7.3	7.8	7.2	8.2	21	24	21	26
F 51 2_30.0	30.0	5.9	6.4	5.9	6.4	5.9	6.4	5.8	6.8	20	23	20	25
F 51 2_37.1	37.1	5.0	5.5	5.0	5.5	5.0	5.5	4.9	5.9	19	22	19	24
F 51 3_48.9	48.9	—	—	—	—	8.9	9.4	8.8	9.8	23	26	23	28
F 51 3_65.8	65.8	—	—	—	—	6.9	7.4	6.8	7.8	21	24	21	26
F 51 3_83.2	83.2	—	—	—	—	5.5	6.0	5.4	6.4	20	22	19	24
F 51 3_105.1	105.1	4.8	5.3	4.8	5.3	4.8	5.3	4.6	5.6	19	21	19	24
F 51 3_129.9	129.9	4.3	4.8	4.3	4.8	4.3	4.8	4.1	5.1	18	21	18	23
F 51 3_165.6	165.6	3.8	4.2	3.8	4.2	3.7	4.2	3.6	4.6	18	20	17	22
F 51 3_202.4	202.4	3.5	4.0	3.5	4.0	3.5	4.0	3.3	4.3	18	20	17	22
F 51 3_216.9	216.9	3.5	3.9	3.5	3.9	3.4	3.9	3.3	4.3	—	—	—	—
F 51 3_239.8	239.8	3.4	3.9	3.4	3.9	3.4	3.9	3.2	4.2	—	—	—	—
F 51 3_262.1	262.1	3.4	3.8	3.4	3.8	3.3	3.8	3.2	4.2	—	—	—	—
F 51 3_285.9	285.9	3.3	3.7	3.3	3.7	3.2	3.7	3.1	4.1	—	—	—	—
F 51 3_317.3	317.3	3.2	3.6	3.2	3.6	3.2	3.7	3.0	4.0	—	—	—	—
F 51 3_352.5	352.5	3.1	3.5	3.1	3.5	3.1	3.6	3.0	4.0	—	—	—	—
F 51 4_429.1	429.1	—	—	3.2	3.6	3.1	3.6	3.0	4.0	—	—	—	—
F 51 4_530.5	530.5	—	—	3.2	3.6	3.1	3.6	3.0	4.0	—	—	—	—
F 51 4_676.3	676.3	—	—	3.1	3.6	3.1	3.6	2.9	3.9	—	—	—	—
F 51 4_826.4	826.4	—	—	3.1	3.5	3.0	3.5	2.9	3.9	—	—	—	—
F 51 4_885.5	885.5	—	—	3.1	3.5	3.0	3.5	2.9	3.9	—	—	—	—
F 51 4_979.4	979.4	—	—	3.1	3.5	3.0	3.5	2.9	3.9	—	—	—	—
F 51 4_1070	1070	—	—	3.1	3.5	3.0	3.5	2.9	3.9	—	—	—	—
F 51 4_1168	1168	—	—	3.1	3.5	3.0	3.5	2.9	3.9	—	—	—	—
F 51 4_1296	1296	—	—	3.1	3.5	3.0	3.5	2.9	3.9	—	—	—	—
F 51 4_1439	1439	—	—	3.1	3.5	3.0	3.5	2.9	3.9	—	—	—	—



F 60

	i	J (•10-4) [kgm2]										
			IEC									
			63	71	80	90	100	112	132	160	180	
F 60 3_9.0	9.0	40	—	—	—	—	—	—	59	118	116	61
F 60 3_9.7	9.7	38	—	—	—	—	—	—	57	116	114	59
F 60 3_11.8	11.8	25	—	—	28	28	29	29	44	103	101	46
F 60 3_12.7	12.7	24	—	—	27	27	28	28	43	102	100	45
F 60 3_14.5	14.5	18	—	—	21	20	22	22	37	96	94	39
F 60 3_15.7	15.7	17	—	—	20	20	21	21	36	95	93	38
F 60 3_19.1	19.1	10	—	—	13	13	14	14	29	89	86	31
F 60 3_20.7	20.7	9.9	—	—	13	13	14	14	29	88	86	31
F 60 3_23.5	23.5	7.3	—	—	10	10	11	11	26	86	83	28
F 60 3_25.4	25.4	7.1	—	—	9.9	9.9	11	11	26	85	83	28
F 60 3_29.6	29.6	15	—	—	—	—	—	—	34	93	91	36
F 60 3_32.1	32.1	15	—	—	—	—	—	—	34	93	91	36
F 60 3_38.8	38.8	11	—	—	14	13	15	15	30	89	87	32
F 60 3_42.1	42.1	11	—	—	13	13	15	15	29	89	87	31
F 60 3_47.8	47.8	8.2	—	—	11	11	12	12	27	86	84	29
F 60 3_51.8	51.8	8.1	—	—	11	11	12	12	27	86	84	29
F 60 3_63.0	63.0	4.9	—	—	7.7	7.6	8.9	8.9	24	83	81	26
F 60 3_68.3	68.3	4.8	—	—	7.7	7.6	8.9	8.9	24	83	81	26
F 60 3_77.6	77.6	3.7	—	—	6.6	6.5	7.8	7.8	23	82	80	25
F 60 3_84.0	84.0	3.7	—	—	6.5	6.5	7.8	7.8	23	82	80	25
F 60 3_98.2	98.2	2.7	4.2	4.2	5.6	5.5	6.8	6.8	22	81	79	24
F 60 3_106.4	106.4	2.7	4.2	4.2	5.5	5.4	6.8	6.8	22	81	79	24
F 60 3_120.5	120.5	1.8	3.2	3.2	4.6	4.6	5.9	5.9	21	80	78	23
F 60 3_130.5	130.5	1.8	3.2	3.2	4.6	4.6	5.8	5.8	21	80	78	23
F 60 3_150.4	150.4	1.3	2.7	2.7	4.1	4.1	5.4	5.4	20	80	77	22
F 60 3_162.9	162.9	1.3	2.7	2.7	4.1	4.1	5.4	5.4	20	80	77	22
F 60 3_185.9	185.9	0.90	2.4	2.4	3.8	3.7	5.0	5.0	20	79	77	22
F 60 3_201.4	201.4	0.90	2.4	2.4	3.8	3.7	5.0	5.0	20	79	77	22
F 60 3_217.6	217.6	0.70	2.2	2.2	3.6	3.5	4.8	4.8	—	—	—	22
F 60 3_235.8	235.8	0.70	2.2	2.2	3.6	3.5	4.8	4.8	—	—	—	22
F 60 3_259.1	259.1	0.50	2.0	2.0	3.4	3.3	4.6	4.6	—	—	—	22
F 60 3_280.7	280.7	0.50	2.0	2.0	3.4	3.3	4.6	4.6	—	—	—	22

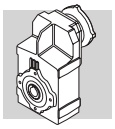
For the values of the moment of inertia of 4-stage gearboxes, please contact our Technical Service department.



F 60

	i	J (•10-4) [kgm2]									
		SERVO									
		95A		80C 95B 110A		95C 110B 130A		130B 180A		180B	
		SK	SC	SK	SC	SK	SC	SK	SC	SK	SC
F 60 3_9.0	9.0	—	—	—	—	—	—	57	59	59	64
F 60 3_9.7	9.7	—	—	—	—	—	—	55	57	57	62
F 60 3_11.8	11.8	—	—	28	29	28	29	42	44	44	49
F 60 3_12.7	12.7	—	—	27	28	27	28	41	43	43	48
F 60 3_14.5	14.5	—	—	21	22	20	21	35	37	37	42
F 60 3_15.7	15.7	—	—	20	21	20	21	34	36	36	41
F 60 3_19.1	19.1	—	—	13	14	13	14	27	29	29	34
F 60 3_20.7	20.7	—	—	13	14	13	14	27	29	29	34
F 60 3_23.5	23.5	—	—	10	11	10	11	24	27	26	31
F 60 3_25.4	25.4	—	—	9.9	10	9.9	11	24	27	26	31
F 60 3_29.6	29.6	—	—	—	—	—	—	32	34	34	39
F 60 3_32.1	32.1	—	—	—	—	—	—	32	34	34	39
F 60 3_38.8	38.8	—	—	14	15	13	14	28	30	30	35
F 60 3_42.1	42.1	—	—	13	14	13	14	28	30	29	34
F 60 3_47.8	47.8	—	—	11	12	11	12	25	28	27	32
F 60 3_51.8	51.8	—	—	11	12	11	12	25	28	27	32
F 60 3_63.0	63.0	—	—	7.7	8.2	7.6	8.6	22	24	24	29
F 60 3_68.3	68.3	—	—	7.7	8.2	7.6	8.6	22	24	24	29
F 60 3_77.6	77.6	—	—	6.6	7.1	6.5	7.5	21	23	23	28
F 60 3_84.0	84.0	—	—	6.5	7.0	6.5	7.5	21	23	23	28
F 60 3_98.2	98.2	—	—	5.6	6.1	5.5	6.5	20	22	22	27
F 60 3_106.4	106.4	5.5	6.0	5.5	6.0	5.4	6.4	20	22	22	27
F 60 3_120.5	120.5	2.2	2.7	4.6	5.1	4.6	5.6	19	21	21	26
F 60 3_130.5	130.5	2.2	2.7	4.6	5.1	4.6	5.6	19	21	21	26
F 60 3_150.4	150.4	4.1	4.6	4.1	4.6	4.1	5.1	18	21	20	25
F 60 3_162.9	162.9	4.1	4.6	4.1	4.6	4.1	5.1	18	21	20	25
F 60 3_185.9	185.9	3.7	4.2	3.8	4.3	3.7	4.7	18	20	20	25
F 60 3_201.4	201.4	3.7	4.2	3.8	4.3	3.7	4.7	18	20	20	25
F 60 3_217.6	217.6	3.5	4.0	3.6	4.1	3.5	4.5	—	—	—	—
F 60 3_235.8	235.8	3.5	4.0	3.6	4.1	3.5	4.5	—	—	—	—
F 60 3_259.1	259.1	3.3	3.8	3.4	3.9	3.3	4.3	—	—	—	—
F 60 3_280.7	280.7	3.3	3.8	3.4	3.9	3.3	4.3	—	—	—	—

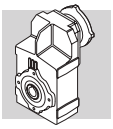
For the values of the moment of inertia of 4-stage gearboxes, please contact our Technical Service department.



F 70

	i	J (•10-4) [kgm2]									
			IEC								
			80	90	100	112	132	160	180	200	
F 70 3_10.0	10.0	—	—	—	—	—	—	169	167	176	133
F 70 3_10.9	10.9	—	—	—	—	—	—	166	163	173	129
F 70 3_12.8	12.8	—	—	—	—	—	—	139	137	146	102
F 70 3_13.9	13.9	—	—	—	—	—	—	137	135	144	100
F 70 3_16.3	16.3	39	—	—	—	—	58	117	115	124	80
F 70 3_17.7	17.7	37	—	—	—	—	56	116	113	123	79
F 70 3_20.9	20.9	26	—	—	—	—	45	105	102	—	68
F 70 3_22.6	22.6	26	—	—	—	—	44	104	102	—	67
F 70 3_24.6	24.6	21	—	—	—	—	40	99	97	—	62
F 70 3_27.7	27.7	—	—	—	—	—	—	128	126	135	73
F 70 3_30.0	30.0	—	—	—	—	—	—	127	125	134	73
F 70 3_35.4	35.4	—	—	—	—	—	—	114	112	121	77
F 70 3_38.4	38.4	—	—	—	—	—	—	114	111	121	77
F 70 3_45.2	45.2	23	—	—	—	—	42	101	99	108	65
F 70 3_49.0	49.0	23	—	—	—	—	42	101	99	108	65
F 70 3_57.7	57.7	17	—	—	—	—	36	95	93	—	58
F 70 3_62.5	62.5	17	—	—	—	—	36	95	93	—	58
F 70 3_67.9	67.9	14	—	—	—	—	33	92	90	—	55
F 70 3_73.6	73.6	14	—	—	—	—	33	92	90	—	55
F 70 3_85.4	85.4	9.0	11	11	13	13	28	87	85	—	50
F 70 3_92.5	92.5	9.0	11	11	13	13	28	87	85	—	50
F 70 3_101.2	101.2	6.3	8.9	8.8	10	10	25	85	82	—	47
F 70 3_109.6	109.6	6.3	8.9	8.8	10	10	25	85	82	—	47
F 70 3_122.7	122.7	5.1	7.9	7.8	9.1	9.1	24	83	81	—	46
F 70 3_133.0	133.0	5.1	7.9	7.8	9.1	9.1	24	83	81	—	46
F 70 3_153.8	153.8	3.2	6.0	6.0	7.3	7.3	22	81	79	—	44
F 70 3_166.7	166.7	3.2	6.0	6.0	7.3	7.3	22	81	79	—	44
F 70 3_180.9	180.9	2.3	5.1	5.1	6.3	6.3	21	81	78	—	43
F 70 3_196.0	196.0	2.3	5.1	5.0	6.3	6.3	21	81	78	—	43

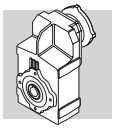
For the values of the moment of inertia of 4-stage gearboxes, please contact our Technical Service department.



F 80

	i	J (•10-4) [kgm2]										
			IEC									
			80	90	100	112	132	160	180	200	225	
F 80 3_10.3	10.3	—	—	—	—	—	—	—	286	300	578	252
F 80 3_11.2	11.2	—	—	—	—	—	—	—	277	291	569	244
F 80 3_12.9	12.9	—	—	—	—	—	—	217	218	231	509	184
F 80 3_14.0	14.0	—	—	—	—	—	—	212	212	226	504	178
F 80 3_16.2	16.2	—	—	—	—	—	—	173	171	180	464	136
F 80 3_17.6	17.6	—	—	—	—	—	—	170	167	177	461	133
F 80 3_20.3	20.3	60	—	—	—	—	79	139	136	146	431	102
F 80 3_22.0	22.0	58	—	—	—	—	77	136	134	143	429	100
F 80 3_25.2	25.2	43	—	—	—	—	62	121	119	150	413	84
F 80 3_28.8	28.8	—	—	—	—	—	—	—	189	203	480	155
F 80 3_31.3	31.3	—	—	—	—	—	—	—	188	201	479	154
F 80 3_36.0	36.0	—	—	—	—	—	—	155	155	169	447	121
F 80 3_39.0	39.0	—	—	—	—	—	—	154	154	168	446	121
F 80 3_45.3	45.3	—	—	—	—	—	—	133	132	141	425	97
F 80 3_49.1	49.1	—	—	—	—	—	—	133	131	140	425	97
F 80 3_56.7	56.7	35	—	—	—	—	54	113	111	120	406	77
F 80 3_61.5	61.5	35	—	—	—	—	54	113	111	120	406	76
F 80 3_70.4	70.4	27	—	—	—	—	46	105	103	133	397	68
F 80 3_76.3	76.3	27	—	—	—	—	45	105	103	133	396	68
F 80 3_85.2	85.2	20	—	—	—	—	39	99	96	126	389	62
F 80 3_92.3	92.3	20	—	—	—	—	39	99	96	126	389	61
F 80 3_105.0	105.0	14	16	16	17	17	32	92	90	119	383	55
F 80 3_113.8	113.8	14	16	16	17	17	32	92	90	119	382	55
F 80 3_122.5	122.5	13	15	15	17	17	32	91	89	118	381	54
F 80 3_132.7	132.7	13	15	15	16	16	31	91	89	118	381	54
F 80 3_147.9	147.9	8.5	11	11	13	13	27	87	85	—	—	50
F 80 3_160.2	160.2	8.5	11	11	13	13	27	87	84	—	—	50
F 80 3_184.6	184.6	5.1	7.9	7.8	9.1	9.1	24	83	81	—	—	46
F 80 3_200.0	200.0	5.0	7.9	7.8	9.1	9.1	24	83	81	—	—	46

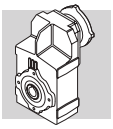
For the values of the moment of inertia of 4-stage gearboxes, please contact our Technical Service department.



F 90

	i	J (•10-4) [kgm2]											
			IEC										
			80	90	100	112	132	160	180	200	225	250	
F 90 3_10.3	10.3	—	—	—	—	—	—	—	549	559	843	870	850
F 90 3_11.1	11.1	—	—	—	—	—	—	—	529	539	823	850	830
F 90 3_13.4	13.4	—	—	—	—	—	—	—	373	383	667	694	674
F 90 3_14.5	14.5	—	—	—	—	—	—	—	361	371	655	682	662
F 90 3_16.5	16.5	—	—	—	—	—	—	—	286	296	580	607	587
F 90 3_17.9	17.9	—	—	—	—	—	—	—	278	288	572	599	579
F 90 3_20.6	20.6	—	—	—	—	—	—	224	222	232	516	542	513
F 90 3_22.3	22.3	—	—	—	—	—	—	220	217	227	511	537	508
F 90 3_25.4	25.4	103	—	—	—	—	122	181	179	188	474	500	471
F 90 3_28.6	28.6	—	—	—	—	—	—	—	291	301	585	613	593
F 90 3_31.0	31.0	—	—	—	—	—	—	—	289	299	583	610	590
F 90 3_37.4	37.4	—	—	—	—	—	—	—	222	232	516	543	523
F 90 3_40.5	40.5	—	—	—	—	—	—	—	220	230	514	541	521
F 90 3_46.1	46.1	—	—	—	—	—	—	—	186	196	480	507	487
F 90 3_49.9	49.9	—	—	—	—	—	—	—	185	195	479	506	486
F 90 3_57.3	57.3	—	—	—	—	—	—	161	158	168	452	479	450
F 90 3_62.1	62.1	—	—	—	—	—	—	160	158	167	451	478	449
F 90 3_70.8	70.8	61	—	—	—	—	80	139	137	146	432	458	429
F 90 3_76.7	76.7	60	—	—	—	—	79	139	136	146	431	458	429
F 90 3_88.4	88.4	44	—	—	—	—	63	123	120	151	414	441	412
F 90 3_95.8	95.8	44	—	—	—	—	63	122	120	151	414	441	412
F 90 3_103.3	103.3	41	—	—	—	—	59	119	117	146	410	436	408
F 90 3_111.9	111.9	40	—	—	—	—	59	119	116	146	409	436	407
F 90 3_126.8	126.8	26	29	29	30	30	45	105	102	132	395	422	393
F 90 3_137.3	137.3	26	29	29	30	30	45	104	102	132	395	422	393
F 90 3_150.3	150.3	21	24	24	25	25	40	100	97	127	390	417	388
F 90 3_162.8	162.8	21	24	24	25	25	40	100	97	127	390	417	388
F 90 3_179.2	179.2	14	16	16	18	18	33	92	90	—	—	—	381
F 90 3_194.2	194.2	14	16	16	17	17	33	92	90	—	—	—	381

For the values of the moment of inertia of 4-stage gearboxes, please contact our Technical Service department.

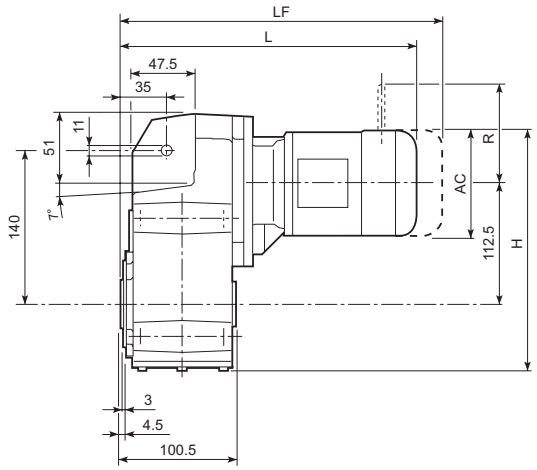


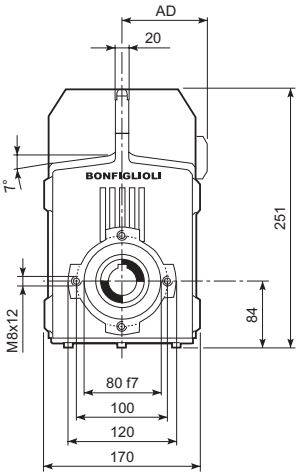
63 EXACT RATIOS

i_N	F 10	F 20	F 25	F 31	F 41	F 51	F 60	F 70	F 80	F 90
6.3		6.41210								
7.1	7.40443		6.86957	6.94907	6.72727	7.19408				
8.0		7.83478	8.39375	8.22917						
9.0	8.58204	8.73227	9.35526	9.01630	9.13580	9.05114	8.96000			
10.0	9.76974	10.03069	10.62451	10.74747			9.70667	10.01538	10.33846	10.26577
11.2	11.53759	11.23370			10.77273	11.11005	11.75320	10.85000	11.20000	11.12125
12.5	13.02632		12.98182	12.72727		13.97796	12.73263	12.81731	12.90240	13.41346
14.0	14.64777	14.79842	14.46890	13.94466	14.62963		14.47385	13.88542	13.97760	14.53125
16.0	16.97738		16.62032	16.80000	17.11667		15.68000	16.34455	16.24615	16.52538
18.0		18.08182	18.61364	18.48804	18.89130	18.82155	19.06872	17.70660	17.60000	17.90250
20.0	19.32692	20.15311	21.81818	21.11230			20.65778	20.86538	20.33231	20.56731
22.4	22.82418	23.14973	23.75758	23.38636		23.79447	23.46381	22.60417	22.02667	22.28125
25.0	25.76923	25.92614	27.20455	27.27273	24.11579		25.41913	24.55695	25.22585	25.38622
28.0	29.63462	30.38961	30.03636	30.12121	30.11875	30.03828	29.61538	27.69231	28.84615	28.61169
31.5	32.98462	33.09091	32.18182	34.36364			32.08333	30.00000	31.25000	30.99600
35.5	35.34066	37.89205	36.41958	37.67273	38.18333	37.13636	38.84771	35.43956	36.00000	37.38462
40.0	39.64497	41.83636	40.72727	40.36364			42.08502	38.39286	39.00000	40.50000
45.0	44.66667	44.82468	45.56607	44.64336	47.92667		47.84024	45.19231	45.32967	46.05785
50.0	48.72727	50.72727	50.78571	47.54630	51.49270	48.89965	51.82692	48.95833	49.10714	49.89600
56.0	56.69231	56.72727	58.33718	52.09420	60.24646		63.02761	57.69231	56.73077	57.32308
63.0	62.99145	61.88430	65.33371	62.76111	66.49275	65.84416	68.27991	62.50000	61.45833	62.10000
71.0	71.12308	69.13636	76.58163	69.06725			77.55467	73.55769	70.38462	70.75385
80.0	81.31624	76.81818	83.38889	78.87092	84.88166	83.24111	84.01756	85.38462	76.25000	76.65000
90.0	91.48077	90.40909	95.48772	87.36632			98.19838	92.50000	92.30769	88.39385
100.0	106.02198	101.63636	105.42738	101.88492	106.01061	105.08407	106.38158	101.18343	105.00000	103.33491
112.2		114.34091	112.95791	112.52623			120.45488	109.61538	113.75000	111.94615
125.5	127.12821	132.19481	127.83242	128.37500	134.39596	129.91558	130.49279	122.72727	122.48521	126.77538
140.0		156.30469	142.95238	140.73704			150.35503	132.95455	132.69231	150.30533
160.0		172.57500	155.94805	166.77778	168.69010	165.62338	162.88462	166.66667	160.22727	162.83077
180.0		184.90179	174.22321	185.43056	180.73939	202.39481	185.89349	180.94406	184.61538	179.21958
200.0		209.25000	193.58135	202.28788	198.92028	216.85158	201.38462	196.02273	200.00000	194.15455
225.0		234.00000	227.83036	228.22222	220.13131	239.84416	217.64679	216.52422	218.49174	213.59178
250.0		255.27273	256.12302	253.58025	240.14325	262.11039	259.08284	234.56790	273.89277	231.39109
280.0		285.18750	288.13839	293.83611	266.93818	285.93861	280.67308	280.93645	296.71717	268.72770
315.0		316.87500	333.13010	332.82407	296.59798	317.26753	315.38899	304.34783	353.67893	291.12168
355.0		372.93750		374.42708	344.79515	352.51948	341.67140	372.46964	383.15217	361.84615
400.0		419.25000	393.88686	418.86023		429.09330	399.34008	403.50877	451.49061	392.00000
450.0		471.65625	434.88795	462.60785	433.67975		432.61842	471.15385	489.11483	457.45099
500.0			465.95137	527.76389			489.84985	510.41667	563.87675	495.57191
560.0		545.30357	527.30872	578.58560	549.80165	530.48864	530.67067	606.83761	610.86648	577.48888
630.0			589.67857	619.91314	690.09587	676.29545	611.44379	657.40741	714.86014	625.61296
710.0			643.28571	685.64198	739.38843	826.44545	755.96686	758.97436	774.43182	713.95030
800.0			718.67076	762.32562	813.76478	885.47727	818.96410	822.22222	897.27273	773.44615
900.0			798.52307	831.62795	900.53719	979.36364	885.09695	899.40828	972.04545	910.18225
1000.0			939.80022	938.24691	982.40421	1070.28409	958.85503	974.35897	1058.06885	986.03077
1125.0			1056.50744	1042.49657	1092.01983	1167.58264	1053.60355	1090.90909	1146.24126	1112.25941
1250.0			1188.57087	1207.99290	1213.35537	1295.50909	1141.40385	1181.81818	1277.33630	1204.94769
1400.0			1374.16167	1368.27675	1410.52562	1439.45455		1367.52137	1383.78099	1427.90059
1600.0				1539.31134				1584.61538	1577.62238	1571.37386
1800.0								1716.66667	1709.09091	1702.32168
2000.0								2019.23077	1833.98601	1937.26864
2250.0								2187.50000	1986.81818	2098.70769

2x 3x 4x

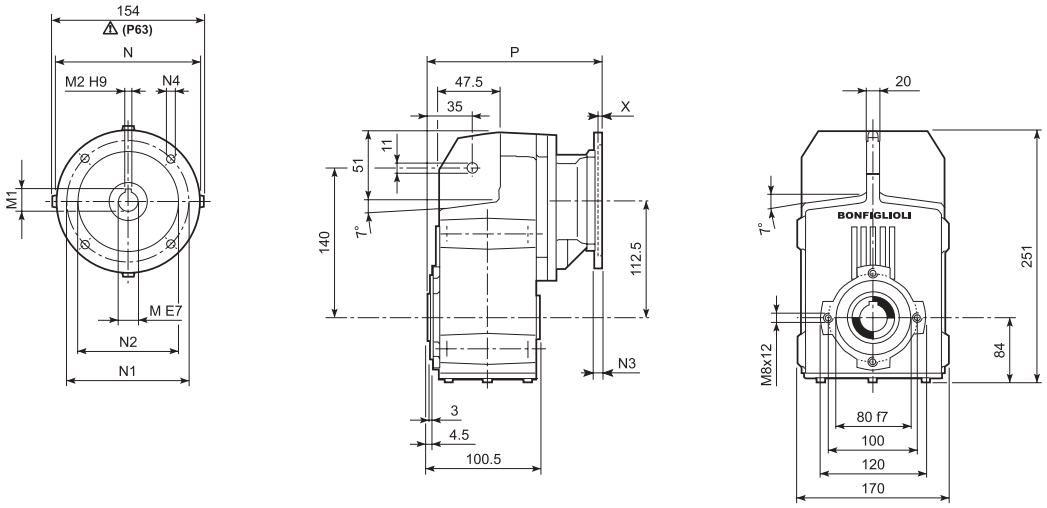
F 10...M/ME/MX





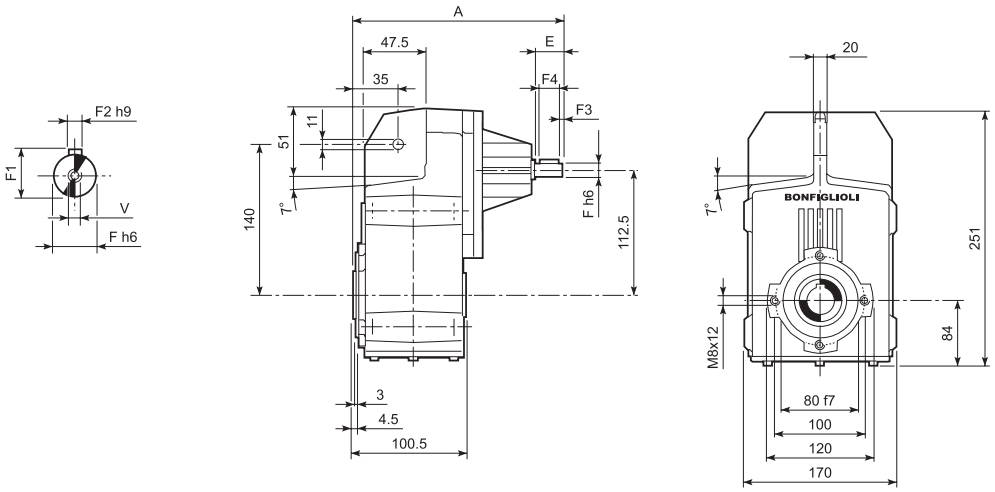
								M...FD M...FA		M...FD		M...FA	
			AC	H	L	AD		LF		R	AD	R	AD
F 10 2	**S05**	**M05**	121	220.5	311.5	95	12	377.5	13	96	122	116	95
F 10 2	**S1**	**M1**	138	265.5	340.5	108	14	401.5	17	103	135	124	108
F 10 2	**S2**	**ME2S**	156	274.5	369.5	119	18	—	—	—	—	—	—
F 10 2	**S2**	**MX2S**	156	274.5	413.5	119	23	—	—	—	—	—	—
F 10 2	**S3**	**ME3S**	195	294	412.5	142	22	—	—	—	—	—	—
F 10 2	**S3**	**MX3S**	195	294	444.5	142	25	—	—	—	—	—	—
F 10 2	**S3**	**ME3L**	195	294	444.5	142	24	—	—	—	—	—	—
F 10 2	**S3**	**MX3L**	195	294	488.5	142	30	—	—	—	—	—	—

F 10...P(IEC)



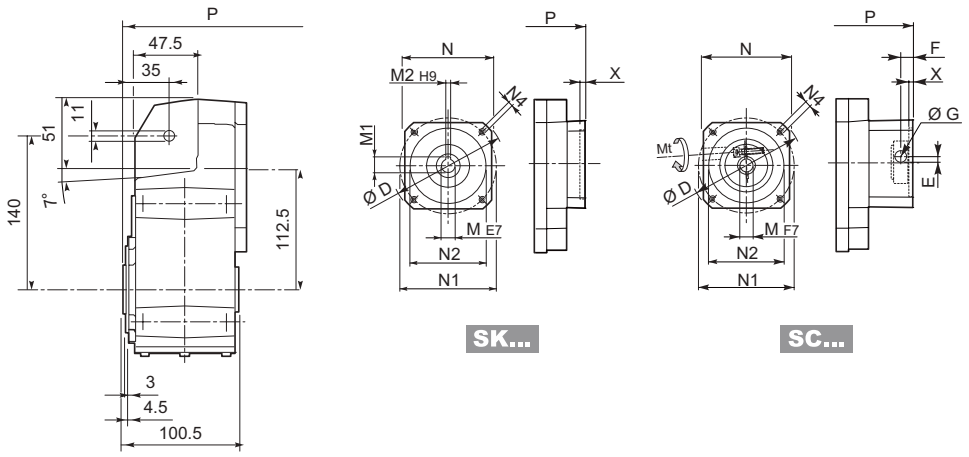
		M	M1	M2	N	N1	N2	N3	N4	X	P	
F 10 2	**P63**	11	12.8	4	140	115	95	—	M8x19	4	185.5	8
F 10 2	**P71**	14	16.3	5	160	130	110	—	M8x16	4.5	185.5	8
F 10 2	**P80**	19	21.8	6	200	165	130	—	M10x14.5	4	205	9
F 10 2	**P90**	24	27.3	8	200	165	130	—	M10x14.5	4	205	9
F 10 2	**P100**	28	31.3	8	250	215	180	—	M12x16	4.5	215	13
F 10 2	**P112**	28	31.3	8	250	215	180	—	M12x16	4.5	215	13

F 10...HS



		A	E	F	F1	F2	F3	F4	V	
F 10 2	**HS**	192	40	16	18	5	2.5	35	M6x16	7.5

F 10...SK / SC

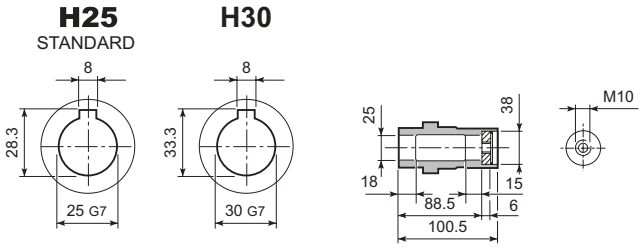


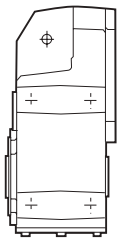
		D	M	M1	M2	N	N1	N2	N4	X	P	
F 10 2	**SK 60A**	102	11	12.8	4	82	75	60	M5x10	3.5	157	8
F 10 2	**SK 60B**	102	14	16.3	5	82	75	60	M5x10	4	164	8
F 10 2	**SK 80A**	115	14	16.3	5	90	100	80	M6x12	4	164	8
F 10 2	**SK 80C**	120	19	21.8	6	96	100	80	M6x12	4	205	9
F 10 2	**SK 95A**	130	14	16.3	5	102	115	95	M8x12	4	205	9
F 10 2	**SK 95B**	130	19	21.8	6	102	115	95	M8x12	4	205	9
F 10 2	**SK 95C**	130	24	27.3	8	102	115	95	M8x12	4	205	9
F 10 2	**SK 110A**	150	19	21.8	6	120	130	110	M8x12	5	205	9
F 10 2	**SK 110B**	150	24	27.3	8	120	130	110	M8x12	5	205	9

			Mt [Nm]	D	E	F	G	M	N	N1	N2	N4	X	P	
F 10 2	**SC 60A**	M6	15	102	7	12.5	12.5	11	82	75	60	M5x10	4	184	8
F 10 2	**SC 60B**	M6	15	102	7	12.5	12.5	14	82	75	60	M5x10	4	184	9
F 10 2	**SC 80A**	M6	15	115	6	12.5	12.5	14	90	100	80	M6x12	4	184	9
F 10 2	**SC 80C**	M6	15	120	15.5	14.5	17.75	19	96	100	80	M6x12	4	228.5	10
F 10 2	**SC 95A**	M6	15	130	16.5	15	17.75	14	102	115	95	M8x16	4	228.5	10
F 10 2	**SC 95B**	M6	15	130	16.5	15	17.75	19	102	115	95	M8x16	4	228.5	10
F 10 2	**SC 95C**	M6	15	130	16.5	15	17.75	24	102	115	95	M8x16	4	228.5	10
F 10 2	**SC 110A**	M6	15	150	16.5	16	17.75	19	120	130	110	M8x16	5	228.5	11
F 10 2	**SC 110B**	M6	15	150	16.5	16	17.75	24	120	130	110	M8x16	5	228.5	11

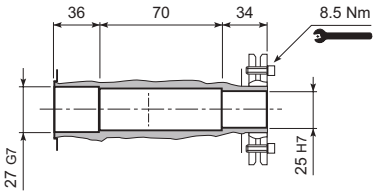
F 10

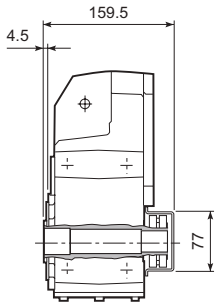
F 10...H



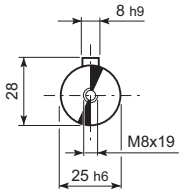


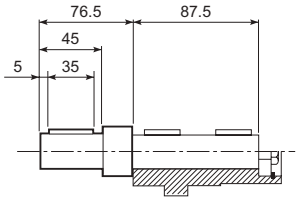
F 10...S

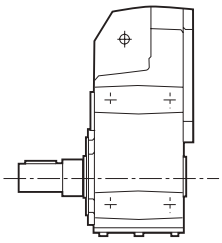




F 10...R

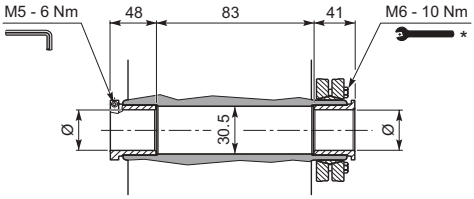


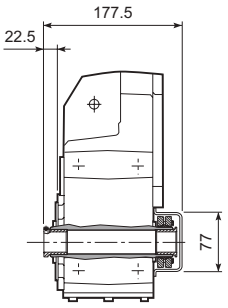




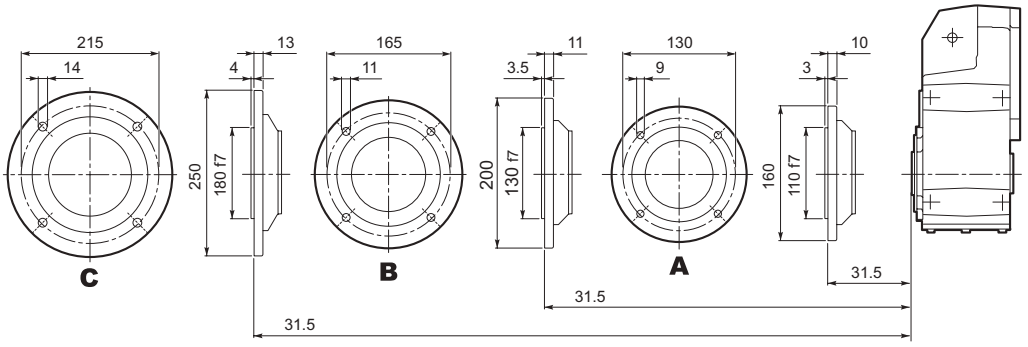
F 10...QF

	Ø
QF25	25
QF30	30



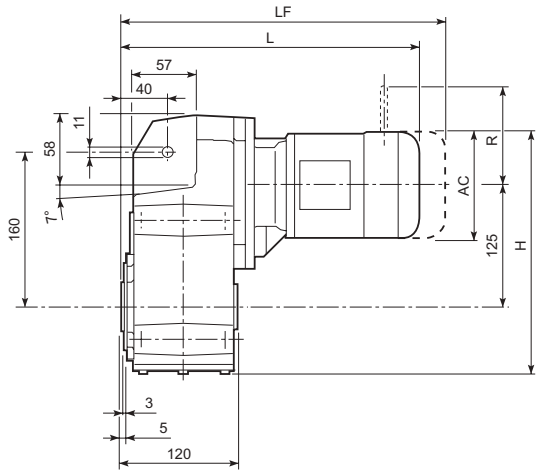


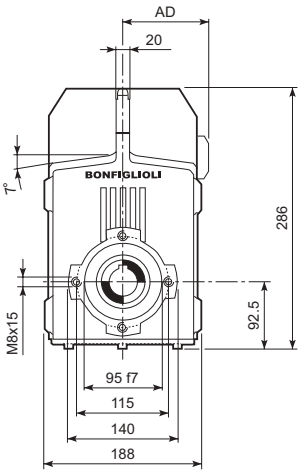
F 10...F...



* Follow the MOUNTING INSTRUCTIONS supplied with the gearbox.

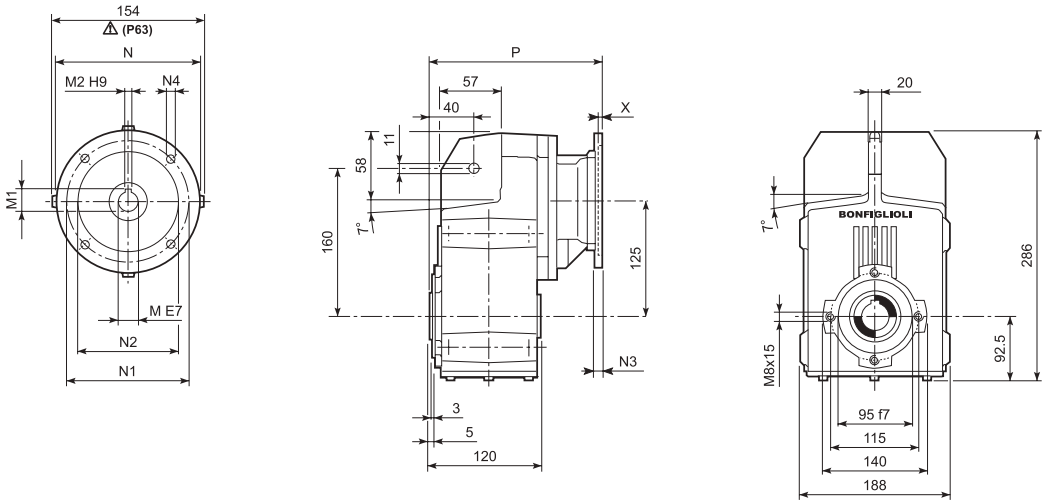
F 20...M/ME/MX





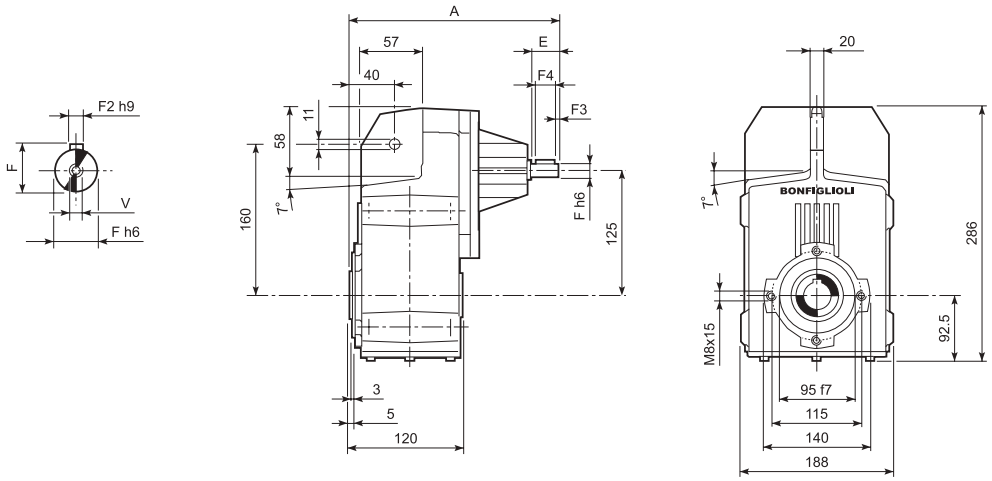
								M...FD M...FA		M...FD		M...FA	
			AC	H	L	AD		LF		R	AD	R	AD
F 20 2	**S05**	**M05**	121	278.2	323.5	95	15	389.5	17	96	122	116	95
F 20 2	**S1**	**M1**	138	286.7	352.5	108	17	413.5	20	103	135	124	108
F 20 2	**S2**	**ME2S**	156	295.7	381.5	119	21	—	—	—	—	—	—
F 20 2	**S2**	**MX2S**	156	295.7	425.5	119	26	—	—	—	—	—	—
F 20 2	**S3**	**ME3S**	195	315.2	424.5	142	26	—	—	—	—	—	—
F 20 2	**S3**	**MX3S**	195	315.2	456.5	142	29	—	—	—	—	—	—
F 20 2	**S3**	**ME3L**	195	315.2	456.5	142	33	—	—	—	—	—	—
F 20 2	**S3**	**MX3L**	195	315.2	500.5	142	39	—	—	—	—	—	—
F 20 3	**S05**	**M05**	121	278.2	379	95	17	445	18	96	122	116	95
F 20 3	**S1**	**M1**	138	286.7	408	108	19	469	21	103	135	124	108
F 20 3	**S2**	**ME2S**	156	295.7	437	119	22	—	—	—	—	—	—
F 20 3	**S2**	**MX2S**	156	295.7	481	119	27	—	—	—	—	—	—
F 20 3	**S3**	**ME3S**	195	315.2	480	142	27	—	—	—	—	—	—
F 20 3	**S3**	**MX3S**	195	315.2	512	142	30	—	—	—	—	—	—
F 20 3	**S3**	**ME3L**	195	315.2	512	142	34	—	—	—	—	—	—
F 20 3	**S3**	**MX3L**	195	315.2	556	142	40	—	—	—	—	—	—

F 20...P(IEC)



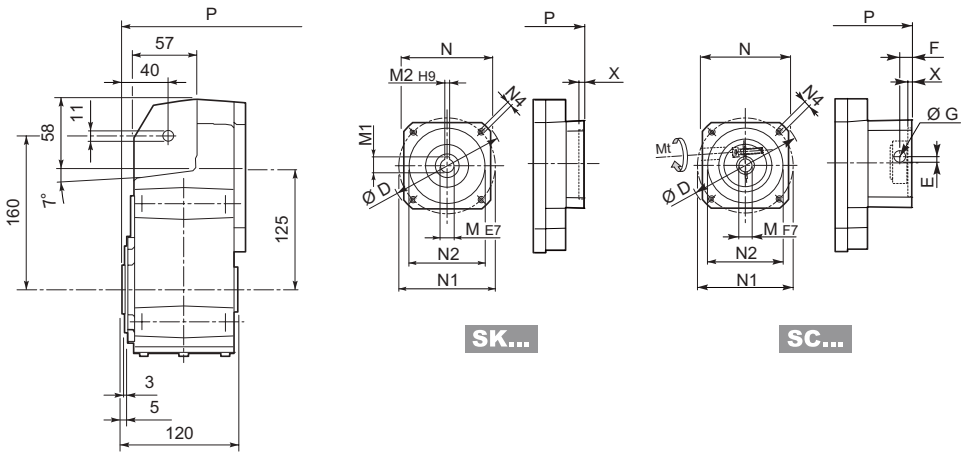
		M	M1	M2	N	N1	N2	N3	N4	X	P	
F 20 2	**P63**	11	12.8	4	140	115	95	—	M8x19	4	197.5	12
F 20 2	**P71**	14	16.3	5	160	130	110	—	M8x16	4.5	197.5	12
F 20 2	**P80**	19	21.8	6	200	165	130	—	M10x14.5	4	217	13
F 20 2	**P90**	24	27.3	8	200	165	130	—	M10x14.5	4	217	12
F 20 2	**P100**	28	31.3	8	250	215	180	—	M12x16	4.5	227	16
F 20 2	**P112**	28	31.3	8	250	215	180	—	M12x16	4.5	227	16
F 20 3	**P63**	11	12.8	4	140	115	95	—	M8x19	4	253	13
F 20 3	**P71**	14	16.3	5	160	130	110	—	M8x16	4.5	253	13
F 20 3	**P80**	19	21.8	6	200	165	130	—	M10x14.5	4	272.5	14
F 20 3	**P90**	24	27.3	8	200	165	130	—	M10x14.5	4	272.5	14
F 20 3	**P100**	28	31.3	8	250	215	180	—	M12x16	4.5	282.5	18
F 20 3	**P112**	28	31.3	8	250	215	180	—	M12x16	4.5	282.5	18

F 20...HS



		A	E	F	F1	F2	F3	F4	V	
F 20 2	**HS**	247.5	40	19	21.5	6	2.5	35	M6x16	11.5
F 20 3		260	40	16	18	5	2.5	35	M6x16	12.4

F 20...SK / SC

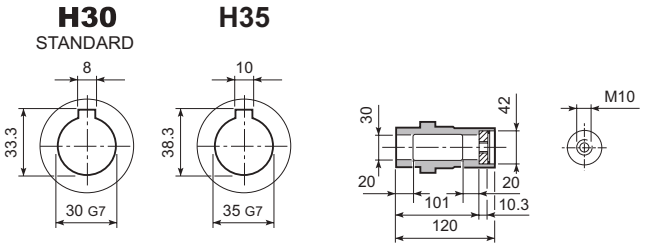


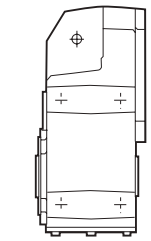
											2x		3x	
		D	M	M1	M2	N	N1	N2	N4	X	P		P	
F 20 2/3	**SK 60A**	102	11	12.8	4	82	75	60	M5x10	3.5	169	11	224.5	12
F 20 2/3	**SK 60B**	102	14	16.3	5	82	75	60	M5x10	4	176	12	231.5	13
F 20 2/3	**SK 80A**	115	14	16.3	5	90	100	80	M6x12	4	217	12	231.5	13
F 20 2/3	**SK 80C**	120	19	21.8	6	96	100	80	M6x12	4	217	13	272.5	14
F 20 2/3	**SK 95A**	130	14	16.3	5	102	115	95	M8x12	4	217	13	272.5	14
F 20 2/3	**SK 95B**	130	19	21.8	6	102	115	95	M8x12	4	217	13	272.5	14
F 20 2/3	**SK 95C**	130	24	27.3	8	102	115	95	M8x12	4	217	13	272.5	14
F 20 2/3	**SK 110A**	150	19	21.8	6	120	130	110	M8x12	5	217	13	272.5	14
F 20 2/3	**SK 110B**	150	24	27.3	8	120	130	110	M8x12	5	217	13	272.5	14

														2x		3x	
			Mt [Nm]	D	E	F	G	M	N	N1	N2	N4	X	P		P	
F 20 2/3	**SC 60A**	M6	15	102	7	12.5	12.5	11	82	75	60	M5x10	4	196	12	251.5	13
F 20 2/3	**SC 60B**	M6	15	102	7	12.5	12.5	14	82	75	60	M5x10	4	196	13	251.5	14
F 20 2/3	**SC 80A**	M6	15	115	6	12.5	12.5	14	90	100	80	M6x12	4	196	13	251.5	14
F 20 2/3	**SC 80C**	M6	15	120	15.5	14.5	17.75	19	96	100	80	M6x12	4	240.5	14	296	15
F 20 2/3	**SC 95A**	M6	15	130	16.5	15	17.75	14	102	115	95	M8x16	4	240.5	14	296	15
F 20 2/3	**SC 95B**	M6	15	130	16.5	15	17.75	19	102	115	95	M8x16	4	240.5	14	296	15
F 20 2/3	**SC 95C**	M6	15	130	16.5	15	17.75	24	102	115	95	M8x16	4	240.5	14	296	15
F 20 2/3	**SC 110A**	M6	15	150	16.5	16	17.75	19	120	130	110	M8x16	5	240.5	15	296	16
F 20 2/3	**SC 110B**	M6	15	150	16.5	16	17.75	24	120	130	110	M8x16	5	240.5	15	296	16

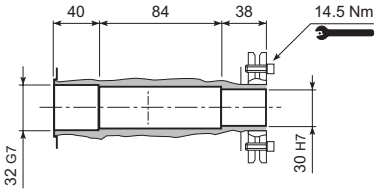
F 20

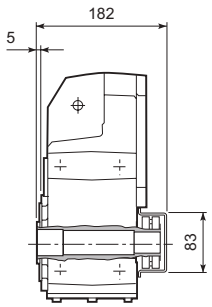
F 20...H



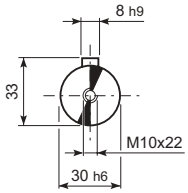


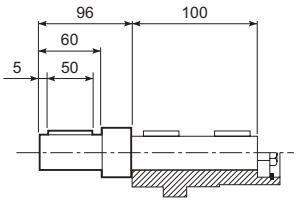
F 20...S

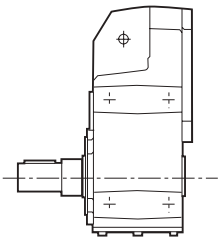




F 20...R

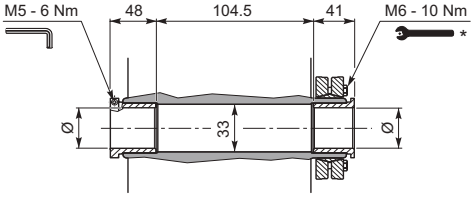


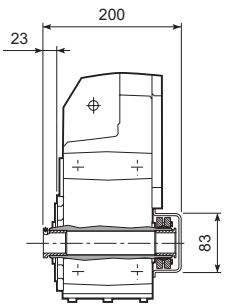




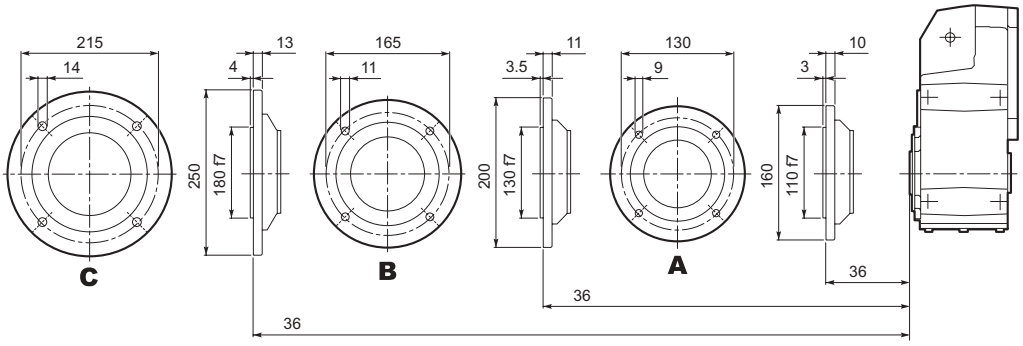
F 20...QF

	Ø
QF25	25
QF30	30



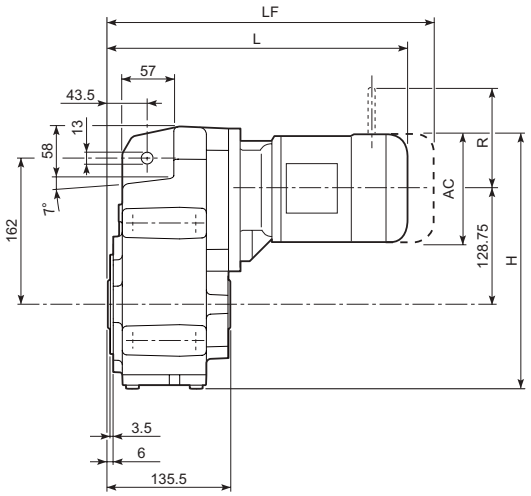


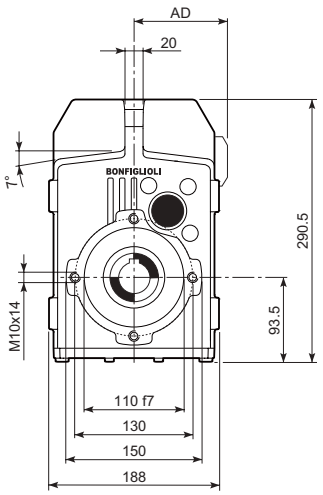
F 20...F...



* Follow the MOUNTING INSTRUCTIONS supplied with the gearbox.

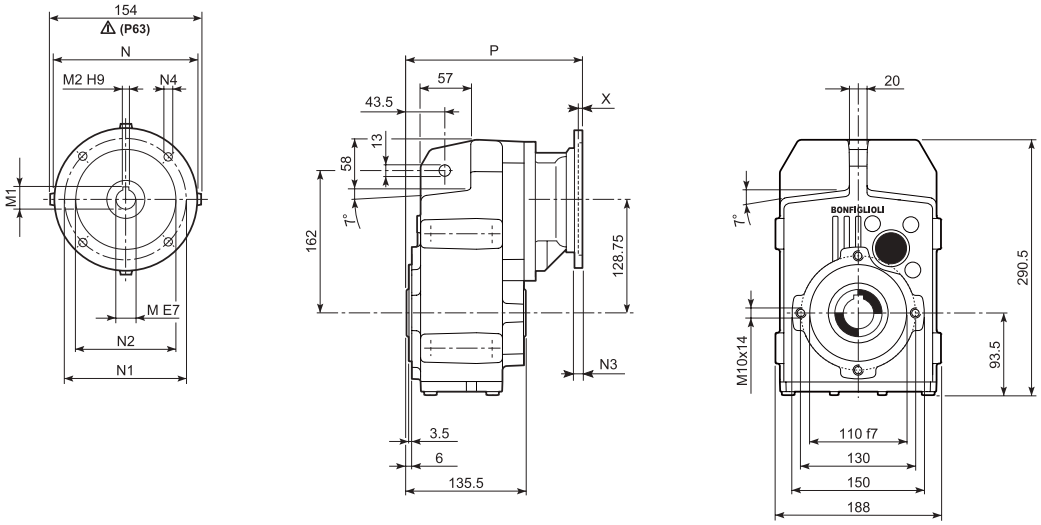
F 25...M/ME/MX





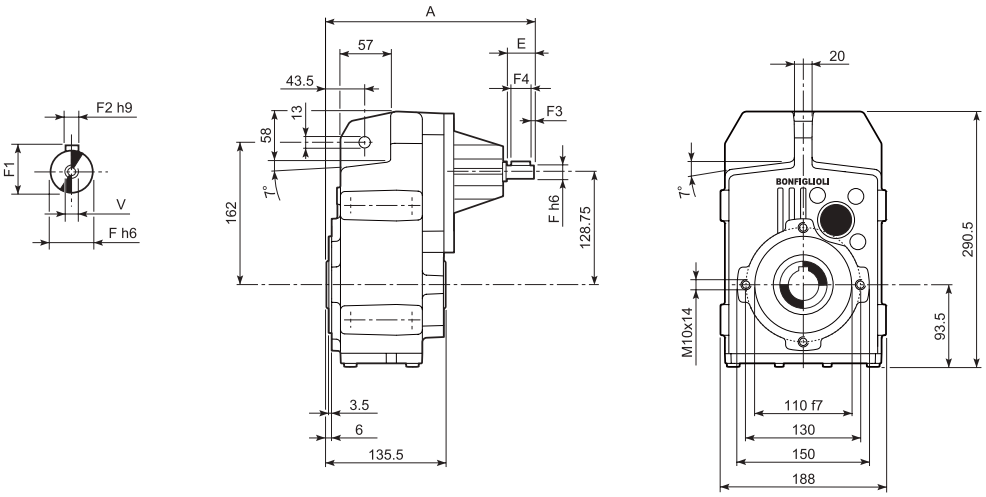
								M...FD M...FA		M...FD		M...FA	
			AC	H	L	AD		LF		R	AD	R	AD
F 25 2/3	**S05**	**M05**	121	283	339	95	15	405	17	96	122	116	95
F 25 2/3	**S1**	**M1**	138	291.5	368	108	17	429	20	103	135	124	108
F 25 2/3	**S2**	**ME2S**	156	300.5	397	119	21	—	—	—	—	—	—
F 25 2/3	**S2**	**MX2S**	156	300.5	441	119	26	—	—	—	—	—	—
F 25 2/3	**S3**	**ME3S**	195	320	440	142	26	—	—	—	—	—	—
F 25 2/3	**S3**	**MX3S**	195	320	472	142	29	—	—	—	—	—	—
F 25 2/3	**S3**	**ME3L**	195	320	472	142	33	—	—	—	—	—	—
F 25 2/3	**S3**	**MX3L**	195	320	516	142	39	—	—	—	—	—	—
F 25 4	**S05**	**M05**	121	283	394.5	95	17	460.5	18	96	122	116	95
F 25 4	**S1**	**M1**	138	291.5	423.5	108	19	484.5	21	103	135	124	108
F 25 4	**S2**	**ME2S**	156	300.5	452.5	119	22	—	—	—	—	—	—
F 25 4	**S2**	**MX2S**	156	300.5	496.5	119	27	—	—	—	—	—	—
F 25 4	**S3**	**ME3S**	195	320	495.5	142	27	—	—	—	—	—	—
F 25 4	**S3**	**MX3S**	195	320	527.5	142	30	—	—	—	—	—	—
F 25 4	**S3**	**ME3L**	195	320	527.5	142	34	—	—	—	—	—	—
F 25 4	**S3**	**MX3L**	195	320	571.5	142	40	—	—	—	—	—	—

F 25...P(IEC)



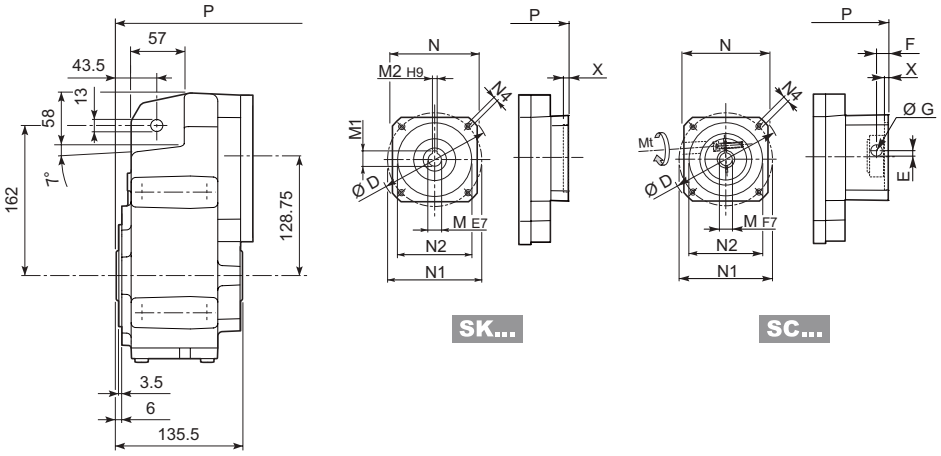
		M	M1	M2	N	N1	N2	N3	N4	X	P	
F 25 2/3	**P63**	11	12.8	4	140	115	95	—	M8x19	4	213	12
F 25 2/3	**P71**	14	16.3	5	160	130	110	—	M8x16	4.5	213	12
F 25 2/3	**P80**	19	21.8	6	200	165	130	—	M10x14.5	4	232.5	13
F 25 2/3	**P90**	24	27.3	8	200	165	130	—	M10x14.5	4	232.5	13
F 25 2/3	**P100**	28	31.3	8	250	215	180	—	M12x16	4.5	242.5	16
F 25 2/3	**P112**	28	31.3	8	250	215	180	—	M12x16	4.5	242.5	16
F 25 4	**P63**	11	12.8	4	140	115	95	—	M8x19	4	268.5	13
F 25 4	**P71**	14	16.3	5	160	130	110	—	M8x16	4.5	268.5	13
F 25 4	**P80**	19	21.8	6	200	165	130	—	M10x14.5	4	288	14
F 25 4	**P90**	24	27.3	8	200	165	130	—	M10x14.5	4	288	14
F 25 4	**P100**	28	31.3	8	250	215	180	—	M12x16	4.5	298	18
F 25 4	**P112**	28	31.3	8	250	215	180	—	M12x16	4.5	298	18

F 25...HS



		A	E	F	F1	F2	F3	F4	V	
F 25 2	**HS**	263	40	19	21.5	6	2.5	35	M6x16	11.5
F 25 3		263	40	19	21.5	6	2.5	35	M6x16	11.5
F 25 4		275.5	40	16	18	5	2.5	35	M6x16	12.5

F 25...SK / SC

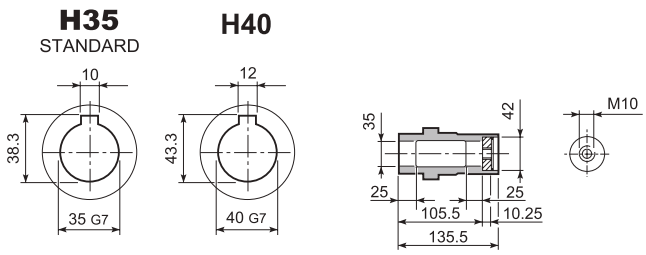


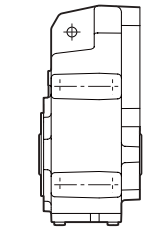
											2/3x		4x	
		D	M	M1	M2	N	N1	N2	N4	X	P		P	
F 25 2/3/4	SK 60A	102	11	12.8	4	82	75	60	M5x10	3.5	184.5	11	240	12
F 25 2/3/4	SK 60B	102	14	16.3	5	82	75	60	M5x10	4	191.5	12	247	13
F 25 2/3/4	SK 80A	115	14	16.3	5	90	100	80	M6x12	4	191.5	12	247	13
F 25 2/3/4	SK 80C	120	19	21.8	6	96	100	80	M6x12	4	232.5	13	288	14
F 25 2/3/4	SK 95A	130	14	16.3	5	102	115	95	M8x12	4	232.5	13	288	14
F 25 2/3/4	SK 95B	130	19	21.8	6	102	115	95	M8x12	4	232.5	13	288	14
F 25 2/3/4	SK 95C	130	24	27.3	8	102	115	95	M8x12	4	232.5	13	288	14
F 25 2/3/4	SK 110A	150	19	21.8	6	120	130	110	M8x12	5	232.5	13	288	14
F 25 2/3/4	SK 110B	150	24	27.3	8	120	130	110	M8x12	5	232.5	13	288	14

														2/3x		4x	
			Mt [Nm]	D	E	F	G	M	N	N1	N2	N4	X	P		P	
F 25 2/3/4	SC 60A	M6	15	102	7	12.5	12.5	11	82	75	60	M5x10	4	211.5	12	267	13
F 25 2/3/4	SC 60B	M6	15	102	7	12.5	12.5	14	82	75	60	M5x10	4	211.5	13	267	14
F 25 2/3/4	SC 80A	M6	15	115	6	12.5	12.5	14	90	100	80	M6x12	4	211.5	13	267	14
F 25 2/3/4	SC 80C	M6	15	120	15.5	14.5	17.75	19	96	100	80	M6x12	4	256	14	311.5	15
F 25 2/3/4	SC 95A	M6	15	130	16.5	15	17.75	14	102	115	95	M8x16	4	256	14	311.5	15
F 25 2/3/4	SC 95B	M6	15	130	16.5	15	17.75	19	102	115	95	M8x16	4	256	14	311.5	15
F 25 2/3/4	SC 95C	M6	15	130	16.5	15	17.75	24	102	115	95	M8x16	4	256	14	311.5	15
F 25 2/3/4	SC 110A	M6	15	150	16.5	16	17.75	19	120	130	110	M8x16	5	256	15	311.5	16
F 25 2/3/4	SC 110B	M6	15	150	16.5	16	17.75	24	120	130	110	M8x16	5	256	15	311.5	16

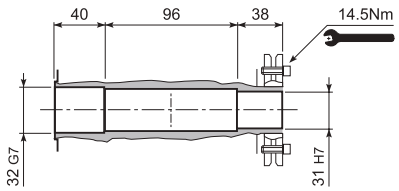
F 25

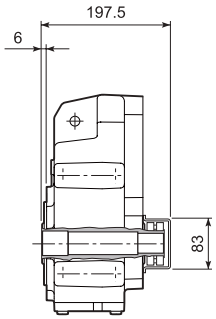
F 25...H



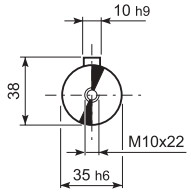


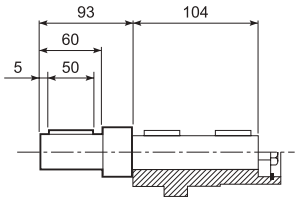
F 25...S

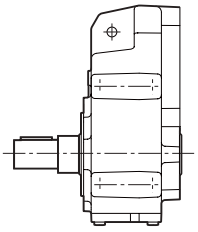




F 25...R



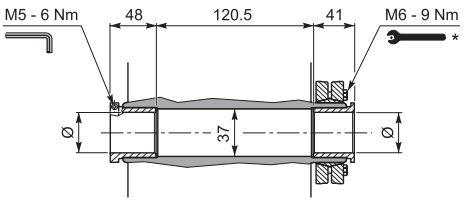


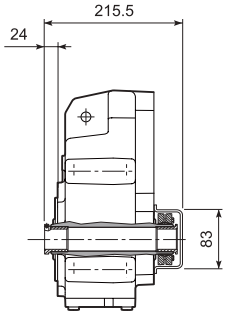


F 25...QF

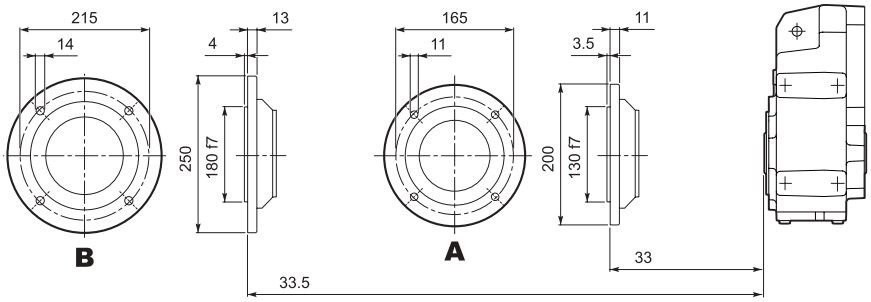
	Ø
QF30	30
QF32	32

$M_{n2\ max}$ [Nm]	
F 25 QF30	350



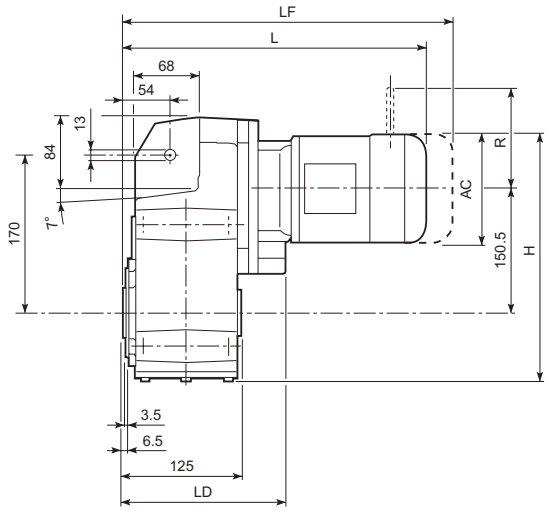


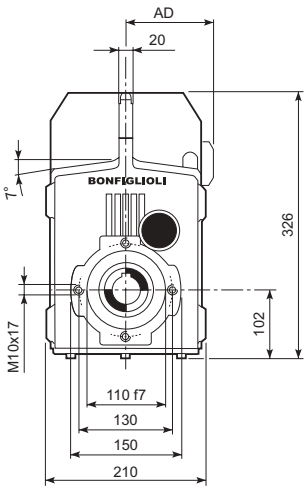
F 25...F...



* Follow the MOUNTING INSTRUCTIONS supplied with the gearbox.

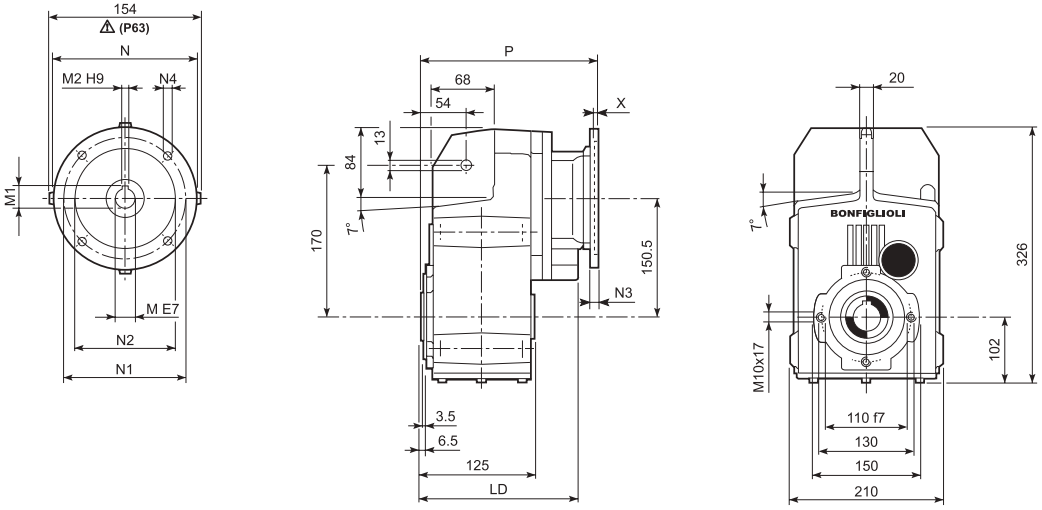
F 31...M/ME/MX





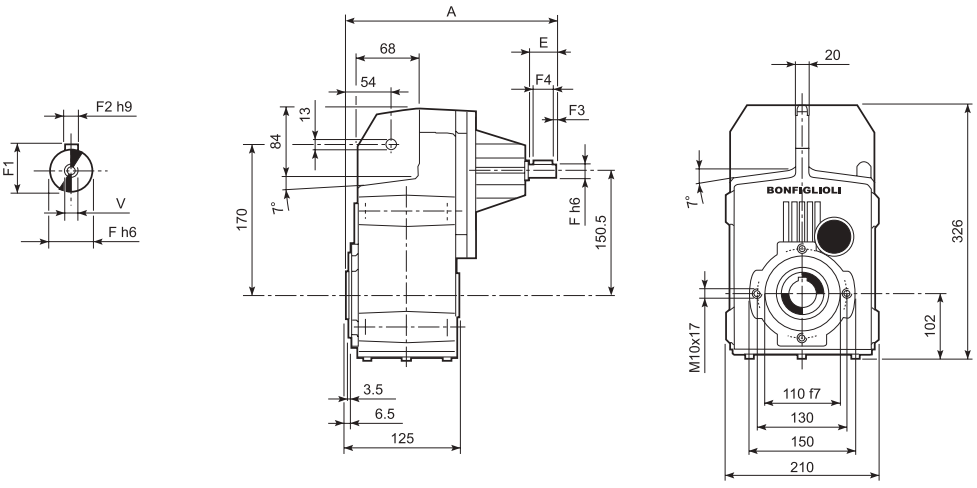
										M...FD M...FA		M...FD		M...FA	
				AC	H	L	LD	AD		LF		R	AD	R	AD
F 31 2/3	**S1**	**M1**		138	321.3	380.5	183.5	108	22	441.5	25	103	135	124	108
F 31 2/3	**S2**	**ME2S**		156	330.3	409.5	195.5	119	26	—	—	—	—	—	—
F 31 2/3	**S2**	**MX2S**		156	330.3	453.5	195.5	119	31	—	—	—	—	—	—
F 31 2/3	**S3**	**ME3S**		195	349.8	452.5	205.5	142	31	—	—	—	—	—	—
F 31 2/3	**S3**	**MX3S**		195	349.8	484.5	205.5	142	34	—	—	—	—	—	—
F 31 2/3	**S3**	**ME3L**		195	349.8	484.5	205.5	142	40	—	—	—	—	—	—
F 31 2/3	**S3**	**MX3L**		195	349.8	528.5	205.5	142	46	—	—	—	—	—	—
F 31 2/3	**S4**	**ME4**	**MX4**	258	381.3	592.5	—	193	72	—	—	—	—	—	—
F 31 2/3	**S4**	**ME4LA**	**MX4LA**	258	381.3	592.5	—	193	78	—	—	—	—	—	—
F 31 4	**S05**	**M05**		121	312.8	409	—	95	20	475	22	96	122	116	95
F 31 4	**S1**	**M1**		138	321.3	438	—	108	22	499	25	103	135	124	108
F 31 4	**S2**	**ME2S**		156	330.3	467	—	119	26	—	—	—	—	—	—
F 31 4	**S2**	**MX2S**		156	330.3	511	—	119	31	—	—	—	—	—	—
F 31 4	**S3**	**ME3S**		195	349.8	510	—	142	31	—	—	—	—	—	—
F 31 4	**S3**	**MX3S**		195	349.8	542	—	142	34	—	—	—	—	—	—
F 31 4	**S3**	**ME3L**		195	349.8	542	—	142	41	—	—	—	—	—	—
F 31 4	**S3**	**MX3L**		195	349.8	586	—	142	47	—	—	—	—	—	—

F 31...P(IEC)



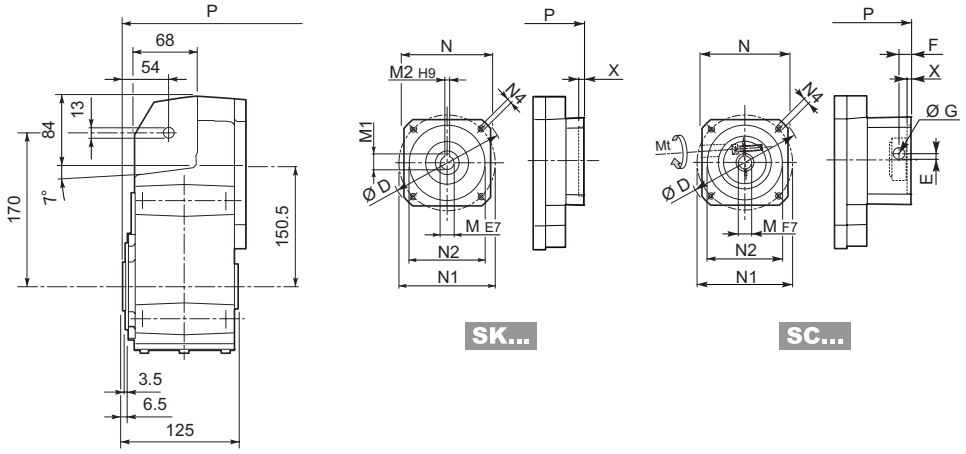
		LD	M	M1	M2	N	N1	N2	N3	N4	X	P	
F 31 2/3	**P63**	195.5	11	12.8	4	140	115	95	—	M8x19	4	225.5	17
F 31 2/3	**P71**	195.5	14	16.3	5	160	130	110	—	M8x16	4.5	225.5	17
F 31 2/3	**P80**	205.5	19	21.8	6	200	165	130	—	M10x14.5	4	245	18
F 31 2/3	**P90**	205.5	24	27.3	8	200	165	130	—	M10x14.5	4	245	17
F 31 2/3	**P100**	205.5	28	31.3	8	250	215	180	—	M12x16	4.5	255	21
F 31 2/3	**P112**	205.5	28	31.3	8	250	215	180	—	M12x16	4.5	255	21
F 31 2/3	**P132**	—	38	41.3	10	300	265	230	—	14	5	291.5	24
F 31 4	**P63**	—	11	12.8	4	140	115	95	—	M8x19	4	283	17
F 31 4	**P71**	—	14	16.3	5	160	130	110	—	M8x16	4.5	283	17
F 31 4	**P80**	—	19	21.8	6	200	165	130	—	M10x14.5	4	302.5	18
F 31 4	**P90**	—	24	27.3	8	200	165	130	—	M10x14.5	4	302.5	18
F 31 4	**P100**	—	28	31.3	8	250	215	180	—	M12x16	4.5	312.5	22
F 31 4	**P112**	—	28	31.3	8	250	215	180	—	M12x16	4.5	312.5	22

F 31...HS



		A	E	F	F1	F2	F3	F4	V	
F 31 2	**HS**	275.5	40	19	21.5	6	2.5	35	M6x16	16.7
F 31 3		275.5	40	19	21.5	6	2.5	35	M6x16	16.7
F 31 4		290	40	16	18	5	2.5	35	M6x16	16.5

F 31...SK / SC

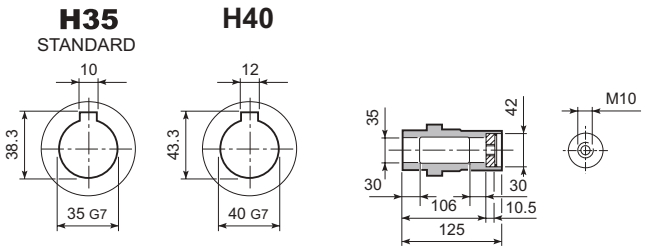


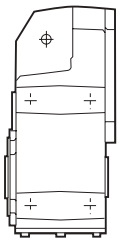
											2/3x		4x	
		D	M	M1	M2	N	N1	N2	N4	X	P		P	
F 31 2/3/4	**SK 60A**	102	11	12.8	4	82	75	60	M5x10	3.5	197	16	254.5	16
F 31 2/3/4	**SK 60B**	102	14	16.3	5	82	75	60	M5x10	4	204	17	261.5	17
F 31 2/3/4	**SK 80A**	115	14	16.3	5	90	100	80	M6x12	4	204	17	261.5	17
F 31 2/3/4	**SK 80C**	120	19	21.8	6	96	100	80	M6x12	4	245	18	302.5	18
F 31 2/3/4	**SK 95A**	130	14	16.3	5	102	115	95	M8x12	4	245	18	302.5	18
F 31 2/3/4	**SK 95B**	130	19	21.8	6	102	115	95	M8x12	4	245	18	302.5	18
F 31 2/3/4	**SK 95C**	130	24	27.3	8	102	115	95	M8x12	4	245	18	302.5	18
F 31 2/3/4	**SK 110A**	150	19	21.8	6	120	130	110	M8x12	5	245	18	302.5	18
F 31 2/3/4	**SK 110B**	150	24	27.3	8	120	130	110	M8x12	5	245	18	302.5	18
F 31 2/3	**SK 130A**	188	24	27.3	8	142	165	130	M10x20	5	245	18	—	—

														2/3x		4x	
			Mt [Nm]	D	E	F	G	M	N	N1	N2	N4	X	P		P	
F 31 2/3/4	**SC 60A**	M6	15	102	7	12.5	12.5	11	82	75	60	M5x10	4	224	17	281.5	17
F 31 2/3/4	**SC 60B**	M6	15	102	7	12.5	12.5	14	82	75	60	M5x10	4	224	18	281.5	18
F 31 2/3/4	**SC 80A**	M6	15	115	6	12.5	12.5	14	90	100	80	M6x12	4	224	18	281.5	18
F 31 2/3/4	**SC 80C**	M6	15	120	15.5	14.5	17.75	19	96	100	80	M6x12	4	268.5	19	326	19
F 31 2/3/4	**SC 95A**	M6	15	130	16.5	15	17.75	14	102	115	95	M8x16	4	268.5	19	326	19
F 31 2/3/4	**SC 95B**	M6	15	130	16.5	15	17.75	19	102	115	95	M8x16	4	268.5	19	326	19
F 31 2/3/4	**SC 95C**	M6	15	130	16.5	15	17.75	24	102	115	95	M8x16	4	268.5	19	326	19
F 31 2/3/4	**SC 110A**	M6	15	150	16.5	16	17.75	19	120	130	110	M8x16	5	268.5	20	326	20
F 31 2/3/4	**SC 110B**	M6	15	150	16.5	16	17.75	24	120	130	110	M8x16	5	268.5	20	326	20
F 31 2/3	**SC 130A**	M6	15	188	19	16	17.75	24	142	165	130	M10x20	5	268.5	21	—	—

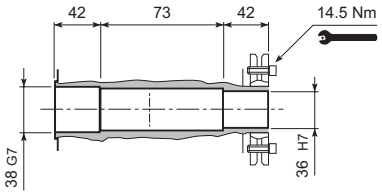
F 31

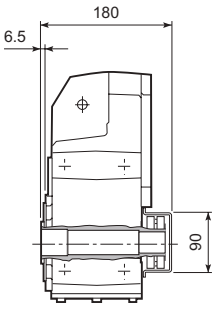
F 31...H



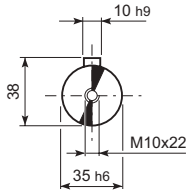


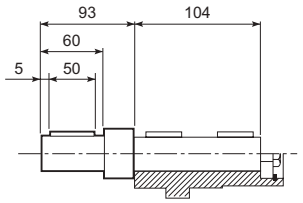
F 31...S

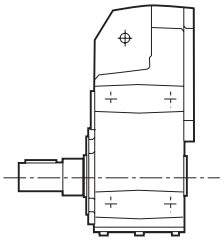




F 31...R

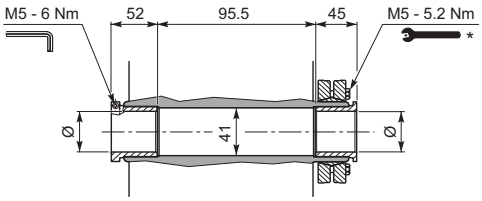


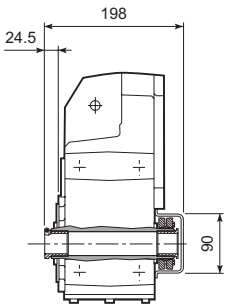




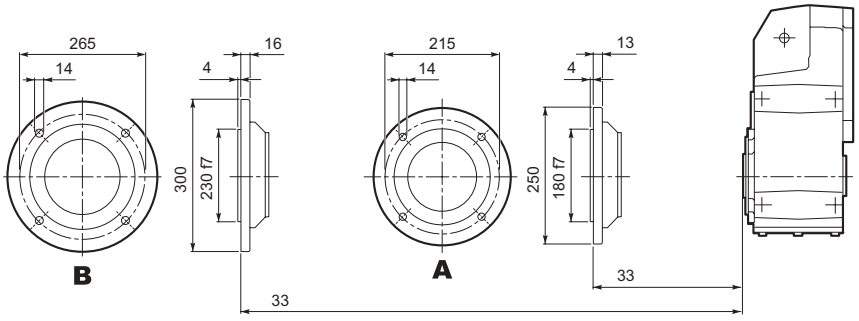
F 31...QF

	Ø
QF35	35
QF40	40



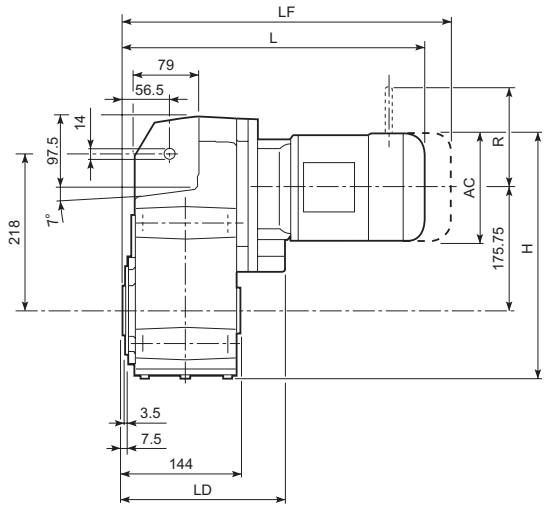


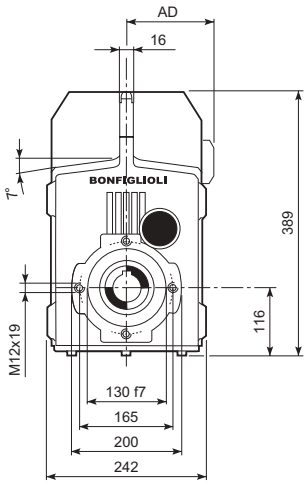
F 31...F...



* Follow the MOUNTING INSTRUCTIONS supplied with the gearbox.

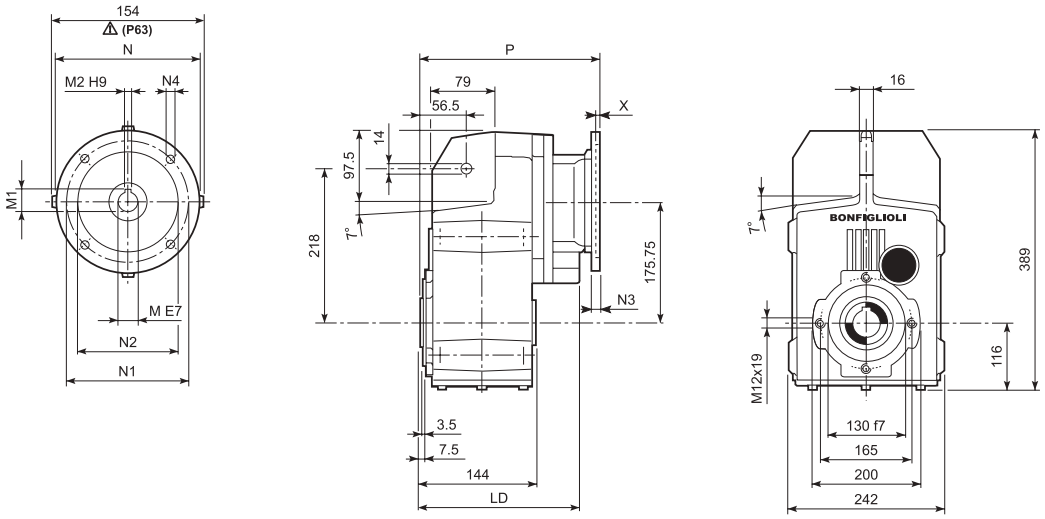
F 41...M/ME/MX





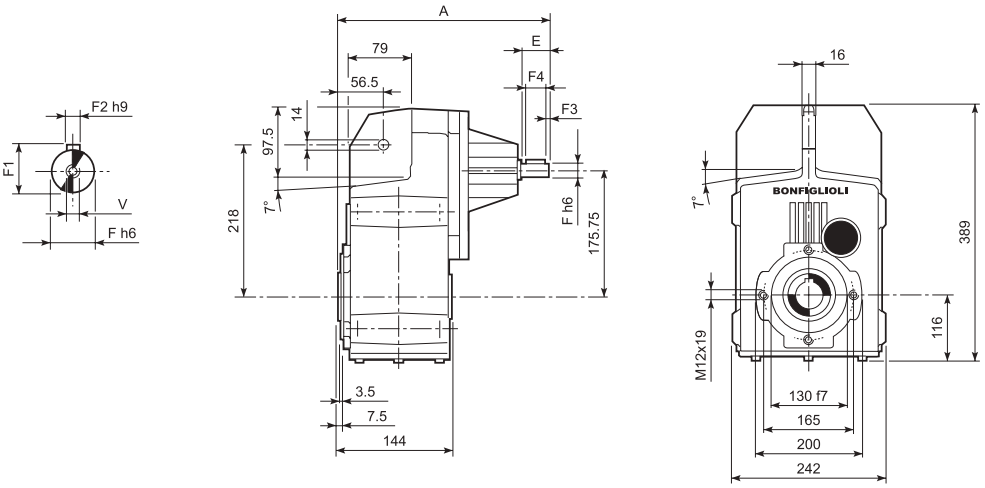
										M...FD M...FA		M...FD		M...FA	
				AC	H	L	LD	AD		LF		R	AD	R	AD
F 41 2/3	**S1**	**M1**		138	360.8	401	199.5	108	46	462	48	103	135	124	108
F 41 2/3	**S2**	**ME2S**		156	369.8	430	215	119	49	—	—	—	—	—	—
F 41 2/3	**S2**	**MX2S**		156	369.8	474	215	119	54	—	—	—	—	—	—
F 41 2/3	**S3**	**ME3S**		195	389.3	473	231	142	54	—	—	—	—	—	—
F 41 2/3	**S3**	**MX3S**		195	389.3	505	231	142	57	—	—	—	—	—	—
F 41 2/3	**S3**	**ME3L**		195	389.3	505	231	142	64	—	—	—	—	—	—
F 41 2/3	**S3**	**MX3L**		195	389.3	549	231	142	70	—	—	—	—	—	—
F 41 2/3	**S4**	**ME4**	**MX4**	258	420.8	613	—	193	96	—	—	—	—	—	—
F 41 2/3	**S4**	**ME4LB**	**MX4LA**	258	420.8	648	—	193	104	—	—	—	—	—	—
F 41 4	**S05**	**M05**		231	352.3	433.5	—	95	45	499.5	46	96	122	116	95
F 41 4	**S1**	**M1**		138	360.8	462.5	—	108	47	523.5	49	103	135	124	108
F 41 4	**S2**	**ME2S**		156	369.8	491.5	—	119	50	—	—	—	—	—	—
F 41 4	**S2**	**MX2S**		156	369.8	535.5	—	119	55	—	—	—	—	—	—
F 41 4	**S3**	**ME3S**		195	389.3	534.5	—	142	55	—	—	—	—	—	—
F 41 4	**S3**	**MX3S**		195	389.3	566.5	—	142	58	—	—	—	—	—	—
F 41 4	**S3**	**ME3L**		195	389.3	566.5	—	142	65	—	—	—	—	—	—
F 41 4	**S3**	**MX3L**		195	389.3	610.5	—	142	71	—	—	—	—	—	—

F 41...P(IEC)



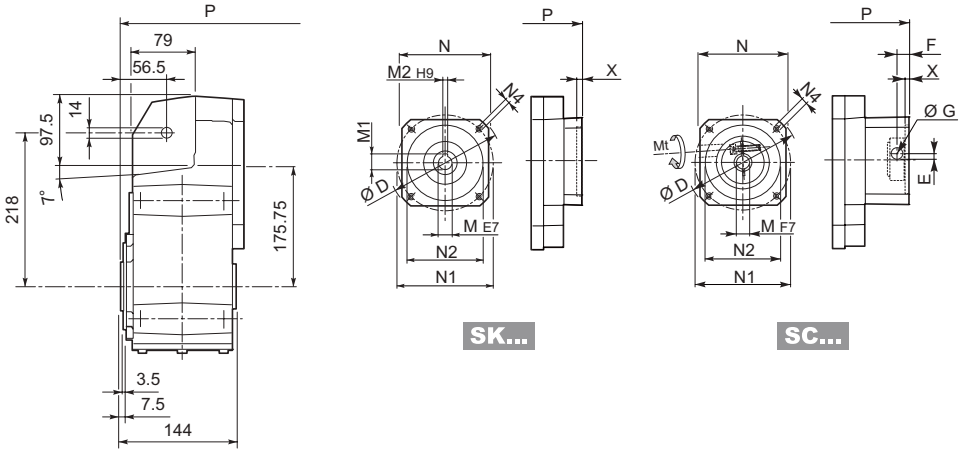
		LD	M	M1	M2	N	N1	N2	N3	N4	X	P	
F 41 2/3	**P63**	215	11	12.8	4	140	115	95	—	M8x19	4	246	42
F 41 2/3	**P71**	215	14	16.3	5	160	130	110	—	M8x16	4.5	246	42
F 41 2/3	**P80**	231	19	21.8	6	200	165	130	—	M10x14.5	4	265.5	43
F 41 2/3	**P90**	231	24	27.3	8	200	165	130	—	M10x14.5	4	265.5	43
F 41 2/3	**P100**	231	28	31.3	8	250	215	180	—	M12x16	4.5	275.5	47
F 41 2/3	**P112**	231	28	31.3	8	250	215	180	—	M12x16	4.5	275.5	47
F 41 2/3	**P132**	—	38	41.3	10	300	265	230	16	14	5	312	50
F 41 4	**P63**	—	11	12.8	4	140	115	95	—	M8x19	4	307.5	44
F 41 4	**P71**	—	14	16.3	5	160	130	110	—	M8x16	4.5	307.5	44
F 41 4	**P80**	—	19	21.8	6	200	165	130	—	M10x14.5	4	327	45
F 41 4	**P90**	—	24	27.3	8	200	165	130	—	M10x14.5	4	327	45
F 41 4	**P100**	—	28	31.3	8	250	215	180	—	M12x16	4.5	337	49
F 41 4	**P112**	—	28	31.3	8	250	215	180	—	M12x16	4.5	337	49

F 41...HS



		A	E	F	F1	F2	F3	F4	V	
F 41 2	**HS**	335.5	50	24	27	8	2.5	45	M8x19	44.9
F 41 3		335.5	50	24	27	8	2.5	45	M8x19	46.4
F 41 4		357.5	40	19	21.5	6	2.5	35	M6x16	43.5

F 41...SK / SC

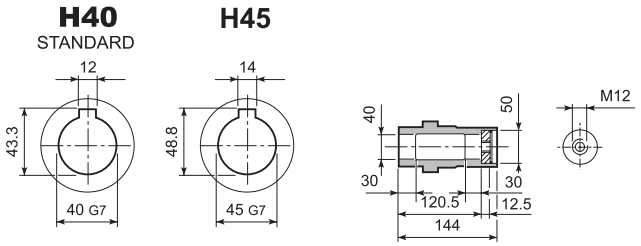


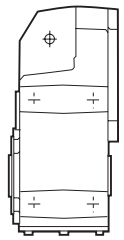
											2/3x		4x	
		D	M	M1	M2	N	N1	N2	N4	X	P		P	
F 41 4	**SK 60A**	102	11	12.8	4	82	75	60	M5x10	3.5	—	—	279	43
F 41 4	**SK 60B**	102	14	16.3	5	82	75	60	M5x10	4	—	—	286	44
F 41 4	**SK 80A**	115	14	16.3	5	90	100	80	M6x12	4	—	—	286	44
F 41 2/3	**SK 80B**	120	14	16.3	5	96	100	80	M6x12	4	265.5	43	—	—
F 41 2/3/4	**SK 80C**	120	19	21.8	6	96	100	80	M6x12	4	265.5	43	327	45
F 41 2/3/4	**SK 95A**	130	14	16.3	5	102	115	95	M8x12	4	265.5	43	327	45
F 41 2/3/4	**SK 95B**	130	19	21.8	6	102	115	95	M8x12	4	265.5	43	327	45
F 41 2/3/4	**SK 95C**	130	24	27.3	8	102	115	95	M8x12	4	265.5	43	327	45
F 41 2/3/4	**SK 110A**	150	19	21.8	6	120	130	110	M8x12	5	265.5	43	327	45
F 41 2/3/4	**SK 110B**	150	24	27.3	8	120	130	110	M8x12	5	265.5	43	327	45
F 41 2/3	**SK 130A**	188	24	27.3	8	142	165	130	M10x20	5	265.5	45	—	—
F 41 2/3	**SK 130B**	189	32	35.3	10	160	165	130	M10x20	5	312	47	—	—
F 41 2/3	**SK 180A**	240	32	35.3	10	192	215	180	M12x19	5	312	47	—	—
F 41 2/3	**SK 180B**	240	38	41.3	10	192	215	180	M12x19	5	312	47	—	—

														2/3x		4x	
			Mt [Nm]	D	E	F	G	M	N	N1	N2	N4	X	P		P	
F 41 4	**SC 60A**	M6	15	102	7	12.5	12.5	11	82	75	60	M5x10	4	—	—	306	44
F 41 4	**SC 60B**	M6	15	102	7	12.5	12.5	14	82	75	60	M5x10	4	—	—	306	45
F 41 4	**SC 80A**	M6	15	115	6	12.5	12.5	14	90	100	80	M6x12	4	—	—	306	45
F 41 2/3	**SC 80B**	M6	15	120	15.5	14.5	17.75	14	96	100	80	M6x12	4	289	44	—	—
F 41 2/3/4	**SC 80C**	M6	15	120	15.5	14.5	17.75	19	96	100	80	M6x12	4	289	44	350.5	46
F 41 2/3/4	**SC 95A**	M6	15	130	16.5	15	17.75	14	102	115	95	M8x16	4	289	44	350.5	46
F 41 2/3/4	**SC 95B**	M6	15	130	16.5	15	17.75	19	102	115	95	M8x16	4	289	44	350.5	46
F 41 2/3/4	**SC 95C**	M6	15	130	16.5	15	17.75	24	102	115	95	M8x16	4	289	44	350.5	46
F 41 2/3/4	**SC 110A**	M6	15	150	16.5	16	17.75	19	120	130	110	M8x16	5	289	45	350.5	47
F 41 2/3/4	**SC 110B**	M6	15	150	16.5	16	17.75	24	120	130	110	M8x16	5	289	45	350.5	47
F 41 2/3	**SC 130A**	M6	15	188	19	16	17.75	24	142	165	130	M10x20	5	289	46	—	—
F 41 2/3	**SC 130B**	M8	36	189	20	17	17.75	32	160	165	130	M10x20	5	335	50	—	—
F 41 2/3	**SC 180A**	M8	36	240	20	17.5	17.75	32	192	215	180	M12x24	5	339	50	—	—
F 41 2/3	**SC 180B**	M8	36	240	20	17.5	17.75	38	192	215	180	M12x24	5	339	50	—	—

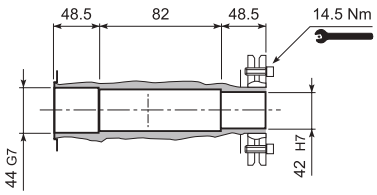
F 41

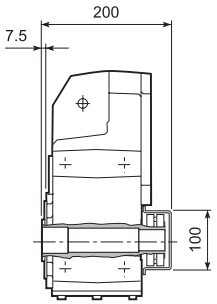
F 41...H



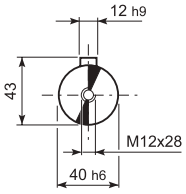


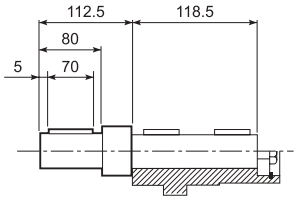
F 41...S

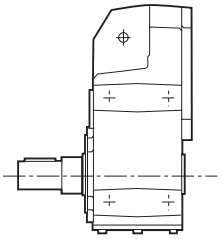




F 41...R



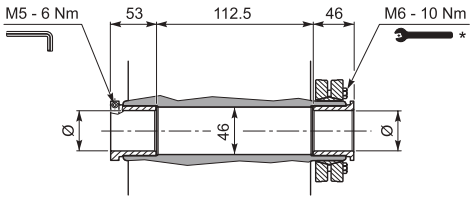


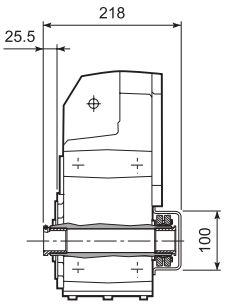


F 41...QF

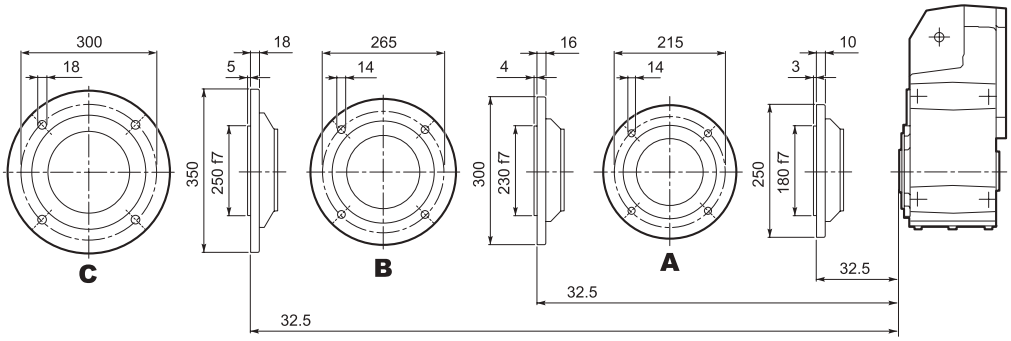
	Ø
QF42	42
QF45	45

$M_{n2\ max}$ [Nm]	
F 41 QF42	850
F 41 QF45	1000



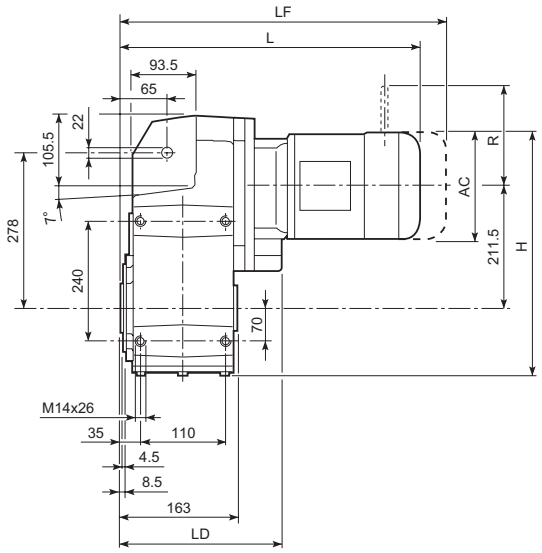


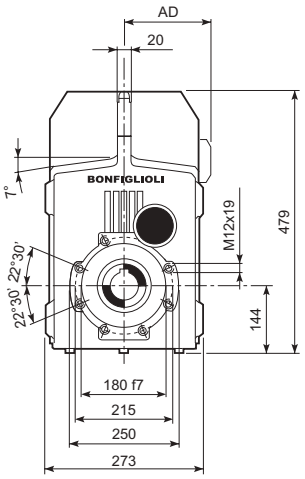
F 41...F...



* Follow the MOUNTING INSTRUCTIONS supplied with the gearbox.

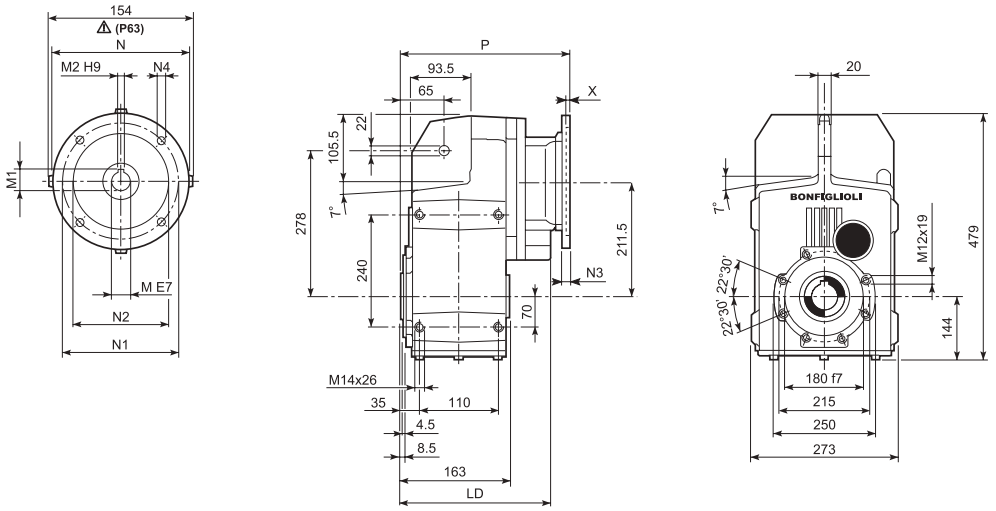
F 51...M/ME/MX





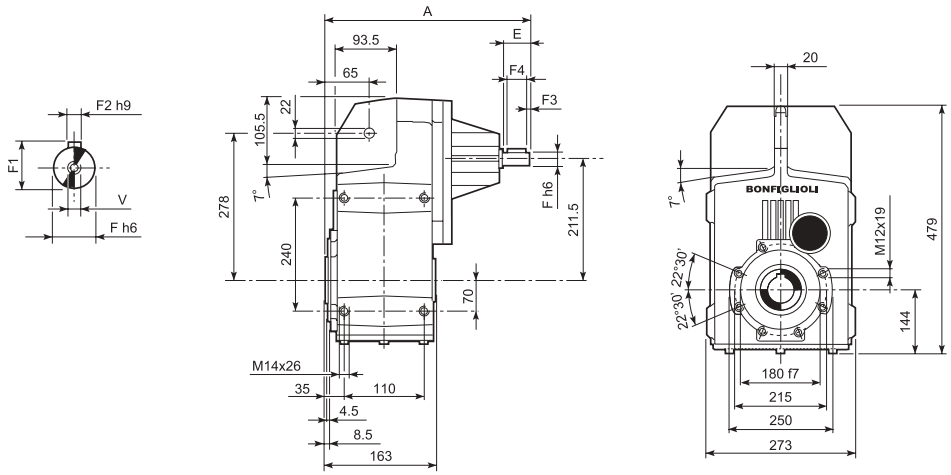
										M...FD M...FA		M...FD		M...FA	
				AC	H	L	LD	AD		LF		R	AD	R	AD
F 51 2/3	**S1**	**M1**		138	424	423	—	108	73	484	76	103	135	124	108
F 51 2/3	**S2**	**ME2S**		156	433	452	238	119	73	—	—	—	—	—	—
F 51 2/3	**S2**	**MX2S**		156	433	496	238	119	78	—	—	—	—	—	—
F 51 2/3	**S3**	**ME3S**		195	452.5	495	253	142	77	—	—	—	—	—	—
F 51 2/3	**S3**	**MX3S**		195	452.5	527	253	142	80	—	—	—	—	—	—
F 51 2/3	**S3**	**ME3L**		195	452.5	527	253	142	87	—	—	—	—	—	—
F 51 2/3	**S3**	**MX3L**		195	452.5	571	253	142	93	—	—	—	—	—	—
F 51 2/3	**S4**	**ME4**	**MX4**	258	484	635	238	193	119	—	—	—	—	—	—
F 51 2/3	**S4**	**ME4LB**	**MX4LA**	258	484	670	238	193	127	—	—	—	—	—	—
F 51 2/3	**S5**	**ME5S**	**MX5S**	310	510	721.5	—	245	153	—	—	—	—	—	—
F 51 2/3	**S5**	**ME5L**	**MX5L**	310	510	765.5	—	245	169	—	—	—	—	—	—
F 51 4	**S1**	**M1**		138	424	494.5	—	108	75	555.5	78	103	135	124	108
F 51 4	**S2**	**ME2S**		156	433	523.5	—	119	79	—	—	—	—	—	—
F 51 4	**S2**	**MX2S**		156	433	567.5	—	119	79	—	—	—	—	—	—
F 51 4	**S3**	**ME3S**		195	452.5	566.5	—	142	84	—	—	—	—	—	—
F 51 4	**S3**	**MX3S**		195	452.5	598.5	—	142	84	—	—	—	—	—	—
F 51 4	**S3**	**ME3L**		195	452.5	598.5	—	142	93	—	—	—	—	—	—
F 51 4	**S3**	**MX3L**		195	452.5	642.5	—	142	93	—	—	—	—	—	—

F 51...P(IEC)



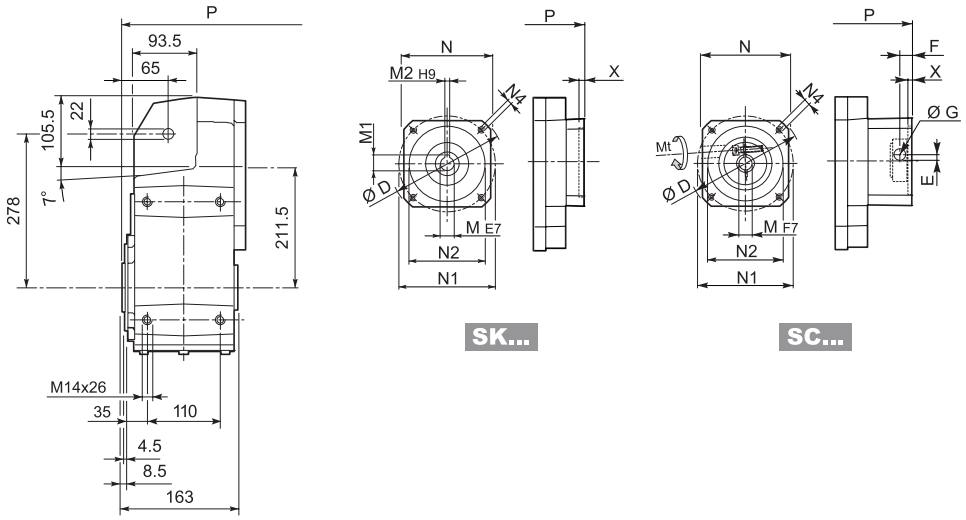
		LD	M	M1	M2	N	N1	N2	N3	N4	X	P	
F 51 2/3	**P63**	238	11	12.8	4	140	115	95	—	M8x19	4	268	65
F 51 2/3	**P71**	238	14	16.3	5	160	130	110	—	M8x16	4.5	268	65
F 51 2/3	**P80**	253	19	21.8	6	200	165	130	—	M10x14.5	4	287.5	67
F 51 2/3	**P90**	253	24	27.3	8	200	165	130	—	M10x14.5	4	287.5	67
F 51 2/3	**P100**	238	28	31.3	8	250	215	180	—	M12x16	4.5	297.5	71
F 51 2/3	**P112**	238	28	31.3	8	250	215	180	—	M12x16	4.5	297.5	71
F 51 2/3	**P132**	238	38	41.3	10	300	265	230	16	14	5	334	74
F 51 2/3	**P160**	—	42	45.3	12	350	300	250	23	18	5.5	384.5	78
F 51 2/3	**P180**	—	48	51.8	14	350	300	250	23	18	5.5	384.5	78
F 51 4	**P63**	—	11	12.8	4	140	115	95	—	M8x19	4	339.5	70
F 51 4	**P71**	—	14	16.3	5	160	130	110	—	M8x16	4.5	339.5	70
F 51 4	**P80**	—	19	21.8	6	200	165	130	—	M10x14.5	4	359	71
F 51 4	**P90**	—	24	27.3	8	200	165	130	—	M10x14.5	4	359	71
F 51 4	**P100**	—	28	31.3	8	250	215	180	—	M12x16	4.5	369	75
F 51 4	**P112**	—	28	31.3	8	250	215	180	—	M12x16	4.5	369	75

F 51...HS



		A	E	F	F1	F2	F3	F4	V	
F 51 2	**HS**	357.5	50	24	27	8	2.5	45	M8x19	65
F 51 3		357.5	50	24	27	8	2.5	45	M8x19	68
F 51 4		389.5	40	19	21.5	6	2.5	35	M6x16	70

F 51...SK / SC

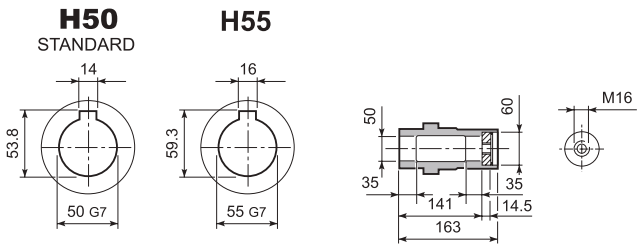


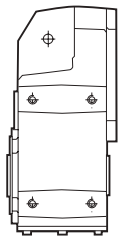
											2/3x		4x	
		D	M	M1	M2	N	N1	N2	N4	X	P		P	
F 51 2/3	**SK 80B**	120	14	16.3	5	96	100	80	M6x12	4	287.5	67	—	—
F 51 2/3/4	**SK 80C**	120	19	21.8	6	96	100	80	M6x12	4	287.5	67	359	71
F 51 2/3/4	**SK 95A**	130	14	16.3	5	102	115	95	M8x12	4	287.5	67	359	71
F 51 2/3/4	**SK 95B**	130	19	21.8	6	102	115	95	M8x12	4	287.5	67	359	71
F 51 2/3/4	**SK 95C**	130	24	27.3	8	102	115	95	M8x12	4	287.5	67	359	71
F 51 2/3/4	**SK 110A**	150	19	21.8	6	120	130	110	M8x12	5	287.5	67	359	71
F 51 2/3/4	**SK 110B**	150	24	27.3	8	120	130	110	M8x12	5	287.5	67	359	71
F 51 2/3/4	**SK 130A**	188	24	27.3	8	142	165	130	M10x20	5	287.5	69	359	73
F 51 2/3	**SK 130B**	189	32	35.3	10	160	165	130	M10x20	5	334	75	—	—
F 51 2/3	**SK 180A**	240	32	35.3	10	192	215	180	M12x19	5	334	75	—	—
F 51 2/3	**SK 180B**	240	38	41.3	10	192	215	180	M12x19	5	334	75	—	—

														2/3x		4x	
			Mt [Nm]	D	E	F	G	M	N	N1	N2	N4	X	P		P	
F 51 2/3	**SC 80B**	M6	15	120	15.5	14.5	17.75	14	96	100	80	M6x12	4	311	70	—	—
F 51 2/3/4	**SC 80C**	M6	15	120	15.5	14.5	17.75	19	96	100	80	M6x12	4	311	70	382.5	74
F 51 2/3/4	**SC 95A**	M6	15	130	16.5	15	17.75	14	102	115	95	M8x16	4	311	70	382.5	74
F 51 2/3/4	**SC 95B**	M6	15	130	16.5	15	17.75	19	102	115	95	M8x16	4	311	70	382.5	74
F 51 2/3/4	**SC 95C**	M6	15	130	16.5	15	17.75	24	102	115	95	M8x16	4	311	70	382.5	74
F 51 2/3/4	**SC 110A**	M6	15	150	16.5	16	17.75	19	120	130	110	M8x16	5	311	71	382.5	75
F 51 2/3/4	**SC 110B**	M6	15	150	16.5	16	17.75	24	120	130	110	M8x16	5	311	71	382.5	75
F 51 2/3/4	**SC 130A**	M6	15	188	19	16	17.75	24	142	165	130	M10x20	5	311	72	382.5	76
F 51 2/3	**SC 130B**	M8	36	189	20	17	17.75	32	160	165	130	M10x20	5	357	75	—	—
F 51 2/3	**SC 180A**	M8	36	240	20	17.5	17.75	32	192	215	180	M12x24	5	361	75	—	—
F 51 2/3	**SC 180B**	M8	36	240	20	17.5	17.75	38	192	215	180	M12x24	5	361	75	—	—

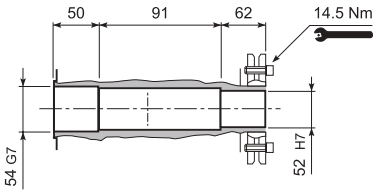
F 51

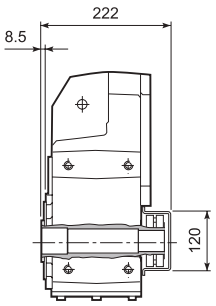
F 51...H



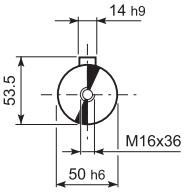


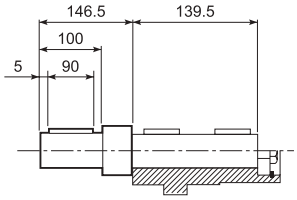
F 51...S

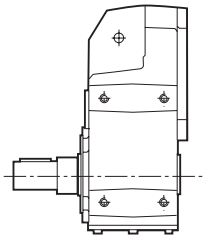




F 51...R



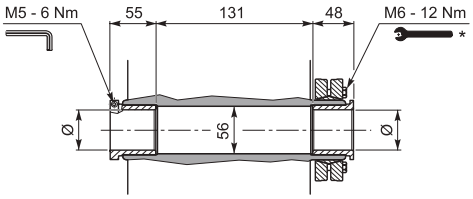


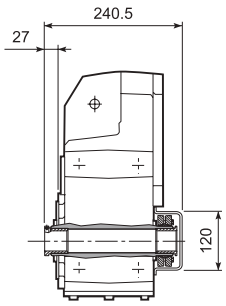


F 51...QF

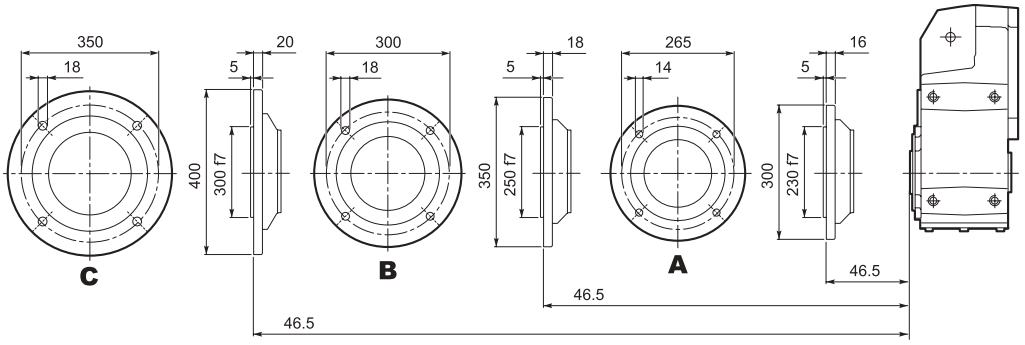
	Ø
QF50	50
QF55	55

$M_{n2\ max}$ [Nm]	
F 51 QF50	1750



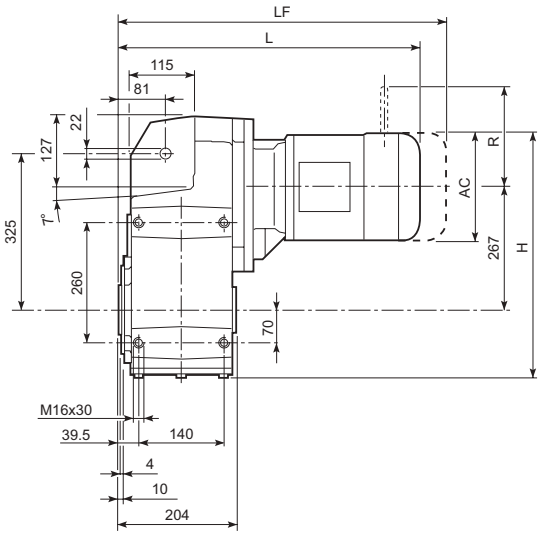


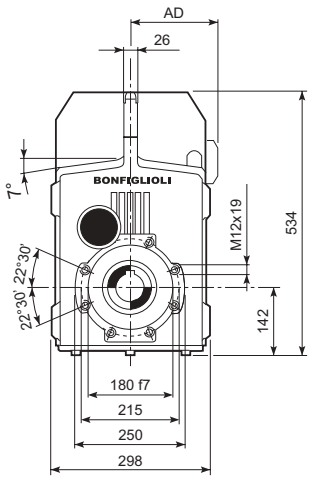
F 51...F...



* Follow the MOUNTING INSTRUCTIONS supplied with the gearbox.

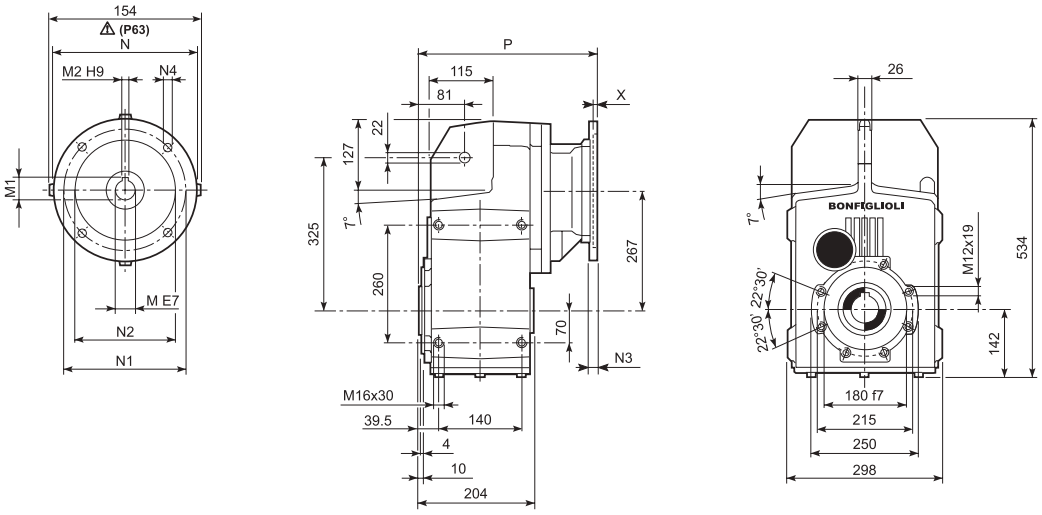
F 60...M/ME/MX





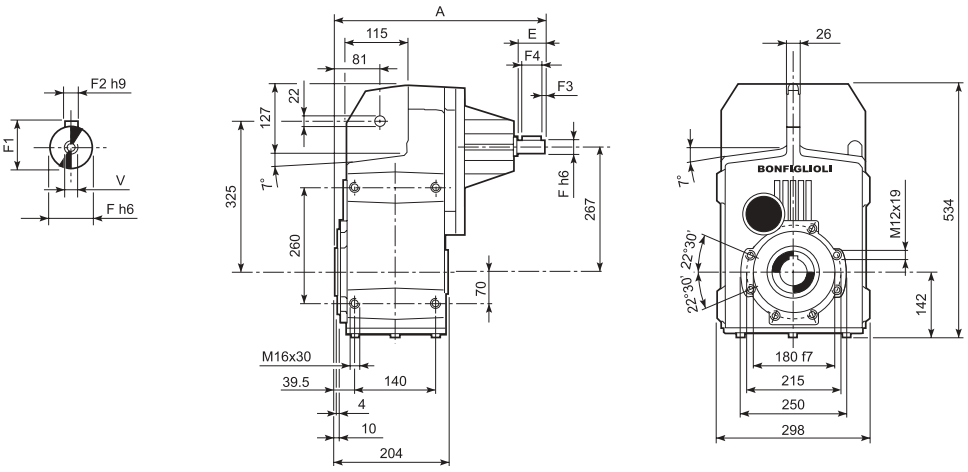
									M...FD M...FA		M...FD		M...FA	
				AC	H	L	AD		LF		R	AD	R	AD
F 60 3	**S2**	**ME2S**		156	487	486.5	119	114	—	—	—	—	—	—
F 60 3	**S2**	**MX2S**		156	487	530.5	119	119	—	—	—	—	—	—
F 60 3	**S3**	**ME3S**		195	506.5	529.5	142	119	—	—	—	—	—	—
F 60 3	**S3**	**MX3S**		195	506.5	561.5	142	122	—	—	—	—	—	—
F 60 3	**S3**	**ME3L**		195	506.5	561.5	142	124	—	—	—	—	—	—
F 60 3	**S3**	**MX3L**		195	506.5	605.5	142	130	—	—	—	—	—	—
F 60 3	**S4**	**ME4**	**MX4**	258	538	669.5	193	156	—	—	—	—	—	—
F 60 3	**S4**	**ME4LB**	**MX4LA**	258	538	704.5	193	164	—	—	—	—	—	—
F 60 3	**S5**	**ME5S**	**MX5S**	310	564	756	245	184	—	—	—	—	—	—
F 60 3	**S5**	**ME5L**	**MX5L**	310	564	800	245	200	—	—	—	—	—	—
F 60 4	**S1**	**M1**		138	478	528	108	113	589	116	103	135	124	108
F 60 4	**S2**	**ME2S**		156	487	557	119	117	—	—	—	—	—	—
F 60 4	**S2**	**MX2S**		156	487	601	119	122	—	—	—	—	—	—
F 60 4	**S3**	**ME3S**		195	506.5	600	142	122	—	—	—	—	—	—
F 60 4	**S3**	**MX3S**		195	506.5	632	142	125	—	—	—	—	—	—
F 60 4	**S3**	**ME3L**		195	506.5	632	142	131	—	—	—	—	—	—
F 60 4	**S3**	**MX3L**		195	506.5	676	142	137	—	—	—	—	—	—
F 60 4	**S4**	**ME4**	**MX4**	258	538	740	193	156	—	—	—	—	—	—
F 60 4	**S4**	**ME4LB**	**MX4LA**	258	538	775	193	164	—	—	—	—	—	—

F 60...P(IEC)



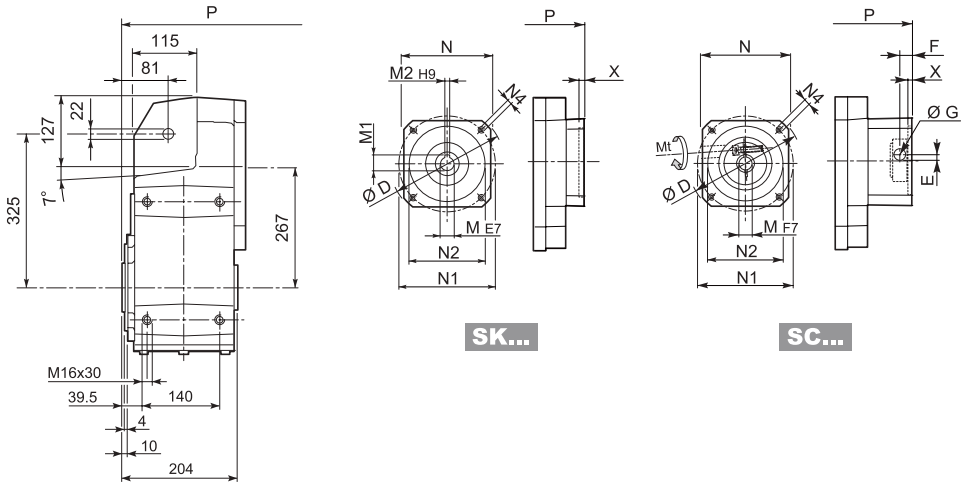
		M	M1	M2	N	N1	N2	N3	N4	X	P	
F 60 3	**P63**	11	12.8	4	140	115	95	—	M8x19	4	302.5	103
F 60 3	**P71**	14	16.3	5	160	130	110	—	M8x16	4.5	302.5	103
F 60 3	**P80**	19	21.8	6	200	165	130	—	M10x14.5	4	322	104
F 60 3	**P90**	24	27.3	8	200	165	130	—	M10x14.5	4	322	104
F 60 3	**P100**	28	31.3	8	250	215	180	—	M12x16	4.5	331	108
F 60 3	**P112**	28	31.3	8	250	215	180	—	M12x16	4.5	331	108
F 60 3	**P132**	38	41.3	10	300	265	230	16	14	5	367.5	111
F 60 3	**P160**	42	45.3	12	350	300	250	23	18	5.5	419	116
F 60 3	**P180**	48	51.8	14	350	300	250	23	18	5.5	419	116
F 60 4	**P63**	11	12.8	4	140	115	95	—	M8x19	4	373	108
F 60 4	**P71**	14	16.3	5	160	130	110	—	M8x16	4.5	373	108
F 60 4	**P80**	19	21.8	6	200	165	130	—	M10x14.5	4	392.5	110
F 60 4	**P90**	24	27.3	8	200	165	130	—	M10x14.5	4	392.5	110
F 60 4	**P100**	28	31.3	8	250	215	180	—	M12x16	4.5	402.5	114
F 60 4	**P112**	28	31.3	8	250	215	180	—	M12x16	4.5	402.5	114

F 60...HS



		A	E	F	F1	F2	F3	F4	V	
F 60 3	**HS**	419	60	28	31	8	5.0	50	M10x22	108
F 60 4		462.5	50	24	27	8	2.5	45	M8x19	105

F 60...SK / SC

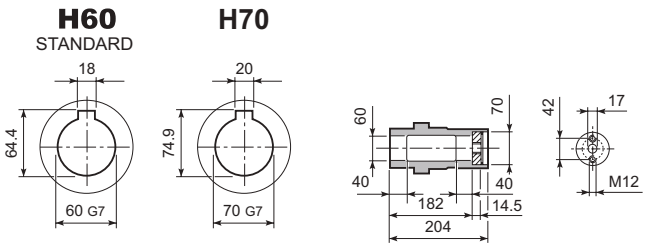


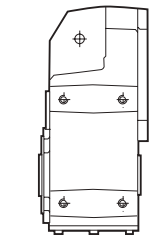
											2/3x		4x	
		D	M	M1	M2	N	N1	N2	N4	X	P		P	
F 60 4	**SK 80B**	120	14	16.3	5	96	100	80	M6x12	4	—	—	392.5	109
F 60 3/4	**SK 80C**	120	19	21.8	6	96	100	80	M6x12	4	322	106	392.5	112
F 60 3/4	**SK 95A**	130	14	16.3	5	102	115	95	M8x12	4	322	106	392.5	112
F 60 3/4	**SK 95B**	130	19	21.8	6	102	115	95	M8x12	4	322	106	392.5	112
F 60 3/4	**SK 95C**	130	24	27.3	8	102	115	95	M8x12	4	322	106	392.5	112
F 60 3/4	**SK 110A**	140	19	21.8	6	120	130	110	M8x12	5	322	106	392.5	112
F 60 3/4	**SK 110B**	140	24	27.3	8	120	130	110	M8x12	5	322	106	392.5	112
F 60 3/4	**SK 130A**	188	24	27.3	8	142	165	130	M10x20	5	322	108	392.5	112
F 60 3	**SK 130B**	189	32	35.3	10	160	165	130	M10x20	5	368.5	109	—	—
F 60 3	**SK 180A**	240	32	35.3	10	192	215	180	M12x19	5	368.5	109	—	—
F 60 3	**SK 180B**	240	38	41.3	10	192	215	180	M12x19	5	368.5	109	—	—

														2/3x		4x	
			Mt [Nm]	**D**	**E**	**F**	**G**	**M**	**N**	**N1**	**N2**	**N4**	**X**	**P**		**P**	
F 60 4	**SC 80B**	M6	15	120	15.5	14.5	17.75	14	96	100	80	M6x12	4	—	—	416	113
F 60 3/4	**SC 80C**	M6	15	120	15.5	14.5	17.75	19	96	100	80	M6x12	4	345.5	107	416	113
F 60 3/4	**SC 95A**	M6	15	130	16.5	15	17.75	14	102	115	95	M8x16	4	345.5	107	416	113
F 60 3/4	**SC 95B**	M6	15	130	16.5	15	17.75	19	102	115	95	M8x16	4	345.5	107	416	113
F 60 3/4	**SC 95C**	M6	15	130	16.5	15	17.75	24	102	115	95	M8x16	4	345.5	107	416	113
F 60 3/4	**SC 110A**	M6	15	140	16.5	16	17.75	19	120	130	110	M8x16	5	345.5	108	416	113
F 60 3/4	**SC 110B**	M6	15	140	16.5	16	17.75	24	120	130	110	M8x16	5	345.5	108	416	113
F 60 3/4	**SC 130A**	M6	15	188	19	16	17.75	24	142	165	130	M10x20	5	345.5	109	416	115
F 60 3	**SC 130B**	M8	36	189	20	17	17.75	32	160	165	130	M10x20	5	390.5	112	—	—
F 60 3	**SC 180A**	M8	36	240	20	17.5	17.75	32	192	215	180	M12x24	5	394.5	112	—	—
F 60 3	**SC 180B**	M8	36	240	20	17.5	17.75	38	192	215	180	M12x24	5	394.5	112	—	—

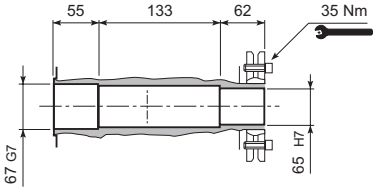
F 60

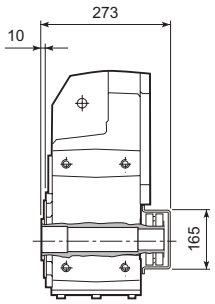
F 60...H



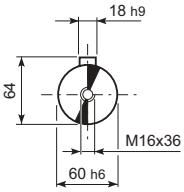


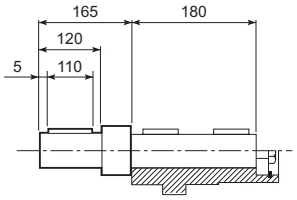
F 60...S

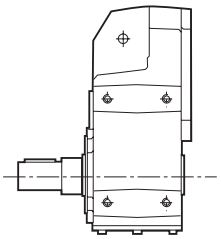




F 60...R

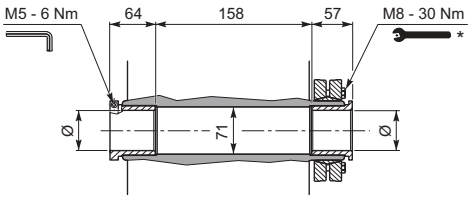


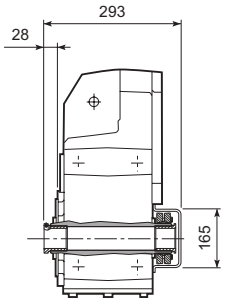




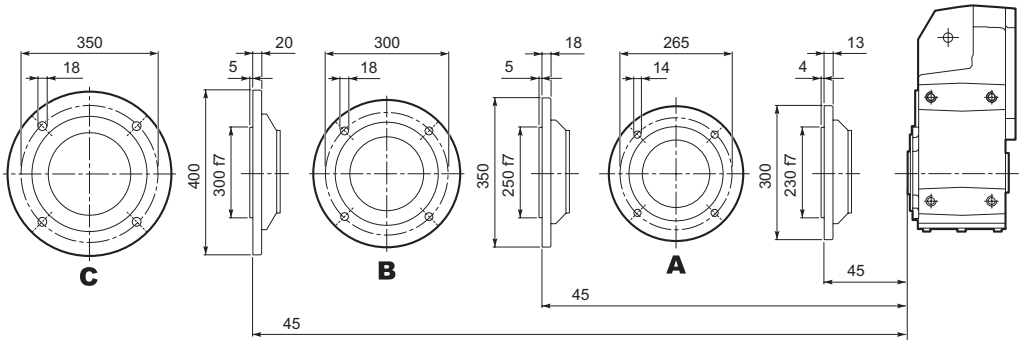
F 60...QF

	Ø
QF60	60
QF65	65
QF70	70



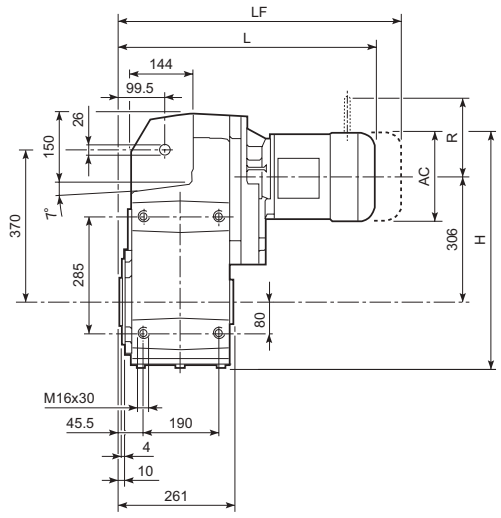


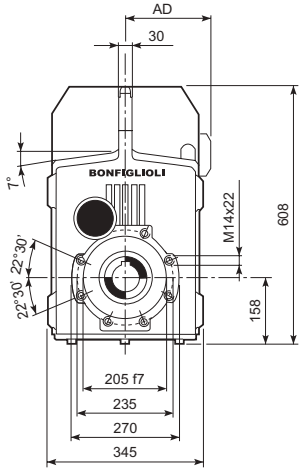
F 60...F...



* Follow the MOUNTING INSTRUCTIONS supplied with the gearbox.

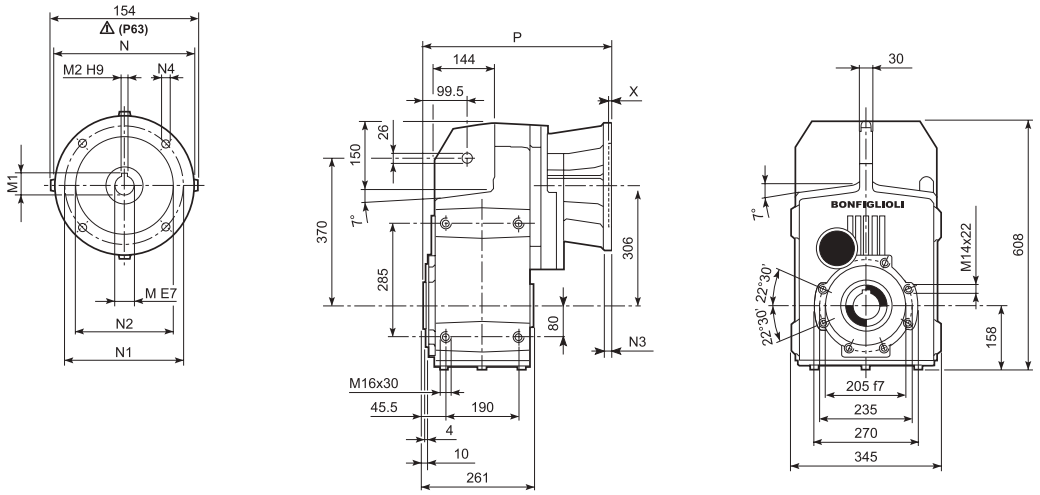
F 70...M/ME/MX





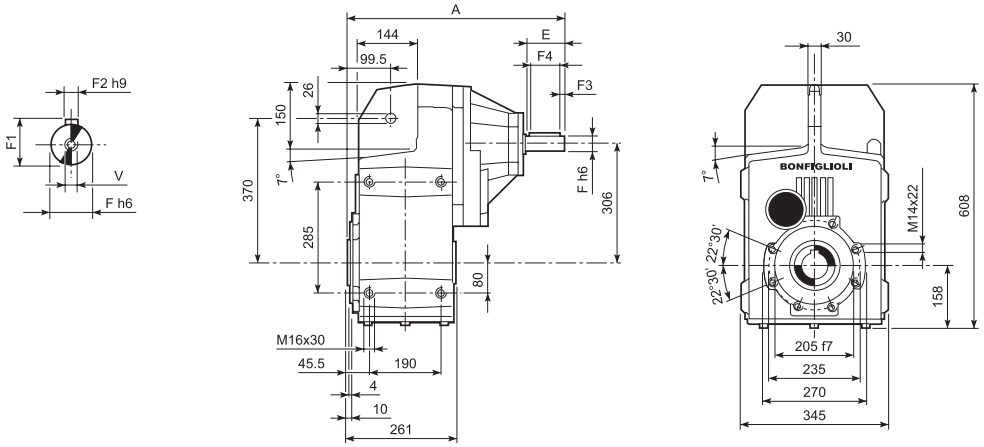
									M...FD M...FA		M...FD		M...FA	
				AC	H	L	AD		LF		R	AD	R	AD
F 70 3	**S2**	**ME2S**		156	542	552	119	173	—	—	—	—	—	—
F 70 3	**S2**	**MX2S**		156	542	596	119	178	—	—	—	—	—	—
F 70 3	**S3**	**ME3S**		195	561.5	595	142	178	—	—	—	—	—	—
F 70 3	**S3**	**MX3S**		195	561.5	627	142	181	—	—	—	—	—	—
F 70 3	**S3**	**ME3L**		195	561.5	627	142	188	—	—	—	—	—	—
F 70 3	**S3**	**MX3L**		195	561.5	671	142	194	—	—	—	—	—	—
F 70 3	**S4**	**ME4**	**MX4**	258	593	735	193	220	—	—	—	—	—	—
F 70 3	**S4**	**ME4LB**	**MX4LA**	258	593	770	193	228	—	—	—	—	—	—
F 70 3	**S5**	**ME5S**	**MX5S**	310	619	821.5	245	248	—	—	—	—	—	—
F 70 3	**S5**	**ME5L**	**MX5L**	310	619	865.5	245	264	—	—	—	—	—	—
F 70 4	**S1**	**M1**		138	533	574	108	173	635	176	103	135	124	108
F 70 4	**S2**	**ME2S**		156	542	603	119	177	—	—	—	—	—	—
F 70 4	**S2**	**MX2S**		156	542	647	119	182	—	—	—	—	—	—
F 70 4	**S3**	**ME3S**		195	561.5	646	142	181	—	—	—	—	—	—
F 70 4	**S3**	**MX3S**		195	561.5	678	142	184	—	—	—	—	—	—
F 70 4	**S3**	**ME3L**		195	561.5	678	142	191	—	—	—	—	—	—
F 70 4	**S3**	**MX3L**		195	561.5	722	142	197	—	—	—	—	—	—
F 70 4	**S4**	**ME4**	**MX4**	258	593	786	193	223	—	—	—	—	—	—
F 70 4	**S4**	**ME4LB**	**MX4LA**	258	593	821	193	231	—	—	—	—	—	—

F 70...P(IEC)

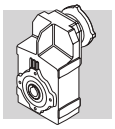


		M	M1	M2	N	N1	N2	N3	N4	X	P	
F 70 3	**P80**	19	21.8	6	200	165	130	—	M10x14.5	4	387.5	167
F 70 3	**P90**	24	27.3	8	200	165	130	—	M10x14.5	4	387.5	167
F 70 3	**P100**	28	31.3	8	250	215	180	—	M12x16	4.5	397.5	171
F 70 3	**P112**	28	31.3	8	250	215	180	—	M12x16	4.5	397.5	171
F 70 3	**P132**	38	41.3	10	300	265	230	16	14	5	434	173
F 70 3	**P160**	42	45.3	12	350	300	250	23	18	6	489.5	185
F 70 3	**P180**	48	51.8	14	350	300	250	23	18	6	489.5	185
F 70 3	**P200**	55	59.3	16	400	350	300	—	M16x25	7	514.5	206
F 70 4	**P63**	11	12.8	4	140	115	95	—	M8x19	4	419	168
F 70 4	**P71**	14	16.3	5	160	130	110	—	M8x16	4.5	419	168
F 70 4	**P80**	19	21.8	6	200	165	130	—	M10x14.5	4	438.5	170
F 70 4	**P90**	24	27.3	8	200	165	130	—	M10x14.5	4	438.5	170
F 70 4	**P100**	28	31.3	8	250	215	180	—	M12x16	4.5	446.5	174
F 70 4	**P112**	28	31.3	8	250	215	180	—	M12x16	4.5	446.5	174
F 70 4	**P132**	38	41.3	10	300	265	230	16	14	5	482	176

F 70...HS

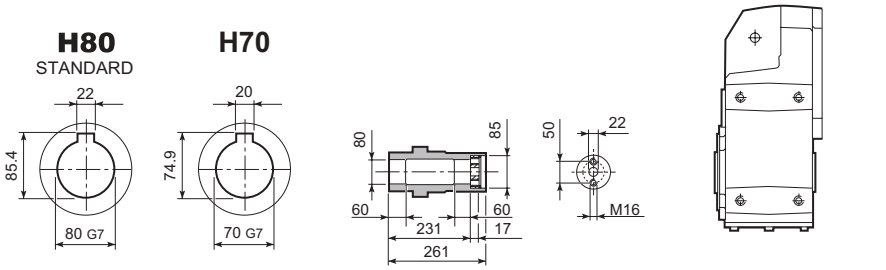


		A	E	F	F1	F2	F3	F4	V	
F 70 3	**HS**	572	110	42	45	12	10	90	M12x28	186
F 70 4		508.5	50	24	27	8	2.5	45	M8x19	174

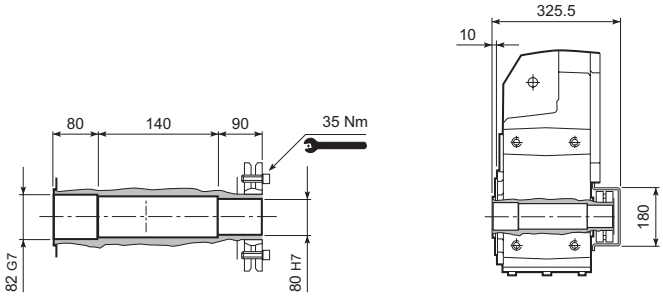


F 70

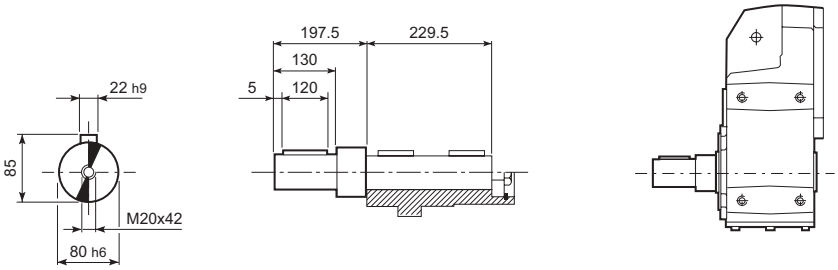
F 70...H



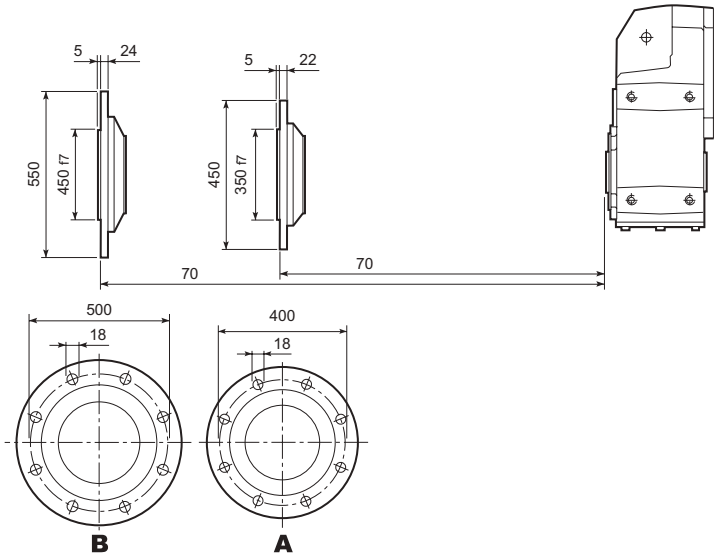
F 70...S



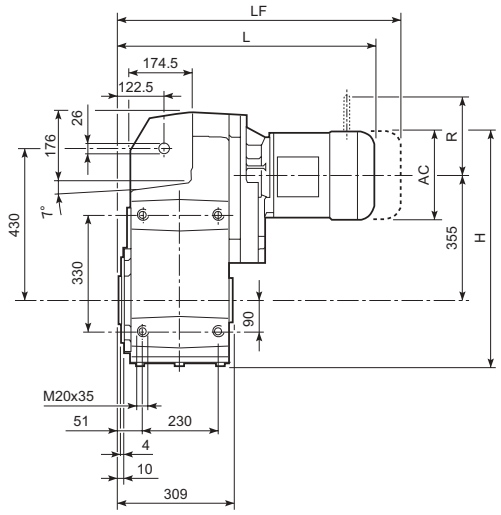
F 70...R

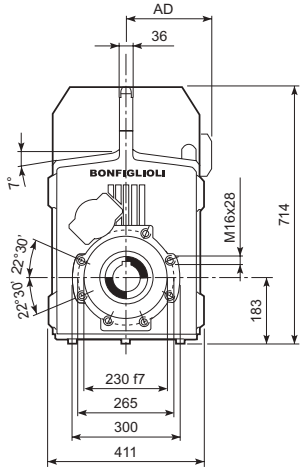


F 70...F...



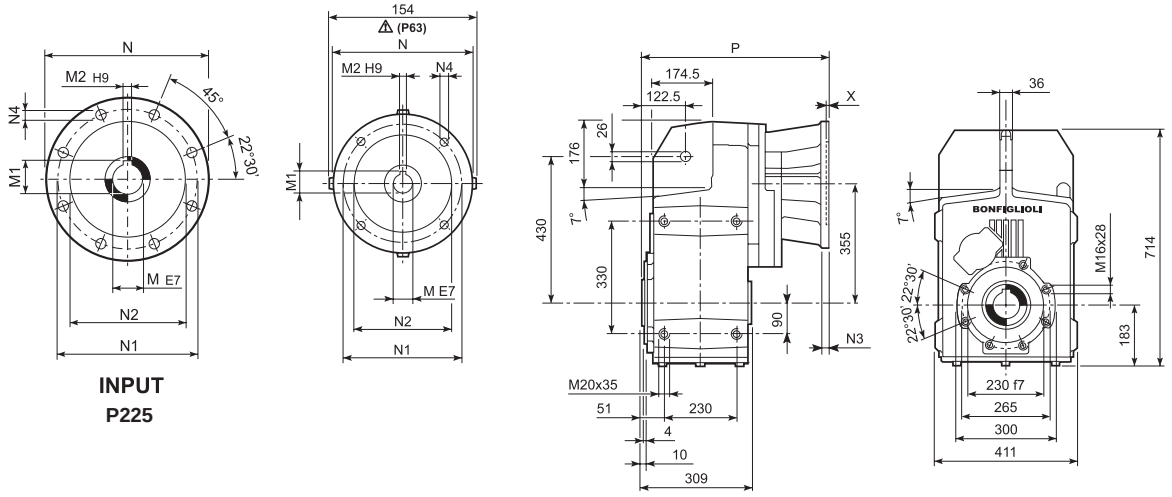
F 80...M/ME/MX





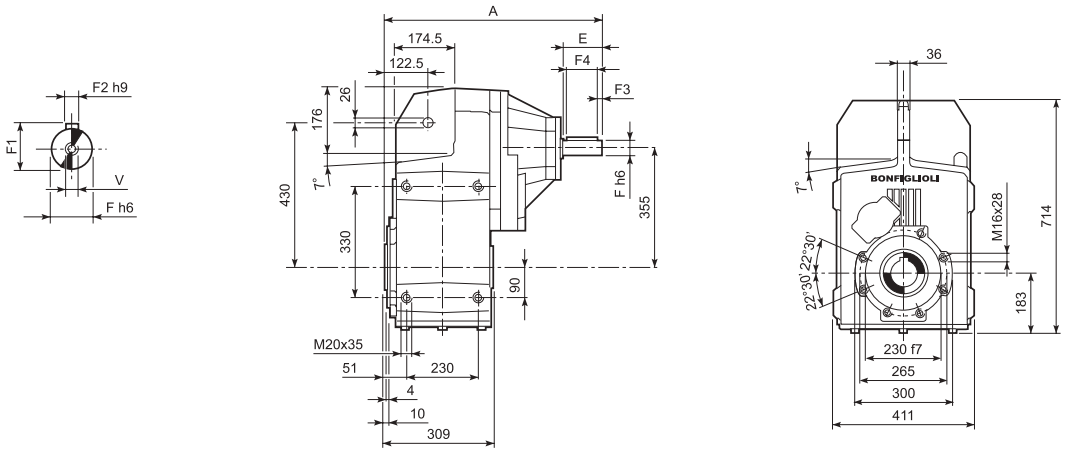
									M...FD M...FA		M...FD		M...FA	
				AC	H	L	AD		LF		R	AD	R	AD
F 80 3	**S3**	**ME3S**		195	635.5	653	142	266	—	—	—	—	—	—
F 80 3	**S3**	**MX3S**		195	635.5	685	142	269	—	—	—	—	—	—
F 80 3	**S3**	**ME3L**		195	635.5	685	142	275	—	—	—	—	—	—
F 80 3	**S3**	**MX3L**		195	635.5	729	142	281	—	—	—	—	—	—
F 80 3	**S4**	**ME4**	**MX4**	258	667	793	193	307	—	—	—	—	—	—
F 80 3	**S4**	**ME4LB**	**MX4LA**	258	667	828	193	315	—	—	—	—	—	—
F 80 3	**S5**	**ME5S**	**MX5S**	310	693	879.5	245	335	—	—	—	—	—	—
F 80 3	**S5**	**ME5L**	**MX5L**	310	693	923.5	245	351	—	—	—	—	—	—
F 80 4	**S1**	**M1**		138	607	644	108	262	705	265	103	135	124	108
F 80 4	**S2**	**M2S**		156	616	673	119	266	743	269	129	146	134	119
F 80 4	**S2**	**ME2S**		156	616	673	119	266	—	—	—	—	—	—
F 80 4	**S2**	**MX2S**		156	616	717	119	271	—	—	—	—	—	—
F 80 4	**S3**	**ME3S**		195	635.5	716	142	271	—	—	—	—	—	—
F 80 4	**S3**	**MX3S**		195	635.5	748	142	274	—	—	—	—	—	—
F 80 4	**S3**	**ME3L**		195	635.5	748	142	280	—	—	—	—	—	—
F 80 4	**S3**	**MX3L**		195	635.5	792	142	286	—	—	—	—	—	—
F 80 4	**S4**	**ME4**	**MX4**	258	667	856	193	312	—	—	—	—	—	—
F 80 4	**S4**	**ME4LB**	**MX4LA**	258	667	891	193	320	—	—	—	—	—	—

F 80...P(IEC)



		M	M1	M2	N	N1	N2	N3	N4	X	P	
F 80 3	**P80**	19	21.8	6	200	165	130	—	M10x14.5	4	445.5	255
F 80 3	**P90**	24	27.3	8	200	165	130	—	M10x14.5	4	445.5	255
F 80 3	**P100**	28	31.3	8	250	215	180	—	M12x16	4.5	455.5	259
F 80 3	**P112**	28	31.3	8	250	215	180	—	M12x16	4.5	455.5	259
F 80 3	**P132**	38	41.3	10	300	265	230	16	14	5	492	261
F 80 3	**P160**	42	45.3	12	350	300	250	23	18	6	547.5	276
F 80 3	**P180**	48	51.8	14	350	300	250	23	18	6	547.5	276
F 80 3	**P200**	55	59.3	16	400	350	300	—	M16x25	7	572.5	298
F 80 3	**P225**	60	64.4	18	450	400	350	25	18	6	618	298
F 80 4	**P63**	11	12.8	4	140	115	95	—	M8x19	4	489	258
F 80 4	**P71**	14	16.3	5	160	130	110	—	M8x16	4.5	489	258
F 80 4	**P80**	19	21.8	6	200	165	130	—	M10x14.5	4	508.5	260
F 80 4	**P90**	24	27.3	8	200	165	130	—	M10x14.5	4	508.5	260
F 80 4	**P100**	28	31.3	8	250	215	180	—	M12x16	4.5	518.5	264
F 80 4	**P112**	28	31.3	8	250	215	180	—	M12x16	4.5	518.5	264
F 80 4	**P132**	38	41.3	10	300	265	230	16	14	5	552	266

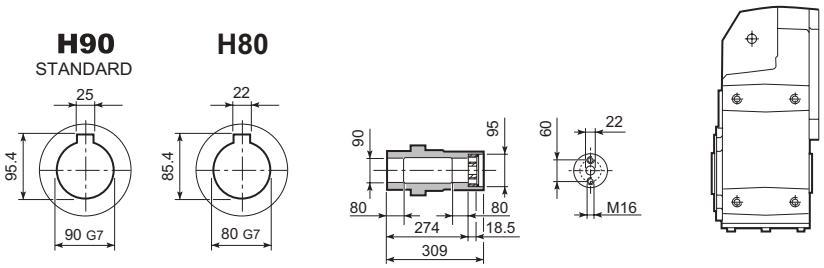
F 80...HS



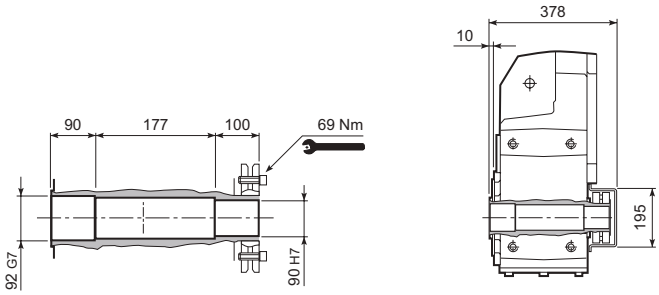
		A	E	F	F1	F2	F3	F4	V	
F 80 3	**HS**	630	110	42	45	12	10	90	M12x28	273
F 80 4		575.5	50	24	27	8	2.5	45	M8x19	263

F 80

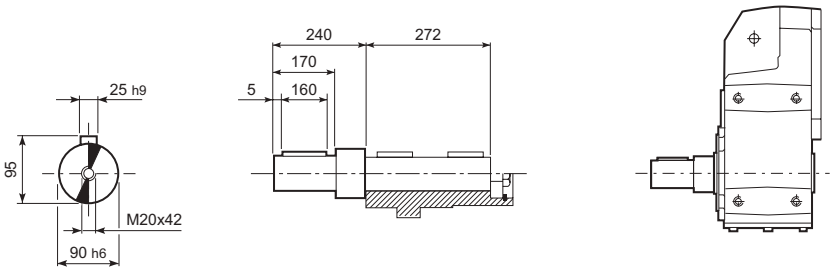
F 80...H



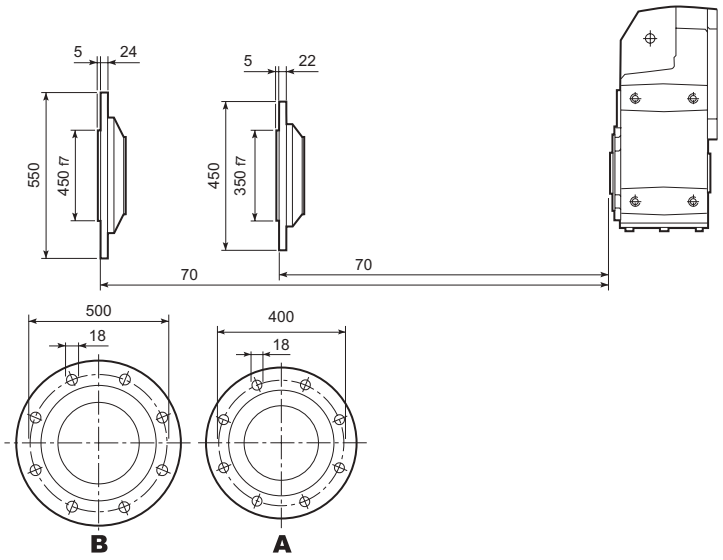
F 80...S



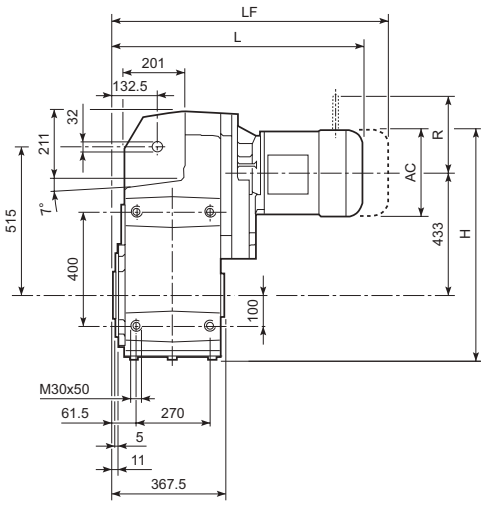
F 80...R

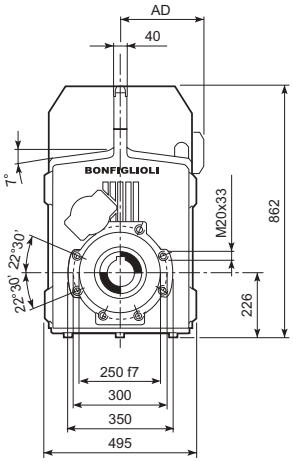


F 80...F...



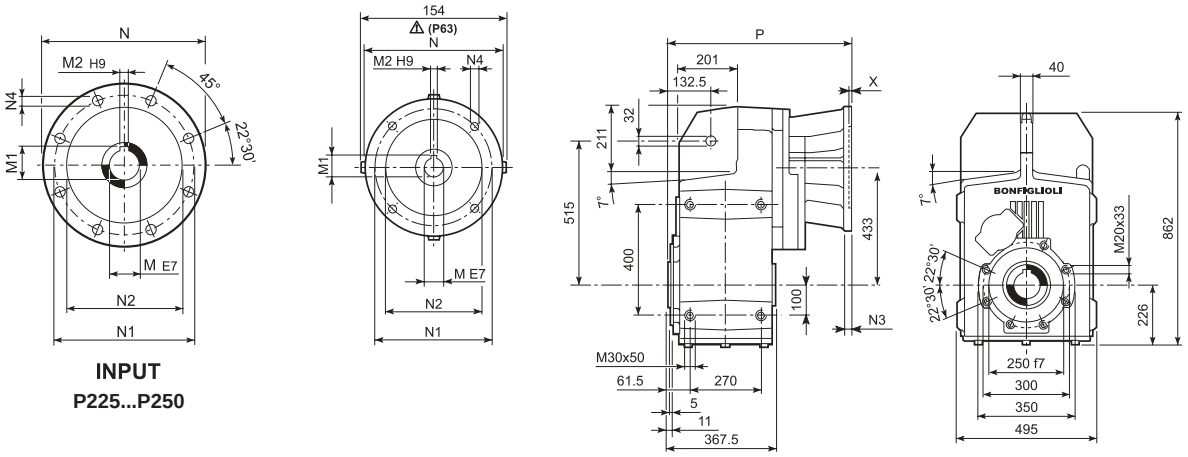
F 90...M/ME/MX





									M...FD M...FA		M...FD		M...FA	
				AC	H	L	AD		LF		R	AD	R	AD
F 90 3	**S3**	**ME3S**		195	756	728	142	453	—	—	—	—	—	—
F 90 3	**S3**	**MX3S**		195	756	760	142	456	—	—	—	—	—	—
F 90 3	**S3**	**ME3L**		195	756	760	142	462	—	—	—	—	—	—
F 90 3	**S3**	**MX3L**		195	756	804	142	468	—	—	—	—	—	—
F 90 3	**S4**	**ME4**	**MX4**	258	787.5	868	193	494	—	—	—	—	—	—
F 90 3	**S5**	**ME5L**	**MX5L**	310	813.5	998.5	245	538	—	—	—	—	—	—
F 90 4	**S2**	**M2S**		156	736.5	768	119	456	838	460	129	146	134	119
F 90 4	**S2**	**ME2S**		156	736.5	768	119	456	—	—	—	—	—	—
F 90 4	**S2**	**MX2S**		156	736.5	812	119	461	—	—	—	—	—	—
F 90 4	**S3**	**ME3S**		195	756	811	142	460	—	—	—	—	—	—
F 90 4	**S3**	**MX3S**		195	756	843	142	463	—	—	—	—	—	—
F 90 4	**S3**	**ME3L**		195	756	843	142	470	—	—	—	—	—	—
F 90 4	**S3**	**MX3L**		195	756	887	142	476	—	—	—	—	—	—
F 90 4	**S4**	**ME4**	**MX4**	258	787.5	951	193	502	—	—	—	—	—	—
F 90 4	**S4**	**ME4LB**	**MX4LA**	258	787.5	986	193	510	—	—	—	—	—	—

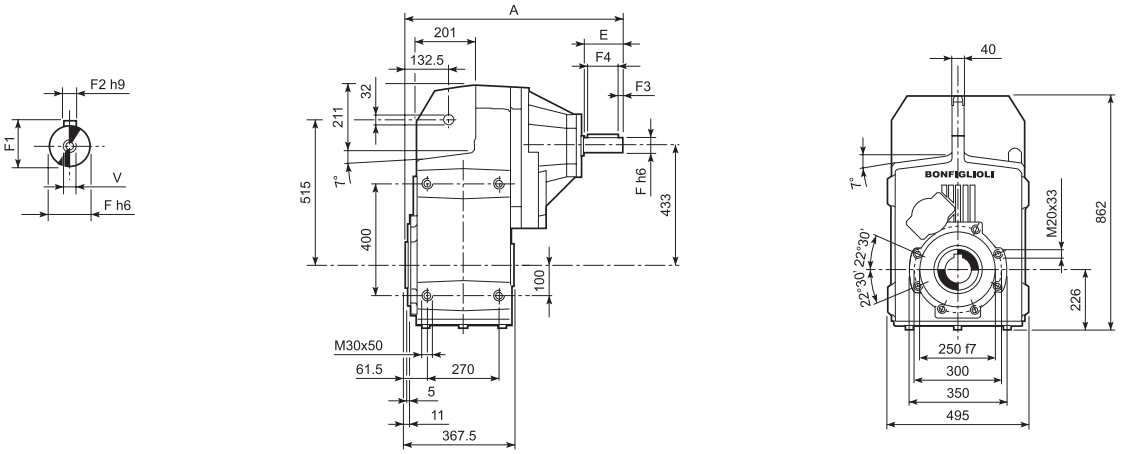
F 90...P(IEC)



INPUT
P225...P250

		M	M1	M2	N	N1	N2	N3	N4	X	P	
F 90 3	**P80**	19	21.8	6	200	165	130	—	M10x14.5	4	520.5	442
F 90 3	**P90**	24	27.3	8	200	165	130	—	M10x14.5	4	520.5	442
F 90 3	**P100**	28	31.3	8	250	215	180	—	M12x16	4.5	530.5	446
F 90 3	**P112**	28	31.3	8	250	215	180	—	M12x16	4.5	530.5	446
F 90 3	**P132**	38	41.3	10	300	265	230	16	14	5	567	449
F 90 3	**P160**	42	45.3	12	350	300	250	23	18	6	622.5	463
F 90 3	**P180**	48	51.8	14	350	300	250	23	18	6	622.5	463
F 90 3	**P200**	55	59.3	16	400	350	300	—	M16x25	7	647.5	485
F 90 3	**P225**	60	64.4	18	450	400	350	30	18	6	693	485
F 90 3	**P250**	65	69.4	18	550	500	450	30	18	6	723	507
F 90 4	**P63**	11	12.8	4	140	115	95	—	M8x19	4	584	448
F 90 4	**P71**	14	16.3	5	160	130	110	—	M8x16	4.5	584	448
F 90 4	**P80**	19	21.8	6	200	165	130	—	M10x14.5	4	603.5	450
F 90 4	**P90**	24	27.3	8	200	165	130	—	M10x14.5	4	603.5	450
F 90 4	**P100**	28	31.3	8	250	215	180	—	M12x16	4.5	613.5	454
F 90 4	**P112**	28	31.3	8	250	215	180	—	M12x16	4.5	613.5	454
F 90 4	**P132**	38	41.3	10	300	265	230	16	14	5	650	455
F 90 4	**P160**	42	45.3	12	350	300	250	23	18	5.5	700.5	461
F 90 4	**P180**	48	51.8	14	350	300	250	23	18	5.5	700.5	461

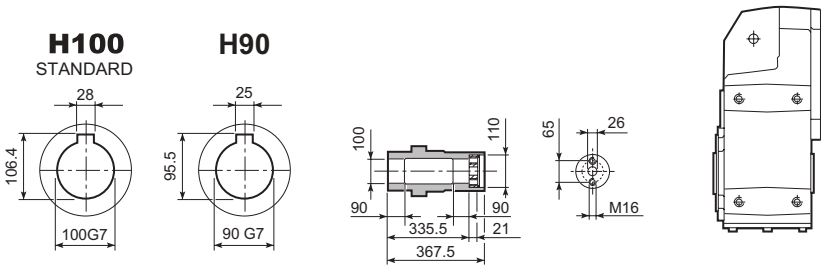
F 90...HS



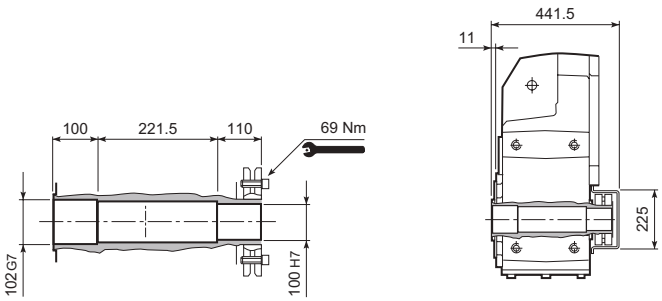
		A	E	F	F1	F2	F3	F4	V	
F 90 3	**HS**	806.5	140	60	64	18	10	120	M16x36	485
F 90 4		673.5	50	24	27	8	2.5	45	M8x19	452

F 90

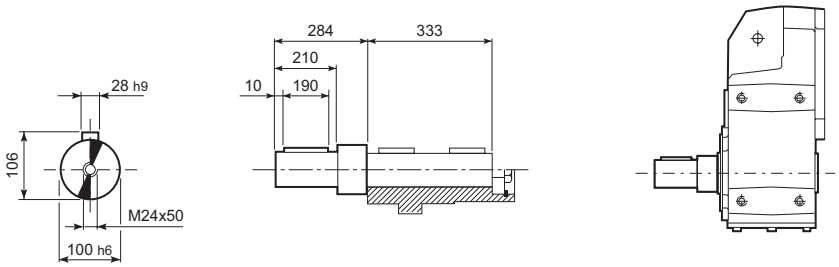
F 90...H



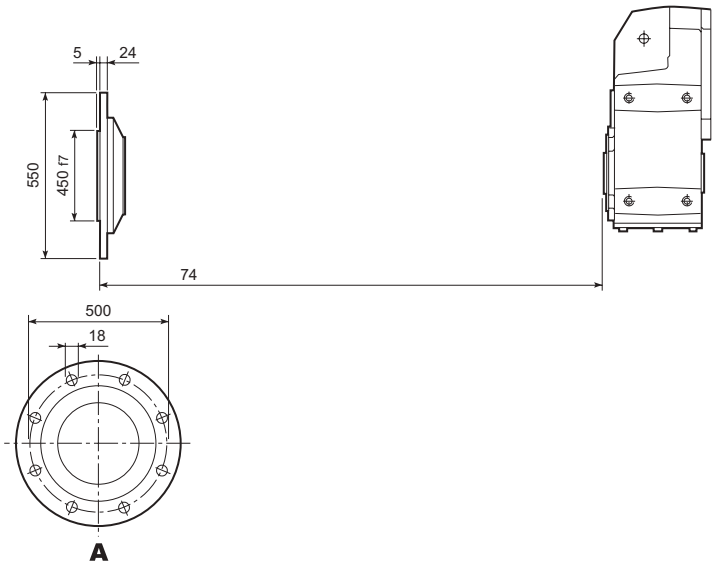
F 90...S



F 90...R



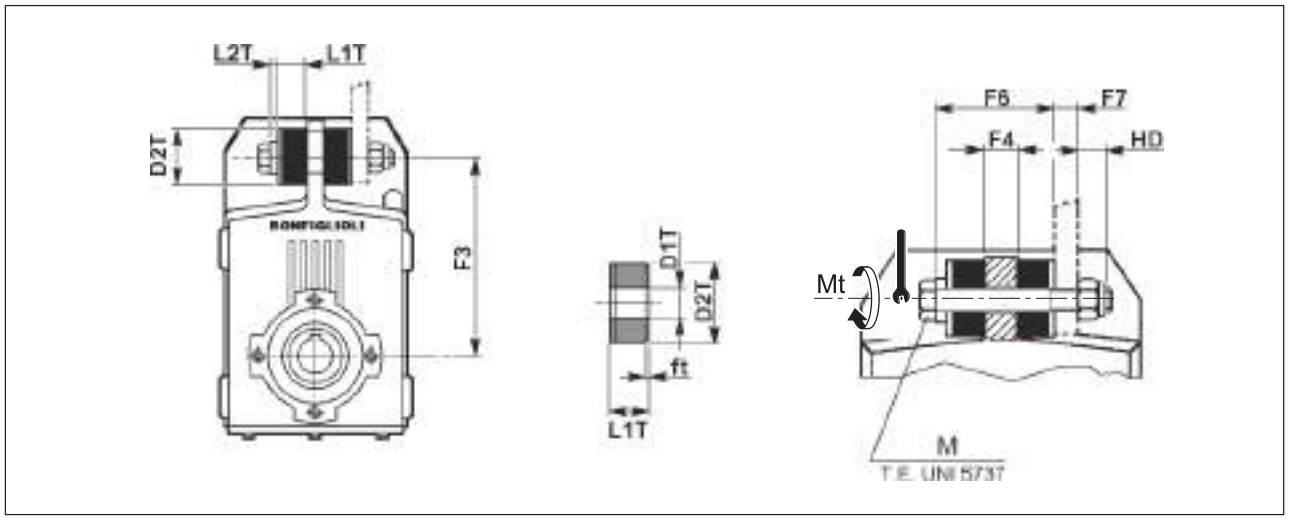
F 90...F...



65 ACCESSORIES

Anti-vibration kit

The gearboxes of the F series are supplied with an anti-vibration kit at customer request.
The kit includes all components required for shaft mounting (torque arm is out of scope). Dimensions are shown in the following table.



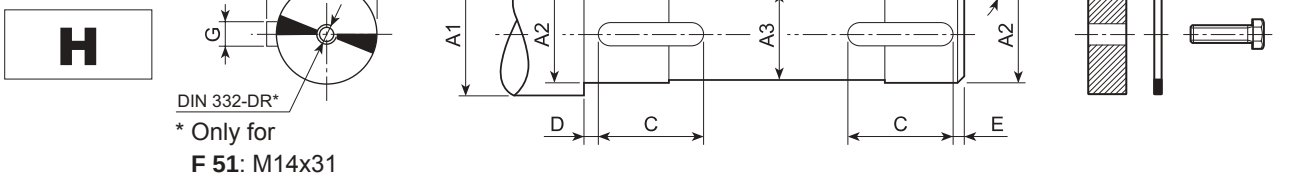
	F3	F4	F6	F7 (max.)	HD	L1T	L2T	D1T	D2T	M	Mt [Nm]	ft
F 10	140	20	55	10	12.3	15	5	11	30	M10x80	10	1.5
F 20	160	20	55	10	12.3	15	5	11	30	M10x80	10	1.5
F 25	162	20	65	20	14.8	20	5	12.5	40	M12x100	20	1.5
F 31	170	20	65	20	14.8	20	5	12.5	40	M12x100	20	1.5
F 41	218	16	61	24	14.8	20	5	12.5	40	M12x100	20	2.3
F 51	278	20	90	47	23	30	10	21	60	M20x160	50	3.0
F 60	325	26	96	41	23	30	10	21	60	M20x160	50	4.0
F 70	370	30	122	50	28	40	12	25	80	M24x200	100	4.0
F 80	430	36	128	44	28	40	12	25	80	M24x200	100	6.0
F 90	515	40	175	40	33.2	60	15	32	100	M30x260	200	9.0

f_t = shortening of the rubber buffer under rated torque transmission.

66 CUSTOMER' SHAFT

Make the driven shaft to be coupled to the gear unit's output shaft from a good quality steel, respecting the dimensions given in the table.

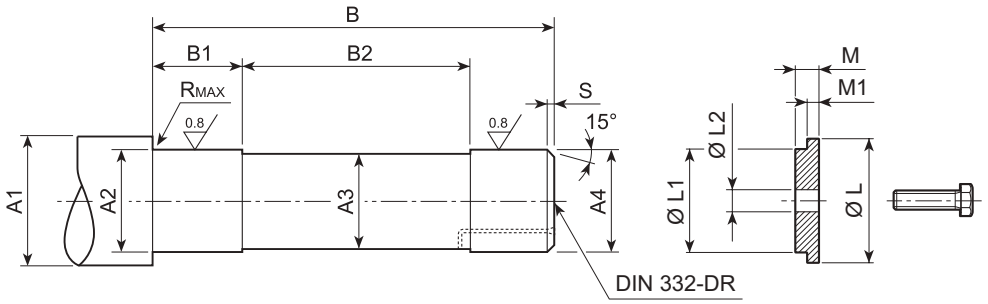
A device such as that illustrated below should also be installed to secure the shaft axially. Take care to verify and dimension the various components to suit the needs of the application.



* Only for
F 51: M14x31

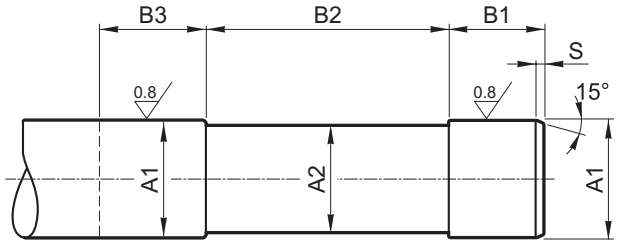
	A1	A2	A3	B	B1	B2	C	D	E	F	G	R	S	UNI 6604	UNI 5739
F 10	≥ 35	30 h7	29	87.5	15.5	56.5	20	2	2	33	8 h9	0.5	1.5	8x7x20 A	M8x25
	≥ 30	25 h7	24	87.5	15.5	56.5	20	2	2	28	8 h9	0.5	1.5	8x7x20 A	
F 20	≥ 42	35 h7	34	99	18	63	22	2	2	38	10 h9	0.5	1.5	10x8x22 A	M8x30
	≥ 35	30 h7	29	99	18	63	22	2	2	33	8 h9	0.5	1.5	8x7x22 A	
F 25	≥ 47	40 h7	39	104	23	58	30	2	2	43	12 h9	0.5	1.5	12x8x30 A	M8x30
	≥ 42	35 h7	34	104	23	58	30	2	2	38	10 h9	0.5	1.5	10x8x30 A	
F 31	≥ 47	40 h7	39	104	28	48	30	2	2	43	12 h9	0.5	1.5	12x8x30 A	M8x30
	≥ 42	35 h7	34	104	28	48	30	2	2	38	10 h9	0.5	1.5	10x8x30 A	
F 41	≥ 52	45 h7	44	118	27.5	63	45	2.5	2.5	48.5	14 h9	1	2.0	14x9x45 A	M10x30
	≥ 47	40 h7	39	118	27.5	63	45	2.5	2.5	43	12 h9	1	2.0	12x8x45 A	
F 51	≥ 63	55 h7	54	139	33	73	50	2.5	2.5	59	16 h9	1	2.0	16x10x50 A	M14x45
	≥ 57	50 h7	49	139	33	73	50	2.5	2.5	53.5	14 h9	1	2.0	14x9x50 A	
F 60	≥ 78	70 h7	69	180	38	104	70	2.5	2.5	74.5	20 h9	1	2.0	20x12x70 A	M16x45
	≥ 68	60 h7	59	180	38	104	70	2.5	2.5	64	18 h9	1	2.0	18x11x70 A	
F 70	≥ 89	80 h7	79	229	58	113	75	3	3	85	22 h9	2.5	2.5	22x14x75 A	M20x55
	≥ 78	70 h7	69	229	58	113	75	3	3	74.5	20 h9	2.5	2.5	20x12x75 A	
F 80	≥ 99	90 h7	89	272	78	116	100	3	3	95	25 h9	2.5	2.5	25x14x100 A	M20x55
	v 89	80 h7	79	272	78	116	100	3	3	85	22 h9	2.5	2.5	22x14x100 A	
F 90	≥ 111	100 h7	99	333	87.5	158	110	3	3	106	28 h9	2.5	2.5	28x16x110 A	M24x65
	≥ 99	90 h7	89	333	87.5	158	110	3	3	95	25 h9	2.5	2.5	25x14x110 A	

S



	A1	A2	A3	A4	B	B1	B2	R	S	L	L1	L2	M	M1	UNI 5739
F 10	≥ 36	27 h7	24	25 h6	138	34	70	0.5	1.5	29.5	25 d9	9	7	5.5	M8x25
F 20	≥ 42	32 h7	29	30 h6	160	38	84	0.5	1.5	35.5	30 d9	9	7	5.5	M8x25
F 25	≥ 42	32 h7	30	31 h6	172	38	96	0.5	1.5	35.5	31 d9	9	7	5.5	M8x25
F 31	≥ 50	38 h7	35	36 h6	155	40	73	1	2	43	36 d9	9	7	5.5	M8x25
F 41	≥ 58	44 h7	41	42 h6	177	46.5	82	1	2	49	42 d9	11	8.5	7	M10x30
F 51	≥ 68	54 h7	51	52 g6	201	48	91	1	2	61	52 d9	18	9	7.5	M16x45
F 60	≥ 84	67 h7	64	65 g6	248	53	133	1.5	2	80	65 d9	18	9	7.5	M16x45
F 70	≥ 104	82 h7	79	80 g6	308	78	140	2.5	2.5	95	80 d9	22	13.5	12	M20x55
F 80	≥ 114	92 h7	89	90 g6	365	88	177	2.5	2.5	105	90 d9	22	13.5	12	M20x55
F 90	≥ 126	102 h7	99	100 g6	429.5	98	221.5	2.5	2.5	120	100 d9	26	20	18.5	M24x70

QF

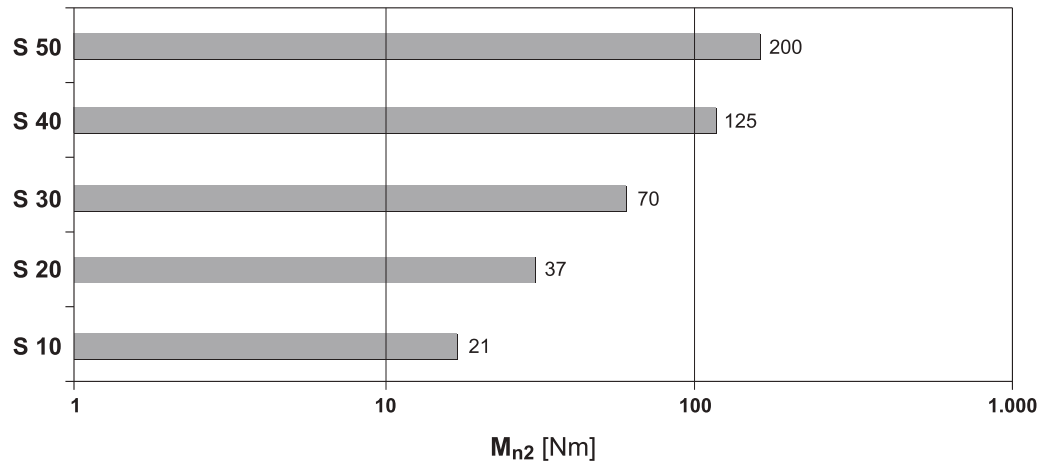


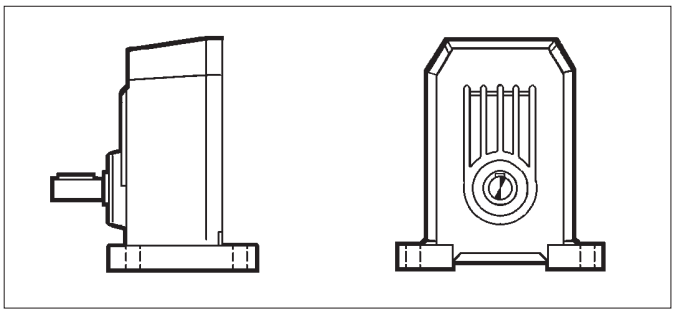
		A1	A2	B1	B2	B3	S
F 10	**QF25**	25 h6	24	41	83	≥ 50	1.5
	QF30	30 h6	29				
F 20	**QF25**	25 h6	24	41	104.5	≥ 50	1.5
	QF30	30 h6	29				
F 25	**QF30**	30 h6	29	41	120.5	≥ 50	1.5
	QF32	32 h6	31				
F 31	**QF35**	35 h6	34	45	95.5	≥ 54	1.5
	QF40	40 h6	39				
F 41	**QF42**	42 h6	41	46	112.5	≥ 55	2
	QF45	45 h6	44				
F 51	**QF50**	50 h6	49	48	131	≥ 57	2
	QF55	55 h6	54				
F 60	**QF60**	60 h6	59	57	158	≥ 66	2.5
	QF65	65 h6	64				
	QF70	70 h6	69				

67 DESIGN FEATURES

The main design characteristics are:
- modularity
- space effective
- high efficiency
- quite operation
- gears in hardened and case-hardened steel
- bare aluminium housing for sizes 10, 20, 30, unpainted
  high strength painted cast-iron housings for larger frame sizes
- input and output shafts from high grade steel.

(E 60)

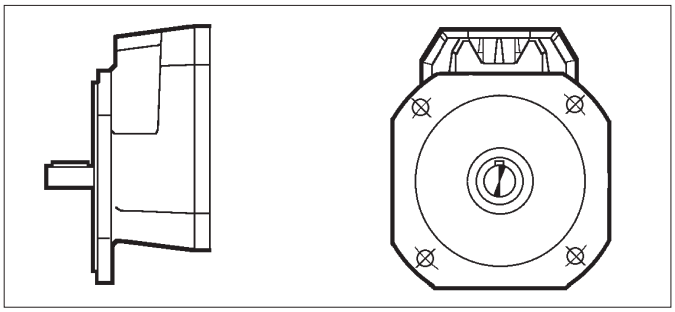




P

Foot mount

S 10 ... S 50



F

Flange mount

S 10 ... S 50

69 DESIGNATION

GEAR UNIT

S 10 1 P 1.4 S1 B3 .....

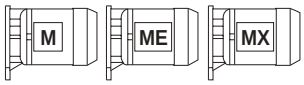
OPTIONS

MOUNTING POSITION

S...P: **B3** (Standard), **B6**, **B7**, **B8**, **V5**, **V6**
S...F: **B5** (Standard), **B51**, **B52**, **B53**, **V1**, **V3**

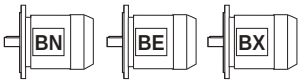
INPUT CONFIGURATION

S05	**S3**
S1	**S4**
S2	**S5**



IEC_

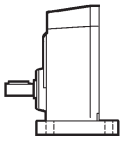
P63	**P112**
P71	**P132**
P80	**P160**
P90	**P180**
P100	



HS

GEAR RATIO

VERSION



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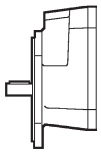
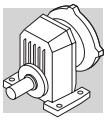


F

REDUCTIONS
1

GEAR FRAME SIZE
10, **20**, **30**, **40**, **50**

TYPE: **S** = single stage gear unit



MOTOR | BRAKE

M 1LA 4 230/400-50 IP54 CLF ..... **W FD** 7.5 R SB 220 SA .....

OPTIONS

BRAKE SUPPLY

RECTIFIER TYPE
AC/DC
NB, **SB**, **NBR**, **SBR**

BRAKE HAND RELEASE
R, **RM**

BRAKE TORQUE

BRAKE TYPE
FD (d.c. brake)
FA (a.c. brake)

TERMINAL BOX POSITION
W (default), **N**, **E**, **S**

MOTOR MOUNTING
— (compact motor)
B5 (IEC - motor)

INSULATION CLASS
CL F standard
CL H option

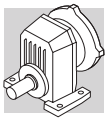
DEGREE OF PROTECTION
IP55 standard (IP54 - brake motor)

VOLTAGE - FREQUENCY

POLE NUMBER
2, **4**, **6**, **2/4**, **2/6**, **2/8**, **2/12**, **4/6**, **4/8**

MOTOR SIZE
0B ... 5LA (compact motor)
63A ... 280M (IEC motor)

MOTOR TYPE
MX = compact 3-phase, class IE3
BX = IEC 3-phase, class IE3
ME = compact 3-phase, class IE2
BE = IEC 3-phase, class IE2
M = compact 3-phase
BN = IEC 3-phase



69.1 Gearbox options

SO

Gear units S10, S20, S30, S40, usually factory filled with oil, to be supplied unlubricated.

LO

Gearbox S50, usually supplied without oil, to be supplied with synthetic oil currently used by BONFIGLIOLI RIDUTTORI and filled according to requested mounting position.

DV

Dual oil seals on input shaft. (Available only for compact gearmotors).

VV

Fluoro elastomer oil seal on input shaft.

PV

All oil seals in Fluoro elastomer.

SURFACE PROTECTION

When no specific protection class is requested, the painted (ferrous) surfaces of gearboxes are protected to at least corrosivity class C2 (UNI EN ISO 12944-2). For improved resistance to atmospheric corrosion, gearboxes can be delivered with **C3** and **C4** surface protection, obtained by painting the complete gearbox.

(E 61)

SURFACE PROTECTION	Typical environments	Maximum surface temperature	Corrosivity class according to UNI EN ISO 12944-2
C3	Urban and industrial environments with up to 100% relative humidity (medium air pollution)	120°C	C3
C4	Industrial areas, coastal areas, chemical plant, with up to 100% relative humidity (high air pollution)	120°C	C4

Gearboxes with optional protection to class **C3** or **C4** are available in a choice of colours.
If no specific colour is requested (see the “PAINTING” option) gearboxes are finished in RAL 7042.
Gearboxes can also be supplied with surface protection for corrosivity class **C5** according to UNI EN ISO 12944-2. Contact our Technical Service for further details.

PAINTING

Gearboxes with optional protection to class C3 or C4 are available in the colours listed in the following table.

(E 62)

PAINTING	Colour	RAL number
RAL7042*	Traffic Grey A	7042
RAL5010	Gentian Blue	5010
RAL9005	Jet Black	9005
RAL9006	White Aluminium	9006
RAL9010	Pure White	9010

* Gearboxes are supplied in this standard colour if no other colour is specified.

NOTE – “PAINTING” options can only be specified in conjunction with “SURFACE PROTECTION” options.

CERTIFICATES

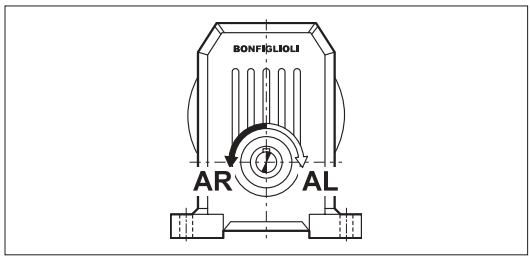
AC - Certificate of compliance
The document certifies the compliance of the product with the purchase order and the construction in conformity with the applicable procedures of the Bonfiglioli Quality System.

CC - Inspection certificate
The document entails checking on order compliance, the visual inspection of external conditions and of mating dimensions. Checking on main functional parameters in unloaded conditions is also performed along with oil seal proofing, both in static and in running conditions. Units inspected are sampled within the shipping batch and marked individually.

69.2 Motor options

AL, AR
A backstop device on the motor itself, as described in the electric motors section of this catalogue, is available for gearmotors with integral M, ME or MX Series motors. The following table shows the direction of free rotation of the gearbox, on the basis of which the correct option must be selected.

(E 63)



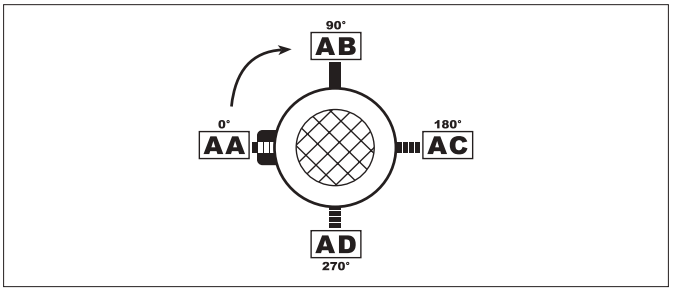
For further information on options, consult the electric motors section.

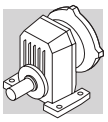
70 MOUNTING POSITION AND TERMINAL BOX ANGULAR LOCATION

Location of motor terminal box can be specified by viewing the motor from the fan side; standard location is shown in black (W).

Angular position of the brake release lever.
Unless otherwise specified, brake motors have the manual device side located, 90° apart from terminal box.
Different angles can be specified through the relevant options available.

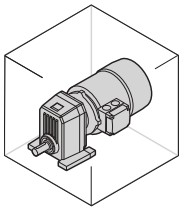
(E 64)

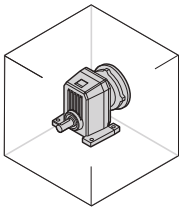


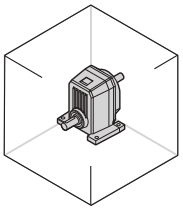


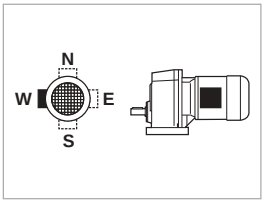
S ... P

B3

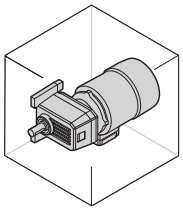

_S

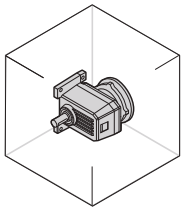

_P(IEC)


_HS



B6


_S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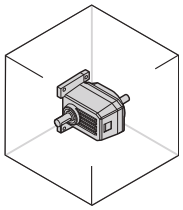
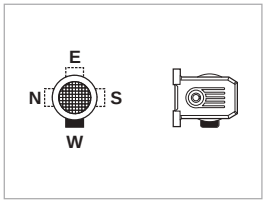
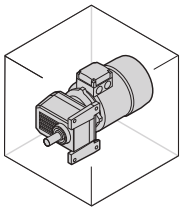
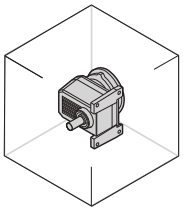

_HS



B7


_S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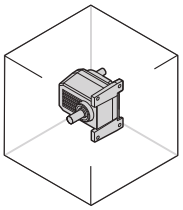
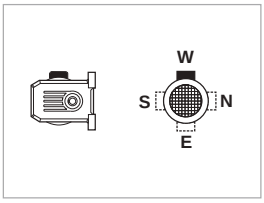
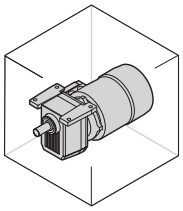

_HS



B8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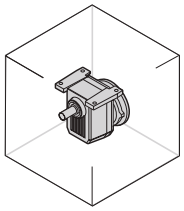
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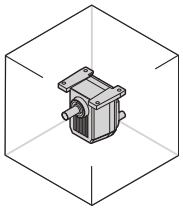
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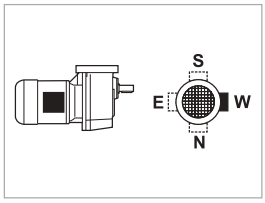

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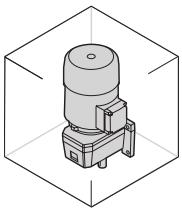
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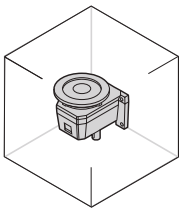
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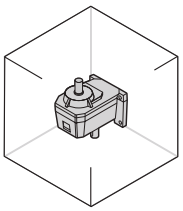
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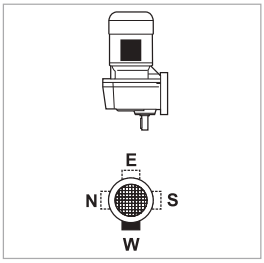

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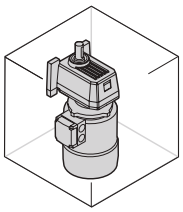
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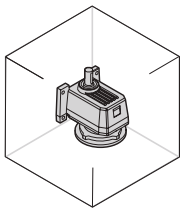
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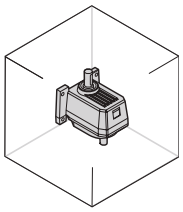
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W = Default

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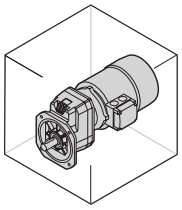
B5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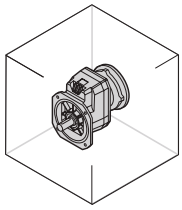
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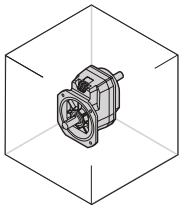
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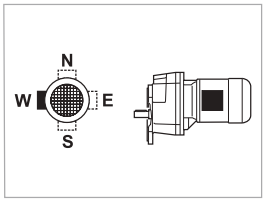

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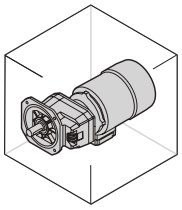
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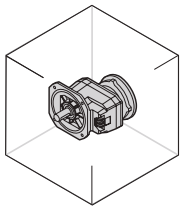
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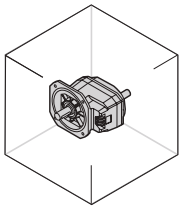
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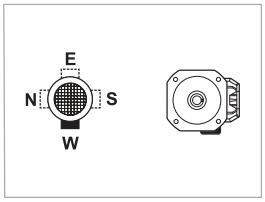

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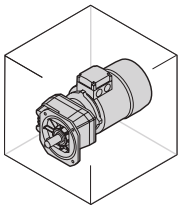
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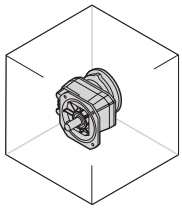
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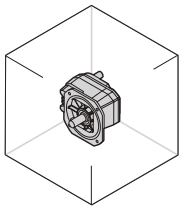
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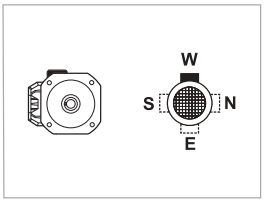

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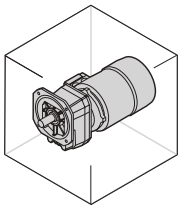
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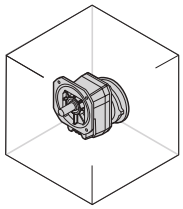
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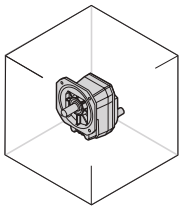
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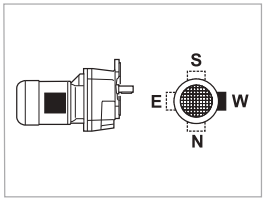

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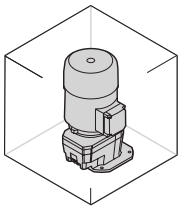
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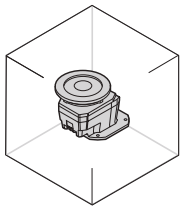
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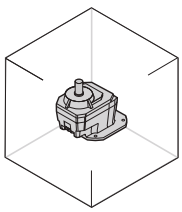
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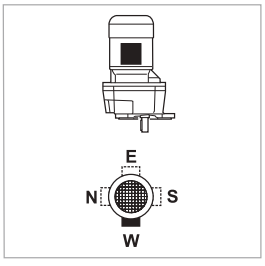

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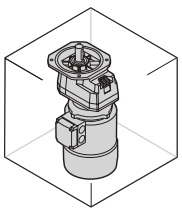
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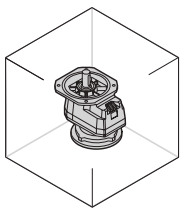
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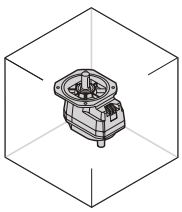

_HS

W = Default

71 OVERHUNG LOADS

External transmissions keyed onto input and/or output shaft generate loads that act radially onto same shaft.
Resulting shaft loading must be compatible with both the bearing and the shaft capacity. Namely shaft loading (R_{c1} for input shaft, R_{c2} for output shaft), must be equal or lower than admissible overhung load capacity for shaft under study (R_{n1} for input shaft, R_{n2} for output shaft). OHL capability listed in the rating chart section.
In the formulas given below, index (1) applies to parameters relating to input shaft, whereas index (2) refers to output shaft.
The load generated by an external transmission can be calculated with close approximation by the following equations:

$$R_{c1}[N] = \frac{2000 \cdot M_1[Nm] \cdot K_r}{d\,[mm]} \quad ; \quad R_{c2}[N] = \frac{2000 \cdot M_2[Nm] \cdot K_r}{d\,[mm]} \qquad (44)$$

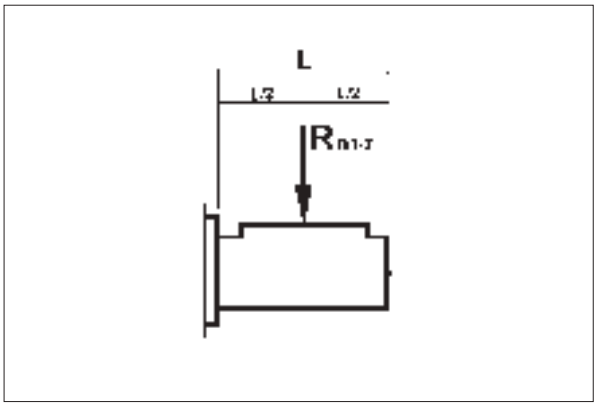
(E 65)

M_1 [Nm]	Torque applied to input shaft
M_2 [Nm]	Torque drawn at output shaft
d [mm]	Pitch diameter of element keyed onto shaft
K_r = 1	Chain transmission

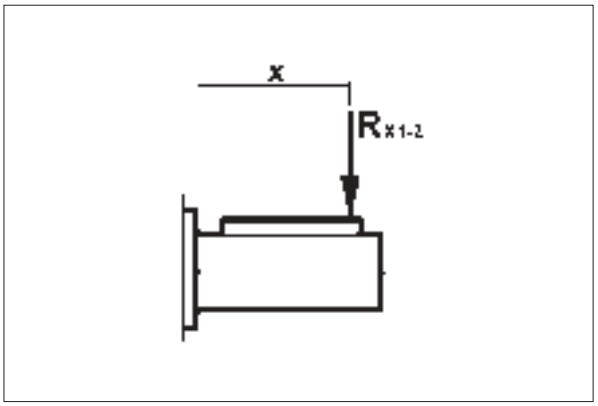
K_r = 1,25	Gear transmission
K_r = 1,5	V-belt transmission
K_r = 2,0	Flat belt transmission

Verification of OHL capability varies depending on whether load applies at midpoint of shaft or it is shifted further out:

(E 66)



(E 67)



a) Load applied at midpoint of shaft, tab. (E66)

A comparison of shaft loading with catalogue OHL ratings should verify the following condition:

$Rc1 \leq Rn1$ [input shaft]

or

$Rc2 \leq Rn2$ [output shaft]

b) Load off the midpoint tab. (E67)

When load is shifted at an “x” distance from shaft shoulder, permissible load must be calculated for that distance.
Revised permissible overhung loads Rx1 (input) and Rx2 (output) are calculated respectively from original rated values Rn1 and Rn2 through factor:

$$\frac{a}{b+x} \qquad (45)$$

(E 68)

	Load location factors					
	Output shaft			Input shaft		
	a	**b**	**c**	**a**	**b**	**c**
S 10 1	61	46	200	21	1	300
S 20 1	73.5	53.5	270	40	20	350
S 30 1	91.5	66.5	380	38.5	18.5	350
S 40 1	126.5	96.5	600	49.5	24.5	450
S 50 1	153.5	113.5	680	49.5	24.5	450

Verification procedure is described here after.

INPUT SHAFT

1. Calculate:

$$R_{x1} = R_{n1} \cdot \frac{a}{b+x} \qquad (46)$$

N.B. Subject to condition:

$$\frac{L}{2} \leq x \leq c \qquad (47)$$

Finally, the following condition must be verified:

$$R_{c1} \leq R_{x1} \quad (48)$$

OUTPUT SHAFT

1. Calculate:

$$R_{x2} = R_{n2} \cdot \frac{a}{b+x} \quad (49)$$

N.B. Subject to condition:

$$\frac{L}{2} \leq x \leq c \quad (50)$$

Finally, the following condition must be verified:

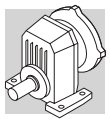
$$R_{c2} \leq R_{x2} \quad (51)$$

72 THRUST LOADS, A_{n1}, A_{n2}

Permissible thrust loads on input [A_{n1}] and output [A_{n2}] shafts are obtained from the radial loading for the shaft under consideration [R_{n1}] and [R_{n2}] through the following equation:

$$A_{n1} = R_{n1} \cdot 0.2$$
$$A_{n2} = R_{n2} \cdot 0.2 \quad (52)$$

The thrust loads calculated through these formulas apply to thrust forces occurring at the same time as rated radial loads.
In the only case that no overhung load acts on the shaft the value of the admissible thrust load [A_n] amounts to 50% of rated OHL [R_n] on same shaft.
Where thrust loads exceed permissible value or largely prevail over radial loads, contact Bonfiglioli Riduttori for an in-depth analysis of the application.



73 GEARMOTOR RATING CHARTS

The selection of motors without brake takes into account the requirements of Regulation EC 640/2009 (see section **M** of this catalogue). When the motor rated power is above 0.75kW, BN/M motors can be provided.

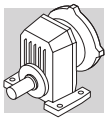
Considering that the Regulation EC 640/2009 shall not apply to the motors equipped with brake, the brakemotor selection takes into account BN/M motors only, without taking into account the rated power BX, BE, MX and ME brakemotors are available on request.

0.09 kW

n_2 min^{-1}	M_2 Nm	S	i	R_{n2} N	 IE1		IE1	
69	12.1	2.9	13.1	2400			**S301_13.1 P63 BN63A6**	487
73	11.5	1.7	12.4	1500	**S201_12.4 S05 M05A6**	484	**S201_12.4 P63 BN63A6**	485
74	11.4	1.1	12.3	1160	**S101_12.3 S05 M05A6**	482	**S101_12.3 P63 BN63A6**	483
85	10.0	2.0	10.8	1500	**S201_10.8 S05 M05A6**	484	**S201_10.8 P63 BN63A6**	485
88	9.5	1.3	10.3	1100	**S101_10.3 S05 M05A6**	482	**S101_10.3 P63 BN63A6**	483
103	8.2	1.5	8.9	1060	**S101_8.9 S05 M05A6**	482	**S101_8.9 P63 BN63A6**	483
107	7.9	2.5	8.5	1500	**S201_8.5 S05 M05A6**	484	**S201_8.5 P63 BN63A6**	485
132	6.4	2.7	6.9	990	**S101_6.9 S05 M05A6**	482	**S101_6.9 P63 BN63A6**	483
149	5.7	3.0	6.1	960	**S101_6.1 S05 M05A6**	482	**S101_6.1 P63 BN63A6**	483
193	4.4	3.2	4.7	890	**S101_4.7 S05 M05A6**	482	**S101_4.7 P63 BN63A6**	483
237	3.6	3.9	3.8	830	**S101_3.8 S05 M05A6**	482	**S101_3.8 P63 BN63A6**	483
284	3.0	4.7	3.2	790	**S101_3.2 S05 M05A6**	482	**S101_3.2 P63 BN63A6**	483
364	2.3	5.2	2.5	730	**S101_2.5 S05 M05A6**	482	**S101_2.5 P63 BN63A6**	483
485	1.7	6.9	1.9	670	**S101_1.9 S05 M05A6**	482	**S101_1.9 P63 BN63A6**	483
640	1.3	9.1	1.4	610	**S101_1.4 S05 M05A6**	482	**S101_1.4 P63 BN63A6**	483

0.12 kW

n_2 min^{-1}	M_2 Nm	S	i	R_{n2} N	 IE1		IE1	
69	16.2	2.2	13.1	2400			**S301_13.1 P63 BN63A4**	487
73	15.3	1.3	12.4	1500	**S201_12.4 S05 M05B6**	484	**S201_12.4 P63 BN63B6**	485
85	13.3	1.5	10.8	1500	**S201_10.8 S05 M05B6**	484	**S201_10.8 P63 BN63B6**	485
88	12.7	2.8	10.3	2400			**S301_10.3 P63 BN63B6**	487
88	12.7	0.9	10.3	1060	**S101_10.3 S05 M05B6**	482	**S101_10.3 P63 BN63B6**	483
102	11.0	3.2	8.9	2400			**S301_8.9 P63 BN63B6**	487
103	11.0	1.1	8.9	1030	**S101_8.9 S05 M05B6**	482	**S101_8.9 P63 BN63B6**	483
107	10.5	2.8	13.1	2400			**S301_13.1 P63 BN63B6**	487
107	10.5	1.9	8.5	1500	**S201_8.5 S05 M05B6**	484	**S201_8.5 P63 BN63B6**	485
113	10.0	1.7	12.4	1500	**S201_12.4 S05 M05A4**	484	**S201_12.4 P63 BN63A4**	485
114	9.9	1.0	12.3	1000	**S101_12.3 S05 M05A4**	482	**S101_12.3 P63 BN63A4**	483
126	8.9	3.4	7.2	1500	**S201_7.2 S05 M05B6**	484	**S201_7.2 P63 BN63B6**	485
130	8.6	2.0	10.8	1500	**S201_10.8 S05 M05A4**	484	**S201_10.8 P63 BN63A4**	485
132	8.5	2.0	6.9	960	**S101_6.9 S05 M05B6**	482	**S101_6.9 P63 BN63B6**	483
136	8.3	1.2	10.3	960	**S101_10.3 S05 M05A4**	482	**S101_10.3 P63 BN63A4**	483
149	7.5	2.3	6.1	940	**S101_6.1 S05 M05B6**	482	**S101_6.1 P63 BN63B6**	483

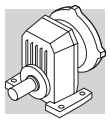


0.12 kW

n_2 min^{-1}	M_2 Nm	S	i	R_{n2} N	IE1		IE1	
158	7.1	1.4	8.9	920	**S101_8.9 S05 M05A4**	482	**S101_8.9 P63 BN63A4**	483
165	6.8	2.5	8.5	1500	**S201_8.5 S05 M05A4**	484	**S201_8.5 P63 BN63A4**	485
193	5.8	2.4	4.7	870	**S101_4.7 S05 M05B6**	482	**S101_4.7 P63 BN63B6**	483
203	5.5	2.7	6.9	860	**S101_6.9 S05 M05A4**	482	**S101_6.9 P63 BN63A4**	483
229	4.9	3.1	6.1	830	**S101_6.1 S05 M05A4**	482	**S101_6.1 P63 BN63A4**	483
237	4.7	2.9	3.8	820	**S101_3.8 S05 M05B6**	482	**S101_3.8 P63 BN63B6**	483
284	3.9	3.5	3.2	780	**S101_3.2 S05 M05B6**	482	**S101_3.2 P63 BN63B6**	483
296	3.8	3.2	4.7	770	**S101_4.7 S05 M05A4**	482	**S101_4.7 P63 BN63A4**	483
364	3.1	3.9	3.8	720	**S101_3.8 S05 M05A4**	482	**S101_3.8 P63 BN63A4**	483
364	3.1	3.9	2.5	720	**S101_2.5 S05 M05B6**	482	**S101_2.5 P63 BN63B6**	483
438	2.6	4.7	3.2	680	**S101_3.2 S05 M05A4**	482	**S101_3.2 P63 BN63A4**	483
485	2.3	5.2	1.9	660	**S101_1.9 S05 M05B6**	482	**S101_1.9 P63 BN63B6**	483
560	2.0	5.0	2.5	630	**S101_2.5 S05 M05A4**	482	**S101_2.5 P63 BN63A4**	483
640	1.8	6.8	1.4	600	**S101_1.4 S05 M05B6**	482	**S101_1.4 P63 BN63B6**	483
747	1.5	6.6	1.9	580	**S101_1.9 S05 M05A4**	482	**S101_1.9 P63 BN63A4**	483
985	1.1	8.8	1.4	530	**S101_1.4 S05 M05A4**	482	**S101_1.4 P63 BN63A4**	483

0.18 kW

n_2 min^{-1}	M_2 Nm	S	i	R_{n2} N	IE1		IE1	
69	24.6	1.4	13.1	2400			**S301_13.1 P71 BN71A6**	487
73	23.2	2.5	12.4	3800	**S401_12.4 S1 M1SC6**	488	**S401_12.4 P71 BN71A6**	489
84	20.1	1.0	10.8	1500			**S201_10.8 P71 BN71A6**	485
84	20.0	2.9	10.7	3800	**S401_10.7 S1 M1SC6**	488	**S401_10.7 P71 BN71A6**	489
87	19.3	1.8	10.3	2400	**S301_10.3 S1 M1SC6**	486	**S301_10.3 P71 BN71A6**	487
101	16.6	2.1	8.9	2400	**S301_8.9 S1 M1SC6**	486	**S301_8.9 P71 BN71A6**	487
106	15.9	1.3	8.5	1500	**S201_8.5 S1 M1SC6**	484	**S201_8.5 P71 BN71A6**	485
106	15.9	1.9	13.1	2400			**S301_13.1 P63 BN63B4**	487
112	15.1	1.1	12.4	1500	**S201_12.4 S05 M05B4**	484	**S201_12.4 P63 BN63B4**	485
112	15.0	3.3	12.4	3800			**S401_12.4 P63 BN63B4**	489
125	13.5	2.2	7.2	1500	**S201_7.2 S1 M1SC6**	484	**S201_7.2 P71 BN71A6**	485
129	13.0	1.3	10.8	1500	**S201_10.8 S05 M05B4**	484	**S201_10.8 P63 BN63B4**	485
130	12.9	1.3	6.9	910	**S101_6.9 S1 M1SC6**	482	**S101_6.9 P71 BN71A6**	483
135	12.5	2.4	10.3	2330			**S301_10.3 P63 BN63B4**	487
147	11.4	1.5	6.1	890	**S101_6.1 S1 M1SC6**	482	**S101_6.1 P71 BN71A6**	483
155	10.9	2.8	5.8	1500	**S201_5.8 S1 M1SC6**	484	**S201_5.8 P71 BN71A6**	485
156	10.8	2.8	8.9	2230			**S301_8.9 P63 BN63B4**	487
157	10.8	0.9	8.9	880	**S101_8.9 S05 M05B4**	482	**S101_8.9 P63 BN63B4**	483
164	10.3	1.7	8.5	1500	**S201_8.5 S05 M05B4**	484	**S201_8.5 P63 BN63B4**	485
189	8.9	3.4	4.8	1500	**S201_4.8 S1 M1SC6**	484	**S201_4.8 P71 BN71A6**	485
190	8.8	1.6	4.7	830	**S101_4.7 S1 M1SC6**	482	**S101_4.7 P71 BN71A6**	483
192	8.8	3.0	7.2	1500	**S201_7.2 S05 M05B4**	484	**S201_7.2 P63 BN63B4**	485
201	8.4	1.8	6.9	820	**S101_6.9 S05 M05B4**	482	**S101_6.9 P63 BN63B4**	483
214	7.9	3.1	13.1	2020			**S301_13.1 P63 BN63A2**	487
226	7.5	1.7	12.4	1480	**S201_12.4 S05 M05A2**	484	**S201_12.4 P63 BN63A2**	485
227	7.4	2.0	6.1	800	**S101_6.1 S05 M05B4**	482	**S101_6.1 P63 BN63B4**	483
228	7.4	1.1	12.3	800	**S101_12.3 S05 M05A2**	482	**S101_12.3 P63 BN63A2**	483
234	7.2	1.9	3.8	790	**S101_3.8 S1 M1SC6**	482	**S101_3.8 P71 BN71A6**	483
261	6.4	2.0	10.8	1420	**S201_10.8 S05 M05A2**	484	**S201_10.8 P63 BN63A2**	485
273	6.2	1.3	10.3	760	**S101_10.3 S05 M05A2**	482	**S101_10.3 P63 BN63A2**	483
281	6.0	2.3	3.2	750	**S101_3.2 S1 M1SC6**	482	**S101_3.2 P71 BN71A6**	483
294	5.7	2.1	4.7	750	**S101_4.7 S05 M05B4**	482	**S101_4.7 P63 BN63B4**	483
317	5.3	1.5	8.9	730	**S101_8.9 S05 M05A2**	482	**S101_8.9 P63 BN63A2**	483



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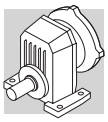
n_2 min^{-1}	M_2 Nm	S	i	R_{n2} N	IE1		IE1	
331	5.1	2.6	8.5	1320	**S201_8.5 S05 M05A2**	484	**S201_8.5 P63 BN63A2**	485
360	4.7	2.6	2.5	700	**S101_2.5 S1 M1SC6**	482	**S101_2.5 P71 BN71A6**	483
361	4.7	2.6	3.8	700	**S101_3.8 S05 M05B4**	482	**S101_3.8 P63 BN63B4**	483
407	4.1	2.9	6.9	680	**S101_6.9 S05 M05A2**	482	**S101_6.9 P63 BN63A2**	483
434	3.9	3.1	3.2	670	**S101_3.2 S05 M05B4**	482	**S101_3.2 P63 BN63B4**	483
460	3.7	3.3	6.1	660	**S101_6.1 S05 M05A2**	482		
480	3.5	3.4	1.9	640	**S101_1.9 S1 M1SC6**	482	**S101_1.9 P71 BN71A6**	483
556	3.0	3.3	2.5	620	**S101_2.5 S05 M05B4**	482	**S101_2.5 P63 BN63B4**	483
594	2.8	3.5	4.7	610	**S101_4.7 S05 M05A2**	482	**S101_4.7 P63 BN63A2**	483
633	2.7	4.5	1.4	590	**S101_1.4 S1 M1SC6**	482	**S101_1.4 P71 BN71A6**	483
731	2.3	4.3	3.8	570	**S101_3.8 S05 M05A2**	482	**S101_3.8 P63 BN63A2**	483
741	2.3	4.4	1.9	570	**S101_1.9 S05 M05B4**	482	**S101_1.9 P63 BN63B4**	483
878	1.9	5.2	3.2	540	**S101_3.2 S05 M05A2**	482	**S101_3.2 P63 BN63A2**	483
978	1.7	5.8	1.4	520	**S101_1.4 S05 M05B4**	482	**S101_1.4 P63 BN63B4**	483
1124	1.5	5.3	2.5	500	**S101_2.5 S05 M05A2**	482	**S101_2.5 P63 BN63A2**	483
1499	1.1	7.1	1.9	460	**S101_1.9 S05 M05A2**	482	**S101_1.9 P63 BN63A2**	483
1977	0.9	9.4	1.4	420	**S101_1.4 S05 M05A2**	482	**S101_1.4 P63 BN63A2**	483

0.25 kW

n_2 min^{-1}	M_2 Nm	S	i	R_{n2} N	IE1		IE1	
69	34.1	1.0	13.1	2400			**S301_13.1 P71 BN71B6**	487
70	33.5	3.0	12.9	6520	**S501_12.9 S1 M1SD6**	490	**S501_12.9 P71 BN71B6**	491
73	32.2	1.8	12.4	3800	**S401_12.4 S1 M1SD6**	488	**S401_12.4 P71 BN71B6**	489
84	27.7	2.1	10.7	3800	**S401_10.7 S1 M1SD6**	488	**S401_10.7 P71 BN71B6**	489
87	26.8	1.3	10.3	2400	**S301_10.3 S1 M1SD6**	486	**S301_10.3 P71 BN71B6**	487
101	23.1	1.5	8.9	2400	**S301_8.9 S1 M1SD6**	486	**S301_8.9 P71 BN71B6**	487
104	22.5	3.1	8.6	3800	**S401_8.6 S1 M1SD6**	488	**S401_8.6 P71 BN71B6**	489
105	22.3	1.3	13.1	2400			**S301_13.1 P71 BN71A4**	487
106	22.1	0.9	8.5	1500	**S201_8.5 S1 M1SD6**	484	**S201_8.5 P71 BN71B6**	485
111	21.1	2.4	12.4	3800			**S401_12.4 P71 BN71A4**	489
125	18.8	1.6	7.2	1500	**S201_7.2 S1 M1SD6**	484	**S201_7.2 P71 BN71B6**	485
127	18.4	3.1	7.1	2340	**S301_7.1 S1 M1SD6**	486	**S301_7.1 P71 BN71B6**	487
128	18.3	0.9	10.8	1500	**S201_10.8 S05 M05C4**	484	**S201_10.8 P71 BN71A4**	485
129	18.2	2.8	10.7	3800			**S401_10.7 P71 BN71A4**	489
130	17.9	0.9	6.9	850	**S101_6.9 S1 M1SD6**	482	**S101_6.9 P71 BN71B6**	483
133	17.5	1.7	10.3	2300			**S301_10.3 P71 BN71A4**	487
147	15.9	1.1	6.1	840	**S101_6.1 S1 M1SD6**	482	**S101_6.1 P71 BN71B6**	483
155	15.1	2.0	5.8	1500	**S201_5.8 S1 M1SD6**	484	**S201_5.8 P71 BN71B6**	485
155	15.1	2.0	8.9	2200			**S301_8.9 P71 BN71A4**	487
162	14.5	1.2	8.5	1500	**S201_8.5 S05 M05C4**	484	**S201_8.5 P71 BN71A4**	485
189	12.4	2.4	4.8	1500	**S201_4.8 S1 M1SD6**	484	**S201_4.8 P71 BN71B6**	485
190	12.3	1.1	4.7	790	**S101_4.7 S1 M1SD6**	482	**S101_4.7 P71 BN71B6**	483
190	12.3	2.1	7.2	1500	**S201_7.2 S05 M05C4**	484	**S201_7.2 P71 BN71A4**	485
199	11.7	1.3	6.9	780	**S101_6.9 S05 M05C4**	482	**S101_6.9 P71 BN71A4**	483
214	10.9	2.2	13.1	2000			**S301_13.1 P63 BN63B2**	487
225	10.4	1.4	6.1	770	**S101_6.1 S05 M05C4**	482	**S101_6.1 P71 BN71A4**	483
226	10.3	1.3	12.4	1450	**S201_12.4 S05 M05B2**	484	**S201_12.4 P63 BN63B2**	485
229	10.2	2.9	3.9	1440	**S201_3.9 S1 M1SD6**	484	**S201_3.9 P71 BN71B6**	485
234	10.0	1.4	3.8	750	**S101_3.8 S1 M1SD6**	482	**S101_3.8 P71 BN71B6**	483
236	9.9	2.6	5.8	1430	**S201_5.8 S05 M05C4**	484	**S201_5.8 P71 BN71A4**	485
261	9.0	1.5	10.8	1390	**S201_10.8 S05 M05B2**	484	**S201_10.8 P63 BN63B2**	485
273	8.6	2.8	10.3	1860			**S301_10.3 P63 BN63B2**	487



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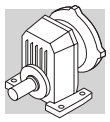
n_2 min^{-1}	M_2 Nm	S	i	R_{n2} N	IE1		IE1	
273	8.6	0.9	10.3	730	**S101_10.3 S05 M05B2**	482	**S101_10.3 P63 BN63B2**	483
281	8.3	1.7	3.2	720	**S101_3.2 S1 M1SD6**	482	**S101_3.2 P71 BN71B6**	483
288	8.1	3.2	4.8	1350	**S201_4.8 S05 M05C4**	484	**S201_4.8 P71 BN71A4**	485
291	8.0	1.5	4.7	720	**S101_4.7 S05 M05C4**	482	**S101_4.7 P71 BN71A4**	483
316	7.4	3.2	8.9	1770			**S301_8.9 P63 BN63B2**	487
317	7.4	1.1	8.9	710	**S101_8.9 S05 M05B2**	482	**S101_8.9 P63 BN63B2**	483
331	7.1	1.8	8.5	1300	**S201_8.5 S05 M05B2**	484	**S201_8.5 P63 BN63B2**	485
358	6.5	1.8	3.8	680	**S101_3.8 S05 M05C4**	482	**S101_3.8 P71 BN71A4**	483
360	6.5	1.8	2.5	680	**S101_2.5 S1 M1SD6**	482	**S101_2.5 P71 BN71B6**	483
389	6.0	3.5	7.2	1240	**S201_7.2 S05 M05B2**	484	**S201_7.2 P63 BN63B2**	485
407	5.7	2.1	6.9	660	**S101_6.9 S05 M05B2**	482	**S101_6.9 P63 BN63B2**	483
430	5.4	2.2	3.2	650	**S101_3.2 S05 M05C4**	482	**S101_3.2 P71 BN71A4**	483
460	5.1	2.4	6.1	640	**S101_6.1 S05 M05B2**	482	**S101_6.1 P63 BN63B2**	483
480	4.9	2.5	1.9	620	**S101_1.9 S1 M1SD6**	482	**S101_1.9 P71 BN71B6**	483
550	4.3	2.4	2.5	610	**S101_2.5 S05 M05C4**	482	**S101_2.5 P71 BN71A4**	483
594	3.9	2.5	4.7	600	**S101_4.7 S05 M05B2**	482	**S101_4.7 P63 BN63B2**	483
633	3.7	3.2	1.4	580	**S101_1.4 S1 M1SD6**	482	**S101_1.4 P71 BN71B6**	483
731	3.2	3.1	3.8	560	**S101_3.8 S05 M05B2**	482	**S101_3.8 P63 BN63B2**	483
733	3.2	3.1	1.9	560	**S101_1.9 S05 M05C4**	482	**S101_1.9 P71 BN71A4**	483
878	2.7	3.8	3.2	530	**S101_3.2 S05 M05B2**	482	**S101_3.2 P63 BN63B2**	483
968	2.4	4.1	1.4	510	**S101_1.4 S05 M05C4**	482	**S101_1.4 P71 BN71A4**	483
1124	2.1	3.8	2.5	500	**S101_2.5 S05 M05B2**	482	**S101_2.5 P63 BN63B2**	483
1499	1.6	5.1	1.9	450	**S101_1.9 S05 M05B2**	482	**S101_1.9 P63 BN63B2**	483
1977	1.2	6.8	1.4	420	**S101_1.4 S05 M05B2**	482	**S101_1.4 P63 BN63B2**	483

0.37 kW

n_2 min^{-1}	M_2 Nm	S	i	R_{n2} N	IE1		IE1	
71	49.0	2.0	12.9	6420	**S501_12.9 S1 M1LA6**	490	**S501_12.9 P80 BN80A6**	491
73	47.2	1.2	12.4	3800	**S401_12.4 S1 M1LA6**	488	**S401_12.4 P80 BN80A6**	489
85	40.6	1.4	10.7	3800	**S401_10.7 S1 M1LA6**	488	**S401_10.7 P80 BN80A6**	489
87	39.8	2.9	10.5	6020	**S501_10.5 S1 M1LA6**	490	**S501_10.5 P80 BN80A6**	491
102	33.8	1.0	8.9	2400	**S301_8.9 S1 M1LA6**	486	**S301_8.9 P80 BN80A6**	487
104	33.2	0.9	13.1	2390			**S301_13.1 P71 BN71B4**	487
105	32.9	2.1	8.6	3800	**S401_8.6 S1 M1LA6**	488	**S401_8.6 P80 BN80A6**	489
106	32.6	3.1	12.9	5650	**S501_12.9 S1 M1SD4**	490	**S501_12.9 P71 BN71B4**	491
110	31.3	1.6	12.4	3800	**S401_12.4 S1 M1SD4**	488	**S401_12.4 P71 BN71B4**	489
126	27.5	1.1	7.2	1500	**S201_7.2 S1 M1LA6**	484	**S201_7.2 P80 BN80A6**	485
127	27.2	3.3	7.2	3800	**S401_7.2 S1 M1LA6**	488	**S401_7.2 P80 BN80A6**	489
128	27.0	2.1	7.1	2260	**S301_7.1 S1 M1LA6**	486	**S301_7.1 P80 BN80A6**	487
128	27.0	1.9	10.7	3800	**S401_10.7 S1 M1SD4**	488	**S401_10.7 P71 BN71B4**	489
133	26.0	1.2	10.3	2240	**S301_10.3 S1 M1SD4**	486	**S301_10.3 P71 BN71B4**	487
154	22.5	1.3	8.9	2150	**S301_8.9 S1 M1SD4**	486	**S301_8.9 P71 BN71B4**	487
156	22.2	2.6	5.8	2140	**S301_5.8 S1 M1LA6**	486	**S301_5.8 P80 BN80A6**	487
156	22.1	1.4	5.8	1500	**S201_5.8 S1 M1LA6**	484	**S201_5.8 P80 BN80A6**	485
159	21.8	2.7	8.6	3610	**S401_8.6 S1 M1SD4**	488	**S401_8.6 P71 BN71B4**	489
184	18.8	3.1	4.9	2040	**S301_4.9 S1 M1LA6**	486	**S301_4.9 P80 BN80A6**	487
190	18.3	1.4	7.2	1460	**S201_7.2 S1 M1SD4**	484	**S201_7.2 P71 BN71B4**	485
191	18.1	1.7	4.8	1460	**S201_4.8 S1 M1LA6**	484	**S201_4.8 P80 BN80A6**	485
193	17.9	2.8	7.1	2020	**S301_7.1 S1 M1SD4**	486	**S301_7.1 P71 BN71B4**	487
214	16.2	1.5	13.1	1960			**S301_13.1 P71 BN71A2**	487
224	15.4	1.0	6.1	710	**S101_6.1 S1 M1SD4**	482	**S101_6.1 P71 BN71B4**	483
227	15.3	2.6	12.4	3230			**S401_12.4 P71 BN71A2**	489



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n_2 min^{-1}	M_2 Nm	S	i	R_{n2} N	IE1		IE1	
231	15.0	2.0	3.9	1380	**S201_3.9 S1 M1LA6**	484	**S201_3.9 P80 BN80A6**	485
234	14.8	3.4	5.8	1900	**S301_5.8 S1 M1SD4**	486	**S301_5.8 P71 BN71B4**	487
235	14.7	1.8	5.8	1390	**S201_5.8 S1 M1SD4**	484	**S201_5.8 P71 BN71B4**	485
237	14.6	1.0	3.8	690	**S101_3.8 S1 M1LA6**	482	**S101_3.8 P80 BN80A6**	483
261	13.2	1.0	10.8	1350	**S201_10.8 S05 M05C2**	484	**S201_10.8 P71 BN71A2**	485
263	13.1	3.0	10.7	3080			**S401_10.7 P71 BN71A2**	489
273	12.7	1.9	10.3	1820			**S301_10.3 P71 BN71A2**	487
284	12.2	1.1	3.2	670	**S101_3.2 S1 M1LA6**	482	**S101_3.2 P80 BN80A6**	483
287	12.1	2.2	4.8	1310	**S201_4.8 S1 M1SD4**	484	**S201_4.8 P71 BN71B4**	485
290	11.9	1.0	4.7	670	**S101_4.7 S1 M1SD4**	482	**S101_4.7 P71 BN71B4**	483
293	11.8	2.5	3.1	1300	**S201_3.1 S1 M1LA6**	484	**S201_3.1 P80 BN80A6**	485
316	11.0	2.2	8.9	1740			**S301_8.9 P71 BN71A2**	487
331	10.5	1.2	8.5	1270	**S201_8.5 S05 M05C2**	484	**S201_8.5 P71 BN71A2**	485
348	9.9	2.6	3.9	1240	**S201_3.9 S1 M1SD4**	484	**S201_3.9 P71 BN71B4**	485
356	9.7	1.2	3.8	640	**S101_3.8 S1 M1SD4**	482	**S101_3.8 P71 BN71B4**	483
364	9.5	1.3	2.5	630	**S101_2.5 S1 M1LA6**	482	**S101_2.5 P80 BN80A6**	483
373	9.3	3.2	2.4	1210	**S201_2.4 S1 M1LA6**	484	**S201_2.4 P80 BN80A6**	485
389	8.9	2.4	7.2	1210	**S201_7.2 S05 M05C2**	484	**S201_7.2 P71 BN71A2**	485
407	8.5	1.4	6.9	630	**S101_6.9 S05 M05C2**	482	**S101_6.9 P71 BN71A2**	483
428	8.1	1.5	3.2	620	**S101_3.2 S1 M1SD4**	482	**S101_3.2 P71 BN71B4**	483
440	7.9	3.3	3.1	1160	**S201_3.1 S1 M1SD4**	484	**S201_3.1 P71 BN71B4**	485
460	7.5	1.6	6.1	610	**S101_6.1 S05 M05C2**	482	**S101_6.1 P71 BN71A2**	483
480	7.2	2.8	1.9	1130	**S201_1.9 S1 M1LA6**	484	**S201_1.9 P80 BN80A6**	485
483	7.2	2.9	5.8	1130	**S201_5.8 S05 M05C2**	484	**S201_5.8 P71 BN71A2**	485
485	7.1	1.7	1.9	590	**S101_1.9 S1 M1LA6**	482	**S101_1.9 P80 BN80A6**	483
548	6.3	1.6	2.5	580	**S101_2.5 S1 M1SD4**	482	**S101_2.5 P71 BN71B4**	483
594	5.8	1.7	4.7	570	**S101_4.7 S05 M05C2**	482	**S101_4.7 P71 BN71A2**	483
640	5.4	2.2	1.4	550	**S101_1.4 S1 M1LA6**	482	**S101_1.4 P80 BN80A6**	483
731	4.7	2.1	3.8	540	**S101_3.8 S05 M05C2**	482	**S101_3.8 P71 BN71A2**	483
731	4.7	2.1	1.9	540	**S101_1.9 S1 M1SD4**	482	**S101_1.9 P71 BN71B4**	483
878	3.9	2.5	3.2	520	**S101_3.2 S05 M05C2**	482	**S101_3.2 P71 BN71A2**	483
964	3.6	2.8	1.4	500	**S101_1.4 S1 M1SD4**	482	**S101_1.4 P71 BN71B4**	483
1124	3.1	2.6	2.5	480	**S101_2.5 S05 M05C2**	482	**S101_2.5 P71 BN71A2**	483
1499	2.3	3.5	1.9	440	**S101_1.9 S05 M05C2**	482	**S101_1.9 P71 BN71A2**	483
1977	1.8	4.6	1.4	410	**S101_1.4 S05 M05C2**	482	**S101_1.4 P71 BN71A2**	483

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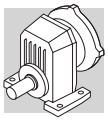
n_2 min^{-1}	M_2 Nm	S	i	R_{n2} N	IE1		IE1	
71	72.1	1.4	12.9	6290	**S501_12.9 S2 M2SA6**	490	**S501_12.9 P80 BN80B6**	491
86	59.7	1.0	10.7	3800	**S401_10.7 S2 M2SA6**	488	**S401_10.7 P80 BN80B6**	489
88	58.5	2.0	10.5	5910	**S501_10.5 S2 M2SA6**	490	**S501_10.5 P80 BN80B6**	491
105	49.1	2.5	8.8	5600	**S501_8.8 S2 M2SA6**	490	**S501_8.8 P80 BN80B6**	491
107	48.3	1.4	8.6	3800	**S401_8.6 S2 M2SA6**	488	**S401_8.6 P80 BN80B6**	489
107	48.1	2.1	12.9	5560	**S501_12.9 S1 M1LA4**	490	**S501_12.9 P80 BN80A4**	491
111	46.3	1.1	12.4	3800	**S401_12.4 S1 M1LA4**	488	**S401_12.4 P80 BN80A4**	489
124	41.4	3.4	7.4	5310	**S501_7.4 S2 M2SA6**	490	**S501_7.4 P80 BN80B6**	491
129	40.0	2.2	7.2	3780	**S401_7.2 S2 M2SA6**	488	**S401_7.2 P80 BN80B6**	489
129	39.8	1.3	10.7	3770	**S401_10.7 S1 M1LA4**	488	**S401_10.7 P80 BN80A4**	489
130	39.7	1.5	7.1	2150	**S301_7.1 S2 M2SA6**	486	**S301_7.1 P80 BN80B6**	487
132	39.0	2.8	10.5	5220	**S501_10.5 S1 M1LA4**	490	**S501_10.5 P80 BN80A4**	491
152	33.9	3.1	6.1	3600	**S401_6.1 S2 M2SA6**	488	**S401_6.1 P80 BN80B6**	489
155	33.2	0.9	8.9	2060	**S301_8.9 S1 M1LA4**	486	**S301_8.9 P80 BN80A4**	487



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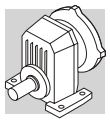
n_2 min-1	M_2 Nm	S	i	R_{n2} N	IE1		IE1	
157	32.7	1.8	5.8	2050	**S301_5.8 S2 M2SA6**	486	**S301_5.8 P80 BN80B6**	487
157	32.7	3.4	8.8	4940	**S501_8.8 S1 M1LA4**	490	**S501_8.8 P80 BN80A4**	491
158	32.6	0.9	5.8	1420	**S201_5.8 S2 M2SA6**	484	**S201_5.8 P80 BN80B6**	485
160	32.2	1.9	8.6	3540	**S401_8.6 S1 M1LA4**	488	**S401_8.6 P80 BN80A4**	489
186	27.6	2.1	4.9	1960	**S301_4.9 S2 M2SA6**	486	**S301_4.9 P80 BN80B6**	487
191	26.9	1.0	7.2	1370	**S201_7.2 S1 M1LA4**	484	**S201_7.2 P80 BN80A4**	485
193	26.7	1.1	4.8	1370	**S201_4.8 S2 M2SA6**	484	**S201_4.8 P80 BN80B6**	485
193	26.7	3.0	7.2	3350	**S401_7.2 S1 M1LA4**	488	**S401_7.2 P80 BN80A4**	489
195	26.4	1.9	7.1	1940	**S301_7.1 S1 M1LA4**	486	**S301_7.1 P80 BN80A4**	487
214	24.0	1.0	13.1	1900			**S301_13.1 P71 BN71B2**	487
218	23.6	3.4	12.9	4460	**S501_12.9 S1 M1SD2**	490	**S501_12.9 P71 BN71B2**	491
227	22.7	1.8	12.4	3190	**S401_12.4 S1 M1SD2**	488	**S401_12.4 P71 BN71B2**	489
233	22.1	2.6	3.9	1850	**S301_3.9 S2 M2SA6**	486	**S301_3.9 P80 BN80B6**	487
234	22.0	1.4	3.9	1300	**S201_3.9 S2 M2SA6**	484	**S201_3.9 P80 BN80B6**	485
236	21.8	2.3	5.8	1840	**S301_5.8 S1 M1LA4**	486	**S301_5.8 P80 BN80A4**	487
237	21.7	1.2	5.8	1310	**S201_5.8 S1 M1LA4**	484	**S201_5.8 P80 BN80A4**	485
263	19.5	2.0	10.7	3040	**S401_10.7 S1 M1SD2**	488	**S401_10.7 P71 BN71B2**	489
273	18.9	1.3	10.3	1780	**S301_10.3 S1 M1SD2**	486	**S301_10.3 P71 BN71B2**	487
280	18.4	2.7	4.9	1760	**S301_4.9 S1 M1LA4**	486	**S301_4.9 P80 BN80A4**	487
289	17.8	1.5	4.8	1250	**S201_4.8 S1 M1LA4**	484	**S201_4.8 P80 BN80A4**	485
296	17.4	1.7	3.1	1230	**S201_3.1 S2 M2SA6**	484	**S201_3.1 P80 BN80B6**	485
300	17.1	3.4	3.1	1720	**S301_3.1 S2 M2SA6**	486	**S301_3.1 P80 BN80B6**	487
316	16.3	1.5	8.9	1700	**S301_8.9 S1 M1SD2**	486	**S301_8.9 P71 BN71B2**	487
325	15.8	3.0	8.6	2850	**S401_8.6 S1 M1SD2**	488	**S401_8.6 P71 BN71B2**	489
350	14.7	3.4	3.9	1650	**S301_3.9 S1 M1LA4**	486	**S301_3.9 P80 BN80A4**	487
351	14.7	1.8	3.9	1190	**S201_3.9 S1 M1LA4**	484	**S201_3.9 P80 BN80A4**	485
377	13.6	2.2	2.4	1160	**S201_2.4 S2 M2SA6**	484	**S201_2.4 P80 BN80B6**	485
389	13.2	1.6	7.2	1160	**S201_7.2 S1 M1SD2**	484	**S201_7.2 P71 BN71B2**	485
396	13.0	3.1	7.1	1600	**S301_7.1 S1 M1SD2**	486	**S301_7.1 P71 BN71B2**	487
407	12.6	0.9	6.9	570	**S101_6.9 S1 M1SD2**	482	**S101_6.9 P71 BN71B2**	483
431	11.9	1.0	3.2	560	**S101_3.2 S1 M1LA4**	482	**S101_3.2 P80 BN80A4**	483
444	11.6	2.2	3.1	1120	**S201_3.1 S1 M1LA4**	484	**S201_3.1 P80 BN80A4**	485
460	11.2	1.1	6.1	570	**S101_6.1 S1 M1SD2**	482	**S101_6.1 P71 BN71B2**	483
483	10.7	2.0	5.8	1100	**S201_5.8 S1 M1SD2**	484	**S201_5.8 P71 BN71B2**	485
486	10.6	1.9	1.9	1080	**S201_1.9 S2 M2SA6**	484	**S201_1.9 P80 BN80B6**	485
491	10.5	1.1	1.9	540	**S101_1.9 S2 M2SA6**	482	**S101_1.9 P80 BN80B6**	483
504	10.2	3.4	1.8	1470	**S301_1.8 S2 M2SA6**	486	**S301_1.8 P80 BN80B6**	487
552	9.3	1.1	2.5	540	**S101_2.5 S1 M1LA4**	482	**S101_2.5 P80 BN80A4**	483
566	9.1	2.9	2.4	1050	**S201_2.4 S1 M1LA4**	484	**S201_2.4 P80 BN80A4**	485
589	8.7	2.4	4.8	1040	**S201_4.8 S1 M1SD2**	484	**S201_4.8 P71 BN71B2**	485
594	8.7	1.2	4.7	540	**S101_4.7 S1 M1SD2**	482	**S101_4.7 P71 BN71B2**	483
647	8.0	1.5	1.4	510	**S101_1.4 S2 M2SA6**	482	**S101_1.4 P80 BN80B6**	483
661	7.8	2.6	1.4	990	**S201_1.4 S2 M2SA6**	484	**S201_1.4 P80 BN80B6**	485
714	7.2	2.9	3.9	980	**S201_3.9 S1 M1SD2**	484	**S201_3.9 P71 BN71B2**	485
728	7.1	2.4	1.9	970	**S201_1.9 S1 M1LA4**	484	**S201_1.9 P80 BN80A4**	485
731	7.0	1.4	3.8	510	**S101_3.8 S1 M1SD2**	482	**S101_3.8 P71 BN71B2**	483
736	7.0	1.4	1.9	500	**S101_1.9 S1 M1LA4**	482	**S101_1.9 P80 BN80A4**	483
878	5.9	1.7	3.2	490	**S101_3.2 S1 M1SD2**	482	**S101_3.2 P71 BN71B2**	483
971	5.3	1.9	1.4	470	**S101_1.4 S1 M1LA4**	482	**S101_1.4 P80 BN80A4**	483
992	5.2	3.3	1.4	890			**S201_1.4 P80 BN80A4**	485
1124	4.6	1.7	2.5	460	**S101_2.5 S1 M1SD2**	482	**S101_2.5 P71 BN71B2**	483
1499	3.4	2.3	1.9	430	**S101_1.9 S1 M1SD2**	482	**S101_1.9 P71 BN71B2**	483
1977	2.6	3.1	1.4	390	**S101_1.4 S1 M1SD2**	482	**S101_1.4 P71 BN71B2**	483



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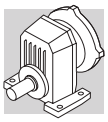
n_2 min-1	M_2 Nm	S	i	R_{n2} N	IE2	IE3		IE2	IE3	
73	96	1.0	12.9	6170	**S501_12.9 S3 ME3SA6**		490	**S501_12.9 P90 BE90S6**		491
90	78	1.5	10.5	5810	**S501_10.5 S3 ME3SA6**		490	**S501_10.5 P90 BE90S6**		491
107	65	1.9	8.8	5520	**S501_8.8 S3 ME3SA6**		490	**S501_8.8 P90 BE90S6**		491
111	63	1.6	12.9	5460	**S501_12.9 S2 ME2SB4**	**S501_12.9 S2 MX2SB4**	490	**S501_12.9 P80 BE80B4**	**S501_12.9 P80 BX80B4**	491
127	55	2.5	7.4	5240	**S501_7.4 S3 ME3SA6**		490	**S501_7.4 P90 BE90S6**		491
131	53	1.7	7.2	3700	**S401_7.2 S3 ME3SA6**		488	**S401_7.2 P90 BE90S6**		489
134	52	1.0	10.7	3670	**S401_10.7 S2 ME2SB4**	**S401_10.7 S2 MX2SB4**	488	**S401_10.7 P80 BE80B4**	**S401_10.7 P80 BX80B4**	489
137	51	2.1	10.5	5130	**S501_10.5 S2 ME2SB4**	**S501_10.5 S2 MX2SB4**	490	**S501_10.5 P80 BE80B4**	**S501_10.5 P80 BX80B4**	491
155	45	2.3	6.1	3530	**S401_6.1 S3 ME3SA6**		488	**S401_6.1 P90 BE90S6**		489
161	44	1.3	5.8	1960	**S301_5.8 S3 ME3SA6**		486	**S301_5.8 P90 BE90S6**		487
163	43	2.6	8.8	4870	**S501_8.8 S2 ME2SB4**	**S501_8.8 S2 MX2SB4**	490	**S501_8.8 P80 BE80B4**	**S501_8.8 P80 BX80B4**	491
166	42	1.4	8.6	3460	**S401_8.6 S2 ME2SB4**	**S401_8.6 S2 MX2SB4**	488	**S401_8.6 P80 BE80B4**	**S401_8.6 P80 BX80B4**	489
191	37	1.6	4.9	1880	**S301_4.9 S3 ME3SA6**		486	**S301_4.9 P90 BE90S6**		487
194	36	2.9	4.8	3300	**S401_4.8 S3 ME3SA6**		488	**S401_4.8 P90 BE90S6**		489
200	35	2.3	7.2	3280	**S401_7.2 S2 ME2SB4**	**S401_7.2 S2 MX2SB4**	488	**S401_7.2 P80 BE80B4**	**S401_7.2 P80 BX80B4**	489
202	35	1.4	7.1	1860	**S301_7.1 S2 ME2SB4**	**S301_7.1 S2 MX2SB4**	486	**S301_7.1 P80 BE80B4**	**S301_7.1 P80 BX80B4**	487
221	32	2.5	12.9	4420	**S501_12.9 S2 ME2SA2**		490	**S501_12.9 P80 BE80A2**		491
230	31	1.3	12.4	3150	**S401_12.4 S2 ME2SA2**		488	**S401_12.4 P80 BE80A2**		489
236	30	3.0	6.1	3120	**S401_6.1 S2 ME2SB4**	**S401_6.1 S2 MX2SB4**	488	**S401_6.1 P80 BE80B4**	**S401_6.1 P80 BX80B4**	489
238	29	2.0	3.9	1780	**S301_3.9 S3 ME3SA6**		486	**S301_3.9 P90 BE90S6**		487
245	29	1.7	5.8	1780	**S301_5.8 S2 ME2SB4**	**S301_5.8 S2 MX2SB4**	486	**S301_5.8 P80 BE80B4**	**S301_5.8 P80 BX80B4**	487
246	29	0.9	5.8	1160	**S201_5.8 S2 ME2SB4**	**S201_5.8 S2 MX2SB4**	484	**S201_5.8 P80 BE80B4**	**S201_5.8 P80 BX80B4**	485
267	26	1.5	10.7	3000	**S401_10.7 S2 ME2SA2**		488	**S401_10.7 P80 BE80A2**		489
273	26	3.3	10.5	4140	**S501_10.5 S2 ME2SA2**		490	**S501_10.5 P80 BE80A2**		491
277	25	0.9	10.3	1730	**S301_10.3 S2 ME2SA2**		486	**S301_10.3 P80 BE80A2**		487
290	24	2.1	4.9	1700	**S301_4.9 S2 ME2SB4**	**S301_4.9 S2 MX2SB4**	486	**S301_4.9 P80 BE80B4**	**S301_4.9 P80 BX80B4**	487
300	23	1.1	4.8	1180	**S201_4.8 S2 ME2SB4**	**S201_4.8 S2 MX2SB4**	484	**S201_4.8 P80 BE80B4**	**S201_4.8 P80 BX80B4**	485
302	23	1.3	3.1	1160	**S201_3.1 S3 ME3SA6**		484	**S201_3.1 P90 BE90S6**		485
307	23	2.5	3.1	1670	**S301_3.1 S3 ME3SA6**		486	**S301_3.1 P90 BE90S6**		487
321	22	1.1	8.9	1660	**S301_8.9 S2 ME2SA2**		486	**S301_8.9 P80 BE80A2**		487
330	21	2.3	8.6	2820	**S401_8.6 S2 ME2SA2**		488	**S401_8.6 P80 BE80A2**		489
363	19.3	2.6	3.9	1600	**S301_3.9 S2 ME2SB4**	**S301_3.9 S2 MX2SB4**	486	**S301_3.9 P80 BE80B4**	**S301_3.9 P80 BX80B4**	487
364	19.3	1.3	3.9	1130	**S201_3.9 S2 ME2SB4**	**S201_3.9 S2 MX2SB4**	484	**S201_3.9 P80 BE80B4**	**S201_3.9 P80 BX80B4**	485
386	18.2	1.6	2.4	1110	**S201_2.4 S3 ME3SA6**		484	**S201_2.4 P90 BE90S6**		485
388	18.1	3.2	2.4	1560	**S301_2.4 S3 ME3SA6**		486	**S301_2.4 P90 BE90S6**		487
395	17.8	1.2	7.2	1120	**S201_7.2 S2 ME2SA2**		484	**S201_7.2 P80 BE80A2**		485
402	17.5	2.3	7.1	1560	**S301_7.1 S2 ME2SA2**		486	**S301_7.1 P80 BE80A2**		487
460	15.2	1.7	3.1	1070	**S201_3.1 S2 ME2SB4**	**S201_3.1 S2 MX2SB4**	484	**S201_3.1 P80 BE80B4**	**S201_3.1 P80 BX80B4**	485
467	15.0	3.3	3.1	1490	**S301_3.1 S2 ME2SB4**	**S301_3.1 S2 MX2SB4**	486	**S301_3.1 P80 BE80B4**	**S301_3.1 P80 BX80B4**	487
488	14.4	2.8	5.8	1480	**S301_5.8 S2 ME2SA2**		486	**S301_5.8 P80 BE80A2**		487
490	14.3	1.5	5.8	1060	**S201_5.8 S2 ME2SA2**		484	**S201_5.8 P80 BE80A2**		485
496	14.1	1.4	1.9	1040	**S201_1.9 S3 ME3SA6**		484	**S201_1.9 P90 BE90S6**		485
515	13.6	2.6	1.8	1440	**S301_1.8 S3 ME3SA6**		486	**S301_1.8 P90 BE90S6**		487
578	12.1	3.3	4.9	1410	**S301_4.9 S2 ME2SA2**		486	**S301_4.9 P80 BE80A2**		487
587	11.9	2.2	2.4	1010	**S201_2.4 S2 ME2SB4**	**S201_2.4 S2 MX2SB4**	484	**S201_2.4 P80 BE80B4**	**S201_2.4 P80 BX80B4**	485
591	11.9	4.2	2.4	1380	**S301_2.4 S2 ME2SB4**	**S301_2.4 S2 MX2SB4**	486	**S301_2.4 P80 BE80B4**	**S301_2.4 P80 BX80B4**	487
598	11.7	1.8	4.8	1010	**S201_4.8 S2 ME2SA2**		484	**S201_4.8 P80 BE80A2**		485
661	10.6	1.1	1.4	460	**S101_1.4 S3 ME3SA6**		482	**S101_1.4 P90 BE90S6**		483
668	10.5	3.3	1.4	1330	**S301_1.4 S3 ME3SA6**		486	**S301_1.4 P90 BE90S6**		487
676	10.4	1.9	1.4	960	**S201_1.4 S3 ME3SA6**		484	**S201_1.4 P90 BE90S6**		485
725	9.7	2.2	3.9	960	**S201_3.9 S2 ME2SA2**		484	**S201_3.9 P80 BE80A2**		485
741	9.5	1.1	3.8	480	**S101_3.8 S2 ME2SA2**		482	**S101_3.8 P80 BE80A2**		483
755	9.3	1.8	1.9	940	**S201_1.9 S2 ME2SB4**	**S201_1.9 S2 MX2SB4**	484	**S201_1.9 P80 BE80B4**	**S201_1.9 P80 BX80B4**	485
763	9.2	1.1	1.9	460	**S101_1.9 S2 ME2SB4**	**S101_1.9 S2 MX2SB4**	482	**S101_1.9 P80 BE80B4**	**S101_1.9 P80 BX80B4**	483
783	8.9	3.4	1.8	1280	**S301_1.8 S2 ME2SB4**	**S301_1.8 S2 MX2SB4**	486	**S301_1.8 P80 BE80B4**	**S301_1.8 P80 BX80B4**	487
891	7.9	1.3	3.2	460	**S101_3.2 S2 ME2SA2**		482	**S101_3.2 P80 BE80A2**		483
916	7.7	2.7	3.1	900	**S201_3.1 S2 ME2SA2**		484	**S201_3.1 P80 BE80A2**		485

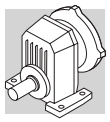


0.75 kW

n_2 min-1	M_2 Nm	S	i	R_{n2} N	IE2	IE3		IE2	IE3	
1006	7.0	1.4	1.4	440	**S101_1.4 S2 ME2SB4**	**S101_1.4 S2 MX2SB4**	482	**S101_1.4 P80 BE80B4**	**S101_1.4 P80 BX80B4**	483
1028	6.8	2.5	1.4	860	**S201_1.4 S2 ME2SB4**	**S201_1.4 S2 MX2SB4**	484	**S201_1.4 P80 BE80B4**	**S201_1.4 P80 BX80B4**	485
1140	6.2	1.3	2.5	440	**S101_2.5 S2 ME2SA2**		482	**S101_2.5 P80 BE80A2**		483
1169	6.0	3.5	2.4	840	**S201_2.4 S2 ME2SA2**		484	**S201_2.4 P80 BE80A2**		485
1504	4.7	2.8	1.9	780	**S201_1.9 S2 ME2SA2**		484	**S201_1.9 P80 BE80A2**		485
1520	4.6	1.7	1.9	410	**S101_1.9 S2 ME2SA2**		482	**S101_1.9 P80 BE80A2**		483
2006	3.5	2.3	1.4	380	**S101_1.4 S2 ME2SA2**		482	**S101_1.4 P80 BE80A2**		483

1.1 kW

n_2 min-1	M_2 Nm	S	i	R_{n2} N	IE2	IE3		IE2	IE3	
90	114	1.0	10.5	5650	**S501_10.5 S3 ME3LA6**		490	**S501_10.5 P100 BE100M6**		491
108	96	1.3	8.8	5380	**S501_8.8 S3 ME3LA6**		490	**S501_8.8 P100 BE100M6**		491
111	93	1.1	12.9	5320	**S501_12.9 S3 ME3SA4**	**S501_12.9 S3 MX3SA4**	490	**S501_12.9 P90 BE90S4**	**S501_12.9 P90 BX90S4**	491
128	81	1.7	7.4	5120	**S501_7.4 S3 ME3LA6**		490	**S501_7.4 P100 BE100M6**		491
132	78	1.2	7.2	3550	**S401_7.2 S3 ME3LA6**		488	**S401_7.2 P100 BE100M6**		489
137	76	1.5	10.5	5020	**S501_10.5 S3 ME3SA4**	**S501_10.5 S3 MX3SA4**	490	**S501_10.5 P90 BE90S4**	**S501_10.5 P90 BX90S4**	491
156	66	1.6	6.1	3400	**S401_6.1 S3 ME3LA6**		488	**S401_6.1 P100 BE100M6**		489
156	66	2.3	6.1	4840	**S501_6.1 S3 ME3LA6**		490	**S501_6.1 P100 BE100M6**		491
163	64	1.7	8.8	4770	**S501_8.8 S3 ME3SA4**	**S501_8.8 S3 MX3SA4**	490	**S501_8.8 P90 BE90S4**	**S501_8.8 P90 BX90S4**	491
166	63	1.0	8.6	3350	**S401_8.6 S3 ME3SA4**	**S401_8.6 S3 MX3SA4**	488	**S401_8.6 P90 BE90S4**	**S401_8.6 P90 BX90S4**	489
192	54	1.1	4.9	1740	**S301_4.9 S3 ME3LA6**		486	**S301_4.9 P100 BE100M6**		487
193	54	2.4	7.4	4530	**S501_7.4 S3 ME3SA4**	**S501_7.4 S3 MX3SA4**	490	**S501_7.4 P90 BE90S4**	**S501_7.4 P90 BX90S4**	491
196	53	2.0	4.8	3200	**S401_4.8 S3 ME3LA6**		488	**S401_4.8 P100 BE100M6**		489
200	52	1.5	7.2	3180	**S401_7.2 S3 ME3SA4**	**S401_7.2 S3 MX3SA4**	488	**S401_7.2 P90 BE90S4**	**S401_7.2 P90 BX90S4**	489
202	51	1.0	7.1	1730	**S301_7.1 S3 ME3SA4**	**S301_7.1 S3 MX3SA4**	486	**S301_7.1 P90 BE90S4**	**S301_7.1 P90 BX90S4**	487
220	47	1.7	12.9	4350	**S501_12.9 S2 ME2SB2**		490	**S501_12.9 P80 BE80B2**		491
236	44	2.0	6.1	3040	**S401_6.1 S3 ME3SA4**	**S401_6.1 S3 MX3SA4**	488	**S401_6.1 P90 BE90S4**	**S401_6.1 P90 BX90S4**	489
236	44	3.0	6.1	4270	**S501_6.1 S3 ME3SA4**	**S501_6.1 S3 MX3SA4**	490	**S501_6.1 P90 BE90S4**	**S501_6.1 P90 BX90S4**	491
240	43	1.3	3.9	1670	**S301_3.9 S3 ME3LA6**		486	**S301_3.9 P100 BE100M6**		487
245	42	1.2	5.8	1670	**S301_5.8 S3 ME3SA4**	**S301_5.8 S3 MX3SA4**	486	**S301_5.8 P90 BE90S4**	**S301_5.8 P90 BX90S4**	487
248	42	2.5	3.8	2990	**S401_3.8 S3 ME3LA6**		488	**S401_3.8 P100 BE100M6**		489
265	39	1.0	10.7	2930	**S401_10.7 S2 ME2SB2**		488	**S401_10.7 P80 BE80B2**		489
271	38	2.2	10.5	4090	**S501_10.5 S2 ME2SB2**		490	**S501_10.5 P80 BE80B2**		491
290	36	1.4	4.9	1610	**S301_4.9 S3 ME3SA4**	**S301_4.9 S3 MX3SA4**	486	**S301_4.9 P90 BE90S4**	**S301_4.9 P90 BX90S4**	487
296	35	2.6	4.8	2850	**S401_4.8 S3 ME3SA4**	**S401_4.8 S3 MX3SA4**	488	**S401_4.8 P90 BE90S4**	**S401_4.8 P90 BX90S4**	489
309	33	1.7	3.1	1580	**S301_3.1 S3 ME3LA6**		486	**S301_3.1 P100 BE100M6**		487
310	33	3.2	3.1	2810	**S401_3.1 S3 ME3LA6**		488	**S401_3.1 P100 BE100M6**		489
323	32	2.7	8.8	3870	**S501_8.8 S2 ME2SB2**		490	**S501_8.8 P80 BE80B2**		491
328	31	1.5	8.6	2760	**S401_8.6 S2 ME2SB2**		488	**S401_8.6 P80 BE80B2**		489
363	29	1.7	3.9	1530	**S301_3.9 S3 ME3SA4**	**S301_3.9 S3 MX3SA4**	486	**S301_3.9 P90 BE90S4**	**S301_3.9 P90 BX90S4**	487
364	29	0.9	3.9	950	**S201_3.9 S3 ME3SA4**	**S201_3.9 S3 MX3SA4**	484	**S201_3.9 P90 BE90S4**	**S201_3.9 P90 BX90S4**	485
375	28	3.3	3.8	2650	**S401_3.8 S3 ME3SA4**	**S401_3.8 S3 MX3SA4**	488	**S401_3.8 P90 BE90S4**	**S401_3.8 P90 BX90S4**	489
390	26	2.2	2.4	1490	**S301_2.4 S3 ME3LA6**		486	**S301_2.4 P100 BE100M6**		487
396	26	2.4	7.2	2610	**S401_7.2 S2 ME2SB2**		488	**S401_7.2 P80 BE80B2**		489
399	26	1.6	7.1	1500	**S301_7.1 S2 ME2SB2**		486	**S301_7.1 P80 BE80B2**		487
460	23	1.2	3.1	990	**S201_3.1 S3 ME3SA4**	**S201_3.1 S3 MX3SA4**	484	**S201_3.1 P90 BE90S4**	**S201_3.1 P90 BX90S4**	485
467	22	2.3	3.1	1430	**S301_3.1 S3 ME3SA4**	**S301_3.1 S3 MX3SA4**	486	**S301_3.1 P90 BE90S4**	**S301_3.1 P90 BX90S4**	487
484	21	1.9	5.8	1420	**S301_5.8 S2 ME2SB2**		486	**S301_5.8 P80 BE80B2**		487
499	21	1.0	1.9	960	**S201_1.9 S3 ME3LA6**		484	**S201_1.9 P100 BE100M6**		485
510	20	3.5	1.9	2420	**S401_1.9 S3 ME3LA6**		488	**S401_1.9 P100 BE100M6**		489
518	19.9	1.8	1.8	1380	**S301_1.8 S3 ME3LA6**		486	**S301_1.8 P100 BE100M6**		487
574	17.9	2.2	4.9	1360	**S301_4.9 S2 ME2SB2**		486	**S301_4.9 P80 BE80B2**		487
587	17.7	1.5	2.4	940	**S201_2.4 S3 ME3SA4**	**S201_2.4 S3 MX3SA4**	484	**S201_2.4 P90 BE90S4**	**S201_2.4 P90 BX90S4**	485

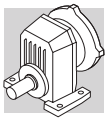


1.1 kW

n_2 min-1	M_2 Nm	S	i	R_{n2} N	IE2	IE3		IE2	IE3	
591	17.6	2.8	2.4	1340	**S301_2.4 S3 ME3SA4**	**S301_2.4 S3 MX3SA4**	486	**S301_2.4 P90 BE90S4**	**S301_2.4 P90 BX90S4**	487
593	17.3	1.2	4.8	950	**S201_4.8 S2 ME2SB2**		484	**S201_4.8 P80 BE80B2**		485
671	15.3	2.3	1.4	1290	**S301_1.4 S3 ME3LA6**		486	**S301_1.4 P100 BE100M6**		487
679	15.2	1.3	1.4	900	**S201_1.4 S3 ME3LA6**		484	**S201_1.4 P100 BE100M6**		485
717	14.3	2.8	3.9	1280	**S301_3.9 S2 ME2SB2**		486	**S301_3.9 P80 BE80B2**		487
719	14.3	1.5	3.9	910	**S201_3.9 S2 ME2SB2**		484	**S201_3.9 P80 BE80B2**		485
755	13.7	1.2	1.9	890	**S201_1.9 S3 ME3SA4**	**S201_1.9 S3 MX3SA4**	484	**S201_1.9 P90 BE90S4**	**S201_1.9 P90 BX90S4**	485
783	13.2	2.3	1.8	1240	**S301_1.8 S3 ME3SA4**	**S301_1.8 S3 MX3SA4**	486	**S301_1.8 P90 BE90S4**	**S301_1.8 P90 BX90S4**	487
910	11.3	1.9	3.1	860	**S201_3.1 S2 ME2SB2**		484	**S201_3.1 P80 BE80B2**		485
1006	10.3	1.0	1.4	390	**S101_1.4 S3 ME3SA4**	**S101_1.4 S3 MX3SA4**	482	**S101_1.4 P90 BE90S4**	**S101_1.4 P90 BX90S4**	483
1016	10.2	2.9	1.4	1150	**S301_1.4 S3 ME3SA4**	**S301_1.4 S3 MX3SA4**	486	**S301_1.4 P90 BE90S4**	**S301_1.4 P90 BX90S4**	487
1028	10.1	1.7	1.4	820	**S201_1.4 S3 ME3SA4**	**S201_1.4 S3 MX3SA4**	484	**S201_1.4 P90 BE90S4**	**S201_1.4 P90 BX90S4**	485
1161	8.9	2.4	2.4	810	**S201_2.4 S2 ME2SB2**		484	**S201_2.4 P80 BE80B2**		485
1494	6.9	1.9	1.9	750	**S201_1.9 S2 ME2SB2**		484	**S201_1.9 P80 BE80B2**		485
1509	6.8	1.2	1.9	380	**S101_1.9 S2 ME2SB2**		482	**S101_1.9 P80 BE80B2**		483
1991	5.2	1.5	1.4	350	**S101_1.4 S2 ME2SB2**		482	**S101_1.4 P80 BE80B2**		483
2034	5.1	2.6	1.4	690	**S201_1.4 S2 ME2SB2**		484	**S201_1.4 P80 BE80B2**		485

1.5 kW

n_2 min-1	M_2 Nm	S	i	R_{n2} N	IE2	IE3		IE2	IE3	
108	130	1.0	8.8	5190	**S501_8.8 S3 ME3LB6**		490	**S501_8.8 P100 BE100LA6**		491
128	110	1.3	7.4	4960	**S501_7.4 S3 ME3LB6**		490	**S501_7.4 P100 BE100LA6**		491
137	102	1.1	10.5	4880	**S501_10.5 S3 ME3SB4**	**S501_10.5 S3 MX3SB4**	490	**S501_10.5 P90 BE90LA4**	**S501_10.5 P90 BX90LA4**	491
156	90	1.7	6.1	4700	**S501_6.1 S3 ME3LB6**		490	**S501_6.1 P100 BE100LA6**		491
163	86	1.3	8.8	4660	**S501_8.8 S3 ME3SB4**	**S501_8.8 S3 MX3SB4**	490	**S501_8.8 P90 BE90LA4**	**S501_8.8 P90 BX90LA4**	491
193	73	1.8	7.4	4440	**S501_7.4 S3 ME3SB4**	**S501_7.4 S3 MX3SB4**	490	**S501_7.4 P90 BE90LA4**	**S501_7.4 P90 BX90LA4**	491
196	72	1.5	4.8	3070	**S401_4.8 S3 ME3LB6**		488	**S401_4.8 P100 BE100LA6**		489
199	71	2.5	4.8	4380	**S501_4.8 S3 ME3LB6**		490	**S501_4.8 P100 BE100LA6**		491
200	70	1.1	7.2	3070	**S401_7.2 S3 ME3SB4**	**S401_7.2 S3 MX3SB4**	488	**S401_7.2 P90 BE90LA4**	**S401_7.2 P90 BX90LA4**	489
222	63	1.3	12.9	4270	**S501_12.9 S3 ME3SA2**		490	**S501_12.9 P90 BE90SA2**		491
236	59	1.5	6.1	2940	**S401_6.1 S3 ME3SB4**	**S401_6.1 S3 MX3SB4**	488	**S401_6.1 P90 BE90LA4**	**S401_6.1 P90 BX90LA4**	489
236	59	2.2	6.1	4190	**S501_6.1 S3 ME3SB4**	**S501_6.1 S3 MX3SB4**	490	**S501_6.1 P90 BE90LA4**	**S501_6.1 P90 BX90LA4**	491
248	57	1.9	3.8	2880	**S401_3.8 S3 ME3LB6**		488	**S401_3.8 P100 BE100LA6**		489
273	51	1.7	10.5	4020	**S501_10.5 S3 ME3SA2**		490	**S501_10.5 P90 BE90SA2**		491
290	48	1.0	4.9	1500	**S301_4.9 S3 ME3SB4**	**S301_4.9 S3 MX3SB4**	486	**S301_4.9 P90 BE90LA4**	**S301_4.9 P90 BX90LA4**	487
296	47	1.9	4.8	2770	**S401_4.8 S3 ME3SB4**	**S401_4.8 S3 MX3SB4**	488	**S401_4.8 P90 BE90LA4**	**S401_4.8 P90 BX90LA4**	489
301	47	3.2	4.8	3890	**S501_4.8 S3 ME3SB4**	**S501_4.8 S3 MX3SB4**	490	**S501_4.8 P90 BE90LA4**	**S501_4.8 P90 BX90LA4**	491
309	45	1.3	3.1	1470	**S301_3.1 S3 ME3LB6**		486	**S301_3.1 P100 BE100LA6**		487
310	45	2.3	3.1	2720	**S401_3.1 S3 ME3LB6**		488	**S401_3.1 P100 BE100LA6**		489
326	43	2.0	8.8	3820	**S501_8.8 S3 ME3SA2**		490	**S501_8.8 P90 BE90SA2**		491
331	42	1.1	8.6	2700	**S401_8.6 S3 ME3SA2**		488	**S401_8.6 P90 BE90SA2**		489
363	39	1.3	3.9	1440	**S301_3.9 S3 ME3SB4**	**S301_3.9 S3 MX3SB4**	486	**S301_3.9 P90 BE90LA4**	**S301_3.9 P90 BX90LA4**	487
375	37	2.4	3.8	2590	**S401_3.8 S3 ME3SB4**	**S401_3.8 S3 MX3SB4**	488	**S401_3.8 P90 BE90LA4**	**S401_3.8 P90 BX90LA4**	489
386	36	2.7	7.4	3630	**S501_7.4 S3 ME3SA2**		490	**S501_7.4 P90 BE90SA2**		491
390	36	1.6	2.4	1400	**S301_2.4 S3 ME3LB6**		486	**S301_2.4 P100 BE100LA6**		487
395	36	3.0	2.4	2540	**S401_2.4 S3 ME3LB6**		488	**S401_2.4 P100 BE100LA6**		489
399	35	1.8	7.2	2560	**S401_7.2 S3 ME3SA2**		488	**S401_7.2 P90 BE90SA2**		489
403	35	1.1	7.1	1420	**S301_7.1 S3 ME3SA2**		486	**S301_7.1 P90 BE90SA2**		487
467	30	1.7	3.1	1360	**S301_3.1 S3 ME3SB4**	**S301_3.1 S3 MX3SB4**	486	**S301_3.1 P90 BE90LA4**	**S301_3.1 P90 BX90LA4**	487
468	30	3.0	3.1	2430	**S401_3.1 S3 ME3SB4**	**S401_3.1 S3 MX3SB4**	488	**S401_3.1 P90 BE90LA4**	**S401_3.1 P90 BX90LA4**	489
471	30	2.3	6.1	2440	**S401_6.1 S3 ME3SA2**		488	**S401_6.1 P90 BE90SA2**		489
488	29	1.4	5.8	1360	**S301_5.8 S3 ME3SA2**		486	**S301_5.8 P90 BE90SA2**		487

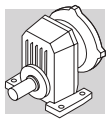


1.5 kW

n_2 min-1	M_2 Nm	S	i	R_{n2} N	IE2	IE3		IE2	IE3	
510	28	2.5	1.9	2350	**S401_1.9 S3 ME3LB6**		488	**S401_1.9 P100 BE100LA6**		489
518	27	1.3	1.8	1310	**S301_1.8 S3 ME3LB6**		486	**S301_1.8 P100 BE100LA6**		487
579	24	1.6	4.9	1310	**S301_4.9 S3 ME3SA2**		486	**S301_4.9 P90 BE90SA2**		487
587	24	1.1	2.4	870	**S201_2.4 S3 ME3SB4**	**S201_2.4 S3 MX3SB4**	484	**S201_2.4 P90 BE90LA4**	**S201_2.4 P90 BX90LA4**	485
591	24	2.1	2.4	1290	**S301_2.4 S3 ME3SB4**	**S301_2.4 S3 MX3SB4**	486	**S301_2.4 P90 BE90LA4**	**S301_2.4 P90 BX90LA4**	487
598	23	3.8	2.4	2200	**S401_2.4 S3 ME3SB4**	**S401_2.4 S3 MX3SB4**	488	**S401_2.4 P90 BE90LA4**	**S401_2.4 P90 BX90LA4**	489
671	21	1.7	1.4	1230	**S301_1.4 S3 ME3LB6**		486	**S301_1.4 P100 BE100LA6**		487
679	21	1.0	1.4	830	**S201_1.4 S3 ME3LB6**		484	**S201_1.4 P100 BE100LA6**		485
693	20	3.5	1.4	2150	**S401_1.4 S3 ME3LB6**		488	**S401_1.4 P100 BE100LA6**		489
724	19.4	2.1	3.9	1240	**S301_3.9 S3 ME3SA2**		486	**S301_3.9 P90 BE90SA2**		487
755	18.6	0.9	1.9	830	**S201_1.9 S3 ME3SB4**	**S201_1.9 S3 MX3SB4**	484	**S201_1.9 P90 BE90LA4**	**S201_1.9 P90 BX90LA4**	485
772	18.1	3.3	1.9	2090	**S401_1.9 S3 ME3SB4**	**S401_1.9 S3 MX3SB4**	488	**S401_1.9 P90 BE90LA4**	**S401_1.9 P90 BX90LA4**	489
783	17.9	1.7	1.8	1200	**S301_1.8 S3 ME3SB4**	**S301_1.8 S3 MX3SB4**	486	**S301_1.8 P90 BE90LA4**	**S301_1.8 P90 BX90LA4**	487
918	15.3	1.4	3.1	810	**S201_3.1 S3 ME3SA2**		484	**S201_3.1 P90 BE90SA2**		485
932	15.1	2.7	3.1	1160	**S301_3.1 S3 ME3SA2**		486	**S301_3.1 P90 BE90SA2**		487
1016	13.8	2.2	1.4	1110	**S301_1.4 S3 ME3SB4**	**S301_1.4 S3 MX3SB4**	486	**S301_1.4 P90 BE90LA4**	**S301_1.4 P90 BX90LA4**	487
1028	13.6	1.2	1.4	780	**S201_1.4 S3 ME3SB4**	**S201_1.4 S3 MX3SB4**	484	**S201_1.4 P90 BE90LA4**	**S201_1.4 P90 BX90LA4**	485
1171	12.0	1.8	2.4	770	**S201_2.4 S3 ME3SA2**		484	**S201_2.4 P90 BE90SA2**		485
1507	9.3	1.4	1.9	720	**S201_1.9 S3 ME3SA2**		484	**S201_1.9 P90 BE90SA2**		485
1563	9.0	2.7	1.8	1000	**S301_1.8 S3 ME3SA2**		486	**S301_1.8 P90 BE90SA2**		487
2009	7.0	1.1	1.4	320	**S101_1.4 S3 ME3SA2**		482	**S101_1.4 P90 BE90SA2**		483
2029	6.9	3.5	1.4	920	**S301_1.4 S3 ME3SA2**		486	**S301_1.4 P90 BE90SA2**		487
2052	6.8	1.9	1.4	670	**S201_1.4 S3 ME3SA2**		484	**S201_1.4 P90 BE90SA2**		485

2.2 kW

n_2 min-1	M_2 Nm	S	i	R_{n2} N	IE2	IE3		IE2	IE3	
158	131	1.1	6.1	4520	**S501_6.1 S4 ME4SA6**		490	**S501_6.1 P112 BE112M6**		491
193	107	1.2	7.4	4280	**S501_7.4 S3 ME3LA4**	**S501_7.4 S3 MX3LA4**	490	**S501_7.4 P100 BE100LA4**	**S501_7.4 P100 BX100LA4**	491
201	102	1.7	4.8	4230	**S501_4.8 S4 ME4SA6**		490	**S501_4.8 P112 BE112M6**		491
236	87	1.0	6.1	2790	**S401_6.1 S3 ME3LA4**	**S401_6.1 S3 MX3LA4**	488	**S401_6.1 P100 BE100LA4**	**S401_6.1 P100 BX100LA4**	489
236	87	1.5	6.1	4060	**S501_6.1 S3 ME3LA4**	**S501_6.1 S3 MX3LA4**	490	**S501_6.1 P100 BE100LA4**	**S501_6.1 P100 BX100LA4**	491
249	83	2.1	3.8	4000	**S501_3.8 S4 ME4SA6**		490	**S501_3.8 P112 BE112M6**		491
250	82	1.3	3.8	2730	**S401_3.8 S4 ME4SA6**		488	**S401_3.8 P112 BE112M6**		489
274	75	1.1	10.5	3910	**S501_10.5 S3 ME3LA2**		490	**S501_10.5 P90 BE90L2**		491
296	70	1.3	4.8	2640	**S401_4.8 S3 ME3LA4**	**S401_4.8 S3 MX3LA4**	488	**S401_4.8 P100 BE100LA4**	**S401_4.8 P100 BX100LA4**	489
301	68	2.2	4.8	3790	**S501_4.8 S3 ME3LA4**	**S501_4.8 S3 MX3LA4**	490	**S501_4.8 P100 BE100LA4**	**S501_4.8 P100 BX100LA4**	491
313	66	1.6	3.1	2590	**S401_3.1 S4 ME4SA6**		488	**S401_3.1 P112 BE112M6**		489
314	66	2.4	3.0	3750	**S501_3.0 S4 ME4SA6**		490	**S501_3.0 P112 BE112M6**		491
327	63	1.3	8.8	3730	**S501_8.8 S3 ME3LA2**		490	**S501_8.8 P90 BE90L2**		491
372	55	2.7	3.8	3570	**S501_3.8 S3 ME3LA4**	**S501_3.8 S3 MX3LA4**	490	**S501_3.8 P100 BE100LA4**	**S501_3.8 P100 BX100LA4**	491
375	55	1.6	3.8	2490	**S401_3.8 S3 ME3LA4**	**S401_3.8 S3 MX3LA4**	488	**S401_3.8 P100 BE100LA4**	**S401_3.8 P100 BX100LA4**	489
387	53	1.9	7.4	3540	**S501_7.4 S3 ME3LA2**		490	**S501_7.4 P90 BE90L2**		491
394	52	1.1	2.4	1260	**S301_2.4 S4 ME4SA6**		486	**S301_2.4 P112 BE112M6**		487
399	52	2.0	2.4	2450	**S401_2.4 S4 ME4SA6**		488	**S401_2.4 P112 BE112M6**		489
400	51	1.2	7.2	2460	**S401_7.2 S3 ME3LA2**		488	**S401_7.2 P90 BE90L2**		489
467	44	1.1	3.1	1240	**S301_3.1 S3 ME3LA4**	**S301_3.1 S3 MX3LA4**	486	**S301_3.1 P100 BE100LA4**	**S301_3.1 P100 BX100LA4**	487
468	44	2.0	3.1	2340	**S401_3.1 S3 ME3LA4**	**S401_3.1 S3 MX3LA4**	488	**S401_3.1 P100 BE100LA4**	**S401_3.1 P100 BX100LA4**	489
470	44	3.2	3.0	3340	**S501_3.0 S3 ME3LA4**	**S501_3.0 S3 MX3LA4**	490	**S501_3.0 P100 BE100LA4**	**S501_3.0 P100 BX100LA4**	491
472	44	1.6	6.1	2360	**S401_6.1 S3 ME3LA2**		488	**S401_6.1 P90 BE90L2**		489
473	44	2.3	6.1	3340	**S501_6.1 S3 ME3LA2**		490	**S501_6.1 P90 BE90L2**		491
490	42	1.0	5.8	1250	**S301_5.8 S3 ME3LA2**		486	**S301_5.8 P90 BE90L2**		487
516	40	1.8	1.9	2280	**S401_1.9 S4 ME4SA6**		488	**S401_1.9 P112 BE112M6**		489

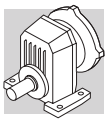


2.2 kW

n_2 min-1	M_2 Nm	S	i	R_{n2} N	IE2	IE3		IE2	IE3	
534	39	3.2	1.8	3210	**S501_1.8 S4 ME4SA6**		490	**S501_1.8 P112 BE112M6**		491
581	35	1.1	4.9	1220	**S301_4.9 S3 ME3LA2**		486	**S301_4.9 P90 BE90L2**		487
591	35	1.4	2.4	1190	**S301_2.4 S3 ME3LA4**	**S301_2.4 S3 MX3LA4**	486	**S301_2.4 P100 BE100LA4**	**S301_2.4 P100 BX100LA4**	487
593	35	2.0	4.8	2210	**S401_4.8 S3 ME3LA2**		488	**S401_4.8 P90 BE90L2**		489
598	34	2.6	2.4	2200	**S401_2.4 S3 ME3LA4**	**S401_2.4 S3 MX3LA4**	488	**S401_2.4 P100 BE100LA4**	**S401_2.4 P100 BX100LA4**	489
679	30	1.2	1.4	1140	**S301_1.4 S4 ME4SA6**		486	**S301_1.4 P112 BE112M6**		487
700	29	2.4	1.4	2090	**S401_1.4 S4 ME4SA6**		488	**S401_1.4 P112 BE112M6**		489
726	28	1.4	3.9	1160	**S301_3.9 S3 ME3LA2**		486	**S301_3.9 P90 BE90L2**		487
751	27	2.6	3.8	2070	**S401_3.8 S3 ME3LA2**		488	**S401_3.8 P90 BE90L2**		489
772	27	2.2	1.9	2040	**S401_1.9 S3 ME3LA4**	**S401_1.9 S3 MX3LA4**	488	**S401_1.9 P100 BE100LA4**	**S401_1.9 P100 BX100LA4**	489
783	26	1.1	1.8	1120	**S301_1.8 S3 ME3LA4**	**S301_1.8 S3 MX3LA4**	486	**S301_1.8 P100 BE100LA4**	**S301_1.8 P100 BX100LA4**	487
921	22	0.9	3.1	730	**S201_3.1 S3 ME3LA2**		484	**S201_3.1 P90 BE90L2**		485
936	22	1.8	3.1	1100	**S301_3.1 S3 ME3LA2**		486	**S301_3.1 P90 BE90L2**		487
1016	20	1.5	1.4	1050	**S301_1.4 S3 ME3LA4**	**S301_1.4 S3 MX3LA4**	486	**S301_1.4 P100 BE100LA4**	**S301_1.4 P100 BX100LA4**	487
1049	19.6	3.1	1.4	1860	**S401_1.4 S3 ME3LA4**	**S401_1.4 S3 MX3LA4**	488	**S401_1.4 P100 BE100LA4**	**S401_1.4 P100 BX100LA4**	489
1175	17.5	1.2	2.4	710	**S201_2.4 S3 ME3LA2**		484	**S201_2.4 P90 BE90L2**		485
1183	17.4	2.3	2.4	1030	**S301_2.4 S3 ME3LA2**		486	**S301_2.4 P90 BE90L2**		487
1512	13.6	1.0	1.9	670	**S201_1.9 S3 ME3LA2**		484	**S201_1.9 P90 BE90L2**		485
1569	13.1	1.8	1.8	960	**S301_1.8 S3 ME3LA2**		486	**S301_1.8 P90 BE90L2**		487
2036	10.1	2.4	1.4	890	**S301_1.4 S3 ME3LA2**		486	**S301_1.4 P90 BE90L2**		487
2059	10.0	1.3	1.4	630	**S201_1.4 S3 ME3LA2**		484	**S201_1.4 P90 BE90L2**		485

3 kW

n_2 min-1	M_2 Nm	S	i	R_{n2} N	IE2	IE3		IE2	IE3	
201	140	1.3	4.8	4040	**S501_4.8 S4 ME4SB6**		490	**S501_4.8 P132 BE132S6**		491
238	119	1.1	6.1	3910	**S501_6.1 S3 ME3LB4**	**S501_6.1 S3 MX3LB4**	490	**S501_6.1 P100 BE100LB4**	**S501_6.1 P100 BX100LB4**	491
249	113	1.5	3.8	3840	**S501_3.8 S4 ME4SB6**		490	**S501_3.8 P132 BE132S6**		491
298	95	1.0	4.8	2490	**S401_4.8 S3 ME3LB4**	**S401_4.8 S3 MX3LB4**	488	**S401_4.8 P100 BE100LB4**	**S401_4.8 P100 BX100LB4**	489
303	93	1.6	4.8	3670	**S501_4.8 S3 ME3LB4**	**S501_4.8 S3 MX3LB4**	490	**S501_4.8 P100 BE100LB4**	**S501_4.8 P100 BX100LB4**	491
313	90	1.2	3.1	2440	**S401_3.1 S4 ME4SB6**		488	**S401_3.1 P132 BE132S6**		489
314	89	1.8	3.0	3630	**S501_3.0 S4 ME4SB6**		490	**S501_3.0 P132 BE132S6**		491
328	85	1.0	8.8	3600	**S501_8.8 S3 ME3LB2**		490	**S501_8.8 P100 BE100L2**		491
375	75	2.0	3.8	3470	**S501_3.8 S3 ME3LB4**	**S501_3.8 S3 MX3LB4**	490	**S501_3.8 P100 BE100LB4**	**S501_3.8 P100 BX100LB4**	491
378	75	1.2	3.8	2370	**S401_3.8 S3 ME3LB4**	**S401_3.8 S3 MX3LB4**	488	**S401_3.8 P100 BE100LB4**	**S401_3.8 P100 BX100LB4**	489
389	72	1.4	7.4	3440	**S501_7.4 S3 ME3LB2**		490	**S501_7.4 P100 BE100L2**		491
397	71	2.1	2.4	3390	**S501_2.4 S4 ME4SB6**		490	**S501_2.4 P132 BE132S6**		491
399	70	1.5	2.4	2320	**S401_2.4 S4 ME4SB6**		488	**S401_2.4 P132 BE132S6**		489
472	60	1.5	3.1	2250	**S401_3.1 S3 ME3LB4**	**S401_3.1 S3 MX3LB4**	488	**S401_3.1 P100 BE100LB4**	**S401_3.1 P100 BX100LB4**	489
473	60	2.3	3.0	3260	**S501_3.0 S3 ME3LB4**	**S501_3.0 S3 MX3LB4**	490	**S501_3.0 P100 BE100LB4**	**S501_3.0 P100 BX100LB4**	491
516	54	1.3	1.9	2170	**S401_1.9 S4 ME4SB6**		488	**S401_1.9 P132 BE132S6**		489
534	53	2.4	1.8	3120	**S501_1.8 S4 ME4SB6**		490	**S501_1.8 P132 BE132S6**		491
595	47	1.1	2.4	1080	**S301_2.4 S3 ME3LB4**	**S301_2.4 S3 MX3LB4**	486	**S301_2.4 P100 BE100LB4**	**S301_2.4 P100 BX100LB4**	487
596	47	1.5	4.8	2130	**S401_4.8 S3 ME3LB2**		488	**S401_4.8 P100 BE100L2**		489
598	47	2.8	2.4	3040	**S501_2.4 S3 ME3LB4**	**S501_2.4 S3 MX3LB4**	490	**S501_2.4 P100 BE100LB4**	**S501_2.4 P100 BX100LB4**	491
602	47	1.9	2.4	2120	**S401_2.4 S3 ME3LB4**	**S401_2.4 S3 MX3LB4**	488	**S401_2.4 P100 BE100LB4**	**S401_2.4 P100 BX100LB4**	489
606	46	2.6	4.8	3030	**S501_4.8 S3 ME3LB2**		490	**S501_4.8 P100 BE100L2**		491
672	42	3.0	1.4	2920	**S501_1.4 S4 ME4SB6**		490	**S501_1.4 P132 BE132S6**		491
700	40	1.7	1.4	2010	**S401_1.4 S4 ME4SB6**		488	**S401_1.4 P132 BE132S6**		489
730	38	1.0	3.9	1070	**S301_3.9 S3 ME3LB2**		486	**S301_3.9 P100 BE100L2**		487
755	37	1.9	3.8	2000	**S401_3.8 S3 ME3LB2**		488	**S401_3.8 P100 BE100L2**		489
778	36	1.7	1.9	1970	**S401_1.9 S3 ME3LB4**	**S401_1.9 S3 MX3LB4**	488	**S401_1.9 P100 BE100LB4**	**S401_1.9 P100 BX100LB4**	489
789	36	0.8	1.8	900	**S301_1.8 S3 ME3LB4**	**S301_1.8 S3 MX3LB4**	486	**S301_1.8 P100 BE100LB4**	**S301_1.8 P100 BX100LB4**	487

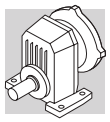


3 kW

n_2 min-1	M_2 Nm	S	i	R_{n2} N	IE2	IE3		IE2	IE3	
805	35	3.1	1.8	2780	**S501_1.8 S3 ME3LB4**	**S501_1.8 S3 MX3LB4**	490	**S501_1.8 P100 BE100LB4**	**S501_1.8 P100 BX100LB4**	491
940	30	1.3	3.1	1020	**S301_3.1 S3 ME3LB2**		486	**S301_3.1 P100 BE100L2**		487
943	30	2.4	3.1	1880	**S401_3.1 S3 ME3LB2**		488	**S401_3.1 P100 BE100L2**		489
1023	28	1.1	1.4	980	**S301_1.4 S3 ME3LB4**	**S301_1.4 S3 MX3LB4**	486	**S301_1.4 P100 BE100LB4**	**S301_1.4 P100 BX100LB4**	487
1056	27	2.2	1.4	1820	**S401_1.4 S3 ME3LB4**	**S401_1.4 S3 MX3LB4**	488	**S401_1.4 P100 BE100LB4**	**S401_1.4 P100 BX100LB4**	489
1190	24	1.7	2.4	980	**S301_2.4 S3 ME3LB2**		486	**S301_2.4 P100 BE100L2**		487
1204	23	3.0	2.4	1760	**S401_2.4 S3 ME3LB2**		488	**S401_2.4 P100 BE100L2**		489
1555	18.1	2.7	1.9	1630	**S401_1.9 S3 ME3LB2**		488	**S401_1.9 P100 BE100L2**		489
1577	17.8	1.3	1.8	910	**S301_1.8 S3 ME3LB2**		486	**S301_1.8 P100 BE100L2**		487
2046	13.7	1.7	1.4	850	**S301_1.4 S3 ME3LB2**		486	**S301_1.4 P100 BE100L2**		487
2070	13.6	1.0	1.4	580	**S201_1.4 S3 ME3LB2**		484	**S201_1.4 P100 BE100L2**		485

4 kW

n_2 min-1	M_2 Nm	S	i	R_{n2} N	IE2	IE3		IE2	IE3	
203	184	0.9	4.8	3810	**S501_4.8 S4 ME4LA6**		490	**S501_4.8 P132 BE132MA6**		491
251	149	1.2	3.8	3650	**S501_3.8 S4 ME4LA6**		490	**S501_3.8 P132 BE132MA6**		491
303	126	1.2	4.8	3530	**S501_4.8 S4 ME4SA4**	**S501_4.8 S4 MX4SA4**	490	**S501_4.8 P112 BE112M4**	**S501_4.8 P112 BX112M4**	491
317	118	1.4	3.0	3470	**S501_3.0 S4 ME4LA6**		490	**S501_3.0 P132 BE132MA6**		491
375	102	1.5	3.8	3360	**S501_3.8 S4 ME4SA4**	**S501_3.8 S4 MX4SA4**	490	**S501_3.8 P112 BE112M4**	**S501_3.8 P112 BX112M4**	491
392	96	1.0	7.4	3320	**S501_7.4 S4 ME4SA2**		490	**S501_7.4 P112 BE112M2**		491
401	93	1.6	2.4	3270	**S501_2.4 S4 ME4LA6**		490	**S501_2.4 P132 BE132MA6**		491
472	81	1.1	3.1	2130	**S401_3.1 S4 ME4SA4**	**S401_3.1 S4 MX4SA4**	488	**S401_3.1 P112 BE112M4**	**S401_3.1 P112 BX112M4**	489
473	81	1.7	3.0	3170	**S501_3.0 S4 ME4SA4**	**S501_3.0 S4 MX4SA4**	490	**S501_3.0 P112 BE112M4**	**S501_3.0 P112 BX112M4**	491
479	78	1.3	6.1	3160	**S501_6.1 S4 ME4SA2**		490	**S501_6.1 P112 BE112M2**		491
521	72	1.0	1.9	2050	**S401_1.9 S4 ME4LA6**		488	**S401_1.9 P132 BE132MA6**		489
540	69	1.8	1.8	3020	**S501_1.8 S4 ME4LA6**		490	**S501_1.8 P132 BE132MA6**		491
598	64	2.0	2.4	2970	**S501_2.4 S4 ME4SA4**	**S501_2.4 S4 MX4SA4**	490	**S501_2.4 P112 BE112M4**	**S501_2.4 P112 BX112M4**	491
602	63	1.4	2.4	2030	**S401_2.4 S4 ME4SA4**	**S401_2.4 S4 MX4SA4**	488	**S401_2.4 P112 BE112M4**	**S401_2.4 P112 BX112M4**	489
611	61	2.0	4.8	2960	**S501_4.8 S4 ME4SA2**		490	**S501_4.8 P112 BE112M2**		491
679	55	2.3	1.4	2830	**S501_1.4 S4 ME4LA6**		490	**S501_1.4 P132 BE132MA6**		491
708	53	1.3	1.4	1920	**S401_1.4 S4 ME4LA6**		488	**S401_1.4 P132 BE132MA6**		489
755	50	2.4	3.8	2790	**S501_3.8 S4 ME4SA2**		490	**S501_3.8 P112 BE112M2**		491
761	49	1.4	3.8	1930	**S401_3.8 S4 ME4SA2**		488	**S401_3.8 P112 BE112M2**		489
778	49	1.2	1.9	1900	**S401_1.9 S4 ME4SA4**	**S401_1.9 S4 MX4SA4**	488	**S401_1.9 P112 BE112M4**	**S401_1.9 P112 BX112M4**	489
805	47	2.3	1.8	2730	**S501_1.8 S4 ME4SA4**	**S501_1.8 S4 MX4SA4**	490	**S501_1.8 P112 BE112M4**	**S501_1.8 P112 BX112M4**	491
953	39	2.8	3.0	2610	**S501_3.0 S4 ME4SA2**		490	**S501_3.0 P112 BE112M2**		491
950	39	1.8	3.1	1820	**S401_3.1 S4 ME4SA2**		488	**S401_3.1 P112 BE112M2**		489
1013	38	2.9	1.4	2560	**S501_1.4 S4 ME4SA4**	**S501_1.4 S4 MX4SA4**	490	**S501_1.4 P112 BE112M4**	**S501_1.4 P112 BX112M4**	491
1056	36	1.7	1.4	1760	**S401_1.4 S4 ME4SA4**	**S401_1.4 S4 MX4SA4**	488	**S401_1.4 P112 BE112M4**	**S401_1.4 P112 BX112M4**	489
1198	31	1.3	2.4	910	**S301_2.4 S4 ME4SA2**		486	**S301_2.4 P112 BE112M2**		487
1213	31	2.3	2.4	1710	**S401_2.4 S4 ME4SA2**		488	**S401_2.4 P112 BE112M2**		489
1566	24	2.0	1.9	1590	**S401_1.9 S4 ME4SA2**		488	**S401_1.9 P112 BE112M2**		489
1588	24	1.0	1.8	860	**S301_1.8 S4 ME4SA2**		486	**S301_1.8 P112 BE112M2**		487
2061	18.2	1.3	1.4	810	**S301_1.4 S4 ME4SA2**		486	**S301_1.4 P112 BE112M2**		487
2127	17.6	2.7	1.4	1460	**S401_1.4 S4 ME4SA2**		488	**S401_1.4 P112 BE112M2**		489

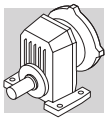


5.5 kW

n_2 min-1	M_2 Nm	S	i	R_{n2} N	IE2	IE3		IE2	IE3	
317	162	1.0	3.0	3260	**S501_3.0 S5 ME5SA6**		490	**S501_3.0 P160 BE160MA6**		491
380	136	1.1	3.8	3150	**S501_3.8 S4 ME4SB4**	**S501_3.8 S4 MX4SB4**	490	**S501_3.8 P132 BE132S4**	**S501_3.8 P132 BX132SB4**	491
401	128	1.2	2.4	3090	**S501_2.4 S5 ME5SA6**		490	**S501_2.4 P160 BE160MA6**		491
480	107	1.3	3.0	3000	**S501_3.0 S4 ME4SB4**	**S501_3.0 S4 MX4SB4**	490	**S501_3.0 P132 BE132S4**	**S501_3.0 P132 BX132SB4**	491
540	95	1.3	1.8	2880	**S501_1.8 S5 ME5SA6**		490	**S501_1.8 P160 BE160MA6**		491
606	85	1.5	2.4	2830	**S501_2.4 S4 ME4SB4**	**S501_2.4 S4 MX4SB4**	490	**S501_2.4 P132 BE132S4**	**S501_2.4 P132 BX132SB4**	491
611	84	1.1	2.4	1870	**S401_2.4 S4 ME4SB4**	**S401_2.4 S4 MX4SB4**	488	**S401_2.4 P132 BE132S4**	**S401_2.4 P132 BX132SB4**	489
616	84	1.4	4.8	2840	**S501_4.8 S4 ME4SB2**		490	**S501_4.8 P132 BE132SA2**		491
679	76	1.6	1.4	2720	**S501_1.4 S5 ME5SA6**		490	**S501_1.4 P160 BE160MA6**		491
708	73	1.0	1.4	1780				**S401_1.4 P160 BE160MA6**		489
761	68	1.8	3.8	2690	**S501_3.8 S4 ME4SB2**		490	**S501_3.8 P132 BE132SA2**		491
767	67	1.0	3.8	1810	**S401_3.8 S4 ME4SB2**		488	**S401_3.8 P132 BE132SA2**		489
788	65	0.9	1.9	1770	**S401_1.9 S4 ME4SB4**	**S401_1.9 S4 MX4SB4**	488	**S401_1.9 P132 BE132S4**	**S401_1.9 P132 BX132SB4**	489
817	63	1.7	1.8	2610	**S501_1.8 S4 ME4SB4**	**S501_1.8 S4 MX4SB4**	490	**S501_1.8 P132 BE132S4**	**S501_1.8 P132 BX132SB4**	491
958	54	1.3	3.1	1730	**S401_3.1 S4 ME4SB2**		488	**S401_3.1 P132 BE132SA2**		489
961	54	2.1	3.0	2530	**S501_3.0 S4 ME4SB2**		490	**S501_3.0 P132 BE132SA2**		491
1027	50	2.2	1.4	2450	**S501_1.4 S4 ME4SB4**	**S501_1.4 S4 MX4SB4**	490	**S501_1.4 P132 BE132S4**	**S501_1.4 P132 BX132SB4**	491
1071	48	1.2	1.4	1660	**S401_1.4 S4 ME4SB4**	**S401_1.4 S4 MX4SB4**	488	**S401_1.4 P132 BE132S4**	**S401_1.4 P132 BX132SB4**	489
1215	42	2.4	2.4	2370	**S501_2.4 S4 ME4SB2**		490	**S501_2.4 P132 BE132SA2**		491
1223	42	1.7	2.4	1640	**S401_2.4 S4 ME4SB2**		488	**S401_2.4 P132 BE132SA2**		489
1580	33	1.5	1.9	1530	**S401_1.9 S4 ME4SB2**		488	**S401_1.9 P132 BE132SA2**		489
1636	31	2.7	1.8	2170	**S501_1.8 S4 ME4SB2**		490	**S501_1.8 P132 BE132SA2**		491
2058	25	3.4	1.4	2030	**S501_1.4 S4 ME4SB2**		490	**S501_1.4 P132 BE132SA2**		491
2145	24	2.0	1.4	1410	**S401_1.4 S4 ME4SB2**		488	**S401_1.4 P132 BE132SA2**		489

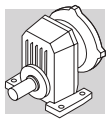
7.5 kW

n_2 min-1	M_2 Nm	S	i	R_{n2} N	IE2	IE3		IE2	IE3	
478	146	1.0	3.0	2810	**S501_3.0 S4 ME4LA4**	**S501_3.0 S4 MX4LA4**	490	**S501_3.0 P132 BE132MA4**	**S501_3.0 P132 BX132MA4**	491
540	130	1.0	1.8	2690	**S501_1.8 S5 ME5SB6**		490	**S501_1.8 P160 BE160MB6**		491
604	116	1.1	2.4	2670	**S501_2.4 S4 ME4LA4**	**S501_2.4 S4 MX4LA4**	490	**S501_2.4 P132 BE132MA4**	**S501_2.4 P132 BX132MA4**	491
679	103	1.2	1.4	2560	**S501_1.4 S5 ME5SB6**		490	**S501_1.4 P160 BE160MB6**		491
761	92	1.3	3.8	2570	**S501_3.8 S4 ME4LA2**		490	**S501_3.8 P132 BE132SB2**		491
814	86	1.3	1.8	2490	**S501_1.8 S4 ME4LA4**	**S501_1.8 S4 MX4LA4**	490	**S501_1.8 P132 BE132MA4**	**S501_1.8 P132 BX132MA4**	491
958	73	1.0	3.1	1610	**S401_3.1 S4 ME4LA2**		488	**S401_3.1 P132 BE132SB2**		489
961	73	1.5	3.0	2440	**S501_3.0 S4 ME4LA2**		490	**S501_3.0 P132 BE132SB2**		491
1024	68	1.6	1.4	2350	**S501_1.4 S4 ME4LA4**	**S501_1.4 S4 MX4LA4**	490	**S501_1.4 P132 BE132MA4**	**S501_1.4 P132 BX132MA4**	491
1067	65	0.9	1.4	1540	**S401_1.4 S4 ME4LA4**	**S401_1.4 S4 MX4LA4**	488	**S401_1.4 P132 BE132MA4**	**S401_1.4 P132 BX132MA4**	489
1215	58	1.7	2.4	2290	**S501_2.4 S4 ME4LA2**		490	**S501_2.4 P132 BE132SB2**		491
1223	57	1.2	2.4	1540	**S401_2.4 S4 ME4LA2**		488	**S401_2.4 P132 BE132SB2**		489
1580	44	1.1	1.9	1450	**S401_1.9 S4 ME4LA2**		488	**S401_1.9 P132 BE132SB2**		489
1636	43	2.0	1.8	2110	**S501_1.8 S4 ME4LA2**		490	**S501_1.8 P132 BE132SB2**		491
2058	34	2.5	1.4	1980	**S501_1.4 S4 ME4LA2**		490	**S501_1.4 P132 BE132SB2**		491
2145	33	1.5	1.4	1350	**S401_1.4 S4 ME4LA2**		488	**S401_1.4 P132 BE132SB2**		489



9.2 kW

n_2 min-1	M_2 Nm	S	i	R_{n2} N	IE2	IE3		IE2	IE3	
602	144	0.9	2.4	2530	**S501_2.4 S4 ME4LB4**	**S501_2.4 S5 MX5SA4**	490	**S501_2.4 P132 BE132MB4**	**S501_2.4 P160 BX160MA4**	491
760	113	1.1	3.8	2470	**S501_3.8 S4 ME4LB2**		490	**S501_3.8 P132 BE132MB2**		491
811	107	1.0	1.8	2390	**S501_1.8 S4 ME4LB4**	**S501_1.8 S5 MX5SA4**	490	**S501_1.8 P132 BE132MB4**	**S501_1.8 P160 BX160MA4**	491
959	90	1.2	3.0	2360	**S501_3.0 S4 ME4LB2**		490	**S501_3.0 P132 BE132MB2**		491
1020	85	1.3	1.4	2270	**S501_1.4 S4 ME4LB4**	**S501_1.4 S5 MX5SA4**	490	**S501_1.4 P132 BE132MB4**	**S501_1.4 P160 BX160MA4**	491
1213	71	1.4	2.4	2220	**S501_2.4 S4 ME4LB2**		490	**S501_2.4 P132 BE132MB2**		491
1221	71	1.0	2.4	1460	**S401_2.4 S4 ME4LB2**		488	**S401_2.4 P132 BE132MB2**		489
1633	53	1.6	1.8	2060	**S501_1.8 S4 ME4LB2**		490	**S501_1.8 P132 BE132MB2**		491
2055	42	2.0	1.4	1930	**S501_1.4 S4 ME4LB2**		490	**S501_1.4 P132 BE132MB2**		491
2141	40	1.2	1.4	1300	**S401_1.4 S4 ME4LB2**		488	**S401_1.4 P132 BE132MB2**		489

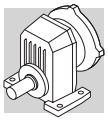


74 GEARBOX RATING CHARTS

S 10 — 21 Nm

	i	n_1 = 2800 min^{-1}					n_1 = 1400 min^{-1}					
		n_2 min^{-1}	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	n_2 min^{-1}	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	
S 10 1_1.4	1.4	1972	8.0	1.7	800	310	986	10.0	1.1	800	390	483
S 10 1_1.9	1.9	1489	8.0	1.3	800	360	745	10.0	0.80	800	460	
S 10 1_2.5	2.5	1120	8.0	0.96	800	420	560	10.0	0.60	800	520	
S 10 1_3.2	3.2	875	10.0	0.93	800	440	438	12.0	0.56	800	560	
S 10 1_3.8	3.8	727	10.0	0.78	800	480	364	12.0	0.47	800	610	
S 10 1_4.7	4.7	592	10.0	0.63	800	520	296	12.0	0.38	800	660	
S 10 1_6.1	6.1	458	12.0	0.59	800	560	229	15.0	0.37	800	710	
S 10 1_6.9	6.9	406	12.0	0.52	800	580	203	15.0	0.33	800	740	
S 10 1_8.9	8.9	315	8.0	0.27	800	700	158	10.0	0.17	800	880	
S 10 1_10.3	10.3	272	8.0	0.23	800	740	136	10.0	0.15	800	930	
S 10 1_12.3	12.3	227	8.0	0.19	800	800	114	10.0	0.12	800	1000	

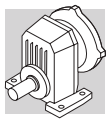
	i	n_1 = 900 min^{-1}					n_1 = 500 min^{-1}					
		n_2 min^{-1}	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	n_2 min^{-1}	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	
S 10 1_1.4	1.4	634	12.0	0.81	800	450	352	14.0	0.53	800	560	483
S 10 1_1.9	1.9	479	12.0	0.61	800	520	266	14.0	0.40	800	640	
S 10 1_2.5	2.5	360	12.0	0.46	800	600	200	14.0	0.30	800	740	
S 10 1_3.2	3.2	281	14.0	0.42	800	650	156	17.0	0.28	800	790	
S 10 1_3.8	3.8	234	14.0	0.35	800	700	130	17.0	0.24	800	850	
S 10 1_4.7	4.7	190	14.0	0.28	800	770	106	17.0	0.19	800	930	
S 10 1_6.1	6.1	147	17.0	0.27	800	820	82	21	0.18	800	1000	
S 10 1_6.9	6.9	130	17.0	0.24	800	860	72	21	0.16	800	1040	
S 10 1_8.9	8.9	101	12.0	0.13	800	1020	56	14.0	0.08	800	1200	
S 10 1_10.3	10.3	87	12.0	0.11	800	1080	49	14.0	0.07	800	1200	
S 10 1_12.3	12.3	73	12.0	0.09	800	1160	41	14.0	0.06	800	1200	



S 20 — 37 Nm

	i	n_1 = 2800 min^{-1}					n_1 = 1400 min^{-1}					
		n_2 min^{-1}	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	n_2 min^{-1}	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	
S 20 1_1.4	1.4	2014	13.0	2.8	1000	590	1007	17.0	1.8	1000	740	
S 20 1_1.9	1.9	1481	13.0	2.1	1000	680	741	17.0	1.3	1000	860	
S 20 1_2.4	2.4	1148	21	2.6	640	680	574	26	1.6	850	860	
S 20 1_3.1	3.1	900	21	2.0	730	750	450	26	1.3	960	950	
S 20 1_3.9	3.9	712	21	1.6	820	840	356	26	0.99	1000	1060	
S 20 1_4.8	4.8	587	21	1.3	910	920	294	26	0.82	1000	1160	485
S 20 1_5.8	5.8	481	21	1.1	960	1000	241	26	0.67	1000	1260	
S 20 1_7.2	7.2	388	21	0.87	980	1090	194	26	0.54	1000	1370	
S 20 1_8.5	8.5	329	13.0	0.46	1000	1240	165	17.0	0.30	1000	1500	
S 20 1_10.8	10.8	260	13.0	0.36	1000	1350	130	17.0	0.24	1000	1500	
S 20 1_12.4	12.4	225	13.0	0.31	1000	1430	113	17.0	0.20	1000	1500	

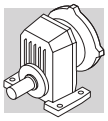
	i	n_1 = 900 min^{-1}					n_1 = 500 min^{-1}					
		n_2 min^{-1}	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	n_2 min^{-1}	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	
S 20 1_1.4	1.4	647	20	1.4	1000	850	360	24	0.92	1000	1040	
S 20 1_1.9	1.9	476	20	1.0	1000	990	265	24	0.68	1000	1210	
S 20 1_2.4	2.4	369	30	1.2	990	990	205	37	0.81	1000	1200	
S 20 1_3.1	3.1	289	30	0.93	1000	1110	161	37	0.64	1000	1340	
S 20 1_3.9	3.9	229	30	0.73	1000	1230	127	37	0.50	1000	1490	
S 20 1_4.8	4.8	189	30	0.60	1000	1350	105	37	0.41	1000	1500	485
S 20 1_5.8	5.8	155	30	0.50	1000	1460	86	37	0.34	1000	1500	
S 20 1_7.2	7.2	125	30	0.40	1000	1500	69	37	0.27	1000	1500	
S 20 1_8.5	8.5	106	20	0.23	1000	1500	59	24	0.15	1000	1500	
S 20 1_10.8	10.8	84	20	0.18	1000	1500	47	24	0.12	1000	1500	
S 20 1_12.4	12.4	72	20	0.15	1000	1500	40	24	0.10	1000	1500	



S 30 — 70 Nm

	i	n_1 = 2800 min^{-1}					n_1 = 1400 min^{-1}					
		n_2 min^{-1}	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	n_2 min^{-1}	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	
S 30 1_1.4	1.4	1986	24	5.1	1500	770	993	30	3.2	1500	970	
S 30 1_1.8	1.8	1530	24	3.9	1500	870	765	30	2.5	1500	1090	
S 30 1_2.4	2.4	1157	40	4.9	1270	850	579	50	3.1	1500	1070	
S 30 1_3.1	3.1	915	40	3.9	1470	950	458	50	2.4	1500	1200	
S 30 1_3.9	3.9	711	40	3.0	1500	1070	355	50	1.9	1500	1360	
S 30 1_4.9	4.9	568	40	2.4	1500	1190	284	50	1.5	1500	1500	487
S 30 1_5.8	5.8	479	40	2.0	1500	1280	239	50	1.3	1500	1610	
S 30 1_7.1	7.1	395	40	1.7	1500	1390	197	50	1.1	1500	1750	
S 30 1_8.9	8.9	315	24	0.81	1500	1650	157	30	0.50	1500	2080	
S 30 1_10.3	10.3	272	24	0.70	1500	1740	136	30	0.44	1500	2190	
S 30 1_13.1	13.1	213	24	0.55	1500	1900	107	30	0.34	1500	2400	

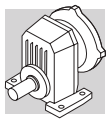
	i	n_1 = 900 min^{-1}					n_1 = 500 min^{-1}					
		n_2 min^{-1}	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	n_2 min^{-1}	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	
S 30 1_1.4	1.4	638	35	2.4	1500	1120	355	42	1.6	1500	1360	
S 30 1_1.8	1.8	492	35	1.8	1500	1260	273	42	1.2	1500	1540	
S 30 1_2.4	2.4	372	58	2.3	1500	1240	207	70	1.5	1500	1510	
S 30 1_3.1	3.1	294	58	1.8	1500	1390	163	70	1.2	1500	1700	
S 30 1_3.9	3.9	228	58	1.4	1500	1570	127	70	0.95	1500	1920	
S 30 1_4.9	4.9	183	58	1.1	1500	1740	101	70	0.76	1500	2120	487
S 30 1_5.8	5.8	154	58	0.95	1500	1870	85	70	0.64	1500	2280	
S 30 1_7.1	7.1	127	58	0.79	1500	2030	71	62	0.47	1500	2400	
S 30 1_8.9	8.9	101	35	0.38	1500	2400	56	42	0.25	1500	2400	
S 30 1_10.3	10.3	87	35	0.33	1500	2400	49	42	0.22	1500	2400	
S 30 1_13.1	13.1	69	35	0.26	1500	2400	38	37	0.15	1500	2400	



S 40 — 125 Nm

	i	n_1 = 2800 min^{-1}					n_1 = 1400 min^{-1}					
		n_2 min^{-1}	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	n_2 min^{-1}	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	
S 40 1_1.4	1.4	2059	48	10.6	2000	1270	1029	60	6.6	2000	1600	
S 40 1_1.9	1.9	1514	48	7.8	2000	1450	757	60	4.9	2000	1830	
S 40 1_2.4	2.4	1172	70	8.8	1860	1490	586	90	5.6	2000	1870	
S 40 1_3.1	3.1	918	70	6.9	2000	1660	459	90	4.4	2000	2080	
S 40 1_3.8	3.8	735	70	5.5	2000	1830	367	90	3.5	2000	2290	
S 40 1_4.8	4.8	580	70	4.3	2000	2020	290	90	2.8	2000	2530	489
S 40 1_6.1	6.1	461	70	3.5	2000	2220	231	90	2.2	2000	2790	
S 40 1_7.2	7.2	392	63	2.6	2000	2410	196	80	1.7	2000	3030	
S 40 1_8.6	8.6	324	48	1.7	2000	2670	162	60	1.0	2000	3370	
S 40 1_10.7	10.7	262	40	1.1	2000	2930	131	50	0.70	2000	3690	
S 40 1_12.4	12.4	226	40	1.0	2000	3100	113	50	0.60	2000	3800	

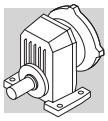
	i	n_1 = 900 min^{-1}					n_1 = 500 min^{-1}					
		n_2 min^{-1}	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	n_2 min^{-1}	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	
S 40 1_1.4	1.4	662	70	4.9	2000	1850	368	85	3.3	2000	2250	
S 40 1_1.9	1.9	486	70	3.6	2000	2120	270	85	2.5	2000	2580	
S 40 1_2.4	2.4	377	105	4.2	2000	2160	209	125	2.8	2000	2650	
S 40 1_3.1	3.1	295	105	3.3	2000	2400	164	125	2.2	2000	2940	
S 40 1_3.8	3.8	236	105	2.7	2000	2650	131	125	1.8	2000	3240	
S 40 1_4.8	4.8	186	105	2.1	2000	2930	104	125	1.4	2000	3580	489
S 40 1_6.1	6.1	148	105	1.7	2000	3220	82	110	1.0	2000	3800	
S 40 1_7.2	7.2	126	90	1.2	2000	3530	70	90	0.67	2000	3800	
S 40 1_8.6	8.6	104	70	0.78	2000	3800	58	85	0.53	2000	3800	
S 40 1_10.7	10.7	84	58	0.52	2000	3800	47	70	0.35	2000	3800	
S 40 1_12.4	12.4	73	58	0.45	2000	3800	40	70	0.30	2000	3800	



S 50 — 200 Nm

	i	n_1 = 2800 min^{-1}					n_1 = 1400 min^{-1}					
		n_2 min^{-1}	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	n_2 min^{-1}	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	
S 50 1_1.4	1.4	1972	85	17.9	730	1720	986	110	11.6	730	2150	
S 50 1_1.8	1.8	1564	85	14.2	1220	1920	782	110	9.2	1370	2400	
S 50 1_2.4	2.4	1162	100	12.4	930	2110	581	130	8.1	970	2640	
S 50 1_3.0	3.0	921	110	10.8	860	2300	461	140	6.9	1020	2880	
S 50 1_3.8	3.8	729	120	9.3	640	2480	365	150	5.8	860	3130	
S 50 1_4.8	4.8	589	120	7.6	880	2710	295	150	4.7	1160	3420	491
S 50 1_6.1	6.1	462	100	4.9	1980	3100	231	130	3.2	2330	3880	
S 50 1_7.4	7.4	378	100	4.0	2060	3340	189	130	2.6	2400	4190	
S 50 1_8.8	8.8	319	85	2.9	2400	3640	160	110	1.9	2400	4570	
S 50 1_10.5	10.5	268	85	2.4	2400	3880	134	110	1.6	2400	4870	
S 50 1_12.9	12.9	217	80	1.9	2400	4200	109	100	1.2	2400	5300	

	i	n_1 = 900 min^{-1}					n_1 = 500 min^{-1}					
		n_2 min^{-1}	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	n_2 min^{-1}	M_{n2} Nm	P_{n1} kW	R_{n1} N	R_{n2} N	
S 50 1_1.4	1.4	634	125	8.5	1010	2510	352	155	5.8	1040	3040	
S 50 1_1.8	1.8	503	125	6.7	1730	2790	279	155	4.6	1940	3380	
S 50 1_2.4	2.4	373	150	6.0	1160	3060	207	180	4.0	1530	3730	
S 50 1_3.0	3.0	296	160	5.1	1290	3350	164	200	3.5	1310	4050	
S 50 1_3.8	3.8	234	175	4.4	940	3620	130	200	2.8	1740	4460	
S 50 1_4.8	4.8	189	175	3.5	1290	3960	105	180	2.0	2400	4970	491
S 50 1_6.1	6.1	149	150	2.4	2400	4500	83	150	1.3	2400	5620	
S 50 1_7.4	7.4	122	140	1.8	2400	4900	68	140	1.0	2400	6100	
S 50 1_8.8	8.8	103	125	1.4	2400	5310	57	125	0.80	2400	6580	
S 50 1_10.5	10.5	86	115	1.1	2400	5700	48	115	0.60	2400	7050	
S 50 1_12.9	12.9	70	100	0.70	2400	6210	39	100	0.40	2400	7200	



75 MOTOR AVAILABILITY

Please be aware that motor-gearbox combinations resulting from the following charts are purely based on geometrical compatibility.

When selecting a gearmotor, refer to procedure specified at paragraph 12 and observe particularly the condition $S \geq f_S$.

(E 69)

		IEC_ BN BE BX (IM B5)																					
		BN		BN	BE	BX	BN	BE	BX	BN	BE	BX	BN	BE	BX	BN	BE	BX	BN	BE	BX	BN	BE	BX
P_{n1}(#) [kW]	2p	0.37	0.75	1.5	1.1	—	2.2	2.2	—	4	3	—	4	4	—	9.2	9.2	—	18.5	18.5	—	22	—	—
	4p	0.25	0.55	1.1	0.75	0.75	1.85	1.5	1.5	3	3	3	4	4	4	9.2	9.2	7.5	15	15	15	22	22	22
	6p	0.12	0.37	0.75	—	—	1.1	0.75	—	1.85	1.5	—	2.2	2.2	—	5.5	4	—	11	7.5	—	15	—	—
		P63	P71	P80			P90			P100			P112			P132			P160			P180		
S 10 1	i =	1.4_12.3	1.4_12.3	1.4_8.9			1.4_8.9			1.4_8.9			1.4_8.9										
S 20 1		1.9_12.4	1.9_12.4	1.4_10.8			1.4_10.8			1.4_10.8			1.4_10.8										
S 30 1		2.4_13.1	2.4_13.1	1.4_13.1			1.4_13.1			1.4_13.1			1.4_13.1			1.4_4.9							
S 40 1		3.1_12.4	3.1_12.4	1.4_12.4			1.4_12.4			1.4_12.4			1.4_12.4			1.4_6.1							
S 50 1		3.8_12.9	3.8_12.9	1.4_12.9			1.4_12.9			1.4_12.9			1.4_12.9			1.4_7.4			1.4_7.4			1.4_7.4	

(#) P_{n1} = maximum installable power on input P_

(E 70)

		M ME MX					
		M05	M1	ME2 - MX2	ME3 - MX3	ME4 - MX4	ME5 - MX5
S 10 1	i =	1.4_12.3	1.4_6.9	1.4_8.9	1.4_8.9		
S 20 1		1.9_12.4	1.9_8.5	1.4_10.8	1.4_10.8		
S 30 1			2.4_10.3	1.4_13.1	1.4_13.1	1.4_4.9	
S 40 1			3.1_12.4	1.4_12.4	1.4_12.4	1.4_6.1	
S 50 1			3.8_12.9	1.4_12.9	1.4_12.9	1.4_7.4	1.4_7.4

76 MOMENT OF INERTIA

The following charts indicate moment of inertia values Jr [kgm^2] referred to the gear unit high speed shaft. A key to the symbols used follows:

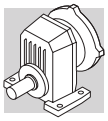
Values under this icon refer to compact gear units, without motor. To obtain the overall moment of inertia for the gearmotor just add the value of the inertia for the specific compact motor, given in the relevant rating chart.

Values under this symbol refer to gearboxes with IEC motor adaptor (IEC size...).

This symbol refers to gearbox values.

S 10

	i	J (•10^{-4}) [kgm^2]							
			IEC						
			63	71	80	90	100	112	
S 10 1_1.4	1.4	0.33	1.8	1.8	3.2	3.1	4.4	4.4	1.2
S 10 1_1.9	1.9	0.22	1.7	1.7	3.1	3.0	4.3	4.3	1.1
S 10 1_2.5	2.5	0.16	1.6	1.6	3.0	2.9	4.2	4.2	1.0
S 10 1_3.2	3.2	0.10	1.6	1.6	3.0	2.9	4.2	4.2	0.97
S 10 1_3.9	3.9	0.08	1.5	1.5	2.9	2.9	4.2	4.2	0.95
S 10 1_4.7	4.7	0.06	1.5	1.5	2.9	2.8	4.1	4.1	0.93
S 10 1_6.1	6.1	0.04	1.5	1.5	2.9	2.8	4.1	4.1	0.92
S 10 1_6.9	6.9	0.03	1.5	1.5	2.9	2.8	4.1	4.1	0.91
S 10 1_8.9	8.9	0.02	1.5	1.5	2.9	2.8	4.1	4.1	0.90
S 10 1_10.3	10.3	0.02	1.5	1.5	—	—	—	—	0.89
S 10 1_12.3	12.3	0.01	1.5	1.5	—	—	—	—	0.89

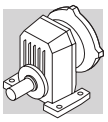


S 20

	i	J (•10-4) [kgm2]							
			IEC						
			63	71	80	90	100	112	
S 20 1_1.4	1.4	0.73	—	—	3.6	3.5	4.8	4.8	2.7
S 20 1_1.9	1.9	0.48	1.9	1.9	3.3	3.3	4.6	4.6	2.4
S 20 1_2.4	2.4	0.34	1.8	1.8	3.2	3.1	4.4	4.4	2.3
S 20 1_3.1	3.1	0.20	1.7	1.7	3.0	3.0	4.3	4.3	2.1
S 20 1_3.9	3.9	0.14	1.6	1.6	3.0	2.9	4.2	4.2	2.1
S 20 1_4.8	4.8	0.12	1.6	1.6	3.0	2.9	4.2	4.2	2.0
S 20 1_5.8	5.8	0.08	1.6	1.5	2.9	2.9	4.2	4.2	2.0
S 20 1_7.2	7.2	0.06	1.5	1.5	2.9	2.8	4.1	4.1	2.0
S 20 1_8.5	8.5	0.05	1.5	1.5	2.9	2.8	4.1	4.1	2.0
S 20 1_10.8	10.8	0.03	1.5	1.5	2.9	2.8	4.1	4.1	1.9
S 20 1_12.4	12.4	0.02	1.5	1.5	—	—	—	—	1.9

S 30

	i	J (•10-4) [kgm2]								
			IEC							
			63	71	80	90	100	112	132	
S 30 1_1.4	1.4	1.5	—	—	4.3	4.3	5.6	5.6	18	3.8
S 30 1_1.8	1.8	1.1	—	—	3.9	3.8	5.1	5.1	18	3.4
S 30 1_2.4	2.4	0.59	2.1	2.0	3.4	3.4	4.7	4.7	17	2.9
S 30 1_3.1	3.1	0.45	1.9	1.9	3.3	3.2	4.5	4.5	17	2.8
S 30 1_3.9	3.9	0.33	1.8	1.8	3.2	3.1	4.4	4.4	17	2.7
S 30 1_4.9	4.9	0.24	1.7	1.7	3.1	3.0	4.3	4.3	17	2.6
S 30 1_5.8	5.8	0.19	1.7	1.7	3.0	3.0	4.3	4.3	—	2.6
S 30 1_7.1	7.1	0.14	1.6	1.6	3.0	2.9	4.2	4.2	—	2.5
S 30 1_8.9	8.9	0.10	1.6	1.6	2.9	2.9	4.2	4.2	—	2.5
S 30 1_10.3	10.3	0.08	1.5	1.5	2.9	2.9	4.2	4.2	—	2.4
S 30 1_13.1	13.1	0.05	1.5	1.5	2.9	2.8	4.1	4.1	—	2.4



S 40

	i	J (•10-4) [kgm2]								
			IEC							
			63	71	80	90	100	112	132	
S 40 1_1.4	1.4	3.7	—	—	6.5	6.5	7.8	7.8	23	14
S 40 1_1.9	1.9	2.4	—	—	5.2	5.2	6.5	6.5	21	13
S 40 1_2.4	2.4	1.6	—	—	4.4	4.4	5.7	5.7	21	12
S 40 1_3.1	3.1	1.1	2.6	2.6	4.0	3.9	5.2	5.2	20	12
S 40 1_3.8	3.8	0.82	2.3	2.3	3.7	3.6	4.9	4.9	18	11
S 40 1_4.8	4.8	0.50	2.0	2.0	3.3	3.3	4.6	4.6	18	11
S 40 1_6.1	6.1	0.39	1.8	1.8	3.2	3.2	4.5	4.5	18	11
S 40 1_7.2	7.2	0.30	1.8	1.8	3.1	3.1	4.4	4.4	—	11
S 40 1_8.6	8.6	0.22	1.7	1.7	3.1	3.0	4.3	4.3	—	11
S 40 1_10.7	10.7	0.15	1.6	1.6	3.0	2.9	4.2	4.2	—	11
S 40 1_12.4	12.4	0.12	1.6	1.6	3.0	2.8	4.2	4.2	—	11

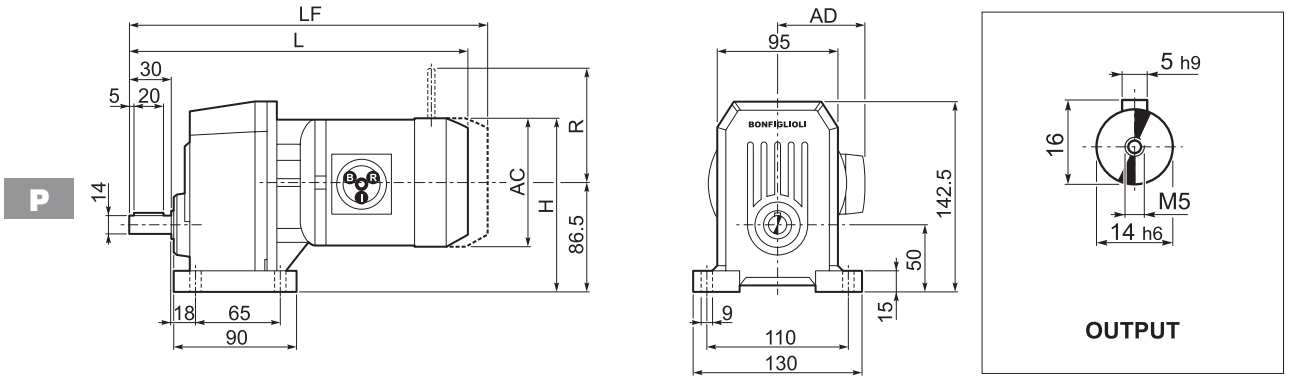
S 50

	i	J (•10-4) [kgm2]									
			IEC								
			63	71	80	90	100	112	132	160	180	
S 50 1_1.4	1.4	8.2	—	—	11	11	12	12	27	86	84	19
S 50 1_1.8	1.8	5.9	—	—	8.8	8.7	10	10	25	84	82	16
S 50 1_2.4	2.4	3.9	—	—	6.8	6.7	8.0	8.0	23	82	80	14
S 50 1_3.0	3.0	2.7	—	—	5.5	5.5	6.8	6.8	22	81	79	13
S 50 1_3.8	3.8	1.9	3.3	3.3	4.7	4.6	5.9	5.9	21	80	78	12
S 50 1_4.8	4.8	1.4	2.8	2.8	4.2	4.1	5.4	5.4	21	79	77	12
S 50 1_6.1	6.1	0.89	2.4	2.4	3.7	3.7	5.0	5.0	21	79	77	11
S 50 1_7.4	7.4	0.63	2.1	2.1	3.5	3.4	4.7	4.7	20	79	77	11
S 50 1_8.8	8.8	0.50	2.0	2.0	3.4	3.3	4.6	4.6	—	—	—	11
S 50 1_10.5	10.5	0.36	1.8	1.8	3.2	3.1	4.4	4.4	—	—	—	11
S 50 1_12.9	12.9	0.25	1.7	1.7	3.1	3.0	4.3	4.3	—	—	—	11

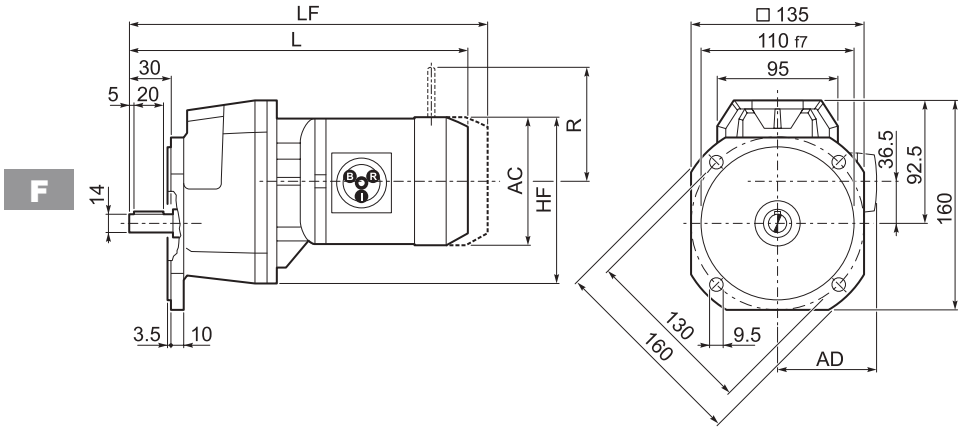
77 DIMENSIONS

S 10...M/ME/MX

P

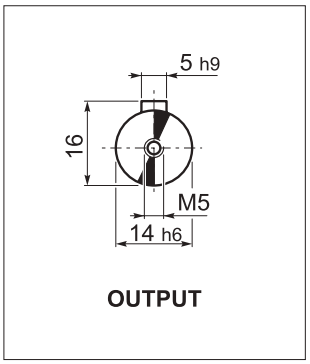


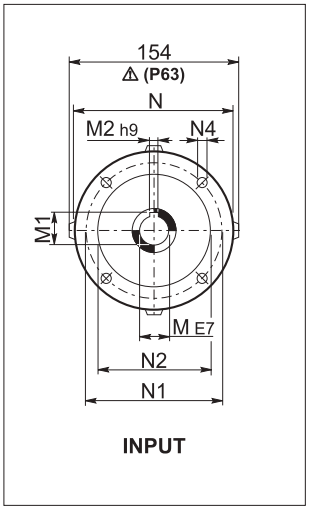
F

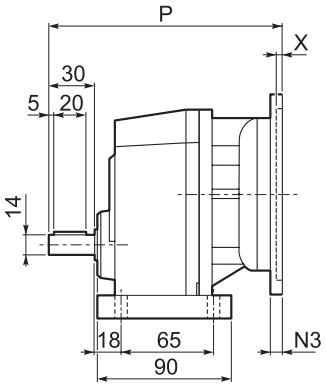


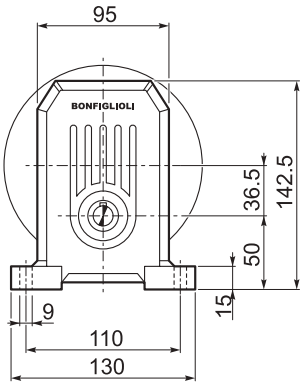
									M...FD M...FA		M...FD		M...FA	
			AC	H	HF	L	AD		LF		R	AD	R	AD
S 10 1	**S05**	**M05**	121	147	143	315	95	8	381	11	96	122	116	95
S 10 1	**S1**	**M1**	137	155	151	344	102	10	405	13	103	135	124	108
S 10 1	**S2**	**M2S**	156	164	160	367	111	13	443	17	129	146	134	119
S 10 1	**S2**	**ME2S**	156	164	160	367	111	13	—	—	—	—	—	—
S 10 1	**S2**	**MX2S**	156	164	160	411	111	18.1	—	—	—	—	—	—
S 10 1	**S3**	**ME3S**	195	184	180	416	135	20.5	—	—	—	—	—	—
S 10 1	**S3**	**MX3S**	195	184	180	448	135	23.5	—	—	—	—	—	—
S 10 1	**S3**	**ME3L**	195	184	180	448	135	21	—	—	—	—	—	—
S 10 1	**S3**	**MX3L**	195	184	180	492	135	27	—	—	—	—	—	—

S 10...P (IEC)

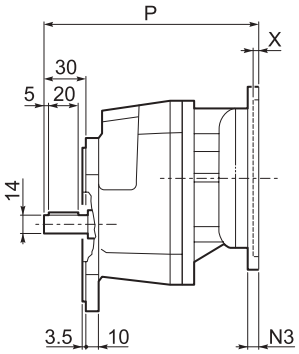


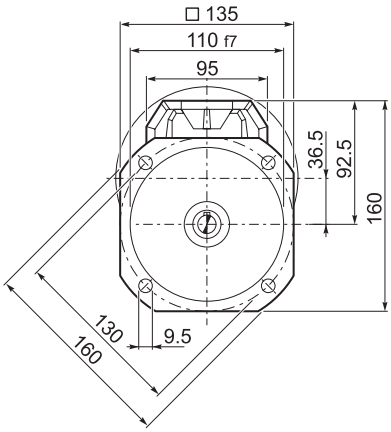






P

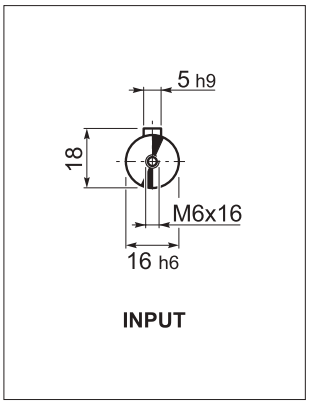


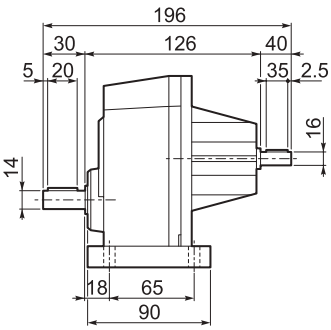


F

		M	M1	M2	N	N1	N2	N3	N4	P	X	
S 10 1	**P63**	11	12.8	4	140	115	95	—	M8x10	189	4	5
S 10 1	**P71**	14	16.3	5	160	130	110	—	M8x10	189	4.5	5
S 10 1	**P80**	19	21.8	6	200	165	130	—	M10x14.5	208	4	6
S 10 1	**P90**	24	27.3	8	200	165	130	—	M10x14.5	208	4	6
S 10 1	**P100**	28	31.3	8	250	215	180	—	M12x16	218	4.5	10
S 10 1	**P112**	28	31.3	8	250	215	180	—	M12x16	218	4.5	10

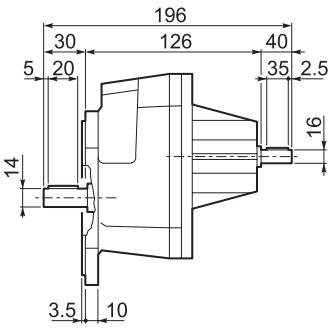
S 10...HS





P

	4.4

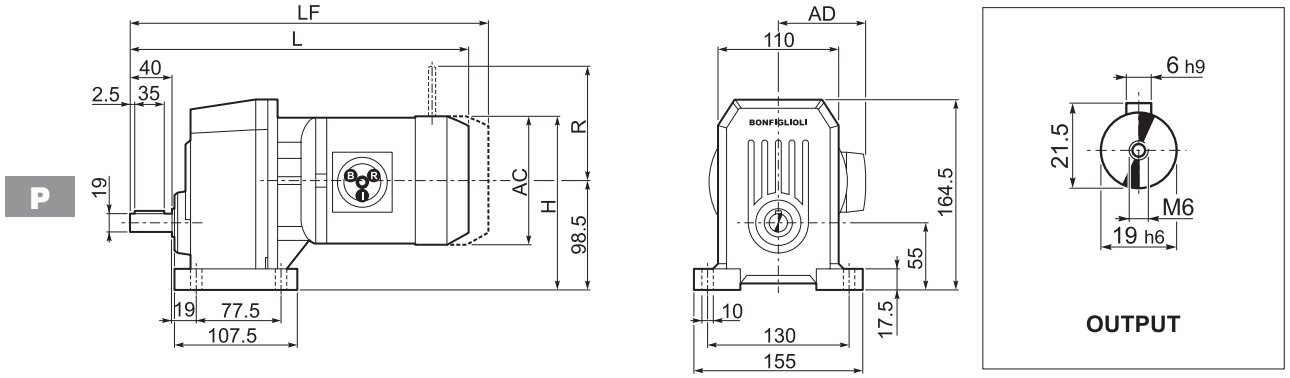


F

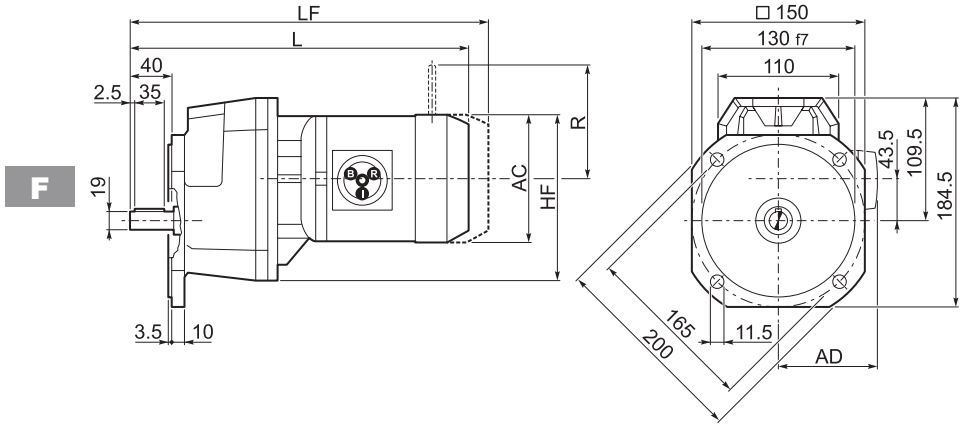
	4.5

S 20...M/ME/MX

P

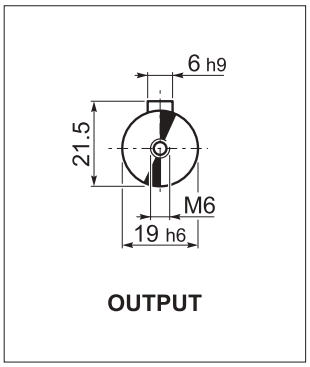


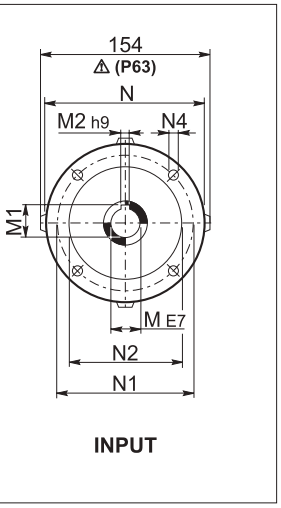
F

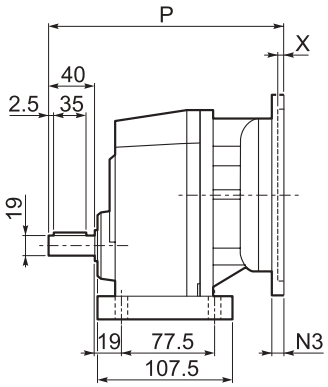


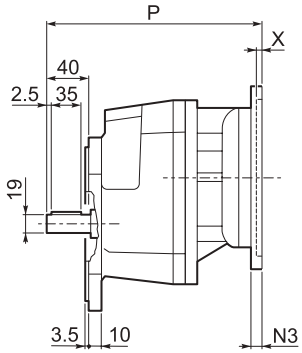
									M...FD M...FA		M...FD		M...FA	
			AC	H	HF	L	AD		LF		R	AD	R	AD
S 20 1	**S05**	**M05**	121	159	153	333.5	95	10	399.5	12	96	122	116	95
S 20 1	**S1**	**M1**	137	167	161	362.5	102	12	423.5	14	103	135	124	108
S 20 1	**S2**	**M2S**	156	176	170	385.5	111	16	461.5	19	129	146	134	119
S 20 1	**S2**	**ME2S**	156	176	170	385.5	111	16	—	—	—	—	—	—
S 20 1	**S2**	**MX2S**	156	176	170	429.5	111	21.1	—	—	—	—	—	—
S 20 1	**S3**	**ME3S**	195	196	190	434.5	135	21.5	—	—	—	—	—	—
S 20 1	**S3**	**MX3S**	195	196	190	466.5	135	24.5	—	—	—	—	—	—
S 20 1	**S3**	**ME3L**	195	196	190	466.5	135	26	—	—	—	—	—	—
S 20 1	**S3**	**MX3L**	195	196	190	510.5	135	32	—	—	—	—	—	—

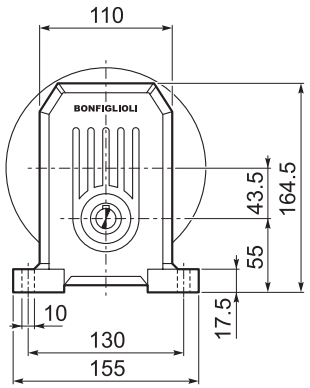
S 20...P(IEC)



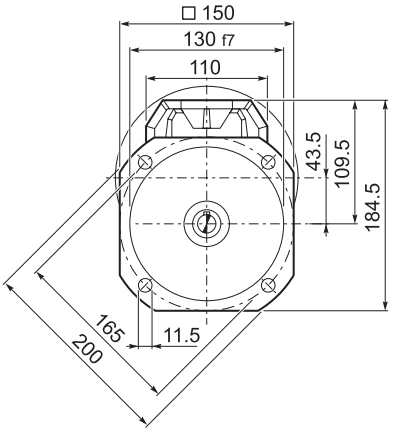








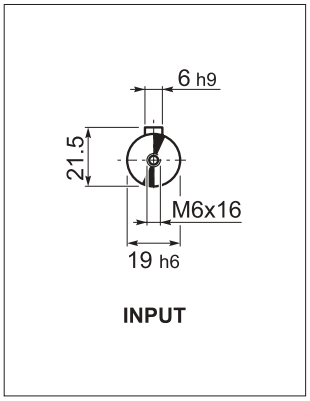
P

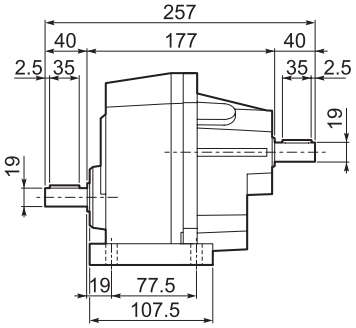


F

		M	M1	M2	N	N1	N2	N3	N4	P	X	
S 20 1	**P63**	11	12.8	4	140	115	95	—	M8x10	207	4	6
S 20 1	**P71**	14	16.3	5	160	130	110	—	M8x10	207	4.5	6
S 20 1	**P80**	19	21.8	6	200	165	130	—	M10x14.5	227	4	7
S 20 1	**P90**	24	27.3	8	200	165	130	—	M10x14.5	227	4	7
S 20 1	**P100**	28	31.3	8	250	215	180	—	M12x16	237	4.5	11
S 20 1	**P112**	28	31.3	8	250	215	180	—	M12x16	237	4.5	11

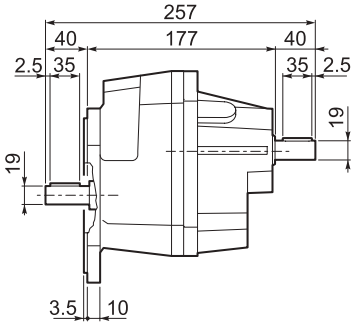
S 20...HS





P

	6.0

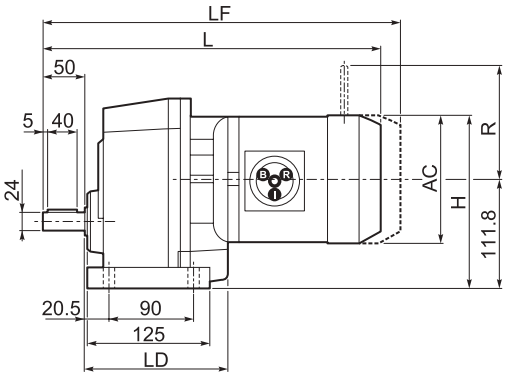


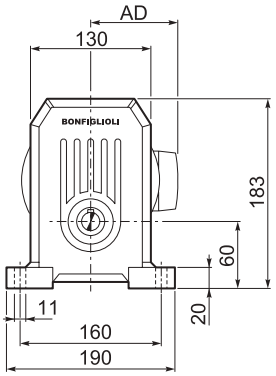
F

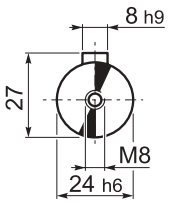
	6.2

S 30...M/ME/MX

P

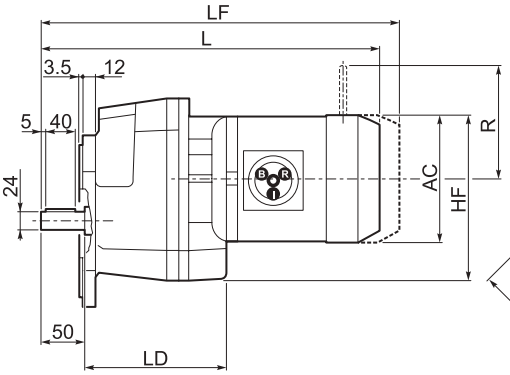


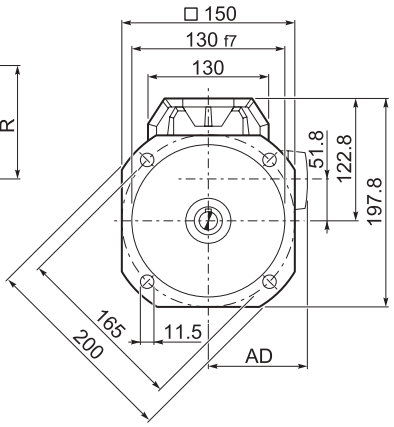




OUTPUT

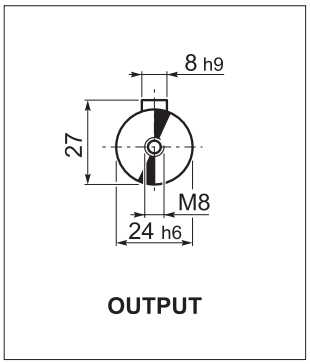
F

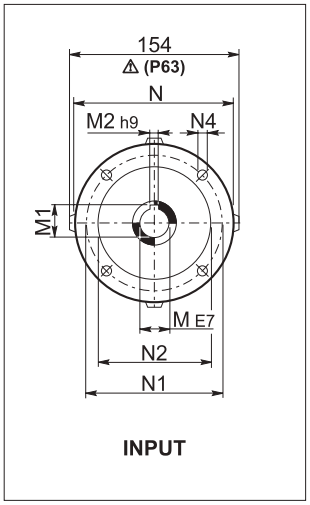


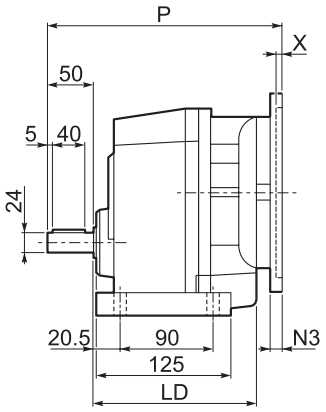


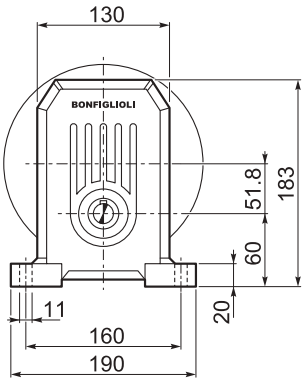
											M...FD M...FA		M...FD		M...FA	
				AC	H	HF	L	LD	AD		LF		R	AD	R	AD
S 30 1	**S1**	**M1**		137	180	177	387.5	140.5	102	14	448.5	16	103	135	124	108
S 30 1	**S1**	**M2S**		156	190	186	410.5	152.5	111	18	486.5	21	129	146	134	119
S 30 1	**S2**	**ME2S**		156	190	186	410.5	152.5	111	18	—	—	—	—	—	—
S 30 1	**S2**	**MX2S**		156	190	186	454.5	152.5	111	23.1	—	—	—	—	—	—
S 30 1	**S3**	**ME3S**		195	209	206	459.5	162.5	135	24.5	—	—	—	—	—	—
S 30 1	**S3**	**MX3S**		195	209	206	491.5	162.5	135	27.5	—	—	—	—	—	—
S 30 1	**S3**	**ME3L**		195	209	206	491.5	162.5	135	32	—	—	—	—	—	—
S 30 1	**S3**	**MX3L**		195	209	206	535.5	162.5	135	38	—	—	—	—	—	—
S 30 1	**S4**	**ME4**	**MX4**	258	240.8	237	599.5	—	193	71	—	—	—	—	—	—
S 30 1	**S4**	**ME4LB**	**MX4LA**	258	240.8	237	634.5	—	193	79	—	—	—	—	—	—

S 30...P(IEC)

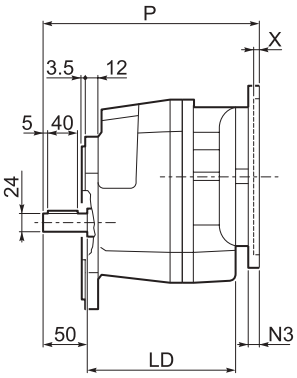


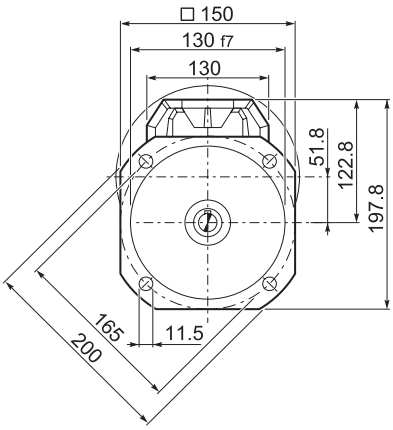






P

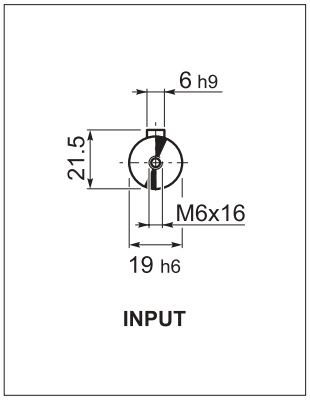


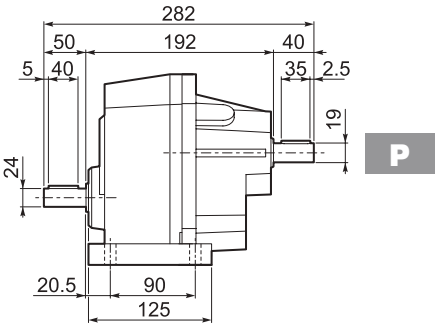


F

		LD	M	M1	M2	N	N1	N2	N3	N4	P	X	
S 30 1	**P63**	152.5	11	12.8	4	140	115	95	—	M8x10	232	4	8
S 30 1	**P71**	152.5	14	16.3	5	160	130	110	—	M8x10	232	4.5	8
S 30 1	**P80**	162.5	19	21.8	6	200	165	130	—	M10x14.5	252	4	9
S 30 1	**P90**	162.5	24	27.3	8	200	165	130	—	M10x14.5	252	4	9
S 30 1	**P100**	162.5	28	31.3	8	250	215	180	—	M12x16	262	4.5	13
S 30 1	**P112**	162.5	28	31.3	8	250	215	180	—	M12x16	262	4.5	13
S 30 1	**P132**	—	38	41.3	10	300	265	230	16	14	298.5	5	21

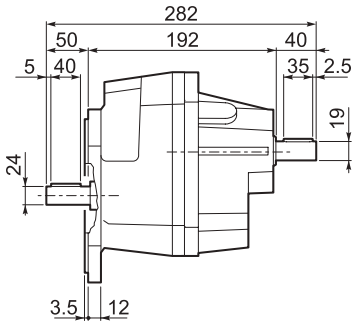
S 30...HS





P

	9.0

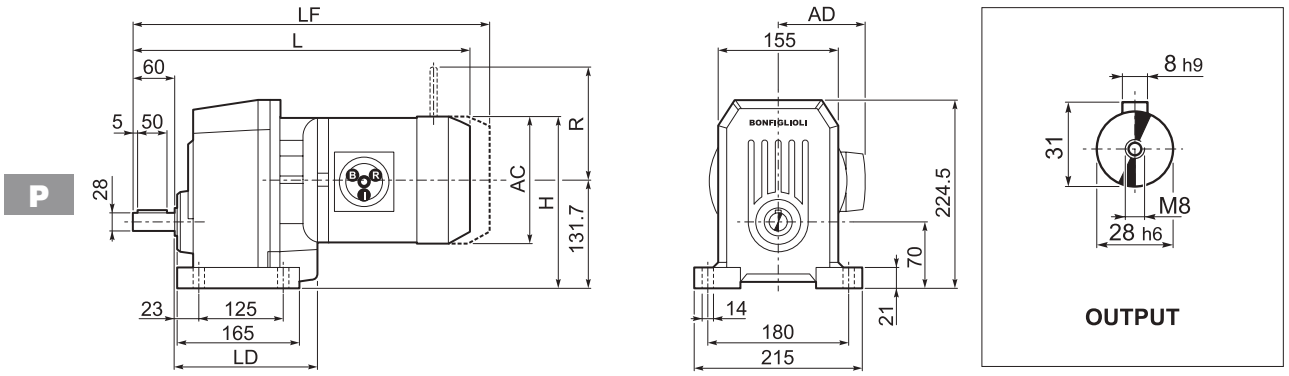


F

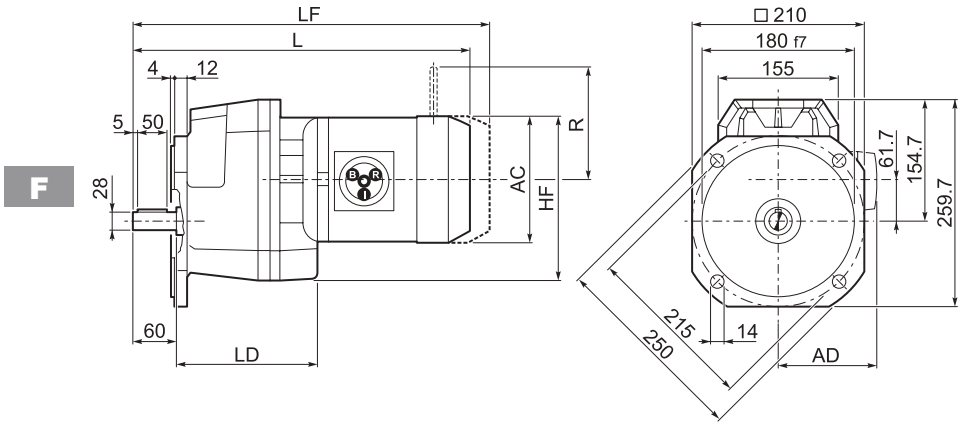
	9.3

S 40...M/ME/MX

P

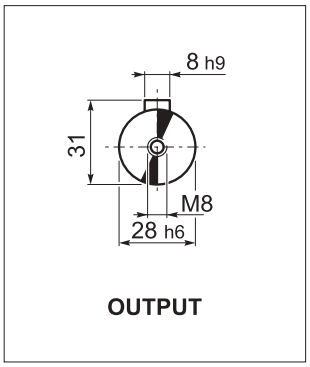


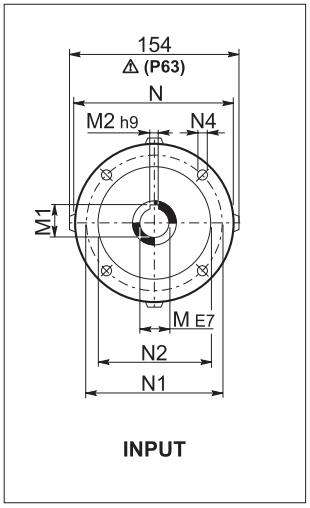
F

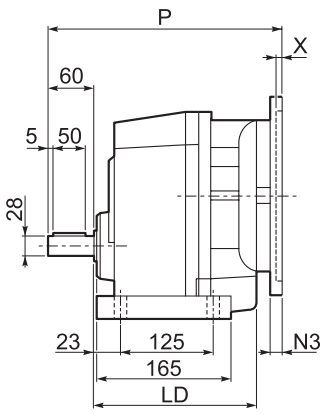


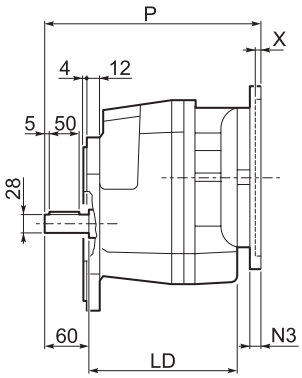
											M...FD M...FA		M...FD		M...FA	
				AC	H	HF	L	LD	AD	kg	LF	kg	R	AD	R	AD
S 40 1	**S1**	**M1**		137	200	197	429.5	168	102	28	490.5	31	103	135	124	108
S 40 1	**S2**	**M2S**		156	210	206	452.5	183.5	111	34	528.5	37	129	146	134	119
S 40 1	**S2**	**ME2S**		156	210	206	452.5	183.5	111	34	—	—	—	—	—	—
S 40 1	**S2**	**MX2S**		156	210	206	496.5	183.5	111	39.1	—	—	—	—	—	—
S 40 1	**S3**	**ME3S**		195	229	226	501.5	199.5	135	40.5	—	—	—	—	—	—
S 40 1	**S3**	**MX3S**		195	229	226	533.5	199.5	135	43.5	—	—	—	—	—	—
S 40 1	**S3**	**ME3L**		195	229	226	533.5	199.5	135	48	—	—	—	—	—	—
S 40 1	**S3**	**MX3L**		195	229	226	577.5	199.5	135	54	—	—	—	—	—	—
S 40 1	**S4**	**ME4**	**MX4**	258	261	257	641.5	—	193	82	—	—	—	—	—	—
S 40 1	**S4**	**ME4LB**	**MX4LA**	258	261	257	676.5	—	193	90	—	—	—	—	—	—

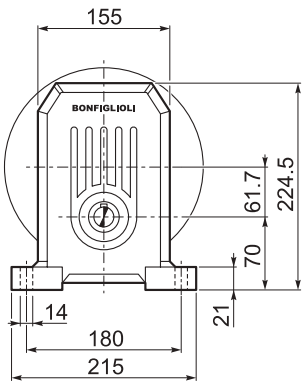
S 40...P(IEC)



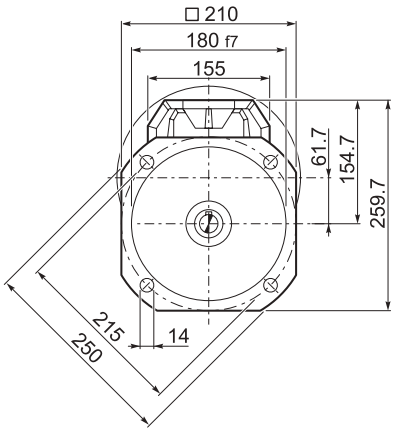








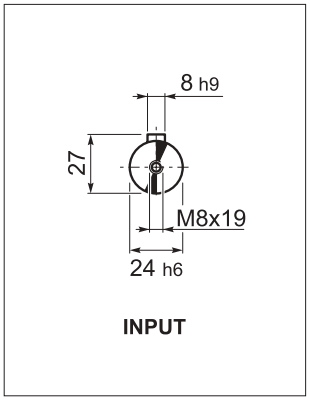
P

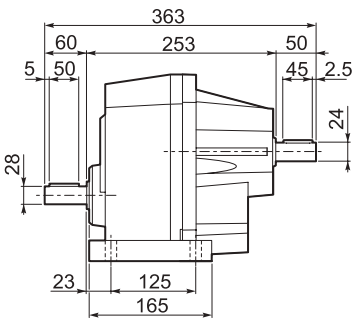


F

		LD	M	M1	M2	N	N1	N2	N3	N4	P	X	
S 40 1	**P63**	183.5	11	12.8	4	140	115	95	—	M8x10	274	4	25
S 40 1	**P71**	183.5	14	16.3	5	160	130	110	—	M8x10	274	4.5	26
S 40 1	**P80**	199.5	19	21.8	6	200	165	130	—	M10x14.5	294	4	26
S 40 1	**P90**	199.5	24	27.3	8	200	165	130	—	M10x14.5	294	4	30
S 40 1	**P100**	—	28	31.3	8	250	215	180	—	M12x16	304	4.5	30
S 40 1	**P112**	—	28	31.3	8	250	215	180	—	M12x16	304	4.5	30
S 40 1	**P132**	—	38	41.3	10	300	265	230	16	14	340	5	32

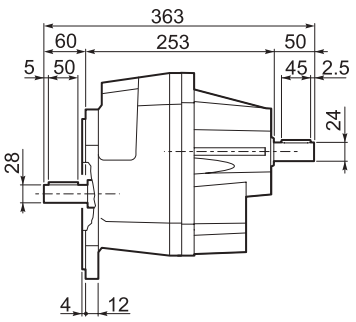
S 40...HS





P

	26.0

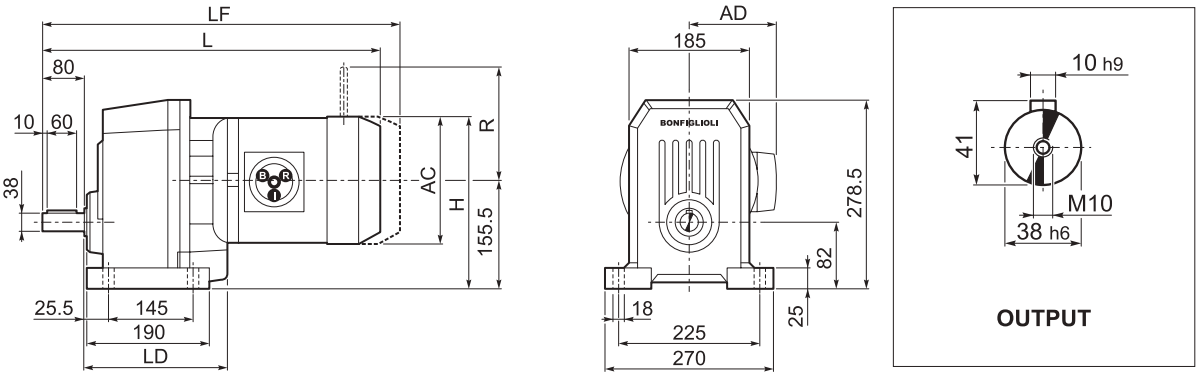


F

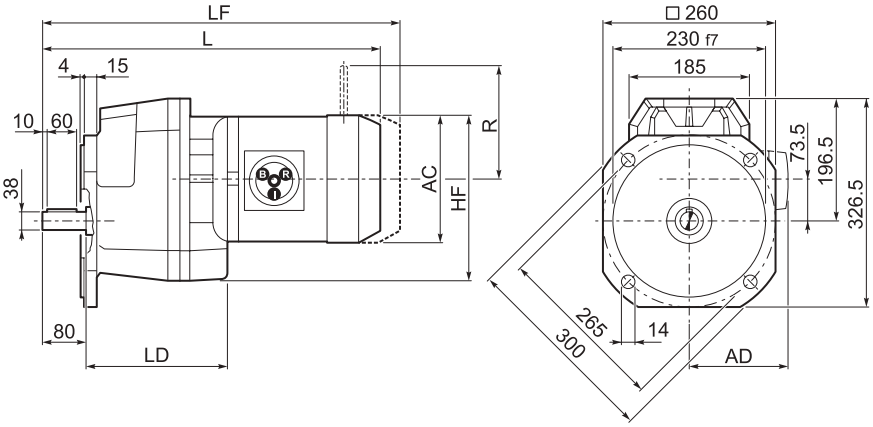
	27.7

S 50...M/ME/MX

P

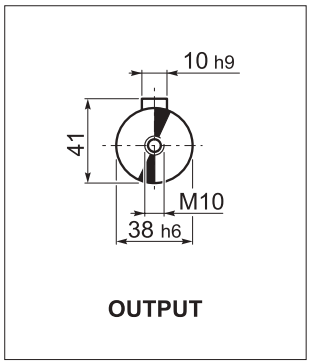


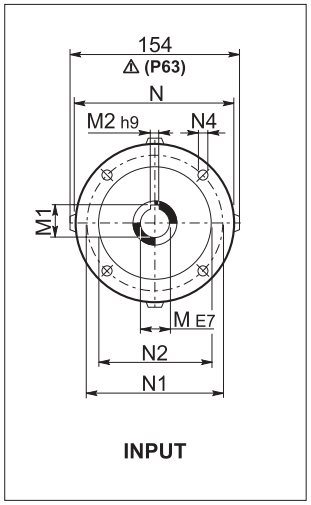
F

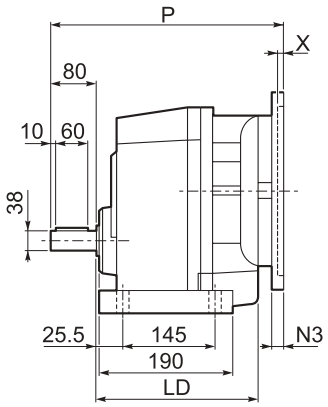


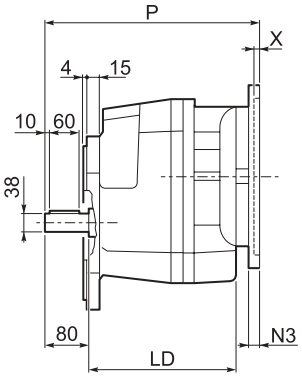
												M...FD M...FA		M...FD		M...FA	
				AC	H	HF	L	LD	AD			LF		R	AD	R	AD
S 50 1	**S1**	**M1**		137	225	222	469	—	102	40		530	42	103	135	124	108
S 50 1	**S2**	**M2S**		156	233	230	492.5	204.5	111	44		568.5	47	129	146	134	119
S 50 1	**S2**	**ME2S**		156	233	230	492.5	204.5	111	44		—	—	—	—	—	—
S 50 1	**S2**	**MX2S**		156	233	230	536.5	204.5	111	49.1		—	—	—	—	—	—
S 50 1	**S3**	**ME3S**		195	253	250	541.5	219.5	135	52.5		—	—	—	—	—	—
S 50 1	**S3**	**MX3S**		195	253	250	573.5	219.5	135	55.5		—	—	—	—	—	—
S 50 1	**S3**	**ME3L**		195	253	250	573.5	219.5	135	60		—	—	—	—	—	—
S 50 1	**S3**	**MX3L**		195	253	250	617.5	219.5	135	66		—	—	—	—	—	—
S 50 1	**S4**	**ME4**	**MX4**	258	284	281	681.5	204.5	193	86		—	—	—	—	—	—
S 50 1	**S4**	**ME4LB**	**MX4LA**	258	284	281	716.5	204.5	193	94		—	—	—	—	—	—
S 50 1	**S5**	**ME5S**	**MX5S**	310	310.5	307	768	—	245	114		—	—	—	—	—	—
S 50 1	**S5**	**ME5L**	**MX5L**	310	310.5	307	812	—	245	130		—	—	—	—	—	—

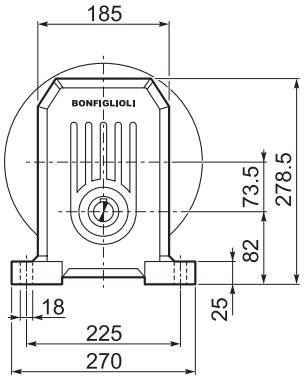
S 50...P(IEC)











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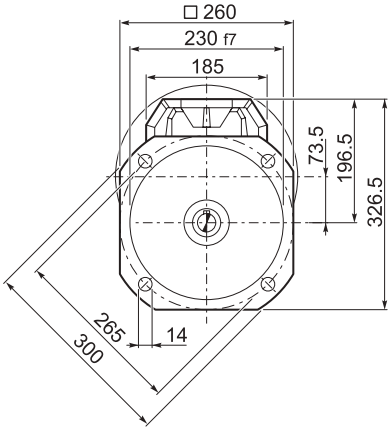

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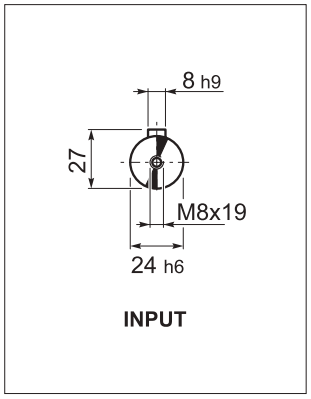
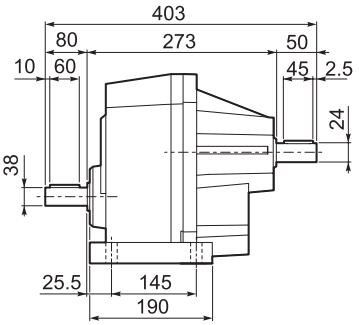
		LD	M	M1	M2	N	N1	N2	N3	N4	P	X	
S 50 1	**P63**	204.5	11	12.8	4	140	115	95	—	M8x10	314	4	35
S 50 1	**P71**	204.5	14	12.8	4	160	130	110	—	M8x10	314	4.5	35
S 50 1	**P80**	219.5	19	16.3	5	200	165	130	—	M10x14.5	314	4	37
S 50 1	**P90**	219.5	24	21.8	6	200	165	130	—	M10x14.5	334	4	37
S 50 1	**P100**	204.5	28	27.3	8	250	215	180	—	M12x16	344	4.5	41
S 50 1	**P112**	204.5	28	31.3	8	250	215	180	—	M12x16	344	4.5	41
S 50 1	**P132**	204.5	38	41.3	10	300	265	230	16	14	380	5	44
S 50 1	**P160**	—	42	45.3	12	350	300	250	23	18	431	5.5	48
S 50 1	**P180**	—	48	51.8	14	350	300	250	23	18	431	5.5	48

S 50...HS





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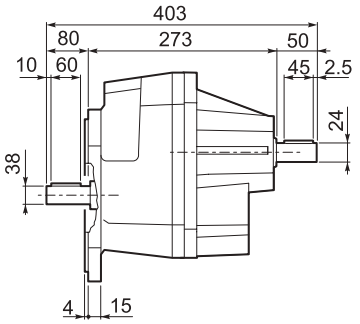

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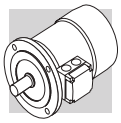


M1 SYMBOLS AND UNITS OF MEASUREMENT

Symbols	Units of Measure	Description
cosφ	–	Power factor
η	–	Efficiency
f_m	–	Power adjusting factor
I	–	Cyclic duration factor
I_N	[A]	Rated current
I_S	[A]	Locked rotor current
J_C	[Kgm^2]	Load moment of inertia
J_M	[Kgm^2]	Moment of inertia
K_c	–	Torque factor
K_d	–	Load factor
K_J	–	Inertia factor
M_A	[Nm]	Mean breakaway torque
M_B	[Nm]	Brake torque
M_N	[Nm]	Rated torque
M_L	[Nm]	Counter-torque during acceleration
M_S	[Nm]	Starting torque

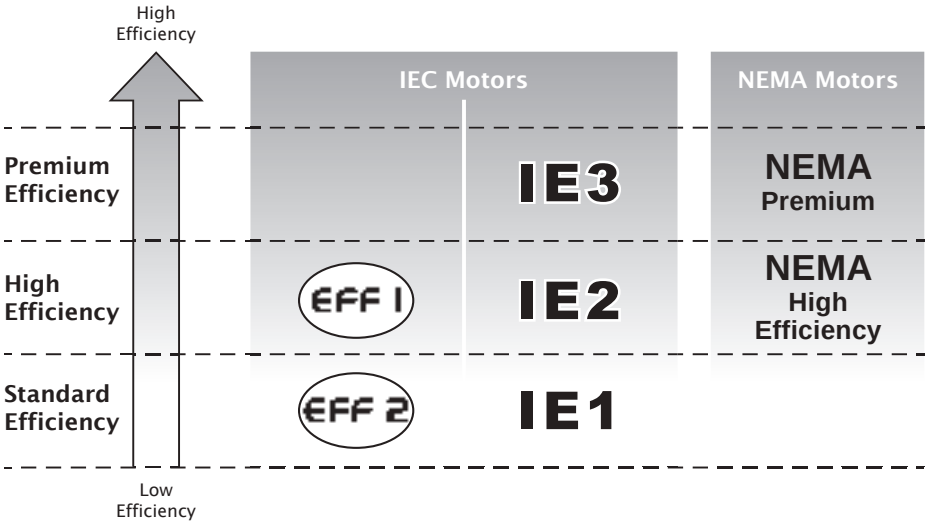
Symbols	Units of Measure	Description
n	[min^{-1}]	Rated speed
P_B	[W]	Power drawn by the brake at 20°C
P_n	[kW]	Motor rated power
P_r	[kW]	Required power
t_1	[ms]	Brake response time with one-way rectifier
t_{1s}	[ms]	Brake response time with electronic-controlled rectifier
t_2	[ms]	Brake reaction time with a.c. disconnect
t_{2c}	[ms]	Brake reaction time with a.c. and d.c. disconnect
t_a	[°C]	Ambient temperature
t_f	[min]	Work time at constant load
t_r	[min]	Rest time
W	[J]	Braking work between service interval
W_{max}	[J]	Maximum brake work for each braking
Z	[1/h]	Permissible starting frequency, loaded
Z_0	[1/h]	Max. permissible unloaded starting frequency (I = 50%)

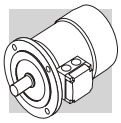
Efficiency classes and test methods

Efficiency classes characterise the efficiency with which an electric motor converts electrical energy into mechanical energy. In Europe, the energy efficiency of low voltage electric motors used to be classified using the voluntary Eff1/Eff2/Eff3 system. Outside Europe, other countries used to apply their own national systems, often very different to the European system. This uncertainty in standards led manufacturers to develop a harmonised international standard, and push for the issue of IEC (International Electrotechnical Commission) standard IEC 60034-30-1, “Efficiency classes of single-speed, three-phase, cage-induction motors (IE code)”.

This new standard:
- defines new classes of efficiency
- **IE1** (standard efficiency)
- **IE2** (high efficiency)
- **IE3** (premium efficiency)
- provides a common, international reference system for the classification of electric motors
- and for national legislation
- introduces a new efficiency measurement method in conformity with standard IEC 60034-1-2:2007

The following table shows the correspondence among the main classes.





European Commission regulation 640/2009

IEC standard 60034-30-1 establishes technical guidelines for efficiency classification but does not impose any legal requirements for the adoption of any particular efficiency class. These are laid down by European Directives and national laws.

The EC Regulation applying Directive 2005/32/EC was adopted on the 22nd July 2009. This establishes the legal requirements and eco-compatible design criteria for electric motors, and imposes minimum efficiency limits according to the following schedule:

ª **16/06/2011:** Electric motors must have a minimum efficiency level equivalent to class **IE2**

ª **01/01/2015**: Electric motors with a rated power output between 7.5 kW and 375 kW must have a minimum efficiency level corresponding to **IE3**, or to **IE2** if controlled by an inverter.

ª **01/01/2017:** Electric motors with a rated power output between 0.75 kW and 375 kW must have a minimum efficiency level corresponding to **IE3**, or to **IE2** if controlled by an inverter.

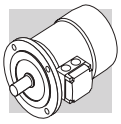
Scope and exclusions

EC Regulation 640/2009 applies to 2, 4, and 6 pole, single-speed, three-phase, 50 Hz or 60 Hz, cage-induction motors with rated outputs of 0.75 kW to 375 kW, and rated voltage up to 1000 V, designed for continuous duty (S1).

The regulation does not apply to:

- brakemotors
- motors designed to function immersed in liquid
- motors that are fully integrated in a product (like a gearbox, pump, fan), so that it is not possible
- to test the performance of the motor independently of that of the product.
- motors expressly designed to function:

▪ at altitudes above 4000 metres a.s.l.;
▪ in ambient temperatures above 60 °C;
▪ at maximum operating temperatures above 400 °C;
▪ in ambient temperatures below -30 °C (all motors) or below 0 °C (water-cooled motors);
▪ with incoming liquid coolants at temperatures below 0 °C or above 32 °C;
▪ in potentially explosive atmospheres as defined by Directive 2014/34/EU.



M3 GENERAL CHARACTERISTICS

M3.1 Production range

The asynchronous three-phase electric motors BX, BE, BN, MX, ME and M of BONFIGLIOLI RIDUTTORI's production, are available in basic design IMB5 and derived versions.
Motors are the enclosed type with outer fan and cage-tipe rotor for use in industrial environments.
Standard versions of BX-BE/MX-ME motors are 230/400V Δ/Y (400/690V Δ/Y in sizes BX-BE 160 and BX- BE 180), 50 Hz motors, with a tolerance of ±10%. Standard BN/M motors are designed to operate from a rated voltage 230/400V Δ/Y (400/690V Δ/Y for frame sizes BN 160 through BN 200) 50 Hz, with ±10% tolerance.

M3.2 Standards

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

(F01)

Title	CEI	IEC
General requirements for rotating electrical machines	**CEI EN 60034-1**	**IEC 60034-1**
Terminal markings and direction of rotation of rotating machines	**CEI 2-8**	**IEC 60034-8**
Methods of cooling for electrical machines	**CEI EN 60034-6**	**IEC 60034-6**
Dimensions and output ratings for rotating electrical machines	**EN 50347**	**IEC 60072**
Classification of degree of protection provided by enclosures for rotating machines	**CEI EN 60034-5**	**IEC 60034-5**
Noise limits	**CEI EN 60034-9**	**IEC 60034-9**
Classification of type of construction and mounting arrangements	**CEI EN 60034-7**	**IEC 60034-7**
Rated voltage for low voltage mains power	**CEI 8-6**	**IEC 60038**
Vibration level of electric machines	**CEI EN 60034-14**	**IEC 60034-14**
Efficiency classes of single-speed, three-phase, cage-induction motors (IE code)	**CEI EN 60034-30-1**	**IEC 60034-30-1**
Standard method for determining losses and efficiency from tests	**CEI EN 60034-2-1**	**IEC 60034-2-1**

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

(F02)

DIN VDE 0530	Germany
BS5000 / BS4999	Great Britain
AS 1359	Australia
NBNC 51 - 101	Belgium
NEK - IEC 34	Norway
NF C 51	France
OEVE M 10	Austria
SEV 3009	Switzerland
NEN 3173	Netherlands
SS 426 01 01	Sweden

M3.3 Directives 2006/95/EC (LVD) and 2004/108/EC (EMC)

BX, BE, BN, MX, ME and M motors meet the requirements of Directives 2006/95/EC (Low Voltage Directive) and 2004/108/EC (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, EN 61000-6-2, EN 61000-6-4.
Motors with FD brakes, when fitted with the suitable capacitive filter at rectifier input (option **CF**), meet the emission limits required by Standard EN 61000-6-3:2007 “Electromagnetic compatibility - Generic Emission Standard - Part 6-3 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.

M3.4 EU Directive 2012/19/EU - Information on disposal

This product should not be mixed with general household waste. Disposal has to be carried out in conformity with EU Directive 2012/19/EU where established, and in accordance to national regulations.
Fulfill disposal in accordance with any other legislation in force throughout the country.

M3.5 Tolerances

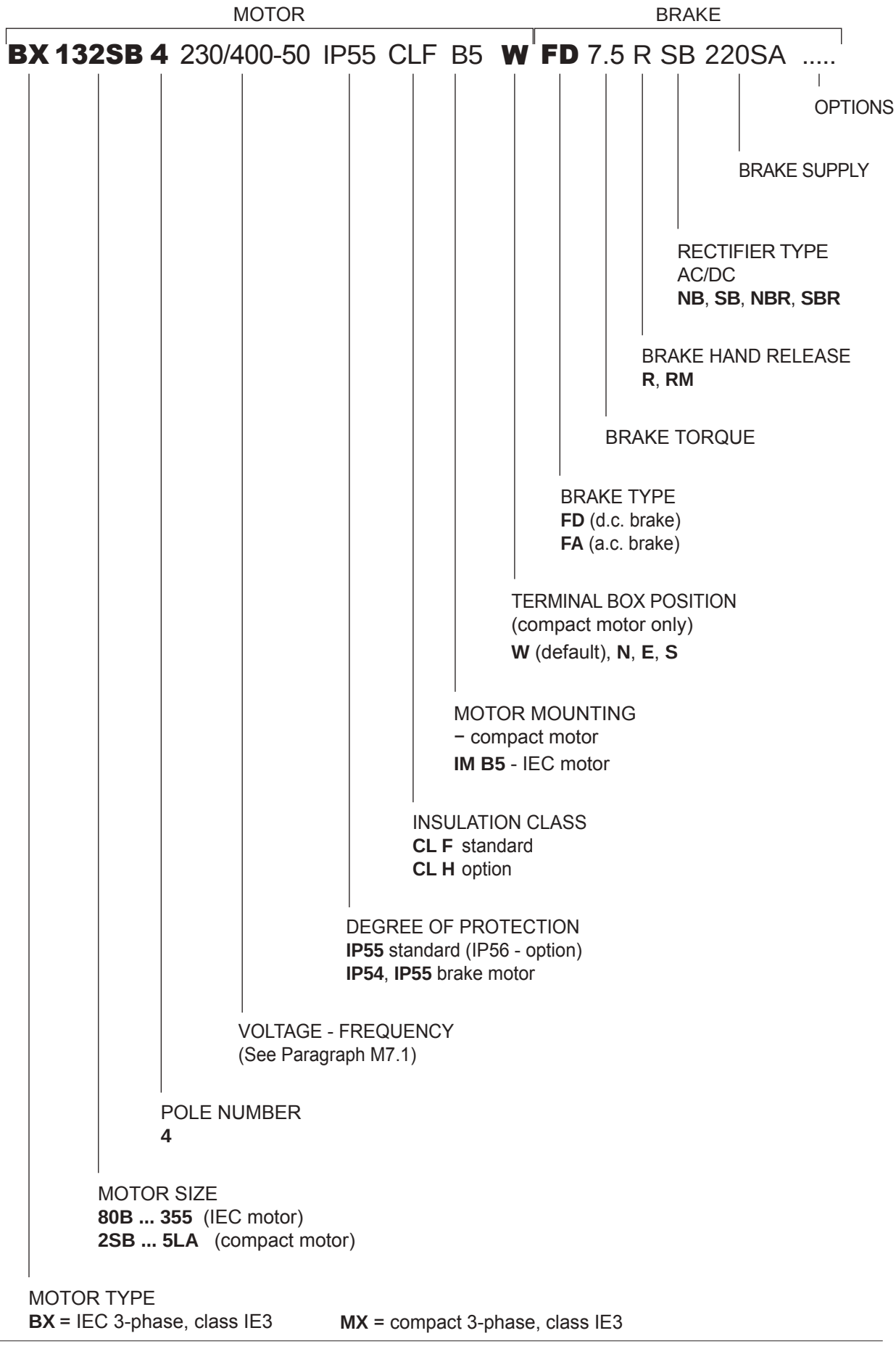
As per the Norms CEI EN 60034-1, applicable the tolerances here below apply to the following quantities.

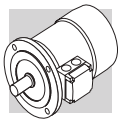
(F03)

-0.15 (1 - η) P ≤ 50kW	Efficiency
-(1 - cosφ)/6 min 0.02 max 0.07	Power factor
±20% *	Slip
+20%	Locked rotor current
-15% +25%	Locked rotor torque
-10%	Max. torque

(*) ± 30% for motors with Pn < 1 kW

M4 MOTOR DESIGNATION





MOTOR

BE **90LA** **4** 230/400-50 IP55 CLF B5 **W** .....

OPTIONS

TERMINAL BOX POSITION
(compact motor only)
W (default), **N**, **E**, **S**

MOTOR MOUNTING
− compact motor
IM B5 - IEC motor

INSULATION CLASS
CL F standard
CL H option

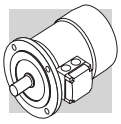
DEGREE OF PROTECTION
IP55 standard (IP56 - option)

VOLTAGE - FREQUENCY
(See Paragraph M7.1)

POLE NUMBER
2, **4**, **6**

MOTOR SIZE
71B ... 180L (IEC motor)
2SA ... 5LA (compact motor)

MOTOR TYPE
BE = IEC 3-phase, class IE2 **ME** = compact 3-phase, class IE2



MOTOR | BRAKE

BN 90LA 4 230/400-50 IP55 CLF B5 **W** **FD** 7.5 R SB 220SA .....

OPTIONS

BRAKE SUPPLY

RECTIFIER TYPE
AC/DC
NB, **SB**, **NBR**, **SBR**

BRAKE HAND RELEASE
R, **RM**

BRAKE TORQUE

BRAKE TYPE
FD (d.c. brake)
FA (a.c. brake)

TERMINAL BOX POSITION
(compact motor only)
W (default), **N**, **E**, **S**

MOTOR MOUNTING
− compact motor
IM B5 - IEC motor

INSULATION CLASS
CL F standard
CL H option

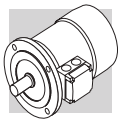
DEGREE OF PROTECTION
IP55 standard (IP56 - option)
IP54, **IP55** brake motor

VOLTAGE - FREQUENCY
(See Paragraph M7.1)

POLE NUMBER
2, **4**, **6**, **2/4**, **2/6**, **2/8**, **2/12**, **4/6**, **4/8**

MOTOR SIZE
56A ... 200LA (IEC motor)
0B ... 5SB (compact motor)

MOTOR TYPE
BN = IEC 3-phase **M** = IEC compact 3-phase



M5 VARIANTS AND OPTIONS

M5.1 Variants

(F04)

Description		Default	Option	Page
Voltage (BN - BE - BX) ≤ 132		230/400/50		506
Voltage (BN - BE - BX) ≥ 160		400/690/50		
Protection class	BX - BE - BN - MX - ME - M	IP 55	IP 56	503
	BX_FD - BX_FA - BN_FD - BN_FA MX_FD - MX_FA - M_FD - M_FA	IP 54	IP 55	
	BX_FD ≥ 200	IP 55		
	BX...K - BX... K_FDK	IP 55	IP 56	
Insulation class		CLF	CLH	512
Design version	BX - BE - BN	**B5** **B5 R**		502

Default values.

M5.2 Options

(F05)

Description	Catalogue numbers								Availability	Page
Thermal protective devices	**D3**	**K1**	**E3**						BX - BE - BN MX - ME - M	529
50 Hz normalized power	**PN**								BN M	508
Feedback devices	**EN1**	**EN2**	**EN3**	**EN4**	**EN5**	**EN6**	**EN7**	**EN8***	BX - BE - BN MX - ME - M	537 538
Anti-condensate heaters	**H1**	**NH1**							BX - BE - BN MX - ME - M	532
Tropicalized windings	**TP**								BX - BE - BN MX - ME - M	533
Double-extended shaft	**PS**								BX - BE - BN MX - ME - M	533
Rotor balancing grade B	**RV**								BX - BE - BN MX - ME - M	534
External mechanical protections	**RC**	**TC**							BX - BE - BN MX - ME - M	537
Forced ventilation	**U1**	**U2****							BX - BE - BN MX - ME - M	535 536
Insulated Bearings	**IB***								BX MX	539
Certification CSA/UL	**CUS**								BX - BE - BN MX - ME - M	509
Bureau of Indiand Standard Certification	**BIS**								BE ME	510
China Compulsory Certification	**CCC**								BX - BE - BN MX - ME - M	511
China Energy Label	**CEL**								BX MX	511
NBR Certification	**NBR**								BX MX	512
EECA Ceertification	**EECA**								BX MX	512
Plug connector	**CON**								BX - BE - BN MX - ME - M	529
Surface protection	**C_**								BX - BE - BN MX - ME - M	540
Painting	**RAL**								BX - BE - BN MX - ME - M	540
Certificates	**ACM**								BX - BE - BN MX - ME - M	541
Inspection certificate	**CC**								BX - BE - BN MX - ME - M	541
Vertical Mounting	**VM***								BX MX	539
Backstop device	**AL**	**AR**							MX - ME - M	534
Type of duty	**S2**	**S3**	**S9**						BN M	513 514

*Only for BX ≥ 200 and BX ≥ 200K ** Only for motors BN

M5.3 Brake-related options

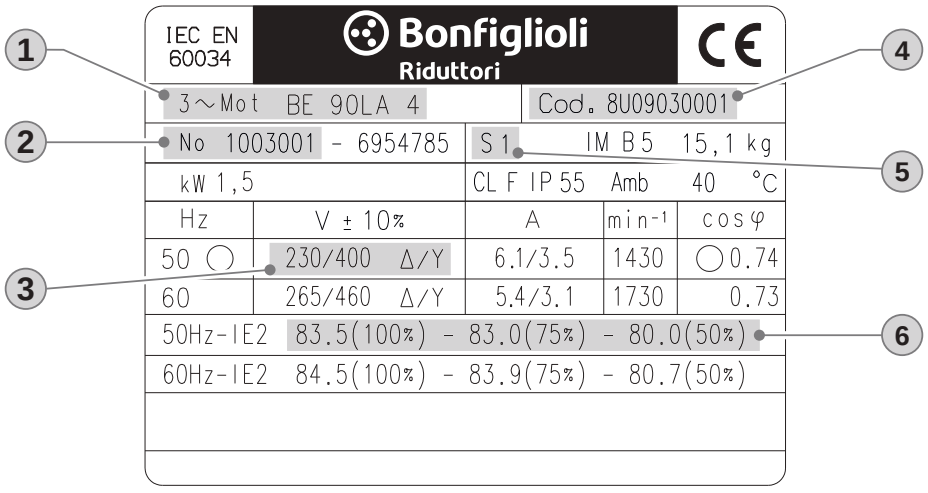
(F06)

Description	Catalogue numbers				Availability	Page
Brake torque	Refer to the specific brake type					521 524
Manual release lever	**R**	**RM**			BX - BN MX - M	526
Release lever orientation	**AB**	**AA**	**AC**	**AD**	BX - BN MX - M	527
DC brake rectifier	**NB**	**NBR**	**SB**	**SBR**	BX - BN MX - M	520
Soft-start flywheel	**F1**				BN M	528
Capacitive filter	**CF**				BX - BN MX - M	528
Brake separate power supply (*)	**...SA**	**...SD**			BX - BN MX - M	527
Brake functionality check	**MSW**				BX - BN MX - M	532
Additional cable entry for brake motors	**IC**				BX - BN MX - M	532

(*) Specify voltage.

Default values.

M5.4 Example of identification nameplate



① BONFIGLIOLI Motor type
② Serial number
③ Rated voltage
④ Motor code
⑤ Type of duty: S1 Continuous duty
⑥ IE Class, Efficiency at: 4/4 - 3/4 - 2/4 load

M6 MECHANICAL FEATURES

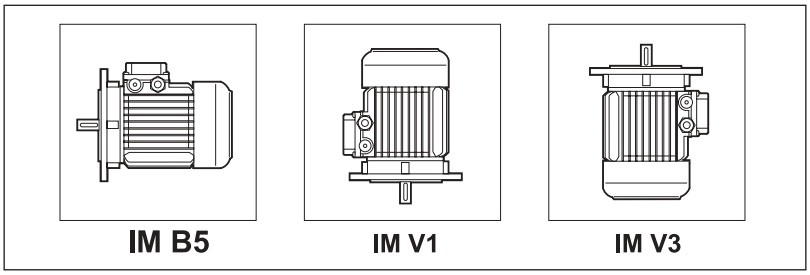
M6.1 Versions

EC-normalised BX, BE and BN motors are available in the design versions as indicated in the table below here after as per Standards EN 60034-7 (BX/BE), CEI EN 60034-14 (BN).

Mounting versions are:
IM B5 (basic)
IM V1, IM V3 (derived)

IM B5 design motors can be installed in positions IM V1 and IM V3; in such cases, the basic design IM B5 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

(F07)



For Motor BX≥200 and BX≥200K it is necessary to select VM options when vertically mounted.

If the motor will be mounted with DE facing downwards, selection of RC option is recommended. This has to be specified during the ordering phase because not present in standard motor version.

Flange output motors are also available with reduced coupling dimensions, as indicated in the table below - executions **B5R**. Their use in combination with gearboxes must be however coherent with the maximum installable power on gearboxes themselves (see chapters “Motors availability”). In case this condition is not met need to contact the Technical Service for the checking of the combination.

(F08)

	BN/BE 71	BX/BE/BN 80	BX/BE/BN 90	BX/BE/BN 100	BX/BE/BN 112	BX/BE/BN 132
	DxE - Ø					
B5R(1)	11x23 - 140	14x30 - 160	19x40 - 200	24x50 - 200	24x50 - 200	28x60 - 250

(1) flange with through holes

M6.2 Degree of protection

IP..

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**).

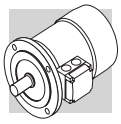
(F09)

		IP 54	IP 55	IP 56
BX - BE - BN	**MX - ME - M**	⛔	standard	on request
BX ≤ 180_FD **BX_FA** **BN_FD** **BN_FA**	**MX_FD** **MX_FA** **M_FD** **M_FA**	standard	on request	⛔
BX ≥ 200_FD **BX ≥ 200K_FD**		⛔	standard	⛔
BX ≥ 280K_FD		⛔	standard	on request

IP 5 5

0		Not protected
1	Ø 50 mm	Protected against extraneous solid bodies having Ø ≥ 50 mm
2	Ø 12 mm	Protected against extraneous solid bodies having Ø ≥ 12.5 mm
3	Ø 2,5 mm	Protected against extraneous solid bodies having Ø ≥ 2.5 mm
4	Ø 1 mm	Protected against extraneous solid bodies having Ø ≥ 1.0 mm
5		Protected against dust
6		No dust ingress

0		Not protected
1		Protected against vertical water drips
2	15°	Protected against vertical water drips inclined up to 15°
3	60°	Protected against rain
4		Protected against water splashes
5		Protected against jets of water
6		Protected against powerful jets of water
7	0-15 m, 1 m	Protected against the effects of temporary immersion
8	m	Protected against the effects of continuous immersion



M6.3 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.

M6.4 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.

M6.5 Noise

Noise levels, measured using the method prescribed by ISO 1680 Standards, are within the maximum levels specified by Standards CEI EN 60034-9.

M6.6 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.

M6.7 Terminal box

Terminal board features 6 studs for eyelet terminal connection (9 studs execution for US voltage “Dual Voltage”). A ground terminal is also supplied for earthing of the equipment. Terminals number and type are shown in the following table. For brake power supply, please read par. M9 (brake FD), M10 (brake FA). 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.

(F10)

		No. of terminals	Terminal threads
BX 80, BX 90 **BE 80, BE 90** **BN 56 ... BN 90**	**MX2, MX3** **ME2** **M05 ... M2**	6	M4
BX 100 ... BX 132 **BE 100 ... BE 132** **BN 100 ... BN 160MR**	**MX3, MX4** **ME3, ME4** **M3 ... M4**	6	M5
BX 160 - BE 160 ... BE 180M **BN 160M ... BN 180M**	**ME5** **MX5 - M5**	6	M6
BX 180 - BE 180L **BN 180L ... BN 200L**	–	6	M8
BX 200 ... BX 250 **BX 200K ... BX 250K**	–	6	M10
BX 280 ... BX 355 **BX 280K ... BX 355K**	–	6	M12
BX 80 ... BX 132 **BE 80 ... BE 132** **BN 63 ... BN 160MR**	**MX2 ... MX4** **ME2 ... ME4** **M05 ... M4**	9	M4
BX 160 ... BX 180 **BE 160 ... BE 180** **BN 160M ... BN 200L**	**MX5** **ME5** **M5**	9	M6

M6.8 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.

(F11)

		Cable gland and dimensions		Maximum cable diameter allowed [mm]
BN 63	**M05**	2 x M20 x 1.5	1 Hole on each side	13
BN 71 - BE 71	**M1**	2 x M25 x 1.5		17
BX 80, BX 90 - BE 80, BE 90 **BN 80, BN 90**	**MX2, MX3 - ME2** **M2**	2 x M25 x 1.5		17
BX 100, BX 112 - BE 100, BE 112 **BN 100**	**MX3, MX4 - ME3** **M3**	2 x M32 x 1.5	2 Holes on each side	21
		2 x M25 x 1.5		17
BN 112	–	2 x M32 x 1.5		21
		2 x M25 x 1.5		17
BX 132 - BE 132 **BN 132 ... BN 160MR**	**MX4 - ME4** **M4**	4 x M32 x 1.5		21
BX 160 - BE 160, BX 180 - BE 180 **BN 160M ... BN 200L**	**MX5 - ME5** **M5**	2 x M40 x 1.5	Pivoting, 4 x 90°	28
BX 200 ... BX 355 **BX 200K ... BX 355K**	–	2 x M63 x 1.5	Pivoting, 4 x 90°	45

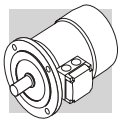
M6.9 Bearings

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

(F12)

	DE	**NDE**	
	MX, ME, M	**M**	**M_FD, M_FA**
M05	6004 2Z C3	6201 2Z C3	6201 2RS C3
M1	6004 2Z C3	6202 2Z C3	6202 2RS C3
MX2 - ME2 - M2	6007 2Z C3	6204 2Z C3	6204 2RS C3
MX3 - ME3 - M3	6207 2Z C3	6206 2Z C3	6206 2RS C3
MX4 - ME4 - M4	6309 2Z C3	6308 2Z C3	6308 2RS C3
MX5 - ME5 - M5	6309 2Z C3	6309 2Z C3	6309 2RS C3

	DE	**NDE**	
	BX, BE, BN	**BX, BE, BN**	**BN_FD** **BN_FA**
BN 56	6201 2Z C3	6201 2Z C3	–
BN 63	6201 2Z C3	6201 2Z C3	6201 2RS C3
BN 71 - BE 71	6202 2Z C3	6202 2Z C3	6202 2RS C3
BX 80 - BE 80 **BN 80**	6204 2Z C3	6204 2Z C3	6204 2RS C3
BX 90 - BE 90 **BN 90**	6205 2Z C3	6205 2Z C3	6305 2RS C3
BX 100 - BE 100 **BN 100**	6206 2Z C3	6206 2Z C3	6206 2RS C3
BX 112 - BE 112 **BN 112**	6306 2Z C3	6306 2Z C3	6306 2RS C3
BX 132 - BE 132 **BN 132**	6308 2Z C3	6308 2Z C3	6308 2RS C3
BN 160MR	6309 2Z C3	6308 2Z C3	6308 2RS C3
BX 160M/L **BE 160M/L** **BN 160M/L**	6309 2Z C3	6309 2Z C3	6309 2RS C3
BN 180M	6310 2Z C3	6309 2Z C3	6309 2RS C3
BX 180M/L **BE 180M/L** **BN 180L**	6310 2Z C3	6310 2Z C3	6310 2RS C3



(F13)

	DE	NDE	
	BX, BE, BN	BX, BE, BN	BN_FD BN_FA
BN 200L BX 200 BX 200K	6312 2Z C3 6312/C3	6310 2Z C3 6210/C3*	6310 2RS C3
BX 225 BX 225K	6313/C3*	6212/C3*	-
BX 250 BX 250K	6315/C3*	6213/C3*	-
BX 280 BX 280K	6316/C3*	6316/C3*	-
BX 315 BX 315K	6319/C3**	6316/C3**	-
BX 355 BX 355K	6322/C3**	6316/C3**	-

*Note: Regreasable bearings with M6x1 Greasing Device
**Note: Regreasable bearings with M10x1 Greasing Device

M7 ELECTRICAL CHARACTERISTICS

M7.1 Voltage

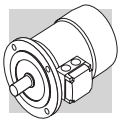
Single speed motors are provided in standard execution either for nominal voltage 230 / 400 V Δ/Y, 50 Hz, or 400 / 690 V Δ/Y, 50 Hz, with a voltage tolerance of □ 10%, according to what is specified on the below table.
Note: Motor nominal voltage/frequency also depends on the selection of options related to energy certifications for specific markets. Table below, then, has to be intended only as a guideline, for more details on the available Voltages/Frequencies as a function of the selected certification, please refer to paragraph M7.5 - M7.10.

On all the motors BN and M, for which the voltage / frequency configuration is not included on the below table, the voltage tolerance is reduced down to □ 5%.
For the operation out of the tolerance boundaries, the temperature may exceed by 10 K the limit provided by the adopted insulation class.
The motors are suitable for operation on distribution European grid with voltage complying with the pubblication IEC 60038.

(F14)

Efficiency class			V_{mot} ± 10 % 3 ~	Configuration
IE3	BX 80 ... BX 132	MX2 ... MX4	230 / 400 V - Δ/Y - 50 Hz	standard
	BX 160 ... BX 355	MX 5	400 / 690 V - Δ/Y - 50 Hz	standard
	BX 200LAK ... BX 355MCK	MX 5	460 / 800 V - Δ/Y - 60 Hz	standard
IE2	BE 71 ... 132	ME2 ... ME4	230 / 400 V - Δ/Y - 50 Hz	standard
			460 V Y - 60 Hz[1]	standard
			400 / 690 V - Δ/Y - 50 Hz	At request, carries no extra charge
	BE 160, BE 180	ME5	400 / 690 V - Δ/Y - 50 Hz	standard
			460 V Δ - 60 Hz[1]	standard
IE1	BN 56 ... BN 132	M0 ... M4	230 / 400 V - Δ/Y - 50 Hz	standard
			400 / 690 V - Δ/Y - 50 Hz	At request, carries no extra charge
			460 V Y - 60 Hz	standard
	BN 160 ... BN 200	M5	400 / 690 V - Δ/Y - 50 Hz	standard
			460 V Δ - 60 Hz	standard

[1] 4 pole motor only



The only rated voltage for motors type et 50 Hz and all double speed motors is 400 V. Applicable tolerances as per CEI EN 60034-1.

The table below shows the wiring options available.

(F15)

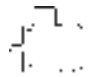
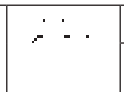
Number of poles		Winding connection
2	**BE 80 ... BE 160, BN 63 ... BN 200**	Δ / Y (²)
4	**BX 80 ... BX 355** **BX 200LAK ... BX 355MCK** **BE 80 ... BE 180, BN 56 ... BN 200**	
6	**BE 90 ... BE 160, BN 63 ... BN 200**	
8	**BN 71 ... BN 132**	
2/4	**BN 63 ... BN 132**	Δ / YY (Dahlander)
2/6	**BN 71 ... BN 132**	Y / Y (Two windings)
2/8	**BN 71 ... BN 132**	
2/12	**BN 80 ... BN 132**	
4/6	**BN 71 ... BN 132**	
4/8	**BN 80 ... BN 132**	Δ / YY (Dahlander)

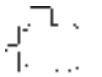
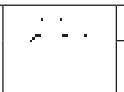
(²) Motors with voltage in ratio 2 (ex. 230/460 - 60) will be equipped with a 9 pin terminal box with winding connection either Δ Δ/ Δ or YY / Y (except 6 pole BN 63 Δ / Y)

M7.2 Frequency

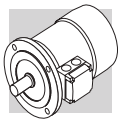
Rated output power BN / M for 60 Hz operation is shown in the following diagram.

(F16)

		P_n [kW]			
		2P	**4P**	**6P**	**8P (*)**
BN 56A	**–**	–	0.07	–	–
BN 56B	**M0B**	–	0.1	–	–
BN 63A	**M05A**	0.21	0.14	0.1	–
BN 63B	**M05B**	0.3	0.21	0.14	–
BN 63C	**M05C**	0.45	0.3	–	–
BN 71A	**–**	0.45	0.3	0.21	0.1
–	**M1SC**	–	–	0.21	–
BN 71B	**M05SD**	0.65	0.45	0.3	0.14
BN 71C	**M1LA**	0.9	0.65	0.45	–
BN 80A	**–**	0.9	0.65	0.45	0.21
BN 80B	**M2SA**	1.3	0.9	0.65	0.30
BN 80C	**M2SB**	1.8	1.3	0.9	–
BN 90S		–	1.3	0.9	0.45
BN 90SA	**–**	1.8	–	–	–
BN 90SB		2.2	–	–	–
BN 90L	**M3SA**	2.5	–	1.3	0.65
BN 90LA		–	1.8	–	–
BN 90LB	**–**	–	2.2	–	–

		P_n [kW]			
		2P	**4P**	**6P**	**8P (*)**
BN 100L	**M3LA**	3.5	–	–	–
BN 100LA		–	2.5	1.8	0.9
BN 100LB	**M3LB**	4.7	3.5	2.2	1.3
BN 112M	**–**	4.7	4.7	2.5	1.8
–	**M3LC**	–	4.7	2.5	–
BN 132S	**M4SA**	–	6.5	3.5	2.5
BN 132SA		6.5	–	–	–
BN 132SB	**M4SB**	8.7	–	–	–
BN 132M	**M4LA**	11	–	–	3.5
BN 132MA		–	8.7	4.6	–
BN 132MB	**M4LB**	–	11	6.5	–
BN 160MR	**M4LC**	12.5	12.5	–	–
BN 160M	**M5SA**	–	–	8.6	–
BN 160MB	**–**	17.5	–	–	–
–	**M5SB**	17.5	17.5	–	–
BN 160L	**–**	21.5	17.5	12.6	–
–	**M5SC**	21.5	–	–	–
BN 180M	**M5LA**	24.5	21.5	–	–
BN 180L	**–**	–	25.3	17.5	–
BN 200L	**–**	–	34	–	–
BN 200LA	**–**	34	–	22	–

(*) Excluded M_ motors



BX / BE / MX / ME motors are available at 60 Hz on a 4 pole configuration only, and their power rating is the same as their 50 Hz counterpart. Double speed BN / M motors supplied at 60 Hz will have an increase of nominal power, referred to 50 Hz, equal to 15%, whereas double speed BX / BE / MX / ME motors are not available. If a nominal power rating, equal to the normalised nominal power rating at 50 Hz, was requested to be on a nameplate of a motor meant to be voltage supplied at 60 Hz, the PN option shall be specified on the motor designation. Motors normally designed for a 50 Hz frequency may be used on a 60 Hz operating grid, but the related data shall be updated according to the following table. Motors designated for 50 Hz operation show on the nameplate also the values for 60 Hz operation (excluding motors in CUS execution and brake motors). See the following table.

(F17)

	50 Hz	**60 Hz**			
	V - 50 Hz	**V** - 60 Hz	**Pn** - 60 Hz	$\mathbf{M_n}$, $\mathbf{M_a/M_n}$ - 60 Hz	**n** [min^{-1}] - 60 Hz
BX/MX BE/ME	**230/400 Δ/Y**	265 - 460 Δ Y	1	0.83	1.2
	400/690 Δ/Y	460 Δ			
BN/M	**230/400 Δ/Y**	220 - 240 Δ			
		380 - 415 Y			
	400/690 Δ/Y	380 - 415 Δ			
BN/M	**230/400 Δ/Y**	265 - 280 Δ	1.15	1	1.2
		440 - 480 Y			
	400/690 Δ/Y	440 - 480 Δ			

M7.3 Ambient temperature

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 table below.

(F18)

Ambient temperature (°C)	40°	45°	50°	55°	60°
Permitted power as a % of rated power	100%	95%	90%	85%	80%

Should a derating factor higher than 15% apply please consult factory.

M7.4 50 HZ normalized power

PN

With this option, motor name plate includes 50 Hz normalized power information even when motor is designated for operation with 60 Hz power mains. For 60 Hz supplies along with voltages 230/460V and 575V the PN option is applied by default.

M7.5 Motors for USA and Canada

CUS

CUS option is available in NEMA Design C execution for BN, BE, M, ME motors, and NEMA Design B for BX motors, with regards to the electrical features. Motors are certified in compliance with CSA (Canadian Standard) C22.2 N° 100 and UL (Underwriters Laboratory) UL 1004-1 standards, as stated on UL file E308649.
BN, BE, M, ME motors nameplates show the below marks:

BX≤180 motors nameplates show the below marks and are certified in compliance with the energy efficiency standards in effect in the USA and Canada, respectively provided by DOE (10 CFR Part 431) and NRCan (Energy Efficiency Regulations), tested according to CSA C390 standard.

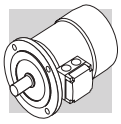
BX 100 motors are available for the USA only and not for Canada, and the related marks reported on the nameplates are the following:

BX≥200K motors shows on nameplate the logo reported below and are compliant to energy efficiency regulations of USA and Canada, respectively established from DOE (10 CFR Part 431) and from NRCan (Energy Efficiency Regulations), and tested in accordance to CSA C390.

NOTES:
Starting from **June, 1st 2016**, CUS motors whose efficiency is below IE3 (i.e. “Premium Efficiency”) cannot be any longer sold in the USA and Canada, unless one or more of the following conditions apply:

- Double speed motors;
- Motors plated for a non - continuous duty (<80%);
- Motors intended to be operated through variable frequency drive only (properly equipped with “Inverter Duty Only” label, or similar).

CUS option is selectable in combination to U1 or U2 only for BX≥200K.
US power mains voltages and the corresponding rated voltages to be specified for the motor are indicated in the following table:



(F19)

Frequency	Mains voltage	V_{mot}
60 Hz	208 V	**200 V**
	240 V	**230 V**
	480 V	**460 V**
	600 V	**575 V**

BX motor with CUS option are available with the following nominal Voltage/Frequency combinations:

(F20)

	V_{mot}
BX ≤ 132	265/460 - 60 Hz
BX ≤ 180	230/460 - 60 Hz 330/575 - 60 Hz
BX ≥ 160 BX ≥ 200K	460/800 - 60 Hz

CUS option is applicable onto 50 Hz operating motors as well (motors BX, MX excluded).

Motors with voltage in ratio 2 (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 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:

(F21)

BX_FD - BN_FD **MX_FD - M_FD**
Connected to terminal box 1~230V c.a.

BX_FA - BN_FA **MX_FA - M_FA**		Power supply
Separate power supply	230V Δ	230SA
Separate power supply	460V Y	460SA

M7.6 Motors certified for India

BIS

Low voltage motors ≥0.37kW manufactured or imported in India must be certified from Bureau of Indian Standard and provided with a mark certifying motor compliance to IS 12615 standard.
BE motors with power from 0.37 to 3.7kW included are avaiable with the above mentioned certification and, when BIS option is selected, are provided with the nameplate reporting the following logo:

BE motor with BIS option are available with the following nominal Voltage/Frequency combinations:

(F22)

	V_{mot}
71 ≤ BE ≤112	230/400 - 50 Hz

M7.7 China Compulsory Certification

CCC

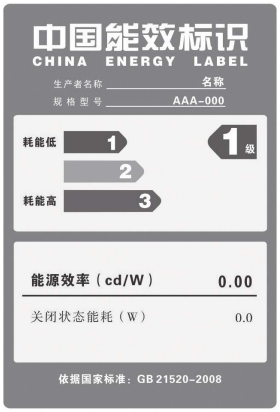
Electric motors destined for sale in the People's Republic of China have to be certified under the CCC (China Compulsory Certification) system. BN motors of up to 7 Nm in rated torque are available with CCC certification and a special nameplate bearing the mark shown below:

CCC option is not currently available for IE3 motors.
CCC option is not currently available for servo - ventilated motors.

M7.8 Motor certified for China (China Energy Label)

CEL

Low voltage motors ≥0.75kW manufactured or imported in China must be certified and registered by the label office and provided with an energy label certifying they meet the energy efficiency levels as defined in GB18613-2012.
BX motors with power from 30 to 355kW included are available with the above mentioned certification and, when CEL option is selected, are provided with the following sticker applyed to the motor:



BX motors with CEL option are available with the following nominal Voltage/Frequency combinations:

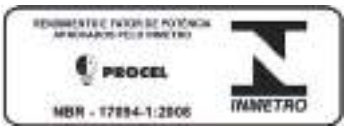
(F23)

	V_{mot}
BX ≥ 200	380/660 - 50 Hz

M7.9 Motors certified for Brazil

NBR

Brazilan laws regulamentates the manufacturing and importation of electric motor in the country. These have to be approved by NBR trough a declaration of the motor efficiency level at INMETRO. Motor compliant to NBR must report the declared efficiency value and have to be provided with a specific NBR nameplate and the additional mark shown in picture below:
NBR option is available for BX ... K motors with power from 30 to 355kW included



BX motors with NBR option are available with the following nominal Voltage/Frequency combinations:

(F24)

	V_{mot}
BX ≥ 200K	440/760 - 60 Hz

M7.10 Motors certified for Australia

EECA

Electric motor covered by Australian/NewZeland's energy regulation must be listed in the national database Energyratig. Mootr with EECA option are registered in the previously mentioned database and can be sold in Australia and New Zeland.
EECA option is available for BX ... K motor with power from 30 to 355kW included.

BX motors with EECA option are available with the following nominal Voltage/Frequency combinations:

(F25)

	V_{mot}
BX ≥ 200K	400/690 - 50 Hz

M7.11 Insulation class

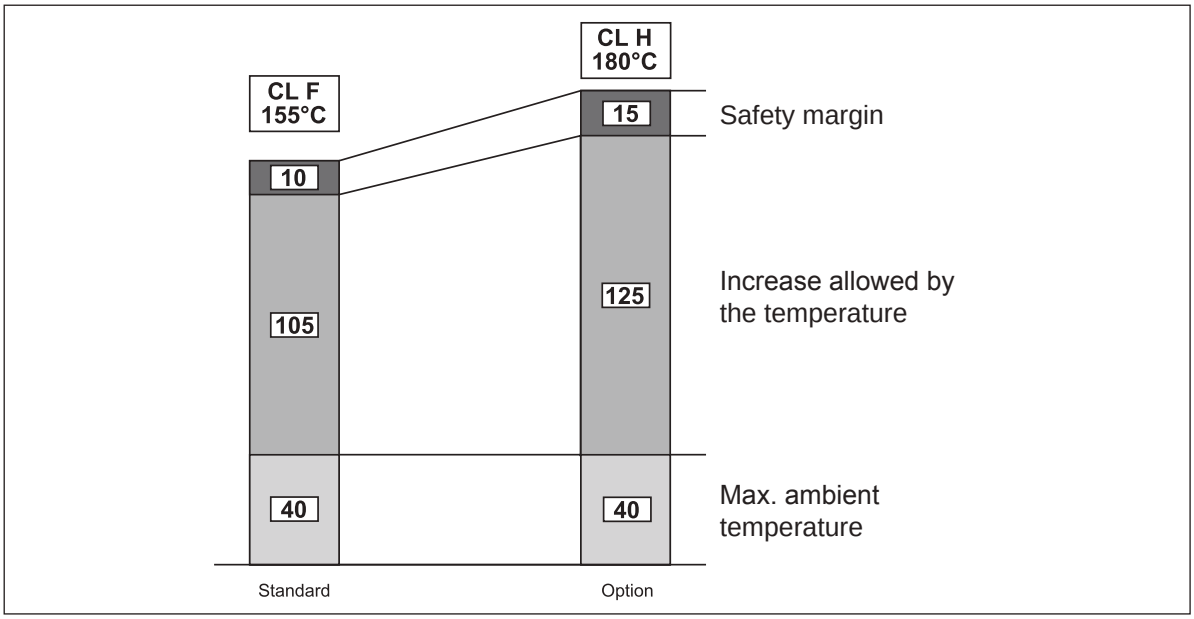
CL F

Bonfiglioli motors use class **F** insulating materials (enamelled wire, insulators, impregnation resins) as compare to the standard motor. In standard motors, stator windings over temperature normally stays below the 80 K limit corresponding to class B over temperature. 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.

CL H

Motors manufactured in insulation class **H** are available at request.
This option can be selected for motors compliant with CSA and UL standards (CUS option), only for BX≥200 and BX≥200K.

(F27)



M7.12 Type of duty

Unless otherwise specified, catalogue motor power refers to continuous duty S1. Any operating conditions other than S1 duty must be identified in accordance with duty cycle definitions laid down in standards CEI EN 60034-1. For duty cycles S2 and S3, the power increase co-efficient reported in the following table may be used. Please note that the table provided below applies to single-speed motors. As an alternative to S1 continuous duty, one of the following values can be specified at the product configuration stage (single speed motors only): S2, S3 or S9. The motor nameplate will be marked with an increased power rating to suit the type of duty, and with specific electrical data and a duty type of S2-30 min, S3-70% or S9 respectively. For further details, contact Bonfigliolis Technical Service. Please contact Bonfiglioli Engineering for the power increase coefficients applicable to switch-pole motors.

(F26)

	Type of duty						
	S2			**S3 ***			**S4 - S9**
	Duration (min)			Intermittence (I)			
	10	**30 (*)**	**60**	**25%**	**40%**	**70% (*)**	Contact us
f_m	1.35	1.15	1.05	1.25	1.15	1.1	

* Cycle duration must, in any event, be equal to or less than 10 minutes; if this time is exceeded, please contact our Technical Service.
(*) Default values from options (tab. F05).

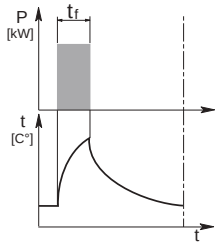
M7.12.1 Cyclic duration factor:

$$I = \frac{t_f}{t_f + t_r} \cdot 100 \qquad (01)$$

t_f = work time under constant load
t_r = rest time

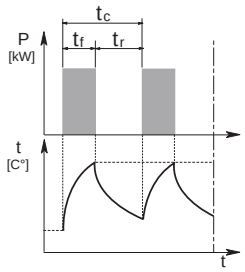
M7.12.2 Limited duration duty S2

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.



M7.12.3 Periodical intermittent duty S3:

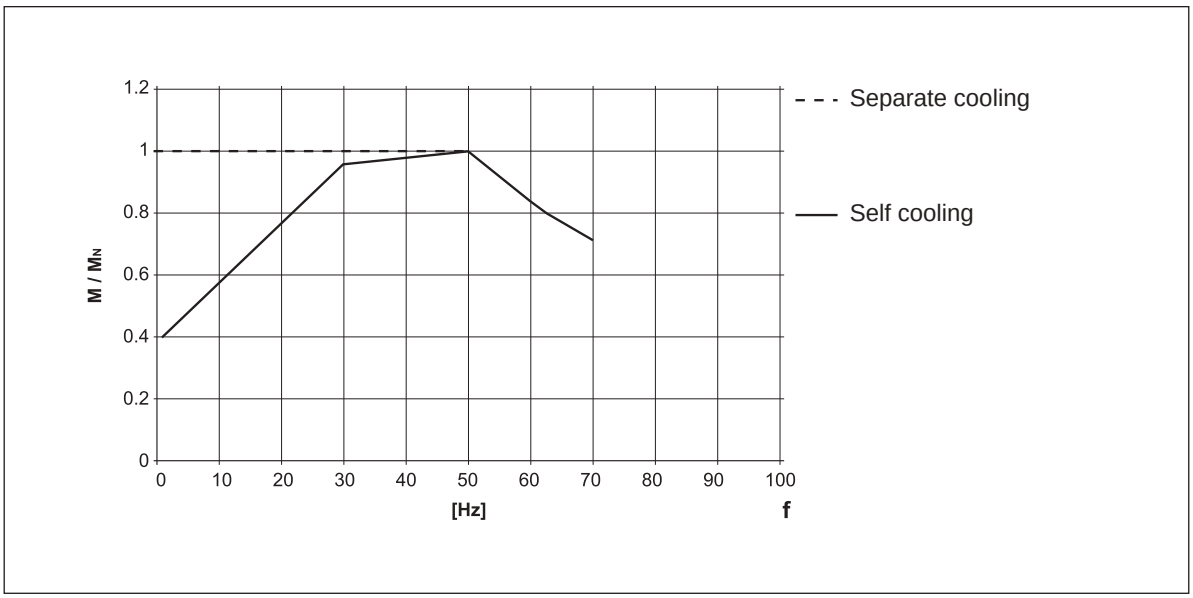
This type of duty is characterized by a sequence of identical operation cycles, each including a constant load operation period and a rest period.
For this type of duty, the starting current does not significantly influence overtemperature.



M7.13 Inverter-controlled motors

The electric motors Bonfiglioli 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 > 0.1µs at motor terminals). Typical torque/speed curves referred to S1 duty for motors with base frequency f_b = 50 Hz is are reported in the table below. 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 ($f/_{fb}$). As motor maximum torque decreases with $(f/_{fb})^2$, the allowed overloading must be reduced progressively.

(F28)



The following table reports the mechanical speed limit for motors operating above rated frequency:

(F29)

		n [min^{-1}]		
		2p	4p	6p
≤ BE 112 - BN 112	ME2, ME3 M05 ... M3	5200	4000	3000
≥ BE 132 - BN 132	ME4, ME5 M4, M5	4500	4000	3000
BX 80 ... BX 180	MX2 ... MX5		4000	

Above rated speed, motors generate increased mechanical vibration and fan noise. Class B rotor balancing is highly recommended in these applications. Installing a separate supply fan cooling may also be advisable. Remote-controlled fan and brake (if fitted) must always be connected direct to mains power supply.

M7.14 Permissible starts per hour, Z

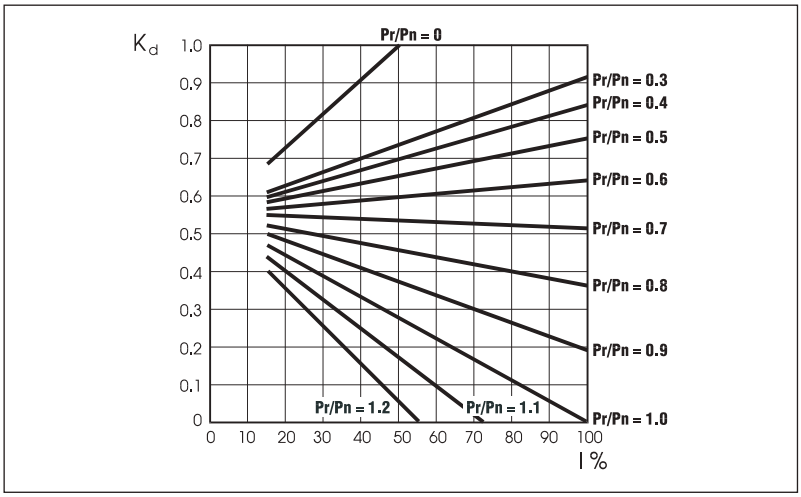
The rating charts of brakemotors lend the permitted number of starts Z_0, based on 50% intermittence and for unloaded operation.
The catalogue value represents the maximum number of starts per hour for the motor without exceeding the rated temperature for the insulation class F.
To give a practical example 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:

$$Z = \frac{Z_0 \cdot K_c \cdot K_d}{K_J} \qquad (02)$$

where:

$K_J = \frac{J_m + J_c}{J_m}$	inertia factor
$K_c = \frac{M_a - M_L}{M_a}$	torque factor
$K_d =$	load factor, see the following table

(F30)



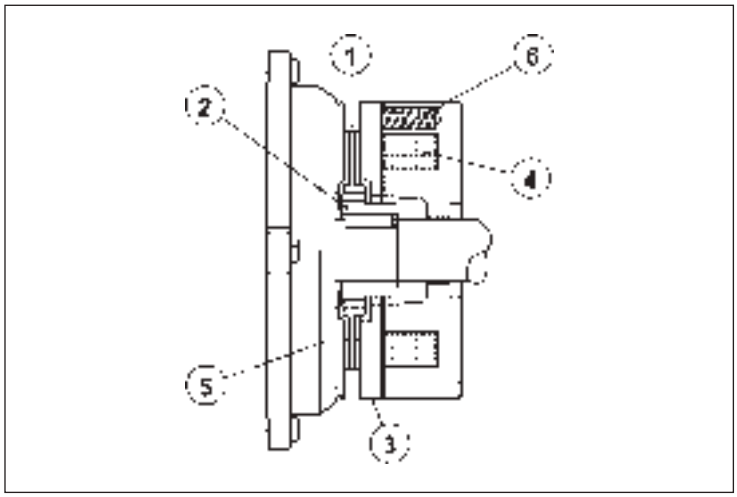
If actual starts per hour is within permitted value (Z) it may be worth checking that braking work is compatible with brake (thermal) capacity Wmax also given in tables (F38), (F41) and dependent on the number of switches (c/h).

M8 ASYNCHRONOUS BRAKE MOTORS

M8.1 Operation

Versions with incorporated brake use spring-applied DC (FD option) or AC (FA 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.

(F31)



Key:
① brake disc
② disc carrier
③ pressure plate
④ brake coil
⑤ motor rear shield
⑥ brake springs

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.

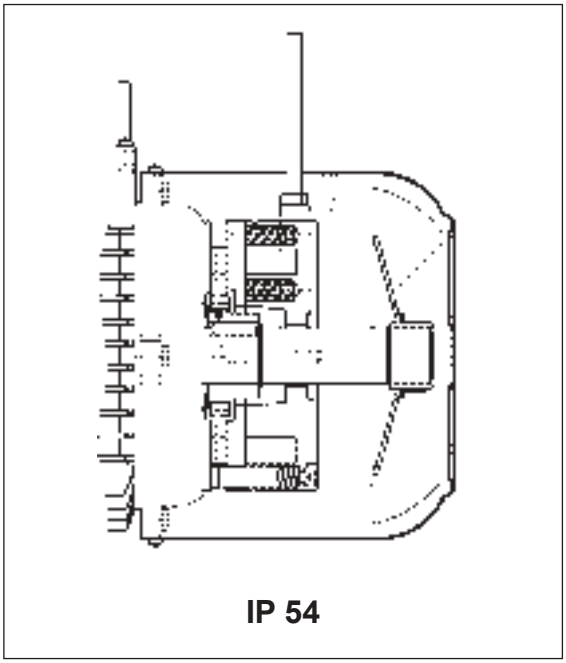
M8.2 Most significant features

- 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, EN4, EN5, EN6).
- Manual release lever (options **R** and **RM** for FD; option **R** for FA).
- Corrosion-proof treatment on all brake surfaces.
- Insulation class F.

M9 DC BRAKE MOTORS TYPE BX_FD, BN_FD, MX_FD and M_FD

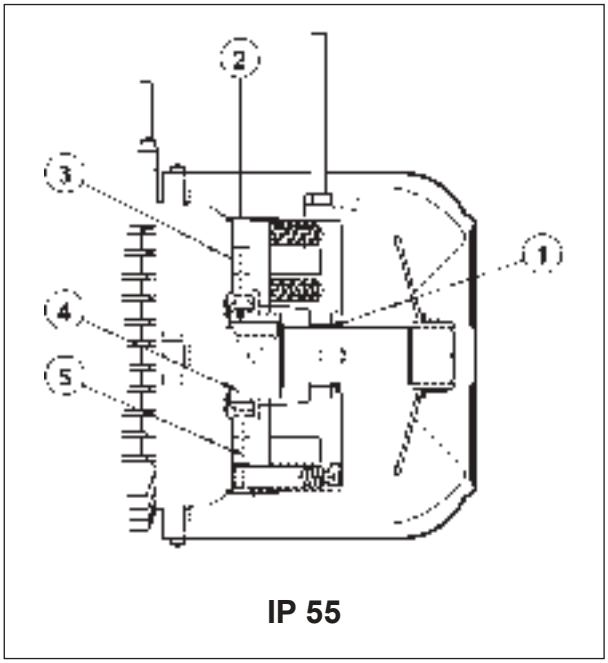
Frame sizes: BX 80 ... BX 355M, BX200LAK … BX 355MCK - BN 63 … BN 200L / MX2SB ... MX5LA - M05 ... M5
BE/ME motors may be available equipped with the FD brake, for further information please contact our Technical Department.

(F32)



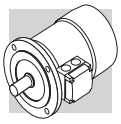
IP 54

(F33)



IP 55

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 device.
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 paragraph “BRAKE RELEASE SYSTEMS” 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.
For applications involving lifting and/or high hourly energy dissipation, contact Bonfiglioli’s Technical Service.



M9.1 Degree of protection

Standard protection class is IP54.
Brake motor FD is also available in protection class **IP55**, 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 shieldand brake disc
④ stainless steel hub
⑤ stainless steel brake disc

M9.2 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 VB is as indicated in the following table, regardless of mains frequency:

(F34)

2, 4, 6 P					**1 speed**
		BN_FD / M_FD		brake connected to terminal board power supply	separate power supply
		V_{mot} ± 10% 3 ~	V_B ± 10% 1 ~		
BX 80…BX 132 **BN 63…BN 132**	**MX2...MX4** **M05...M4LB**	230/400 V – 50 Hz	230 V	standard	specify **V_B SA** o **V_B SD**
BX 160…BX 180 **BN 160…BN 200**	**MX5** **M4LC...M5**	400/690 V – 50 Hz	400 V	standard	specify **V_B SA** o **V_B SD**

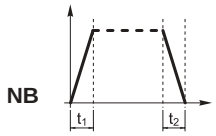
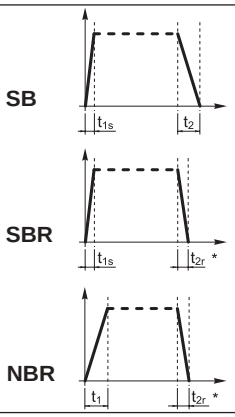
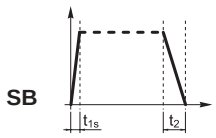
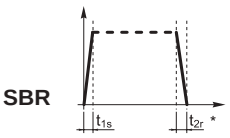
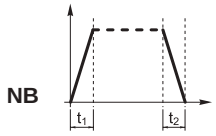
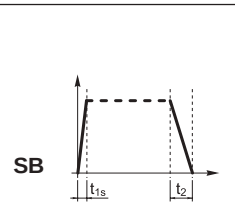
Switch-pole motors feature a separate power supply line for the brake with rectifier input voltage V_B as indicated in the table below:

(F35)

2/4, 2/6, 2/8, 2/12, 4/6, 4/8 P					**2 speed**
		BN_FD / M_FD		brake connected to terminal board power supply	separate power supply
		V_{mot} ± 10% 3 ~	V_B ± 10% 1 ~		
BN 63…BN 132	**M05...M4LB**	400 V – 50 Hz	230 V	⛔	specify **V_B SA** o **V_B SD**

The diode half-wave rectifier (VDC ≈ 0,45 x VAC) is available in versions **NB, SB, NBR** e **SBR**, as detailed in the table below:

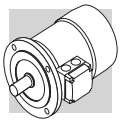
(F36)

		brake	standard	on request
BN 63	**M05**	**FD 02**		
BN 71	**M1**	**FD 03** **FD 53**		
BX 80 - BN 80	**MX2 - M2**	**FD 04**		
BX 90S - BN 90S	**—**	**FD 14**		
BX 90L - BN 90L	**—**	**FD 05**		
BX 100 - BN 100	**MX3 - M3**	**FD 15**		
—		**FD 55**		
BX 112 - BN 112	**—**	**FD 06S**		
BX 132 - BN 132 - BN 160MR	**MX4 - M4**	**FD 56** **FD 06** **FD 07**		
BX 160 - BN 160L - BN 180M	**MX5 - M5**	**FD 08**		
BX 180 - BN 180L - BN 200M	**—**	**FD 09**		
BX 200LA	**—**	**FD 20**		
BX 225SA	**—**	**FD 25**		
BX 250M - BX 315SA	**—**	**FD 30**		
BX 315SB - BX 315SC	**—**	**FD 160**		
BX 315MA - BX 355MA	**—**	**FD 250**		
BX 355MB - BX 355MC	**—**	**FD 400**		
BX 200LAK	**—**	**FD 8**		⛔
BX 225SAK - BX 225SBK	**—**	**FD 9**		
BX 250MAK	**—**	**FD 10**		
BX 280SAK - BX 315SAK	**—**	**FD 1000**		
BX 315SBK - BX 315SCK	**—**	**FD 1600**		
BX 355SAK - BX 355MCK	**—**	**FD 2500**	⛔	

(*) $t_{2c} < t_{2r} < t_2$

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.

Use of the **SB** rectifier is mandatory in the event of:
- high number of operations per hour
- reduced brake release response time
- brake is exposed to extreme thermal stress



Rectifiers **NBR** or **SBR** are available for applications requiring quick brake intervention (braking condition reinstatement) response.
These rectifiers complement the **NB** and **SB** types as their electronic 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.
Versions available: 230Vac ±10%, 400Vac ± 10%, 50/60 Hz (with power supply); 100Vdc ±10%, 180Vdc ± 10% (with SD option).

M9.3 FD brake technical specifications

The table below reports the technical specifications of DC brakes FD.

(F37)

Brake	Brake torque M_b [Nm] springs			Release		Braking		W_{max} per brake operation [J]			W	P
				t_1	$t_{1\,s}$	t_2	t_{2c}					
	6	4	2	[ms]	[ms]	[ms]	[ms]	10 s/h	100 s/h	1000 s/h	[MJ]	[W]
FD02	–	3.5	1.75	30	15	80	9	4500	1400	180	15	17
FD03	5	3.5	1.75	50	20	100	12	7000	1900	230	25	24
FD53	7.5	5	2.5	60	30	100	12					
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					
FD06S	60	40	20	–	80	220	25	20000	4800	550	70	55
FD56	–	75	37	–	90	250	20	29000	7400	800	80	65
FD06		100	50		100	250	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
FD20	260			100	170	340	-	80000	1700	1800	-	100
FD25	400			120	195	390	-	120000	19000	2000	-	110
FD30	1000			180	210	420	-	200000	28000	2900	-	200
FD160	1600			360	245	490	-	240000	36000	2600	-	336
FD250	2500			420	343	685	-	280000	47000	3700	-	400
FD400	4000			530	455	910	-	325000	51000	4500	-	420
FD8	400			176	78	236	-	65000	7000	650	-	85
FD9	600			324	138	176	-	120000	12000	1200	-	100
FD10	800			480	194	172	-	100000	16000	2000	-	150
FD1000	1000			252	-	375	-	220000	27000	2700	-	300
FD1600	1600			366	-	498	-	230000	35000	3500	-	340
FD2500	2500			660	-	880	-	590000	61000	6100	-	530

* brake torque values obtained with 9, 7 and 6 springs, respectively

** brake torque values obtained with 12, 9 and 6 springs, respectively

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. (F37) 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

The brake pad wear depends on the operating/ambient conditions (temperature, humidity, angular speed, specifica pressure); Therefore the declared wear rate must be considered as indicative.

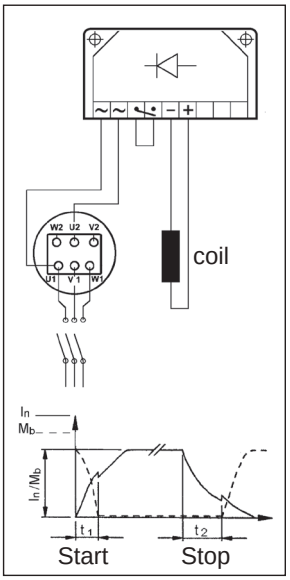
M9.4 FD brake connections

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 VB 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.

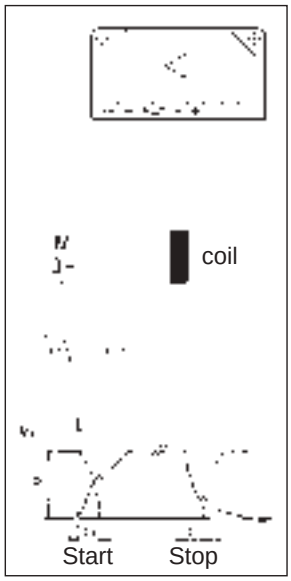
Table (F38) – Brake power supply from motor terminals and AC line interruption
Delayed stop time t_2 and function of motor time constants.
Mandatory when soft-start/stops are required.
Table (F39) – Brake coil with separate power supply and AC line interruption
Normal stop time independent of motor.
Achieved stop times t_2 are indicated in the table (F37).
Table (F40) – Brake coil power supply from motor terminals and AC/DC line interruption.
Quick stop with operation times t_{2c} as per table (F37).
Table (F41) – Brake coil with separate power supply and AC/DC line interruption.
Stop time decreases by values t_{2c} indicated in the table (F37).

The brake may be voltage supplied directly from the motor terminal box (from tab. F38 to tab. F41) only if the nominal voltage of the brake is the same as the smaller voltage of the motor.

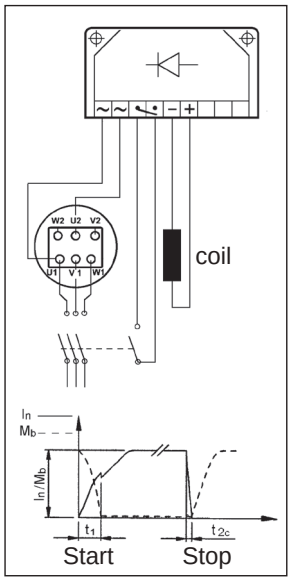
(F38)



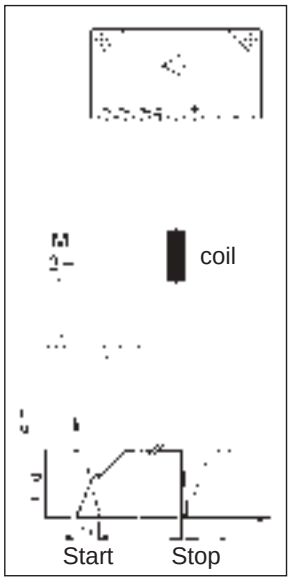
(F39)



(F40)



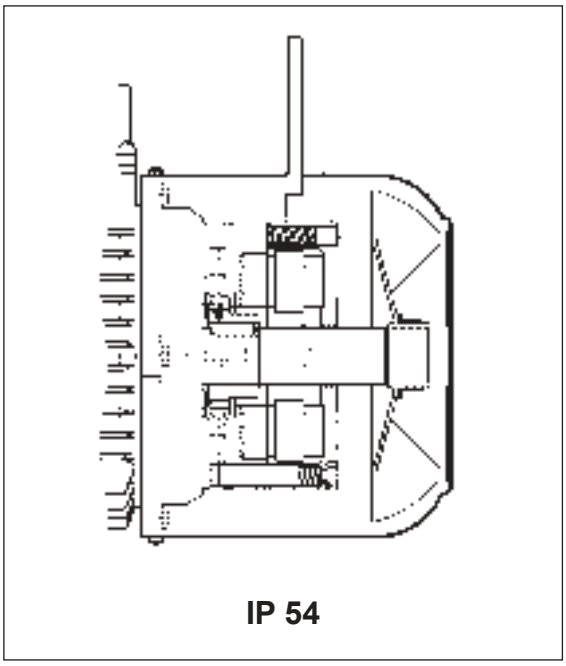
(F41)



M10 AC BRAKE MOTORS TYPE BX_FA, BN_FA, MX_FA and M_FA

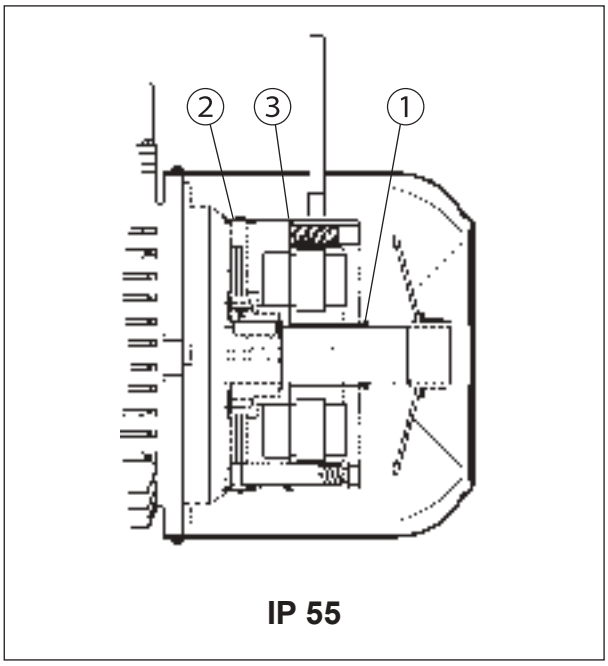
Frame sizes: BX 80 ... BX 160L - BN 63 … BN 180M / MX2SB ... MX5LA - M05 ... M5

(F42)



IP 54

(F43)



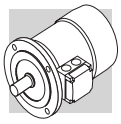
IP 55

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 device.
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. (F45).
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 variant at paragraph “BRAKE RELEASE SYSTEMS” for available release lever locations.
For applications involving lifting and/or high hourly energy dissipation, contact Bonfiglioli’s Technical Service.

M10.1 Degree of protection

Standard protection class is IP54.
Brake motor FA is also available in protection class **IP55**, which mandates the following variants:

① V-ring at N.D.E. of motor shaft
② dust and water-proof rubber boot
③ O-ring



M10.2 FA 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:

(F44)

	BX 80…BX 132 BN 63…BN 132	BX 160 BN 160…BN 180
single-pole motor	230Δ / 400Y V ±10% – 50 Hz	400Δ/ 690Y V ±10% – 50 Hz
	265Δ / 460Y ±10% - 60 Hz	460Y – 60 Hz

	BN 63…BN 132
switch-pole motors (separate power supply line)	230Δ / 400Y V ±10% – 50 Hz
	460Y - 60 Hz

Unless otherwise specified, standard brake power supply is 230Δ /400Y V - 50 Hz.

Special voltages in the 24…690 V, 50-60 Hz range are available at request.

M10.3 Technical specifications of FA brakes

(F45)

Brake	Brake torque M_b [Nm]	Release t_1 [ms]	Braking t_2 [ms]	W_{max} [J] 10 s/h	W_{max} [J] 100 s/h	W_{max} [J] 1000 s/h	W [MJ]	P [VA]
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	40	8	90	18000	4500	500	50	250
FA 15								
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

M_b = max static braking torque (±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

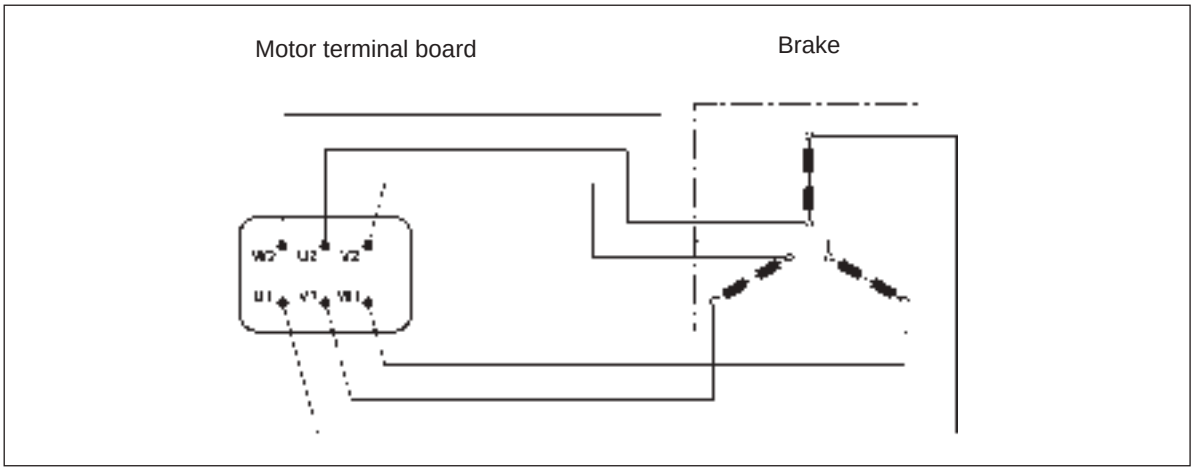
NOTE
Values t_1 and t_2 in the table refer to a brake set at rated torque, medium air gap and rated voltage.

The brake pad wear depends on the operating/ambient conditions (temperature, humidity, angular speed, specifica pressure); Therefore the declared wear rate must be considered as indicative.

M10.4 FA brake connections

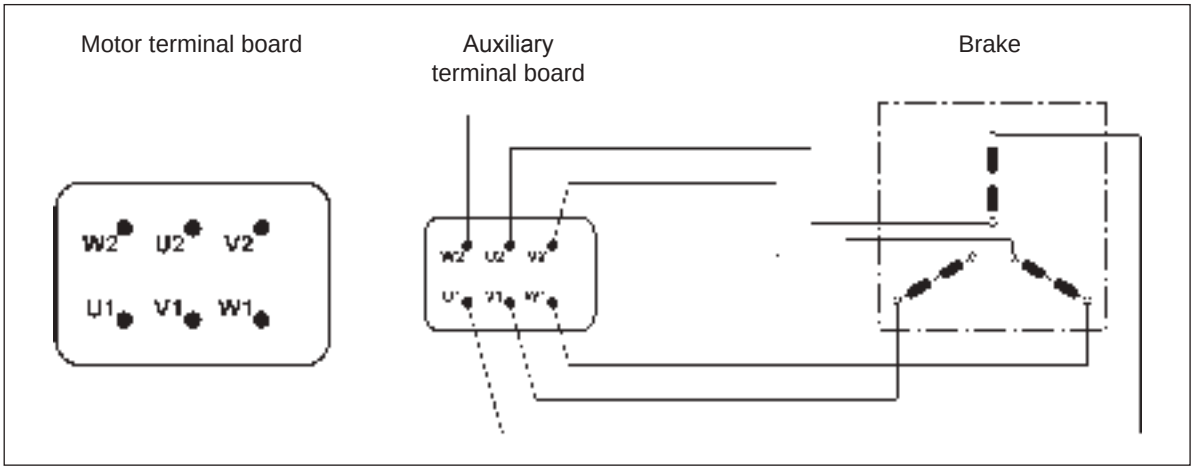
The diagram below shows the wiring when brake is connected directly to same power supply of the motor:

(F46)



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 below:

(F47)

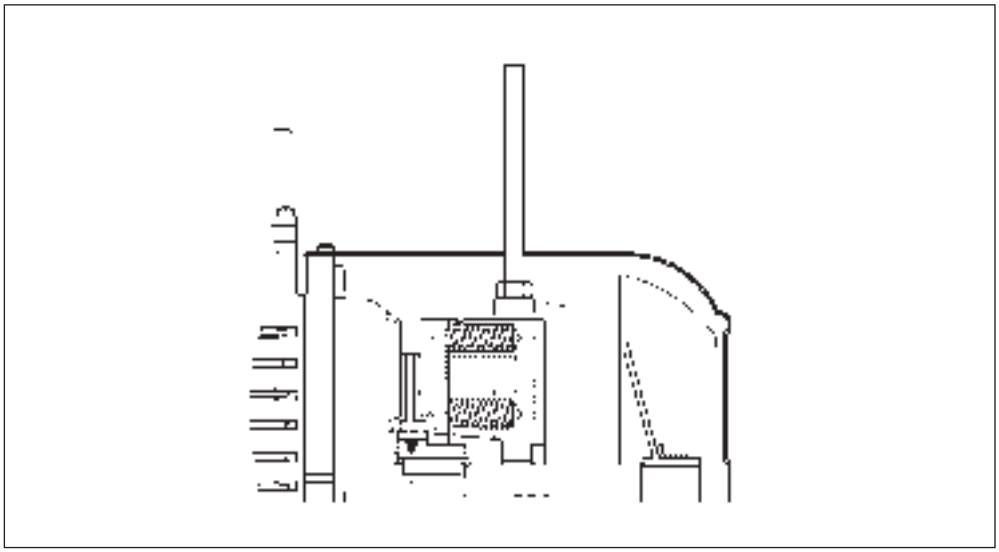


M11 BRAKE RELEASE SYSTEMS

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.

R

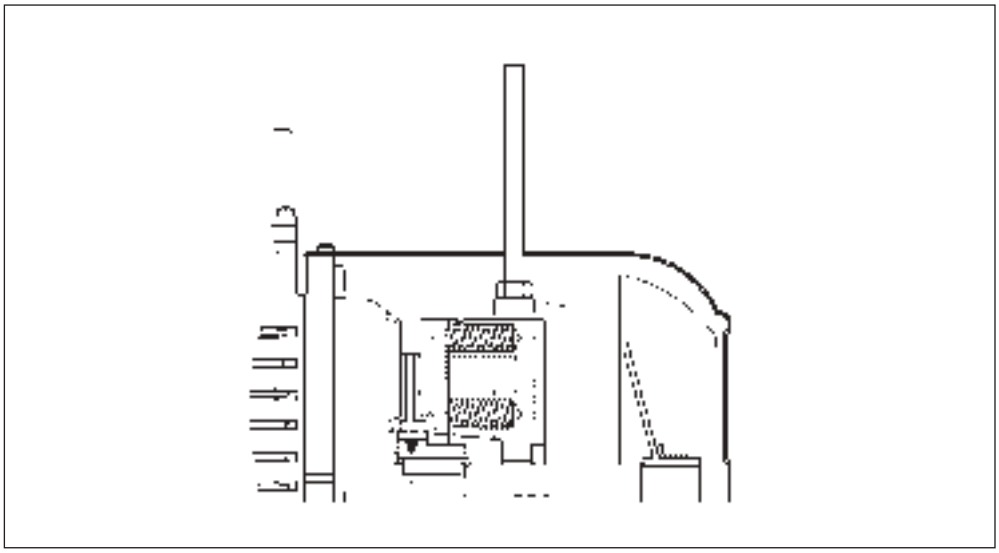
(F48)



A return spring brings the release lever back in the original position.

RM

(F49)



On brake motors type 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.
The availability for the various disengagement devices is charted here below:

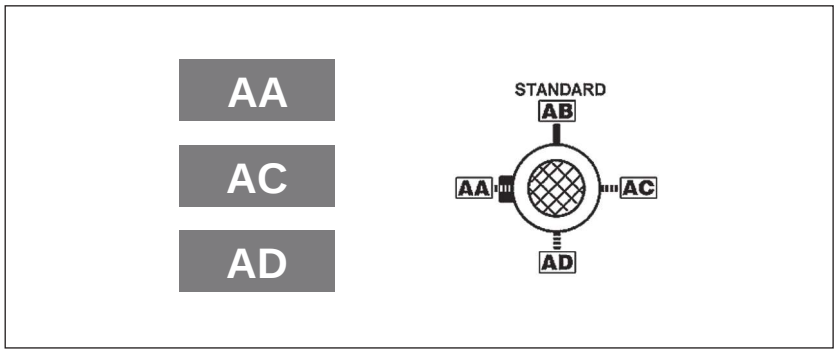
(F50)

	R	RM
BX_FD BN_FD	BX 80 ... BX 180 BX 200K ... BX 315K BN 63 ... BN 200	BX 80 ... BX 132 BN 63 ... BN 132 ⛔ FD07
MX_FD M_FD	MX2 ... MX5 M05 ... M5	MX2 ... MX4 M05 ... M4LA
BX_FA BN_FA	BX 80 ... BX 160 BN 63 ... BN 180M	⛔
MX_FA M_FA	MX2 ... MX5 M05 ... M5	⛔

M11.1 Release lever orientation

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:

(F51)



M11.2 Separate brake supply

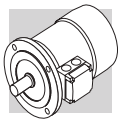
...SA

The brake coil is directly fed through an independent line, separately from the motor.
In this case the rated voltage for the coil must be specified, e.g.230SA. The option is applicable to all motors with brake type FD and FA.

...SD

The brake coil is directly fed with DC current and the rectifier is out of the scope for supply.
The rated voltage for the coil must be specified, e.g. 24SD.

Note: for BX≥200 and BX≥200K it is not possible to directly feed the brake from the motor terminal box, it is then necessary to select option SA or SD.



M12 OPTIONS

M12.1 Soft-start / stop

F1

An optional flywheel - option F1 - is available for applications requiring soft starting or stopping. The flywheel's added inertia uses up kinetic energy during starting and returns it back during braking, thus catering for more progressive and gradual shock loads. The optional flywheel is available for brake motors type BN_FD with specific characteristics as detailed in the table below:

(F52)

Main data for flywheel of motore type: BN_FD, M_FD			
		Fly-wheel weight [Kg]	**Fly-wheel inertia** [Kgm^2]
BN 63	**M05**	0.69	0.00063
BN 71	**M1**	1.13	0.00135
BN 80	**M2**	1.67	0.00270
BN 90 S - BN 90 L	**–**	2.51	0.00530
BN 100	**M3**	3.48	0.00840
BN 112	**–**	4.82	0.01483
BN 132 S - BN 132 M	**M4**	6.19	0.02580

M12.2 Capacitive filter

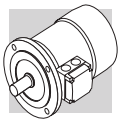
CF

An optional capacitive filter is available for brake motors type FD only. When the suitable capacitive filter is installed upstream of the rectifier (option CF), motors comply with the emission limits required by standard EN61000-6-3:2007“ Electromagnetic Compatibility – Generic Emission Standard – Part 6-3: Residential, commercial and light industrial environment”.

BX≥200LA and BX≥200LAK motors comply with the emission limits required by standard EN 61000-6-3:2007 “Electromagnetic Compatibility - Generic Emission Standard - Part 6-3: residential, commercial and light industrial environment.”

M12.3 Thermal protective devices

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).



M12.4 Thermistors

E3

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. Positive temperature coefficient thermistors are normally used (also known as PTC “cold conductor resistors”). Thermistors cannot control relays directly and must be connected to a suitable disconnect device. Thus protected, three PTCs connected in series are installed in the winding, the terminals of which are located on the auxiliary terminal-board.

K1

The design characteristics of this sub-group of PTC thermistors allow them to be used as positive temperature coefficient sensors with variable resistance.
Functioning temperature range: 0°C ... +260°C.
Thermistors cannot control relays directly and must be connected to a suitable disconnect device.
Terminals (polarised) for 1 x KTY 84-130 are provided on an auxiliary terminal strip.

M12.5 Bimetallic thermostates

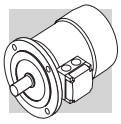
D3

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.

M12.6 Plug connector

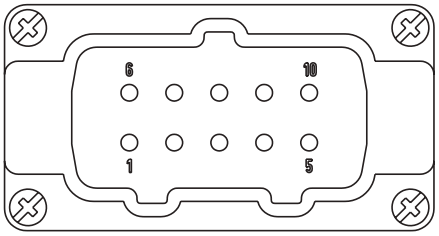
CON

Three types of connectors (CON 1, CON 2, CON 3) are provided; they can be mounted in two different positions: right side of terminal box cover (C1D, C2D, C3D); left side of terminal box cover (C1S, C2S, C3S).
The option CON is applicable to single speed BN and M motors (2, 4, 6, 8 poles), and BX / BE and MX / ME motors on the sizes specified on the following table. All double speed motors are excluded.
The connectors CON 1 / CON 2 are available for BX-BE/MX-ME and BN/M motors without brake and for brakemotors equipped with DC brake type FD, for the motor sizes listed below.
The male connector (with pins) is mounted on the motor, the female connector is not provided. With CON option, the winding connection is always Y.
With option U1 “forced ventilation”, the fan unit supply is available inside the separate terminal box fixed to fan cover.
With options EN1...EN6, the encoder connection is made by a cable not connected to the motor plug connector.
The CON option is not applicable to brakemotors equipped with AC brake type FA.
The CON option is not available when at least one of the next options are selected: the U2, CUS, IC.

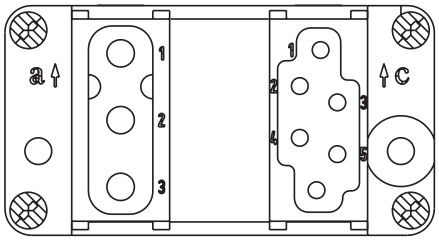


Specifications

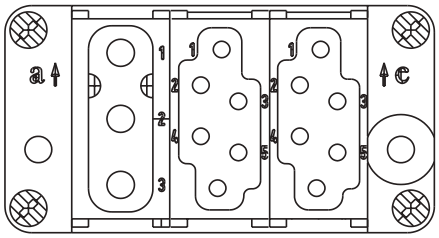
(F53)

Option	CON 1
Motor size	**BX 80 ... BX 112 / MX2, MX3 / BE 71 ... BE 112 / ME2, ME3** **BN 63 … BN 112 / M05 ... M3**
Connector view	
Type of connector	Harting Han 10ES
Housing	Han EMC 10B with 2 levers
Numbers of pins - nominal current	10 x 16A
Voltage	500 Vac
Contact connection	Screw terminals

(F54)

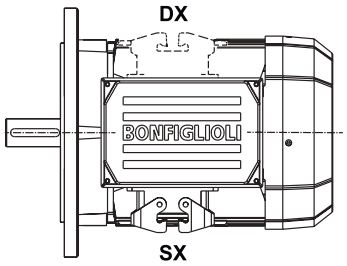
Option	CON 2
Motor size	**BX 80 ... BX 132 / MX2, MX3 / BE 71 ... BE 132 / ME2 ... ME4** **BN 63 … BN 160MR / M05 ... M4**
Connector view	
Type of connector	Harting Han Modular
Housing	Han EMC 10B with 2 levers
Module type	Module C + Module E + Module E
Numbers of pins - nominal current	3 x 36A / 6 x 16A
Voltage	500 Vac
Contact connection	Crimping contacts

(F55)

Option	CON 3
Motor size	**BX 80 ... BX 132M / MX2, MX3 / BN 63 … BN 160MR / M05 ... M4**
Connector view	
Type of connector	Harting Han Modular
Housing	Han EMC 10B with 2 levers
Module type	Module C + Module E + Module E
Numbers of pins - nominal current	3 x 36A / 6 + 6 x 16A
Voltage	500 Vac
Contact connection	Crimping contacts

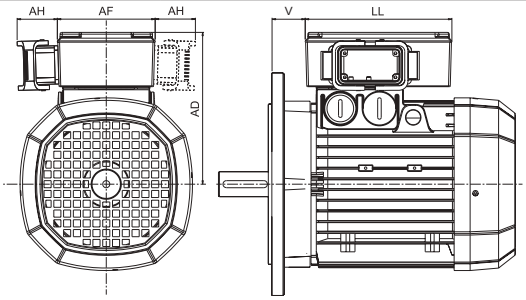
(F56)

Connector orientation



(F57)

Motors without brake dimensions

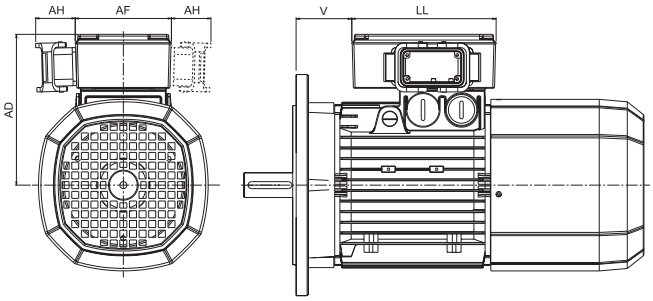


		AD (mm)	**AF** (mm)	**AH** (mm)	**LL** (mm)	**V**(*) (mm)
BN 63	**M05**	136	110	45	165	4.5
BN 71 - BE 71	**M1**	149	110	45	165	15.5
BX 80 - BE 80 - BN 80	**MX2 - ME2 - M2**	160	110	45	165	16.5
BX 90 - BE 90 - BN 90	**MX3**	162	110	45	165	31.5
BX 100 - BE 100 - BN 100	**MX3 - ME3 - M3**	171	110	45	165	37.5
BX 112 - BE 112 - BN 112	**MX4**	186	110	45	165	39
BX 132 - BE 132 - BN 132	**MX4 - ME4 - M4**	210	140	45	188	45.5
BN 160MR	–	210	140	45	188	161

(*) Dimension valid only for motors BX, BE and BN.

(F58)

Motors with FD brake dimensions



		AD (mm)	**AF** (mm)	**AH** (mm)	**LL** (mm)	**V**(*) (mm)
BN 63	**M05**	136	110	45	165	4.5
BN 71	**M1**	149	110	45	165	1.5
BX 80 - BN 80	**MX2 - M2**	160	110	45	165	18.5
BX 90 - BN 90	**—**	162	110	45	165	39.5
BX 100 - BN 100	**MX3 - M3**	171	110	45	165	63.5
BX 112 - BN 112	**—**	186	110	45	165	75
BX 132 - BN 132	**MX4 - M4**	210	140	45	188	122
BN 160MR	**—**	210	140	45	188	161

(*) Dimension valid only for motors BN.and BX

M12.7 Control of brake operation

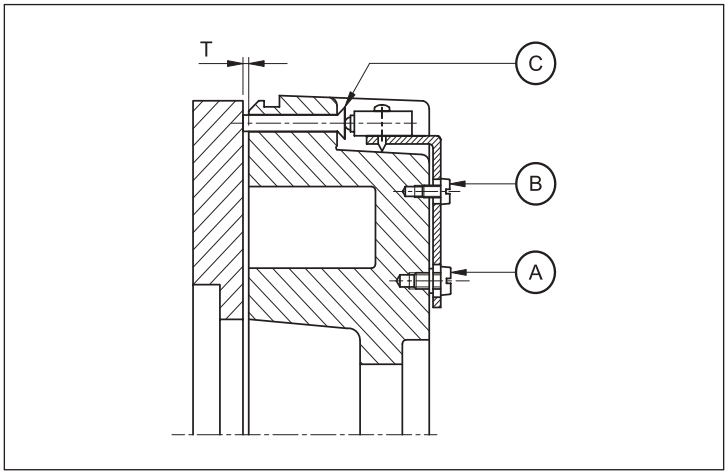
MSW

The microswitch can be set in order to obtain from it a signal related to the attraction/release of anchor plate, or it can be set in order to give feedback when the air gap reaches the maximum value.

MSW option is available for brakes FD03...FD09.

The microswitch is provided with three lead wires (NC, NO, COM). The next figure shown the main components of the brake equipped with microswitch.

(F59)



A: Plate f xing screws

B: Setting screws

C: Actuator control pin

M12.8 Additional cable entry for brakemotors

IC

The terminal box cover of brakemotors BX 80 ... BX 132 - BN 63...BN 160MR/ MX2...MX4 - M05... M4 is provided with two additional cable entry M16 x 1.5 (one cable entry per side).

The terminal box cover of brakemotors BX 160 ... BX 180 - BN 160...BN 200 / MX5 - M5 is provided with an additional cable entry M16 x 1.5 next to the cable entry used for the brake.

M12.9 Anti-condensation heaters

H1 **NH1**

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:

(F60)

	H1	NH1
	1~ 230V ± 10% P [W]	1~ 115V ± 10% P [W]
BX 80 **BE 80** **BN 56 ... BN 80**	10	10
BX 90 ... BX 132 **BE 90 ... BE 132MB** **BN 90 ... BN 160MR**	25	25
BX 160...BX 250 **BX 160 ... BX 250K** **BX 160, BX 180** **BE 160, BE 180** **BN 160, BN 200**	50	50
BX 280 **BX 280K**	60	60
BX 315 ... BX 355 **BX 315K ... BX 355K**	120	120

Warning!
Always remove power supply to the anti-condensante heater before operating the motor.

M12.10 Tropicalization

TP

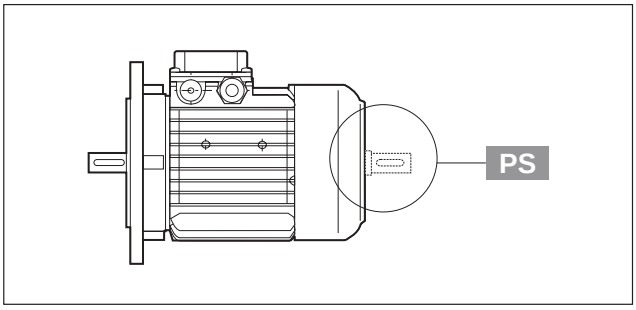
When option **TP** is specified, motor windings receive additional protection for operation in high humidity and temperature conditions.

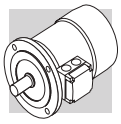
M12.11 Second shaft extension

PS

This option is not compatible with variants RC, TC, U1, U2, EN1, EN2, EN3, EN4, EN5, EN6, EN7, EN8.
For shaft dimensions please see motor dimensions tables.

(F61)





M12.12 Backstop device

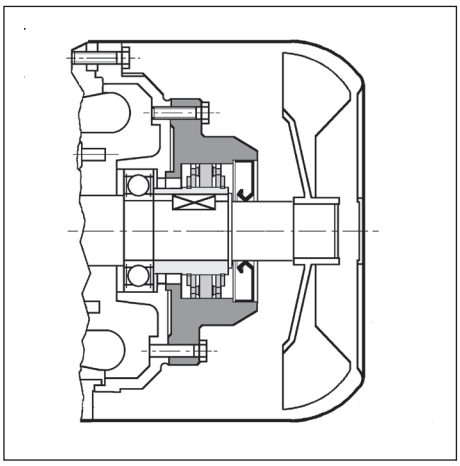
AL **AR**

For applications where backdriving must be avoided, motors equipped with an anti run-back device can be used (available for the MX/ME and 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 (F62) shows rated and maximum locking torques for the anti run-back devices. A diagram of the device can be seen in Table (F63). Overall dimensis are same as the corresponding brake motor. The direction of free rotation is described in the “MOTOR OPTIONS” section of specifically dedicated sections to gear units.

(F62)

	Rated locking torque [Nm]	Max. locking torque [Nm]	Release speed [min^{-1}]
M1	6	10	750
ME2 M2	16	27	650
ME3 M3	54	92	520
MX4 - ME4 M4	110	205	430

(F63)



M12.13 Rotor balancing

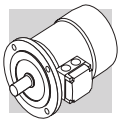
RV

Where low noise is a priority requirement, the option RV ensures reduced vibration in accordance with vibration class B.
The table below reports effective velocity of vibration for normal (A) and B grade balancing.

(F64)

Vibration level	Angular velocity n [min^{-1}]	Limits of the vibration velocity (mm/s) **BX 80 ≤ H ≤ BX 335M ≤ BX 355MK BE 80 ≤ H ≤ BE 180L BN 56 ≤ H ≤ BN 200**
A	600 < n < 3600	1.6
B	600 < n < 3600	0.70

Values are obtained from measurements on freely suspended motor during noload operation; tolerance ±10%.



M12.14 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, M1, BE 80, ME2, BX 80 and MX2 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 motors with rear shaft projection (PS option) are excluded.

This variant has two different models, called **U1** and **U2**, having the same longitudinal size. Longer side of fan cover (**DL**) is specified for both models in the table below. Overall dimension can be reckoned from motor size table.

(F65)

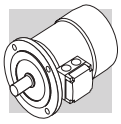
Extra length for servoventilated motors			
		**ΔL_1**	**ΔL_2**
BN 71	**M1**	93	32
BX 80 - BE 80 - BN 80	**MX2 - ME2 - M2**	127	55
BX 90 - BE 90 - BN 90	**MX3**	131	48
BX 100 - BE 100 - BN 100	**MX3 - ME3 - M3**	119	28
BX 112 - BE 112 - BN 112	**MX4**	130	31
BX 132 - BE 132 - BN 132	**MX4 - ME4 - M4**	161	51
BX 160 ... BX 180 **BE 160 ... BE 180** **BN 160 ... BN 200L**	**MX5** **ME5** **M5**	184	184
BX 200	**—**	250	260
BX 225 - BX 250	**—**	320	320
BX 280 - BX 315	**—**	430	430
BX 355	**—**	640	640

ΔL_1 = extra length to LB value of corresponding standard motor.

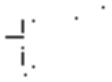
ΔL_2 = extra length to LB value of corresponding brake motor.

U1

Fan wiring terminals are housed in a separate terminal box.
In brake motors of size BX 132 ... BX 160, BE 80 ... BE 160, MX 4 ... MX 5, ME 2 ... ME 5 - BN 71 ... BN 160MR, M1 ... M4L, 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).



(F66)

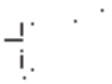


		V a.c. ±10%	Hz	P [W]	I [A]
BN 71	**M1**	1 ~ 230	50 / 60	22	0.12
BX 80 - BE 80 BN 80	**MX2 - ME2 M2**			22	0.12
BX 90 - BE 90 BN 90	**MX3**			40	0.30
BX 100 - BE 100 BN 100	**MX3 - ME3 M3**			50	0.25
BX 112 - BE 112 BN 112	**MX4**	3 ~ 230Δ / 400Y		50	0.26 / 0.15
BX 132 - BE 132 BN 132 ... BN 160MR	**MX4 - ME4 M4L**			110	0.38 / 0.22
BX 160 - BE 160 BN 160M ... BN 180M	**MX5 - ME5 M5**		50	180	1.25 / 0.72
BX 180 - BE 180 BN 180L ... BN 200L	–			250	1.51 / 0.87
BX 200 ... BX 250 BX 200K ... BX 250K	–	3 ~ 400Δ / 690Y		250	0.64
BX 280 ... BX 315M BX 280K ... BX 315MK	–			750	1.7
BX 315 ... BX 355S BX 315LK ... BX 355SK	–			1500	3.3
BX 355M BX 355MK	–			3000	6.1

U2

Fan terminals are wired in the motor terminal box.
The **U2** option does not apply to motors BX, BE, MX, ME and to motors with option CUS (compliant to norms CSA and UL).

(F67)



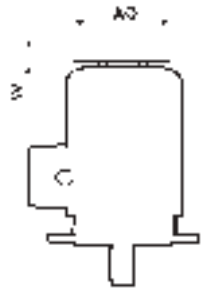
		V a.c. ±10%	Hz	P [W]	I [A]
BN 71	**M1**	1 ~ 230	50 / 60	22	0.12
BN 80	**M2**			22	0.12
BN 90	–			40	0.30
BN 100	**M3**	3 ~ 230Δ / 400Y		40	0.26 / 0.09
BN 112	–			50	0.26 / 0.15
BN 132 ... BN 160MR	**M4L**			110	0.38 / 0.22

M12.15 Rain canopy

RC

The rain canopy 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.
Relevant dimensions are indicated in the table below.
The drip cover is not compatible with variants PS, EN1, EN2, EN3, EN4, EN5, EN6.

(F68)

		AQ	ΔV	
BN 63	**M05**	118	24	
BN 71 - BE 71	**M1**	134	27	
BX 80 - BE 80 **BN 80**	**MX2 - ME2** **M2**	152	25	
BX 90 - BE 90 **BN 90**	**MX3**	168	30	
BX 100 - BE 100 **BN 100**	**MX3 - ME3** **M3**	190	28	
BX 112 - BE 112 **BN 112**	**MX4**	211	32	
BX 132 - BE 132 **BN 132 ... BN 160MR**	**MX4 - ME4** **M4**	254	32	
BX 160 - BE 160 **BN 160M ... BN 180M**	**MX5 - ME5** **M5**	302	36	
BX 180 - BE 180 **BN 180L ... BN 200L**	**—**	340	36	
BX 200	**—**	423	55	
BX 225	**—**	465	55	
BX 250	**—**	514	55	
BX 280	**—**	567	100	
BX 315	**—**	645	100	
BX 355	**—**	740	120	

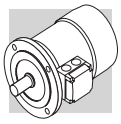
M12.16 Textile canopy

TC

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, EN4, EN5, EN6, PS, U1, U2.
Overall dimensions are the same as drip cover type RC.
TC option is not available for BX motors.

M12.17 Feedback units

Motors may be combined with six 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.



EN1

Incremental encoder, V_{IN} = 5 V, line-driver output RS 422.

EN2

Incremental encoder, V_{IN} = 10-30 V, line-driver output RS 422.

EN3

Incremental encoder, V_{IN} = 12-30 V, push-pull output 12-30 V

EN4

Encoder sin/cos, V_{IN} = 4.5-5.5 V, output Sinus 0.5V_{PP}.

EN5

Absolute encoder singleturn, HIPERFACE® interface, V_{IN} = 7-12 V.

EN6

Absolute encoder multiturn, HIPERFACE® interface, V_{IN} = 7-12 V.

EN7

Incremental encoder Heavy Duty, V_{IN} = 12-30 V, push-pull output 12-30 V.

EN8

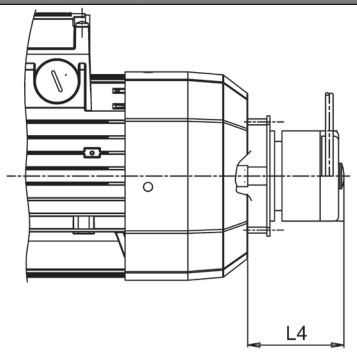
Incremental encoder Heavy Duty, V_{IN} = 12-30 V, push-pull output 9-30 V.

Note: EN7 and EN8 available only for BX≥200

(F69)

		EN1	EN2	EN3	EN4	EN5	EN6	EN7	EN8
Interface		TTL/RS 422	TTL/RS 422	HTL push-pull	Sinus 0.5 VPP	HIPERFACE®	HIPERFACE®	HTL push-pull	HTL push-pull
Power supply voltage	[V]	4...6	10...30	12...30	4.4...5.5	7...12	7...12	9...30	
Output voltage	[V]	5	5	12...30	—	—	—	9...30	
No-load operating current	[mA]	120	100	100	40	80	80	80	
No. of pulses per revolution		1024							2048
Steps per revolution		—	—	—	—	15 bit	15 bit	-	-
Revolutions		—	—	—	—	—	12 bit	-	-
No. of signals		6 (A, B, Z + inverted signals)			6 (cos-, cos+, sin-, sin+, Z, $\overline{Z}$)	—	—	6	6
Max. output frequency	[kHz]	600			200			200	
Max. speed	[min^{-1}]	6000 (9000 min^{-1} for 10 s)						6000	
Temperature range	[°C]	-30 ... +100						-20 ... +85	
Protection class		IP 65						IP67	

(F70)

EN1, EN2, EN3, EN4, EN5, EN6, EN7, EN8		
		
		L4
BN 63 ... BN 200	**M05 ... M5**	65
BE 71... BE180	**ME2S ... ME5L**	65
BX 80 ... BX 180	**MX2 ... MX5L**	65
BX 200 ... BX 280	**—**	100
BX 315 ... BX 355	**—**	100

(F71)

EN_ + U1		
		
		L3
BX 160 - BE 160 BN 160M...BN 180M	**MX5 - ME5 M5**	72
BX 160 - BE 180 BN 180L...BN 200L	–	82
BX 160_FD BN 160M_FD...BN 180M_FD	**MX5_FD M5_FD**	35
BX 180_FD BN 180L_FD...BN 200L_FD	–	41
BX 200 - BX 225 - BX 250	–	100
BX 280 - BX 315 - BX 355	–	150

If the encoder device (option EN_) is specified on motors BX 80 ... BX 132 - MX2 ... MX4 - BE 71 ... BE 132 - ME2 ... ME4 - BN 71 ... BN 160MR - 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.

M12.18 Insulated Bearings

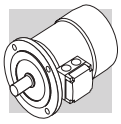
IB

NOTE: This option is available for BX and BX K≥280, and it is mandatory when the motor is operated through a variable speed drive.
When IB option is selected the motor is equipped with insulated bearings at drive end. This prevent early bearings failures due to high frequency circulation currents.

M12.19 Vertical Mounting

VM

NOTE: This option is mandatory for BX ≥ 200 and BX ≥ 200K, when vertically mounted.
When VM is selected the motor is delivered with specific arrangements.
Furthermore, the vertical mounting position will also be reported on motor nameplate.



M12.20 Surface protection

C_

When no specific protection class is requested, the painted (ferrous) surfaces of motors are protected to at least corrosivity class C2 (UNI EN ISO 12944-2). For improved resistance to atmospheric corrosion, motors can be delivered with C3 and C4 surface protection.

(F72)

SURFACE PROTECTION	Typical environments	Maximum surface temperature	Corrosivity class according to UNI EN ISO 12944-2
C3	Urban and industrial environments with up to 100% relative humidity (medium air pollution)	120°C	C3
C4	Industrial areas, coastal areas, chemical plant, with up to 100% relative humidity (high air pollution)	120°C	C4
C5M	Coast and offshore areas with high salt content.	120°C	C5M

Motors with optional protection to class C3 or C4 are available in a choice of colours. If no specific colour is requested (see the “PAINTING” option) motors are finished in RAL 7042 for BN/M, BE/ME and BX≤180/MX and in Munsell blue 8B 4.5/3.25 for BX≥200.
Motors can also be supplied with surface protection for corrosivity class C5 according to UNI EN ISO 12944-2. Contact our Technical Service for further details.

M12.21 Painting

RAL

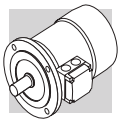
Gearboxes with optional protection to class C3 or C4 are available in the colours listed in the following table.

(F73)

PAINTING	Colour	RAL number
RAL7042	Traffic Grey A	7042
RAL5010	Gentian Blue	5010
RAL9005	Jet Black	9005
RAL9006	White Aluminium	9006
RAL9010	Pure White	9010
Munsell blue 8B* 4.5/3.25	Blue	MUNSELL 8B 4.5/3.25

* BX ≥ 200 and BX ≥ 200K Motors are standardly supplied in this colour with C3 protection unless specified diffrently.

NOTE – “PAINTING” options can only be specified in conjunction with “SURFACE PROTECTION” options.



M12.22 Certificates

ACM

Certificate of compliance of motors
The document certifies the compliance of the product with the purchase order and the construction in conformity with the applicable procedures of the Bonfiglioli Quality System.

Note: Not available for BX≥200 and BX≥200K

CC

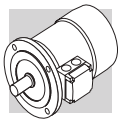
Inspection certificate
The document entails checking on order compliance, the visual inspection of external conditions and instrumental testing of the electrical characteristics in unloaded conditions. Units inspected are sampled within the shipping batch and marked individually.

M13 TABLES OF MOTORS CORRELATION

M13.1 50 Hz Motors

(F74)

2 pole							
Efficiency class		IE1	IE2	IE3	IE1	IE2	IE3
Pn [kW]	0.06						
	0.09						
	0.12						
	0.18	BN 63A 2			M 05A 2		
	0.25	BN 63B 2			M 05B 2		
	0.37	BN 71A 2			M 05C 2		
	0.55	BN 71B 2			M 1SD 2		
	0.75	BN 71C 2	BE 80A 2		M 1LA 2	ME 2SA 2	
		BN 80A 2					
	1.1	BN 80B 2	BE 80B 2		M 2SA 2	ME 2SB 2	
	1.5	BN 90SA 2	BE 90SA 2		M 2SB 2		
	1.85	BN 90SB 2					
	2.2	BN 90L 2	BE 90L 2		M 3SA 2		
	3	BN 100L 2	BE 100L 2		M 3LA 2	ME 3LB 2	
	4	BN 112M 2	BE 112M 2		M 3LB 2		
	5.5	BN 132SA 2	BE 132SA 2		M 4SA 2	ME 4SA 2	
	7.5	BN 132SB 2	BE 132SB 2		M 4SB 2	ME 4LA 2	
	9.2	BN 132M 2	BE 132MB 2		M 4LA 2	ME 4LB 2	
	11	BN 160MR 2	BE 160MA 2		M 4LC 2	ME 5SA 2	
		BN 160M 2					
	15	BN 160MB 2	BE 160MB 2		M 5SB 2	ME 5SB 2	
	18.5	BN 160L 2	BE 160L 2		M 5SC 2	ME 5LA 2	
	22	BN 180M 2			M 5LA 2		
	30	BN 200LA 2					



(F75)

4 pole							
Efficiency class		IE1	IE2	IE3	IE1	IE2	IE3
Pn [kW]	0.06	BN 56A 4					
	0.09	BN 56B 4			M 0B 4		
	0.12	BN 63A 4			M 05A 4		
	0.18	BN 63B 4			M 05B 4		
	0.25	BN 63C 4			M 05C 4		
		BN 71A 4					
	0.37	BN 71B 4			M 1SD 4		
	0.55	BN 71C 4			M 1LA 4		
		BN 80A 4					
	0.75	BN 80B 4	BE 80B 4	BX 80B 4	M 2SA 4	ME 2SB 4	MX 2SB 4
	1.1	BN 80C 4	BE 90S 4	BX 90S 4	M 2SB 4	ME 3SA 4	MX 3SA 4
		BN 90S 4					
	1.5	BN 90LA 4	BE 90LA 4	BX 90LA 4	M 3SA 4	ME 3SB 4	MX 3SB 4
	1.85	BN 90LB 4					
	2.2	BN 100LA 4	BE 100LA 4	BX 100LA 4	M 3LA 4	ME 3LA 4	MX 3LA 4
	3	BN 100LB 4	BE 100LB 4	BX 100LB 4	M 3LB 4	ME 3LB 4	MX 3LB 4
	4	BN 112M 4	BE 112M 4	BX 112M 4	M 3LC 4	ME 4SA 4	MX 4SA 4
	5.5	BN 132S 4	BE 132S 4	BX 132SB 4	M 4SA 4	ME 4SB 4	MX 4SB 4
	7.5	BN 132MA 4	BE 132MA 4	BX 132MA 4	M 4LA 4	ME 4LA 4	MX 4LA 4
	9.2	BN 132MB 4	BE 132MB 4	BX 160MA 4	M 4LB 4	ME 4LB 4	MX 5SA 4
	11	BN 160MR 4	BE 160M 4	BX 160MB 4	M 4LC 4	ME 5SA 4	MX 5SB 4
		BN 160M 4					
	15	BN 160L 4	BE 160L 4	BX 160L 4	M 5SB 4	ME 5LA 4	MX 5LA 4
	18.5	BN 180M 4	BE 180M 4	BX 180M 4	M 5LA 4		
	22	BN 180L 4	BE 180L 4	BX 180L 4			
	30	BN 200L 4		BX 200LA 4*			
	37			BX 225SA 4*			
	45			BX 225SB 4*			
	55			BX 250MA 4*			
	75			BX 280SA 4*			
	90			BX 280SB 4*			
	110			BX 315SA 4*			
	132			BX 315SB 4*			
	160			BX 315SC 4*			
	200			BX 315MA 4*			
	250			BX 355MA 4*			
	315			BX 355MB 4*			
	355			BX 355MC 4*			

Note: For the Australian market these motor has to be selected in the BX ... K 4 Version

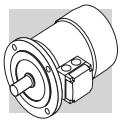
(F76)

6 pole							
Efficiency class		IE1	IE2	IE3	IE1	IE2	IE3
Pn [kW]	0.06						
	0.09	BN 63A 6			M 05A 6		
	0.12	BN 63B 6			M 05B 6		
	0.18	BN 71A 6			M 1SC 6		
	0.25	BN 71B 6			M 1SD 6		
		BN 71C 6					
	0.37	BN 80A 6			M 1LA 6		
	0.55	BN 80B 6			M 2SA 6		
	0.75	BN 80C 6	BE 90S 6		M 2SB 6		
		BN 90S 6					
	1.1	BN 90L 6	BE 100M 6		M 3SA 6	ME 3LA 6	
	1.5	BN 100LA 6	BE 100LA 6		M 3LA 6	ME 3LB 6	
	1.85	BN 100LB 6			M 3LB 6		
	2.2	BN 112M 6	BE 112M 6		M 3LC 6		
	3	BN 132S 6	BE 132S 6		M 4SA 6	ME 4SB 6	
	4	BN 132MA 6	BE 132MA 6		M 4LA 6	ME 4LA 6	
	5.5	BN 132MB 6	BE 160MA 6		M 4LB 6	ME 5SA 6	
	7.5	BN 160M 6	BE 160MB 6		M 5SA 6	ME 5SB 6	
	9.2						
	11	BN 160L 6			M 5SB 6		
	15	BN 180L 6					
	18.5	BN 200LA 6					
	22						
	30						

M13.2 60 Hz Motors

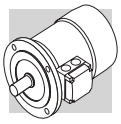
(F77)

2 pole							
Efficiency class		IE1	IE2	IE3	IE1	IE2	IE3
Pn [kW]	0.06						
	0.09						
	0.12						
	0.18	BN 63A 2			M 05A 2		
	0.25	BN 63B 2			M 05B 2		
	0.37	BN 71A 2			M 05C 2		
	0.55	BN 71B 2			M 1SD 2		
	0.75	BN 71C 2			M 1LA 2		
		BN 80A 2					
	1.1	BN 80B 2			M 2SA 2		
	1.5	BN 90SA 2			M 2SB 2		
	1.85	BN 90SB 2					
	2.2	BN 90L 2			M 3SA 2		
	3	BN 100L 2			M 3LA 2		
	3.7	BN 112M 2			M 3LB 2		
	5.5	BN 132SA 2			M 4SA 2		
	7.5	BN 132SB 2			M 4SB 2		
	9.2	BN 132M 2			M 4LA 2		
	11	BN 160MR 2			M 4LC 2		
		BN 160M 2					
	15	BN 160MB 2			M 5SB 2		
	18.5	BN 160L 2			M 5SC 2		
	22	BN 180M 2			M 5LA 2		
	30	BN 200LA 2					



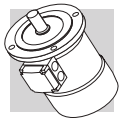
(F78)

4 pole							
Efficiency class		IE1	IE2	IE3	IE1	IE2	IE3
Pn [kW]	0.06	BN 56A 4					
	0.09	BN 56B 4			M 0B 4		
	0.12	BN 63A 4			M 05A 4		
	0.18	BN 63B 4			M 05B 4		
	0.25	BN 63C 4			M 05C 4		
		BN 71A 4					
	0.37	BN 71B 4			M 1SD 4		
	0.55	BN 71C 4			M 1LA 4		
		BN 80A 4					
	0.75	BN 80B 4	BE 80B 4	BX 90SR 4	M 2SA 4	ME 2SB 4	MX 2SB 4
	1.1	BN 80C 4	BE 90S 4	BX 90S 4	M 2SB 4	ME 3SA 4	MX 3SA 4
		BN 90S 4					
	1.5	BN 90LA 4	BE 90LA 4	BX 90LA 4	M 3SA 4	ME 3SB 4	MX 3SB 4
	1.85	BN 90LB 4					
	2.2	BN 100LA 4	BE 100LA 4	BX 100LA 4	M 3LA 4	ME 3LA 4	MX 3LA 4
	3	BN 100LB 4	BE 100LB 4	BX 100LB 4	M 3LB 4	ME 3LB 4	MX 3LB 4
	3.7	BN 112M 4	BE 112M 4	BX 112M 4	M 3LC 4	ME 4SA 4	MX 4SA 4
	5.5	BN 132S 4	BE 132S 4	BX 132SB 4	M 4SA 4	ME 4SB 4	MX 4SB 4
	7.5	BN 132MA 4	BE 132MA 4	BX 132MA 4	M 4LA 4	ME 4LA 4	MX 4LA 4
	9.2	BN 132MB 4	BE 132MB 4	BX 160MA 4	M 4LB 4	ME 4LB 4	MX 5SA 4
	11	BN 160MR 4	BE 160M 4	BX 160MB 4	M 4LC 4	ME 5SA 4	MX 5SB 4
		BN 160M 4					
	15	BN 160L 4	BE 160L 4	BX 160L 4	M 5SB 4	ME 5LA 4	MX 5LA 4
	18.5	BN 180M 4	BE 180M 4	BX 180M 4	M 5LA 4		
	22	BN 180L 4	BE 180L 4	BX 180L 4			
	30	BN 200L 4		BX 200LAK 4			
	37			BX 225SAK 4			
	45			BX 225SBK 4			
	55			BX 280SAK 4			
	75			BX 280SBK 4			
	90			BX 315SAK 4			
	110			BX 315SBK 4			
	132			BX 315SCK 4			
	160			BX 355SAK 4			
	200			BX 355SBK 4			
	250			BX 355SCK 4			
	315			BX 355MBK 4			
	355			BX 355MCK 4			



(F79)

6 pole							
Efficiency class		IE1	IE2	IE3	IE1	IE2	IE3
Pn [kW]	0.06						
	0.09	BN 63A 6			M 05A 6		
	0.12	BN 63B 6			M 05B 6		
	0.18	BN 71A 6			M 1SC 6		
	0.25	BN 71B 6			M 1SD 6		
		BN 71C 6					
	0.37	BN 80A 6			M 1LA 6		
	0.55	BN 80B 6			M 2SA 6		
	0.75	BN 80C 6			M 2SB 6		
		BN 90S 6					
	1.1	BN 90L 6			M 3SA 6		
	1.5	BN 100LA 6			M 3LA 6		
	1.85	BN 100LB 6			M 3LB 6		
	2.2	BN 112M 6			M 3LC 6		
	3	BN 132S 6			M 4SA 6		
	3.7	BN 132MA 6			M 4LA 6		
	5.5	BN 132MB 6			M 4LB 6		
	7.5	BN 160M 6			M 5SA 6		
	9.2						
	11	BN 160L 6			M 5SB 6		
	15	BN 180L 6					
	18.5	BN 200LA 6					
	22						
	30						



4 P	1500 min^{-1} - S1	50 Hz - IE3

CE

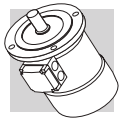
															d.c. brake				a.c. brake			
															FD				FA			
P_n		n	M_n	In 400V	η%			cos φ	$\frac{I_s}{I_n}$	$\frac{M_s}{M_n}$	$\frac{M_a}{M_n}$	KVA code	J_m x 10^{-4}	IM B5	Mod	M_b	J_m x 10^{-4}	IM B5	Mod	M_b	J_m x 10^{-4}	IM B5
kW		min^{-1}	Nm	A	100%	75%	50%						kgm^2			Nm	kgm^2			Nm	kgm^2	
0.75	**BX 80B 4**	1425	5.0	1.61	82.5	83.9	83.2	0.81	6.5	2.0	1.8	J	35	16	**FD 04**	15	37	19.9	**FA 04**	15	37	19.8
1.1	**BX 90S 4**	1425	7.4	2.44	84.1	84.1	82.0	0.77	6.9	3.4	2.2	J	27	16	**FD 14**	15	29	20.2	**FA 14**	15	29	20.1
1.5	**BX 90LA 4**	1420	10.1	3.3	85.3	86.2	84.9	0.78	6.3	3.1	1.9	J	31	17	**FD 05**	26	35	23	**FA 05**	26	35	23.7
2.2	**BX 100LA 4**	1445	14.5	5.1	86.7	86.2	84.0	0.72	7.2	3.6	2.4	K	58	24	**FD 15**	40	62	31	**FA 15**	40	62	31
3	**BX 100LB 4**	1445	19.8	6.7	87.7	87.7	86.0	0.74	7.6	3.9	2.6	K	73	29	**FD 15**	40	77	36	**FA 15**	40	77	36
4	**BX 112M 4**	1445	26	8.1	88.6	88.9	87.6	0.8	8.1	3.8	2.5	J	130	38	**FD 06S**	60	139	48	**FA 06S**	60	139	50
5.5	**BX 132SB 4**	1460	36	10.6	89.6	89.2	88.8	0.83	8.2	3.6	2.3	J	310	57	**FD 56**	75	320	70	**FA 06**	75	320	71
7.5	**BX 132MA 4**	1460	49	15.0	90.4	90.9	90.2	0.80	8.4	3.8	2.5	K	360	67	**FD 06**	100	370	80	**FA 07**	100	370	85
9.2	**BX 160MA 4**	1465	60	17.8	91.0	92.1	91.7	0.82	7.9	3.6	2.1	J	650	95	**FD 08**	170	725	125	**FA 08**	170	725	124
11	**BX 160MB 4**	1465	72	20.5	91.4	92.9	92.5	0.84	7.8	3.4	1.9	J	780	110	**FD 08**	170	855	140	**FA 08**	170	855	139
15	**BX 160L 4**	1465	98	28.1	92.1	93.2	92.6	0.82	9.0	4.1	2.3	K	890	121	**FD 08**	200	965	151	**FA 08**	200	965	150
18.5	**BX 180M 4**	1480	119	32.9	92.6	94.1	93.1	0.85	11.3	2.6	2.3	M	1560	155	**FD 09**	300	1760	195				
22	**BX 180L 4**	1475	142	38.2	93.0	93.6	92.8	0.88	10.2	2.5	2.0	L	1660	163	**FD 09**	300	1860	203				

Note: for more details on the available energy certifications look at the catalog's dedicated section.

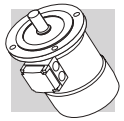
4 P	1500 min^{-1} - S1	50 Hz - IE3

															d.c. brake				a.c. brake			
															FD				FA			
P_n		n	M_n	In 400V	η%			cos φ	$\frac{I_s}{I_n}$	$\frac{M_s}{M_n}$	$\frac{M_a}{M_n}$	KVA code	J_m x 10^{-4}	IM B5	Mod	M_b	J_m x 10^{-4}	IM B5	Mod	M_b	J_m x 10^{-4}	IM B5
kW		min^{-1}	Nm	A	100%	75%	50%						kgm^2			Nm	kgm^2			Nm	kgm^2	
30	**BX 200LA 4**	1483	193.2	54.8	93.6	93.9	93.4	0.84	7.5	2.7	3.2	N/A	3850	292	**FD20**	260	3910	317				
37	**BX 225SA 4**	1482	238.6	68.9	93.9	94.1	93.8	0.83	7.2	3.1	3.1	N/A	4270	322	**FD25**	400	4450	356				
45	**BX 225SB 4**	1482	290	82.3	94.2	94.4	94	0.84	8	3.2	3.5	N/A	5250	357	**FD25**	400	5430	391				
55	**BX 250MA 4**	1482	354.2	100	94.6	94.7	94	0.84	7.1	2.9	3.4	N/A	6940	406	**FD30**	1000	7540	452				
75	**BX 280SA 4**	1485	483	133	95	95.2	94.8	0.86	6.4	2.3	2.8	N/A	13800	645	**FD30**	1000	14400	691				
90	**BX 280SB 4**	1485	578	158	95.2	95.5	95.2	0.86	7.1	2.5	2.9	N/A	17300	700	**FD30**	1000	17900	746				
110	**BX 315SA 4**	1489	705	198	95.4	95.5	95	0.84	7	2.1	3	N/A	24300	930	**FD30**	1000	24900	976				
132	**BX 315SB 4**	1488	847	231	95.6	95.9	95.5	0.86	6.7	2.2	2.9	N/A	29000	1000	**FD160**	1600	30500	1121				
160	**BX 315SC 4**	1488	1026	282	95.8	96	95.8	0.85	6.9	2.2	3	N/A	32000	1065	**FD160**	1600	33500	1186				
200	**BX 315MA 4**	1487	1284	351	96	96.4	96.4	0.86	6.8	2.4	3	N/A	39000	1220	**FD250**	2500	41400	1390				
250	**BX 355MA 4**	1491	1601	435	96	96	95.6	0.86	6.4	2.1	2.9	N/A	59000	1610	**FD250**	2500	61400	1780				
315	**BX 355MB 4**	1491	2018	550	96	96.1	95.7	0.85	7.3	2.4	3.3	N/A	69000	1780	**FD400**	4000	73300	2000				
355	**BX 355MC 4**	1490	2273	616	96	96.2	95.8	0.86	6.3	2.3	2.8	N/A	72000	1820	**FD400**	4000	76300	2040				

Note: for more details on the available energy certifications look at the catalog's dedicated section.



4 P	1500 min^{-1} - S1	50 Hz - IE3



EECA

															d.c. brake				a.c. brake			
															FD				FA			
P_n		n	M_n	In 400V	η%			cos φ	$\frac{I_s}{I_n}$	$\frac{M_s}{M_n}$	$\frac{M_a}{M_n}$	KVA code	J_m x 10^{-4}	IM B5	Mod	M_b	J_m x 10^{-4}	IM B5	Mod	M_b	J_m x 10^{-4}	IM B5
kW		min^{-1}	Nm	A	100%	75%	50%						kgm^2			Nm	kgm^2			Nm	kgm^2	
30	**BX 200LAK 4**	1483	193	55.7	94.7	95.1	95	0.82	8.3	3	3.3	N/A	3660	319	**FD 8**	400	3940	337				
37	**BX 225SAK 4**	1482	238	65.9	95.1	95.5	95.4	0.85	7.7	2.8	3.1	N/A	5360	398	**FD 9**	600	5720	426				
45	**BX 225SBK 4**	1481	290	80.4	95.2	95.6	95.6	0.85	7.9	2.8	3.2	N/A	5360	398	**FD 9**	600	5720	426				
55	**BX 250MAK 4**	1485	354	98.9	95.6	95.8	95.5	0.84	7.9	3	3.3	N/A	9330	476	**FD 10**	800	10080	521				
75	**BX 280SAK 4**	1487	482	134	95.9	96.2	96.1	0.84	7.3	2.5	2.8	N/A	15000	665	**FD 1000**	1000	15360	771				
90	**BX 280SBK 4**	1487	578	161	96.2	96.4	96.1	0.84	7.9	2.9	3	N/A	18500	725	**FD 1000**	1000	18860	831				
110	**BX 315SAK 4**	1491	704	194	96.8	97	96.7	0.84	8.3	2.4	3.1	N/A	29000	1000	**FD 1000**	1000	29360	1106				
132	**BX 315SBK 4**	1490	846	234	96.9	97.1	96.8	0.84	8.1	2.6	3.2	N/A	32000	1065	**FD 1600**	1600	32500	1233				
160	**BX 315SCK 4**	1490	1025	279	96.7	96.9	96.6	0.86	8.2	2.7	3	N/A	39000	1220	**FD 1600**	1600	39500	1388				
200	**BX 355SAK 4**	1491	1281	345	96.6	96.7	96.4	0.87	7.3	2.1	2.7	N/A	59000	1610	**FD 2500**	2500	59500	1778				
250	**BX 355MAK 4**	1491	1601	435	96	96	95.6	0.86	6.4	2.1	2.9	N/A	69000	1780	**FD 2500**	2500	69500	1948				
315	**BX 355MBK 4**	1491	2017	550	96	96.1	95.7	0.85	7.3	2.4	3.3	N/A	72000	1820	**FD 2500**	2500	72500	1988				
355	**BX 355MCK 4**	1490	2275	616	96	96.2	95.8	0.86	6.3	2.3	2.8	N/A	84000	2140	**FD 2500**	2500	84500	2308				

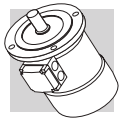
Note: for more details on the available energy certifications look at the catalog's dedicated section.

4 P	1800 min^{-1} - S1	60 Hz - Nema Premium

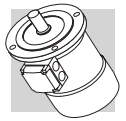
ENERGY

															d.c. brake				a.c. brake			
															FD				FA			
P_n		n	M_n	In 460V	η%			cos φ	$\frac{I_s}{I_n}$	$\frac{M_s}{M_n}$	$\frac{M_a}{M_n}$	KVA code	J_m x 10^{-4}	IM B5	Mod	M_b	J_m x 10^{-4}	IM B5	Mod	M_b	J_m x 10^{-4}	IM B5
kW		min^{-1}	Nm	A	100%	75%	50%						kgm^2			Nm	kgm^2			Nm	kgm^2	
0.75	**BX 90SR 4**	1755	4.1	1.48	85.5	86.4	83.9	0.73	8.0	3.7	2.5	L	27	16	**FD 14**	15	29	20.2	**FA 14**	15	29	20.1
1.1	**BX 90S 4**	1740	6.0	2.15	86.5	85.9	83.0	0.74	8.2	4.1	2.8	K	27	16	**FD 14**	15	29	20.2	**FA 14**	15	29	20.1
1.5	**BX 90LA 4**	1735	8.3	2.91	86.5	86.5	84.4	0.75	7.4	3.6	2.5	K	31	17	**FD 05**	26	35	23	**FA 05**	26	35	23.7
2.2	**BX 100LA 4**	1760	11.9	4.4	89.5	88.6	86.2	0.71	9.9	4.8	3.6	N	73	29	**FD 15**	40	77	36	**FA 15**	40	77	36
3	**BX 100LB 4**	1750	16.4	5.9	89.5	88.9	86.7	0.71	9.1	4.4	3.3	M	73	29	**FD 15**	40	77	36	**FA 15**	40	77	36
3.7	**BX 112M 4**	1760	20	6.7	89.5	89.5	89.1	0.77	10.4	4.7	3.4	M	130	38	**FD 06S**	60	139	48	**FA 06S**	60	139	50
5.5	**BX 132SB 4**	1770	30	9.9	91.7	92.0	90.2	0.76	10.7	5.1	4.6	N	410	77	**FD 56**	75	420	90	**FA 06**	75	420	91
7.5	**BX 132MA 4**	1770	41	13.4	91.7	91.3	89.7	0.76	11.0	4.9	4.4	N	410	77	**FD 06**	100	420	90	**FA 07**	100	420	95
9.2	**BX 160MA 4**	1770	50	15.6	92.4	92.5	91.6	0.8	9.1	4.1	2.6	L	650	95	**FD 08**	170	725	125	**FA 08**	170	725	124
11	**BX 160MB 4**	1770	59	18.2	92.4	92.9	92.0	0.82	9.3	4.0	2.4	L	780	110	**FD 08**	170	855	140	**FA 08**	170	855	139
15	**BX 160L 4**	1770	81	24.5	93.0	93.5	92.5	0.81	10.9	4.8	2.8	M	890	121	**FD 08**	200	965	151	**FA 08**	200	965	150
18.5	**BX 180M 4**	1780	99	28.6	93.6	94.5	93.2	0.85	13.0	2.9	2.7	N	1560	155	**FD 09**	300	1760	195				
22	**BX 180L 4**	1775	118	33.1	93.6	94.2	93.1	0.87	11.5	2.8	2.4	M	1660	163	**FD 09**	300	1860	203				

Note: for more details on the available energy certifications look at the catalog's dedicated section.



4 P	1800 min^{-1} - S1	60 Hz - Nema Premium

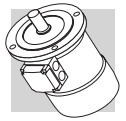


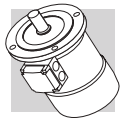
															d.c. brake				a.c. brake			
															FD				FA			
P_n kW		n min^{-1}	M_n Nm	In 460V A	η% 100%	η% 75%	η% 50%	cos φ	$\frac{I_s}{I_n}$	$\frac{M_s}{M_n}$	$\frac{M_a}{M_n}$	KVA code	J_m x 10^{-4} kgm^2	IM B5	Mod	M_b Nm	J_m x 10^{-4} kgm^2	IM B5	Mod	M_b Nm	J_m x 10^{-4} kgm^2	IM B5
30	**BX 200LAK 4**	1786	160	47.9	94.7	94.8	94.1	0.83	9.4	3.3	3.7	N/A	3660	319	**FD 8**	400	3940	337				
37	**BX 225SAK 4**	1784	198	57.3	95.3	95.5	94.9	0.85	8.8	2.9	3.4	N/A	5360	398	**FD 9**	600	5720	426				
45	**BX 225SBK 4**	1785	240	70.5	95.3	95.4	94.8	0.84	8.9	3	3.6	N/A	5360	398	**FD 9**	600	5720	426				
55	**BX 250MAK 4**	1787	293	85.8	95.7	95.8	95.2	0.84	9.1	3.3	3.7	N/A	9330	476	**FD 10**	800	10080	521				
75	**BX 280SAK 4**	1788	401	117	95.9	95.7	94.7	0.84	8.4	2.7	3.1	N/A	15000	665	**FD 1000**	1000	15360	771				
90	**BX 280SBK 4**	1788	481	140	96.1	95.9	95	0.84	9	3.1	3.3	N/A	18500	725	**FD 1000**	1000	18860	831				
110	**BX 315SAK 4**	1792	586	172	96.1	96	95.3	0.84	8.8	2.6	3.4	N/A	29000	1000	**FD 1000**	1000	29360	1106				
132	**BX 315SBK 4**	1791	704	206	96.4	96.3	95.6	0.84	9	2.8	3.6	N/A	32000	1065	**FD 1600**	1600	32500	1233				
160	**BX 315SCK 4**	1791	853	241	96.4	96.4	95.9	0.86	9	2.9	3.3	N/A	39000	1220	**FD 1600**	1600	39500	1388				
200	**BX 355SAK 4**	1792	1065	301	96.4	96.2	95.4	0.87	8.3	2.2	3	N/A	59000	1610	**FD 2500**	2500	59500	1778				
250	**BX 355MAK 4**	1792	1332	381	96.7	96.6	96	0.86	8.8	2.7	3.2	N/A	69000	1780	**FD 2500**	2500	69500	1948				
315	**BX 355MBK 4**	1791	1679	479	96.7	96.6	96.1	0.85	8.5	3.1	3.2	N/A	72000	1820	**FD 2500**	2500	72500	1988				
355	**BX 355MCK 4**	1792	1893	541	96.7	96.5	96.9	0.86	7.2	2.4	3.1	N/A	84000	2140	**FD 2500**	2500	84500	2308				

Note: for more details on the available energy certifications look at the catalog's dedicated section.

4 P	1500 min^{-1} - S1	50 Hz - IE3

															d.c. brake				a.c. brake			
															FD				FA			
P_n		n	M_n	In 400V	η%			cos φ	$\frac{I_s}{I_n}$	$\frac{M_s}{M_n}$	$\frac{M_a}{M_n}$	KVA code	J_m x 10^{-4}	IM B5	Mod	M_b	J_m x 10^{-4}	IM B5	Mod	M_b	J_m x 10^{-4}	IM B5
kW		min^{-1}	Nm	A	100%	75%	50%						kgm^2			Nm	kgm^2			Nm	kgm^2	
0.75	**MX 2SB**	**4**	1425	5.0	1.61	82.5	83.9	83.2	0.81	6.5	2.0	1.8	J	35	16	**FD 04**	15	37	19.9	**FA 04**	15	37	19.8
1.1	**MX 3SA**	**4**	1445	7.3	2.46	84.1	85.5	83.5	0.75	6.7	3.0	2.0	J	35	17	**FD 15**	15	26	24	**FA 15**	15	26	24
1.5	**MX 3SB**	**4**	1445	9.9	3.3	85.3	86.8	85.4	0.75	6.7	3.1	2.0	J	43	20	**FD 15**	26	47	27	**FA 15**	26	47	27
2.2	**MX 3LA**	**4**	1445	14.5	5.1	86.7	86.2	84.0	0.72	7.2	3.6	2.4	K	58	24	**FD 15**	40	62	31	**FA 15**	40	62	31
3	**MX 3LB**	**4**	1445	19.8	6.7	87.7	87.7	86.0	0.74	7.6	3.9	2.6	K	73	29	**FD 15**	40	77	36	**FA 15**	40	77	36
4	**MX 4SA**	**4**	1460	26	7.8	88.6	89.9	88.7	0.82	8.1	3.7	2.5	J	225	45	**FD 56**	75	235	58	**FA 06**	75	235	59
5.5	**MX 4SB**	**4**	1460	36	10.6	89.6	89.9	88.8	0.83	8.2	3.6	2.3	J	310	57	**FD 56**	75	320	70	**FA 06**	75	320	71
7.5	**MX 4LA**	**4**	1460	49	15.0	90.4	90.9	90.2	0.80	8.4	3.8	2.5	K	360	67	**FD 06**	100	370	80	**FA 07**	100	370	85
9.2	**MX 5SA**	**4**	1465	60	17.8	91.0	92.1	91.7	0.82	7.9	3.6	2.1	J	650	95	**FD 08**	170	725	125	**FA 08**	170	725	124
11	**MX 5SB**	**4**	1465	72	20.5	91.4	92.9	92.5	0.84	7.8	3.4	1.9	J	780	110	**FD 08**	170	855	140	**FA 08**	170	855	139
15	**MX 5LA**	**4**	1465	98	28.1	92.1	93.2	92.6	0.82	9.0	4.1	2.3	K	890	121	**FD 08**	200	965	151	**FA 08**	200	965	150

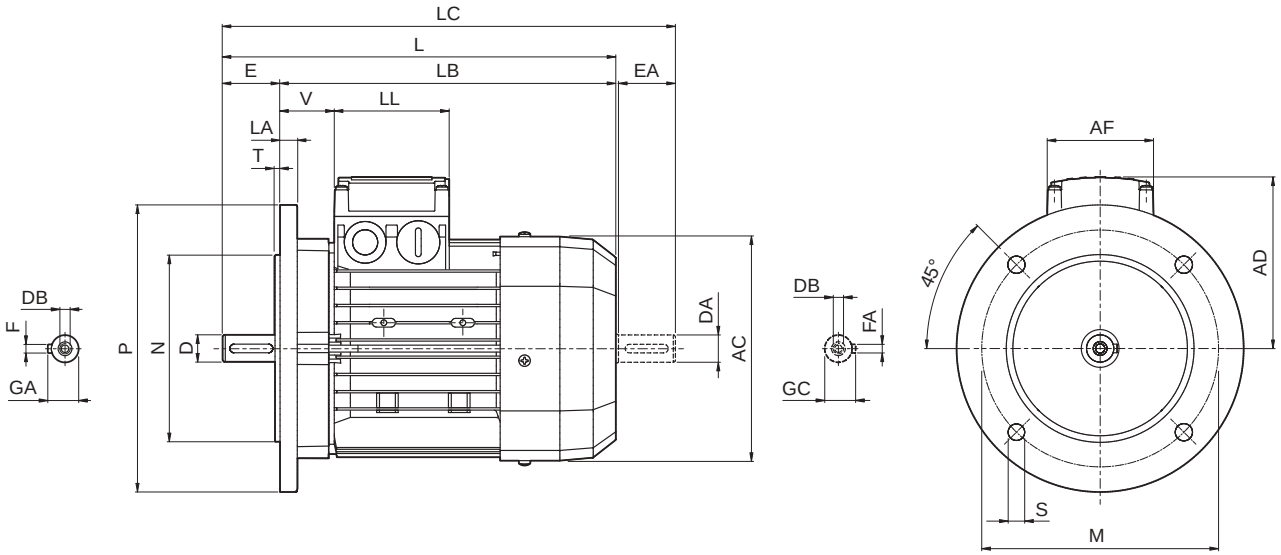




4 P	1800 min^{-1} - S1	60 Hz - IE3

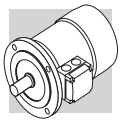
															d.c. brake				a.c. brake			
															FD				FA			
P_n		n	M_n	In 460V	η%			cos φ	$\frac{I_s}{I_n}$	$\frac{M_s}{M_n}$	$\frac{M_a}{M_n}$	KVA code	J_m x 10^{-4}	IM B5	Mod	M_b	J_m x 10^{-4}	IM B5	Mod	M_b	J_m x 10^{-4}	IM B5
kW		min^{-1}	Nm	A	100%	75%	50%						kgm^2			Nm	kgm^2			Nm	kgm^2	
0.75	**MX 2SB**	**4**	1755	4.1	1.48	85.5	86.4	83.9	0.73	8.0	3.7	2.5	L	27	16	**FD 14**	15	29	20.2	**FA 14**	15	29	20.1
1.1	**MX 3SA**	**4**	1755	6.0	2.19	86.5	86.0	83.0	0.73	7.9	3.3	2.5	L	35	17	**FD 15**	15	26	24	**FA 15**	15	26	24
1.5	**MX 3SB**	**4**	1755	8.2	2.96	86.5	87.2	85.0	0.72	8.5	3.7	2.9	L	43	20	**FD 15**	26	47	27	**FA 15**	26	47	27
2.2	**MX 3LA**	**4**	1760	11.9	4.4	89.5	88.6	86.2	0.71	9.9	4.8	3.6	N	73	29	**FD 15**	40	77	36	**FA 15**	40	77	36
3	**MX 3LB**	**4**	1750	16.4	5.9	89.5	88.9	86.7	0.71	9.1	4.4	3.3	M	73	29	**FD 15**	40	77	36	**FA 15**	40	77	36
3.7	**MX 4SA**	**4**	1770	20.0	6.6	89.5	89.8	87.7	0.78	9.9	4.7	3.4	M	225	45	**FD 56**	75	235	58	**FA 06**	75	235	59
5.5	**MX 4SB**	**4**	1770	30	9.9	91.7	92.0	90.2	0.76	10.7	5.1	4.6	N	410	77	**FD 56**	75	420	90	**FA 06**	75	420	91
7.5	**MX 4LA**	**4**	1770	41	13.4	91.7	91.3	89.7	0.76	11.0	4.9	4.4	N	410	77	**FD 06**	100	420	90	**FA 07**	100	420	95
9.2	**MX 5SA**	**4**	1770	50	15.6	92.4	92.5	91.6	0.8	9.1	4.1	2.6	L	650	95	**FD 08**	170	725	125	**FA 08**	170	725	124
11	**MX 5SB**	**4**	1770	59	18.2	92.4	92.9	92.0	0.82	9.3	4.0	2.4	L	780	110	**FD 08**	170	855	140	**FA 08**	170	855	139
15	**MX 5LA**	**4**	1770	81	24.5	93.0	93.5	92.5	0.81	10.9	4.8	2.8	M	890	121	**FD 08**	200	965	151	**FA 08**	200	965	150

BX - IM B5 - CE/CCC

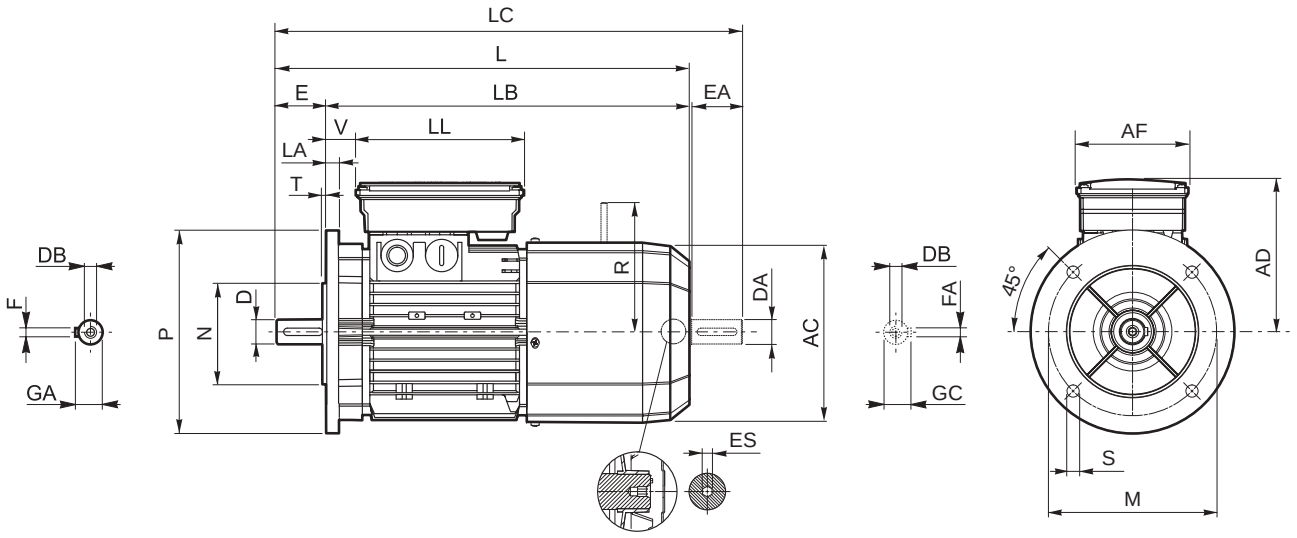


	Shaft					Flange						Motor							
	D DA	E EA	DB	GA GC	F FA	M	N	P	S	T	LA	AC	L	LB	LC	AD	AF	LL	V
BX 80 B	19 14(1)	40 30(1)	M6 M5(1)	21.5 16(1)	6 5(1)	165	130	200	11.5	3.5	11.5	156	320	280	351	119	74	80	38
BX 90 S	24 19(1)	50 40(1)	M8 M6(1)	27 21.5 (1)	8 6(1)							176	326	276	368	133	98	98	44
BX 90 LA																			
BX 100 LA	28 24(1)	60 50(1)	M10 M8(1)	31 27(1)	8 8(1)	215	180	250	14	4	14	195	410	350	462	142			50
BX 100 LB																			
BX 112 M											15	219	430	370	482	157			52
BX 132 SB	38 28(1)	80 60(1)	M12 M10(1)	41 31(1)	10 8(1)	265	230	300			20	258	493	413	556	193	118	118	58
BX 132 MA													528	448	591				
BX 160 MA	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
BX 160 MB													640	530	724				
BX 160 L																			
BX 180 M	48 42(1)	110 110(1)	M16 M16(1)	51.5 45(1)	14 12(1)						18	348	708	598	823	261			52
BX 180 L																			
BX 200LA	55 45(1)	M20 M20(1)		59 48.5(1)	16 14(1)	350	300	400	19		20	423	821	711	934	328	300	311	55
BX 225SA	60 55(1)	140 110(1)		64 59(1)	18 16(1)	400	350	450				465	879	739	1001	348			48
BX 225SB																			
BX 250MA	65 55(1)			69 59(1)		500	450	550			24	514	884	744	1010	376			
BX 280SA	75 65(1)	140 140(1)		79.5 69(1)	20 18(1)				18		23	567	1088	948	1238	482	434	306	43
BX 280SB																			
BX 315SA	80 75(1)	170 140(1)		85 79.5(1)	22 20(1)	600	550	660	23	6	25	645	1204	1034	1352	537	473	347	42
BX 315SB																			
BX 315SC																			
BX 315MA	90 75(1)		M24 M20(1)	95 79.5(1)	25 20(1)								1315	1145	1463				
BX 355MA	100 75(1)	210 170(1)		106 79.5(1)	28 20(1)	740	680	800				740	1479	1269	1659	603	694	413	50
BX 355MB																			
BX 355MC																			

N.B.: 1) These values refer to the rear shaft end (PS).



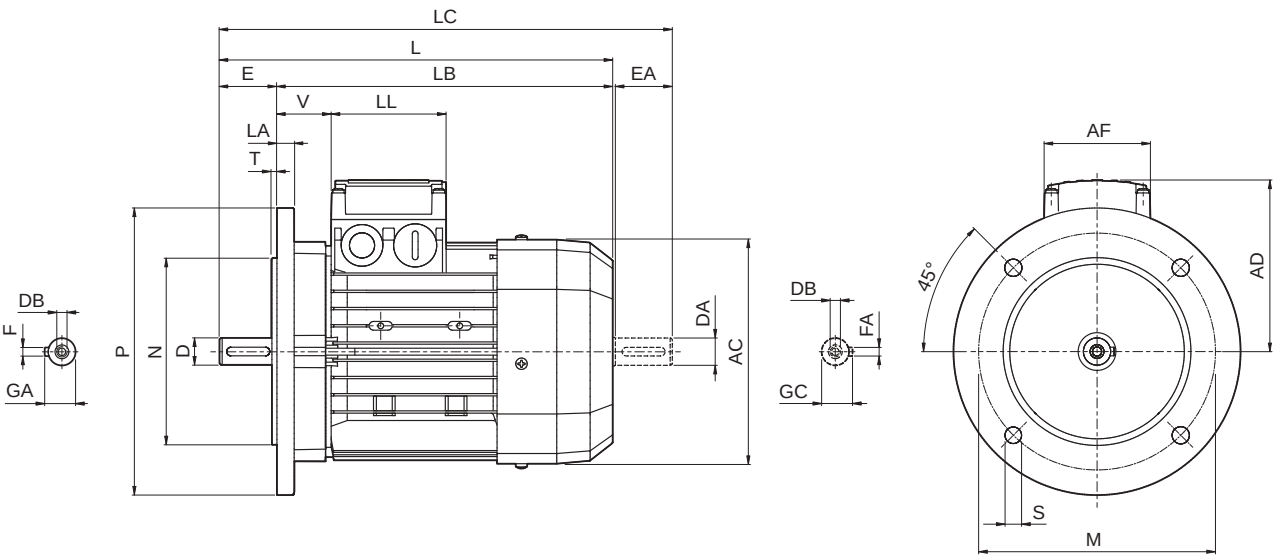
BX - IM B5 - FD/FA - CE/CCC



	Shaft					Flange						Motor										
	D DA	E EA	DB	GA GC	F FA	M	N	P	S	T	LA	AC	L	LB	LC	AD	AF	LL	V	R FD	R FA	ES (2)
BX 80 B	19 14(1)	40 30(1)	M6 M5(1)	21.5 16(1)	6 5(1)	165	130	200	11.5	3.5	11.5	156	392	352	423	143	98	133	25	129	134	5
BX 90 S	24 19(1)	50 40(1)	M8 M6(1)	27 21.5 (1)	8 6(1)							176	410	360	452	146	110	165	32			6
BX 90 LA																				160	160	
BX 100 LA	28 24(1)	60 50(1)	M10 M8(1)	31 27(1)	8 8(1)	215	180	250	14	4	14	195	502	442	554	155			37			
BX 100 LB											15	219	527	467	579	170			39	199	198	
BX 112 M																						
BX 132 SB	38 28(1)	80 60(1)	M12 M10(1)	41 31(1)	10 8(1)	265	230	300			16	258	603	523	667	210	140	188	46	204	200	
BX 132 MA													627	547	690						226	
BX 160 MA	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	247	—
BX 160 MB													780	670	864							
BX 160 L																						
BX 180 M	48 42(1)	110 110(1)	M16 M16(1)	51.5 45(1)	14 12(1)						18	348	866	756	981	261			52	305	—	
BX 180 L																						
BX 200LA	55 45(1)		M20 M20(1)	59 48.5(1)	16 14(1)	350	300	400	19	5	20	423	982	872	1095	328	300	311	55	320		
BX 225SA	60 55(1)	140 110(1)		64 59(1)	18 16(1)	400	350	450				465	1058	918	1180	348			48	445		
BX 225SB																						
BX 250MA	65 55(1)			69 59(1)		500	450	550			24	514	1099	959	1225	376				832		
BX 280SA	75 65(1)	140 140(1)		79.5 69(1)	20 18(1)				18		23	567	1340	1200	1490	482	434	306	43	832	—	
BX 280SB																						
BX 315SA	80 75(1)	170 140(1)		85 79.5(1)	22 20(1)	600	550	660	23	6	25	645	1452	1282	1600	537	473	347	42	832		
BX 315SB													1497	1327	1645					—		
BX 315SC																						
BX 315MA	90 75(1)		M24 M20(1)	95 79.5(1)	25 20(1)								1607	1437	1755							
BX 355MA	100 75(1)	210 170(1)		106 79.5(1)	28 20(1)	740	680	800				740	1790	1580	1970	603	694	413	50			
BX 355MB													1825	1615	2005							
BX 355MC																						

N.B.: 1) These values refer to the rear shaft end (PS). 2) “ES” hexagon is not present with PS option

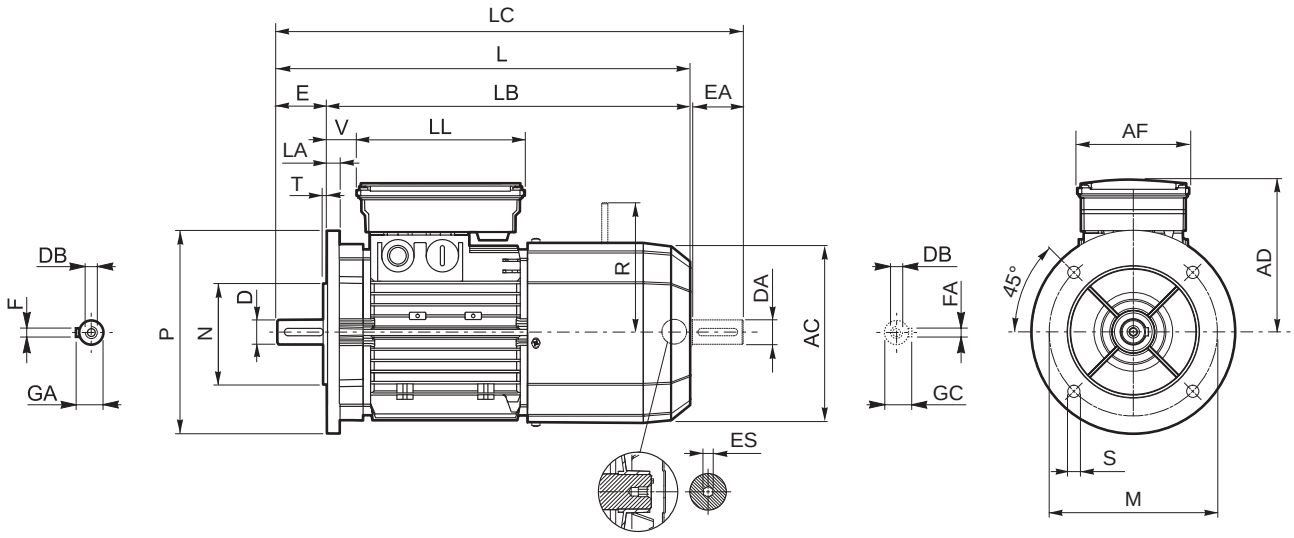
BX - IM B5 - CUS/NBR/EECA



	Shaft					Flange						Motor							
	D DA	**E EA**	**DB**	**GA GC**	**F FA**	**M**	**N**	**P**	**S**	**T**	**LA**	**AC**	**L**	**LB**	**LC**	**AD**	**AF**	**LL**	**V**
BX 90SR	19 19(1)	40 40(1)	M6 M6(1)	21.5 21.5(1)	6 6(1)	165	130	200	11.5	3.5	11.5	176	316	276	358	133			44
BX 90LA																			
BX 100LA																			
BX 100LB	28 24(1)	60 50(1)	M10 M8(1)	31 27(1)	8 8(1)	215	180	250			14	195	410	350	462	142	98	98	50
BX 112M									14	4	15	219	430	370	482	157			52
BX 132SB	38 28(1)	80 60(1)	M12 M10(1)	41 31(1)	10 8(1)	265	230	300			20	258	552	472	615	193	118	118	58
BX 132MA																			
BX 160MA													596	486	680				
BX 160MB	42 38(1)	110 80(1)	M16 M12(1)	45 41(1)	12 10(1)	300	250	350	18.5		15	310	640	530	724	245	187	187	51
BX 160L																			
BX 180M	48 42(1)	110 110(1)	M16 M16(1)	51.5 45(1)	14 12(1)						18	348	708	598	823	261			52
BX 180L																			
BX 200LAK	55 45(1)		M20 M16(1)	59 48.5(1)	16 14(1)	350	300	400		5	20	423	821	711	934	328	300	311	55
BX 225SAK	60 55(1)	140 110(1)		64 59(1)	18 16(1)	400	350	450	19			465	879	739	1001	348			48
BX 225SBK																			
BX 250MAK	65 55(1)			69 59(1)		500	450	550			24	514	884	744	1010	376			
BX 280SAK	75 65(1)	140 140(1)	M20 M20(1)	79.5 69(1)	20 18(1)				18		23	567	1088	948	1238	482	434	306	43
BX 280SBK																			
BX 315SAK													1204	1034	1352				
BX 315SBK	80 75(1)	170 140(1)		85 79.5(1)	22 20(1)	600	550	660				645				537	473	347	42
BX 315SCK													1315	1145	1453				
BX 355SAK									23	6	25								
BX 355MAK	100 75(1)	210 170(1)	M24 M20(1)	106 79.5(1)	28 20(1)	740	680	800				740	1479	1269	1659	603	694	413	50
BX 355MBK																			
BX 355MCK													1584	1374	1764				

N.B.: 1) These values refer to the rear shaft end (PS).

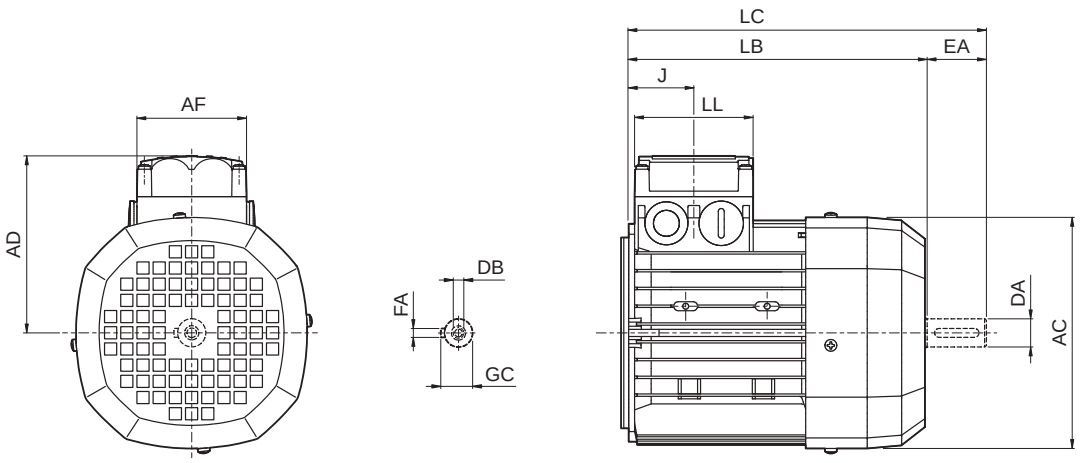
BX - IM B5 - FD/FA - CUS/NBR/EECA



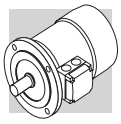
	Shaft					Flange						Motor										
	D DA	E EA	DB	GA GC	F FA	M	N	P	S	T	LA	AC	L	LB	LC	AD	AF	LL	V	R FD	R FA	ES (2)
BX 90 SR	19 19(1)	40 40(1)	M6 M6(1)	21.5 21.5(1)	6 6(1)	165	130	200	11.5	3.5	11.5	176	400	360	442	146	110	165	32	129	134	6
BX 90 S	24 19(1)	50 40(1)	M8 M6(1)	27 21.5(1)	8 6(1)								410		452							
BX 90 LA																				160	160	
BX 100 LA	28 24(1)	60 50(1)	M10 M8(1)	31 27(1)	8 8(1)	215	180	250	14	4	14	195	502	442	554	155			37			
BX 100 LB																						
BX 112 M											15	219	527	467	579	170			39	199	198	
BX 132 SB	38 28(1)	80 60(1)	M12 M10(1)	41 31(1)	10 8(1)	265	230	300			16	258	661	581	724	210	140	188	46	204	200	
BX 132 MA																					226	
BX 160 MA	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	247	—
BX 160 MB													780	670	864							
BX 160 L																						
BX 180 M	48 42(1)	110 110(1)	M16 M16(1)	51.5 45(1)	14 12(1)						18	348	866	756	981	261			52	305	—	
BX 180 L																						
BX 200LAK	55 45(1)		M20 M16(1)	59 48.5(1)	16 14(1)	350	300	400	19	5	20	417	967	857	1082	328	300	311	55	323		
BX 225SAK	60 55(1)	140 110(1)	M20 M20(1)	64 59(1)	18 16(1)	400	350	450				460	1065	925	1180	348			48	308		
BX 225SBK																						
BX 250MAK	65 55(1)			69 59(1)		500	450	550			24	510	1070	930	1240	376				363		
BX 280SAK	75 65(1)	140 140(1)		79.5 69(1)	20 18(1)				18		23	564	1284	1144	1379	482	434	306	43	500	—	
BX 280SBK																						
BX 315SAK	80 75(1)	170 140(1)		85 79.5(1)	22 20(1)	600	550	660	23	6	25	639	1493	1323	1643	537	473	347	42	678		
BX 315SBK													1530	1360	1680							
BX 315SCK													1604	1434	1791							
BX 355SAK	100 75(1)	210 170(1)	M24 M20(1)	106 79.5(1)	28 20(1)	740	680	800				725	1722	1512	1902	603	694	413	50	—		
BX 355MAK																						
BX 355MBK																						
BX 355MCK													1827	1617	2082							

N.B.: 1) These values refer to the rear shaft end (PS). 2) “ES” hexagon is not present with PS option

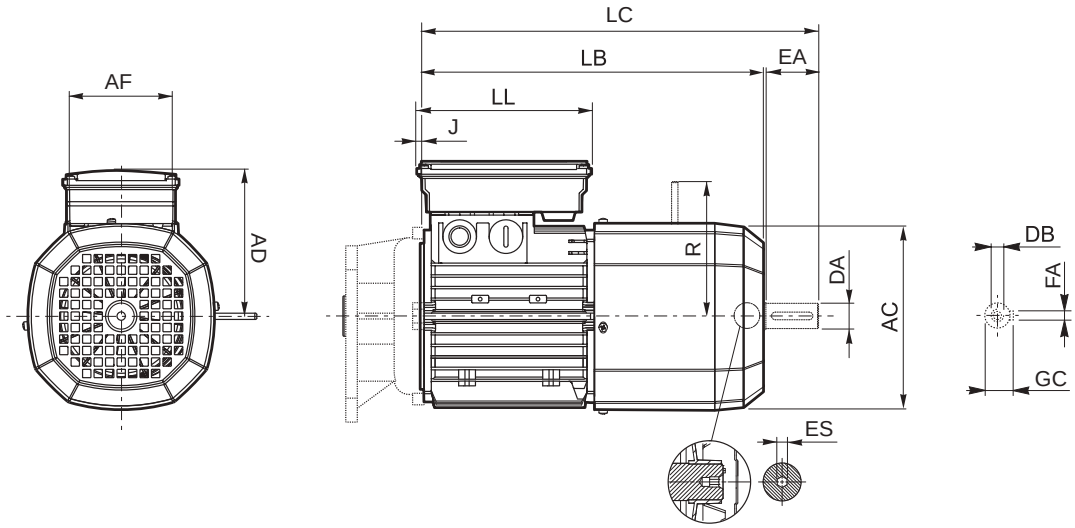
MX



	Rear shaft end					Motor						
	DA	**EA**	**DB**	**GC**	**FA**	**AC**	**LB**	**LC**	**AF**	**LL**	**J**	**AD**
MX 2SB	14	30	M5	16	5	156	246	278	74	80	44	119
MX 3SA	24	50	M8	27	8	195	265	317	98	98	53.5	142
MX 3SB												
MX 3LA							305	357				
MX 3LB												
MX 4SA	28	60	M10	31		258	361	424	118	118	64.5	193
MX 4SB												
MX 4LA							396	459				
MX 5SA	38	80	M12	41	10	310	418	502	187	187	77	245
MX 5SB							462	546				
MX 5LA												



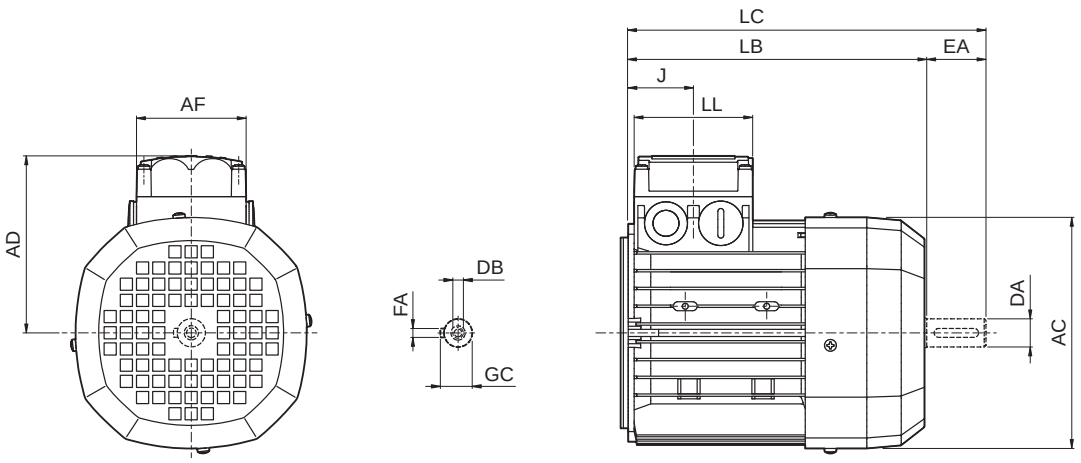
MX_FD/FA



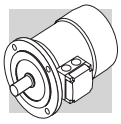
	Rear shaft end					Motor									
	DA	**EA**	**DB**	**GC**	**FA**	**AC**	**LB**	**LC**	**AF**	**LL**	**J**	**AD**	**R FD**	**R FA**	**ES** [1]
MX 2SB	14	30	M5	16	5	156	318	349	98	133	9	143	129	134	5
MX 3SA	24	50	M8	27	8	195	355	407	110	165	7	155	160	160	6
MX 3SB															
MX 3LA							397	450							
MX 3LB															
MX 4SA	28	60	M10	31		258	470	534	140	188		210	204	200	
MX 4SB															
MX 4LA							494	558						226	
MX 5SA	38	80	M12	41	10	310	558	644	187	187	17	245	266	247	—
MX 5SB							602	686							
MX 5LA															

N.B.:
1) “ES” hexagon is not present with PS option

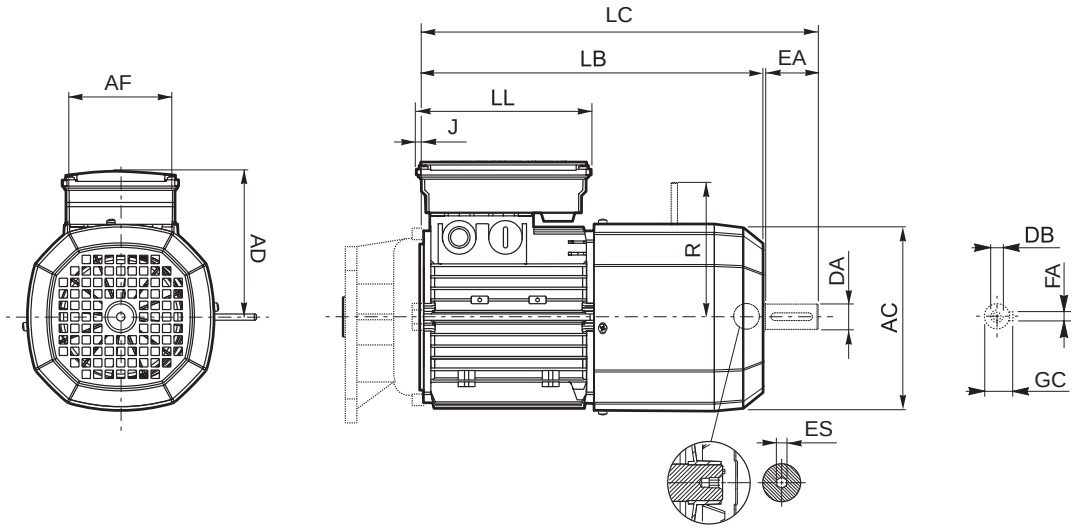
MX CUS



	Rear shaft end					Motor						
	DA	**EA**	**DB**	**GC**	**FA**	**AC**	**LB**	**LC**	**AF**	**LL**	**J**	**AD**
MX 2SB	14	30	M5	16	5	176	262	293	98	98	79	133
MX 3SA	24	50	M8	27	8	195	265	317			53.5	142
MX 3SB												
MX 3LA							305	357				
MX 3LB												
MX 4SA	28	60	M10	31		258	361	424	118	118	64.5	193
MX 4SB							420	483				
MX 4LA												
MX 5SA	38	80	M12	41	10	310	418	502	187	187	77	245
MX 5SB							462	546				
MX 5LA												

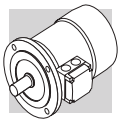


MX_FD/FA CUS



	Rear shaft end					Motor									
	DA	**EA**	**DB**	**GC**	**FA**	**AC**	**LB**	**LC**	**AF**	**LL**	**J**	**AD**	**R FD**	**R FA**	**ES** [1]
MX 2SB	14	30	M5	16	5	176	347	379	110	165	-17	146	129	134	6
MX 3SA	24	50	M8	27	8	195	355	407			7	155	160	160	
MX 3SB															
MX 3LA							397	450							
MX 3LB															
MX 4SA	28	60	M10	31		258	470	534	140	188		210	204	200	
MX 4SB							528	592							
MX 4LA														226	
MX 5SA	38	80	M12	41	10	310	558	644	187	187	17	245	266	247	—
MX 5SB							602	686							
MX 5LA															

N.B.:
1) “ES” hexagon is not present with PS option



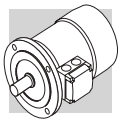
M16 MOTOR RATING CHARTS BE-ME

2 P	3000 min^{-1} - S1	50 Hz - IE2

P_n kW			n min^{-1}	M_n Nm	In 400V A	η% 100%	η% 75%	η% 50%	cos φ	$\frac{I_s}{I_n}$	$\frac{M_s}{M_n}$	$\frac{M_a}{M_n}$	J_m x 10^{-4} kgm^2	IM B5
0.75	**BE 80A**	**2**	2860	2.5	1.65	80.0	79.6	76.4	0.83	6.8	3.8	3.5	9.0	9.5
1.1	**BE 80B**	**2**	2845	3.7	2.35	81.5	82.2	79.9	0.83	6.9	3.8	3.1	11.4	11.3
1.5	**BE 90SA**	**2**	2865	5.0	3.2	81.3	80.7	78.1	0.82	6.8	3.6	2.8	12.5	12.3
2.2	**BE 90L**	**2**	2870	7.3	4.7	83.2	83.1	80.8	0.82	6.9	3.1	2.9	16.7	14
3	**BE 100L**	**2**	2880	9.9	6.2	84.6	84.6	83.7	0.83	7.3	3.5	3.1	39	23
4	**BE 112M**	**2**	2920	13.1	8.2	85.8	85.5	84.3	0.82	7.9	3.5	3.1	57	28
5.5	**BE 132SA**	**2**	2925	18.0	10.6	87.0	85.0	81.7	0.86	8.5	3.6	3.3	145	42
7.5	**BE 132SB**	**2**	2935	24	14.3	88.1	87.4	84.7	0.86	8.8	3.9	3.6	178	53
9.2	**BE 132MB**	**2**	2920	30	16.4	88.8	86.5	84.2	0.91	8.4	3.7	3.3	210	65
11	**BE 160MA**	**2**	2940	36	20.0	89.4	89.5	88.0	0.89	8.1	3.0	2.9	340	84
15	**BE 160MB**	**2**	2950	49	27.2	90.5	90.5	89.5	0.88	8.5	3.0	2.8	420	97
18.5	**BE 160L**	**2**	2945	60	32	90.9	90.5	89.8	0.91	7.7	2.9	2.7	490	109

4 P	1500 min^{-1} - S1	50 Hz - IE2

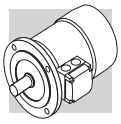
P_n kW			n min^{-1}	M_n Nm	In 400V A	η% 100%	η% 75%	η% 50%	cos φ	$\frac{I_s}{I_n}$	$\frac{M_s}{M_n}$	$\frac{M_a}{M_n}$	J_m x 10^{-4} kgm^2	IM B5
0.37	**BE 71B**	**4**	1385	2.55	1.05	70.1	69.3	64.2	0.75	4.0	2.3	2.2	6.9	5.9
0.55	**BE 80A**	**4**	1405	3.7	1.41	75.1	74.9	71.2	0.76	4.3	2.2	1.9	15	8.2
0.75	**BE 80B**	**4**	1430	5.0	1.65	81.0	80.5	78.0	0.81	6.1	3.2	3.0	28	12.2
1.1	**BE 90S**	**4**	1430	7.4	2.53	82.5	82.0	79.5	0.76	6.3	2.9	2.8	28	13.6
1.5	**BE 90LA**	**4**	1430	10.0	3.5	83.5	83.0	80.0	0.74	5.9	3.1	3.0	34	15.1
2.2	**BE 100LA**	**4**	1430	14.7	4.9	85.4	85.0	84.0	0.76	5.8	3.0	2.8	54	22
3	**BE 100LB**	**4**	1420	20	6.6	85.5	86.0	85.5	0.77	5.9	2.8	2.6	61	24
4	**BE 112M**	**4**	1440	27	8.3	87.0	87.0	86.0	0.80	6.5	2.8	2.8	105	32
5.5	**BE 132S**	**4**	1460	36	11.1	88.5	88.5	87.5	0.81	7.3	2.9	2.9	270	53
7.5	**BE 132MA**	**4**	1460	49	14.8	89.0	89.0	88.5	0.82	6.9	2.9	2.8	319	59
9.2	**BE 132MB**	**4**	1460	60	18.1	89.5	89.5	88.5	0.82	6.9	2.9	3.0	360	70
11	**BE 160M**	**4**	1465	72	21.5	91.0	91.3	90.5	0.81	6.5	2.8	2.6	650	99
15	**BE 160L**	**4**	1465	98	28.7	90.8	91.0	90.5	0.83	6.5	2.6	2.3	790	115
18.5	**BE 180M**	**4**	1465	121	35	91.6	92.0	91.3	0.83	6.5	2.6	2.5	1250	135
22	**BE 180L**	**4**	1465	143	41	91.6	91.8	91.4	0.84	6.8	2.7	2.6	1650	157



6 P	1000 min^{-1} - S1	50 Hz - IE2

P_n kW			n min^{-1}	M_n Nm	In 400V A	η% 100%	η% 75%	η% 50%	cos φ	I_s/I_n	M_s/M_n	M_a/M_n	J_m x 10^{-4} kgm^2	IM B5 Kg
0.75	**BE 90S**	**6**	935	7.7	2.06	75.9	75.9	73.0	0.69	5.1	3.1	2.9	33	15
1.1	**BE 100M**	**6** (*)	945	11.1	2.75	78.1	76.2	73.0	0.74	4.9	2.2	1.9	82	22
1.5	**BE 100LA**	**6**	945	15.2	3.9	79.8	77.5	74.0	0.72	5.6	2.5	2.3	95	24
2.2	**BE 112M**	**6**	950	22	5.2	81.8	81.8	79.3	0.74	5.2	2.6	2.3	168	32
3	**BE 132S**	**6**	955	30	6.6	83.3	83.3	82.4	0.79	6.1	2.1	1.9	295	44
4	**BE 132MA**	**6**	965	40	8.7	84.6	85.0	83.1	0.79	6.9	2.2	2.0	383	56
5.5	**BE 160MA**	**6** (*)	965	54	11.6	87.0	87.0	86.4	0.79	6.6	2.5	2.3	740	83
7.5	**BE 160MB**	**6** (*)	965	74	15.0	88.0	88.0	87.2	0.82	6.6	2.3	2.1	970	103

(*) Power /size relation not standardized

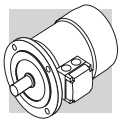


2 P	3000 min^{-1} - S1	50 Hz - IE2

P_n			n	M_n	In 400V	η%			cos φ	$\frac{I_s}{I_n}$	$\frac{M_s}{M_n}$	$\frac{M_a}{M_n}$	J_m x 10^{-4}	IM B9
kW			min^{-1}	Nm	A	100%	75%	50%					kgm^2	
0.75	**ME 2SA**	**2**	2860	2.5	1.63	80.0	79.6	76.4	0.83	6.8	3.8	3.5	9.0	8.8
1.1	**ME 2SB**	**2**	2845	3.7	2.35	81.5	82.2	79.9	0.83	6.9	3.8	3.1	11.4	10.6
1.5	**ME 3SA**	**2**	2845	5.0	3.2	81.3	79.0	76.0	0.84	6.1	2.9	2.7	24	15.5
2.2	**ME 3LA**	**2**	2895	7.3	4.8	83.2	83.2	81.5	0.80	6.3	2.7	2.5	31	18.7
3	**ME 3LB**	**2**	2880	9.9	6.2	84.6	84.6	83.7	0.83	7.3	3.5	3.1	39	22
4	**ME 4SA**	**2**	2900	13.2	7.8	85.8	84.5	82.2	0.87	7.0	2.9	2.8	101	33
5.5	**ME 4SB**	**2**	2925	18.0	10.6	87.0	85.0	81.7	0.86	8.5	3.6	3.3	145	40
7.5	**ME 4LA**	**2**	2935	24	14.3	88.1	87.4	84.7	0.86	8.8	3.9	3.6	178	51
9.2	**ME 4LB**	**2**	2920	30	16.4	88.8	86.5	84.2	0.91	8.4	3.7	3.3	210	60
11	**ME 5SA**	**2**	2940	36	20.0	89.4	89.5	88.0	0.89	8.1	3.0	2.9	340	70
15	**ME 5SB**	**2**	2950	49	27.2	90.5	90.5	89.5	0.88	8.5	3	2.8	420	83
18.5	**ME 5LA**	**2**	2945	60	32	90.9	90.5	89.8	0.91	7.7	2.9	2.7	490	95

4 P	1500 min^{-1} - S1	50 Hz - IE2

P_n			n	M_n	In 400V	η%			cos φ	$\frac{I_s}{I_n}$	$\frac{M_s}{M_n}$	$\frac{M_a}{M_n}$	J_m x 10^{-4}	IM B9
kW			min^{-1}	Nm	A	100%	75%	50%					kgm^2	
0.75	**ME 2SB**	**4**	1430	5.0	1.65	81.0	80.5	78.0	0.81	6.1	3.2	3	28	10.9
1.1	**ME 3SA**	**4**	1430	7.4	2.60	82.5	82.0	79.0	0.74	5.5	2.5	2.8	34	15.5
1.5	**ME 3SB**	**4**	1420	10.1	3.48	84.0	84.0	83.0	0.74	6.2	2.9	2.9	40	17
2.2	**ME 3LA**	**4**	1430	14.7	4.89	85.4	85.0	84.0	0.76	5.8	3	2.8	54	21
3	**ME 3LB**	**4**	1420	20	6.58	85.5	86.0	85.5	0.77	5.9	2.8	2.6	61	23
4	**ME 4SA**	**4**	1440	27	8.25	87.5	86.8	84.0	0.80	7.1	3.0	3.1	213	42
5.5	**ME 4SB**	**4**	1460	36	11.07	88.5	88.5	87.5	0.81	7.3	2.9	2.9	270	51
7.5	**ME 4LA**	**4**	1460	49	14.83	89.0	89.0	88.5	0.82	6.9	2.9	2.8	319	57
9.2	**ME 4LB**	**4**	1460	60	18.09	89.5	89.5	88.5	0.82	6.9	2.9	3	360	65
11	**ME 5SA**	**4**	1465	72	21.54	91.0	91.3	90.5	0.81	6.5	2.8	2.6	650	85
15	**ME 5LA**	**4**	1465	98	28.73	90.8	91.0	90.5	0.83	6.5	2.6	2.3	790	101

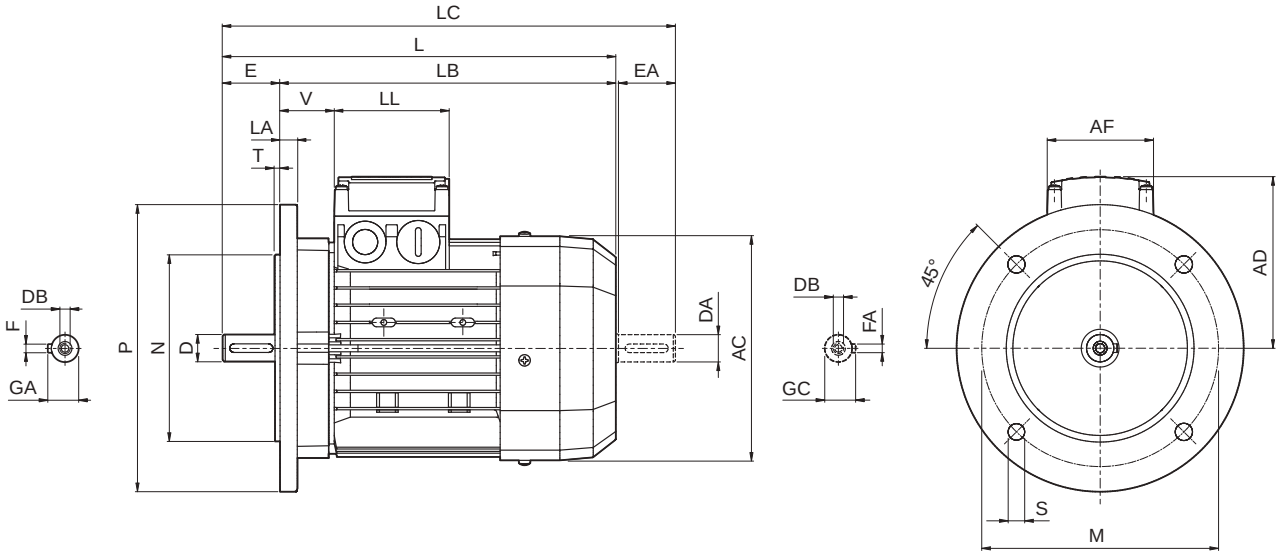


6 P	1000 min^{-1} - S1	50 Hz - IE2

P_n kW	—		n min^{-1}	M_n Nm	In 400V A	η% 100%	η% 75%	η% 50%	cos φ	I_s/I_n	M_s/M_n	M_a/M_n	J_m x 10^{-4} kgm^2	IM B9 kg
0.75	**ME 3SA**	**6**	940	7.6	1.98	75.9	75.0	70.7	0.72	4.7	2.2	2.0	33	17
1.1	**ME 3LA**	**6** (*)	945	11.1	2.75	78.1	76.2	73.0	0.74	4.9	2.2	1.9	82	21
1.5	**ME 3LB**	**6**	945	15.2	3.8	79.8	77.5	74.0	0.72	5.6	2.5	2.3	95	23
2.2	**ME 4SA**	**6**	955	22	4.9	81.8	81.8	80.0	0.80	5.7	1.9	1.7	216	34
3	**ME 4SB**	**6**	955	30	6.6	83.3	83.3	82.4	0.79	6.1	2.1	1.9	295	43
4	**ME 4LA**	**6**	965	40	8.6	84.6	85	83.1	0.79	6.9	2.2	2	383	54
5.5	**ME 5SA**	**6** (*)	965	54	11.6	87.0	87.0	86.4	0.79	6.6	2.5	2.3	740	69
7.5	**ME 5SB**	**6** (*)	965	74	15.0	88.0	88.0	87.2	0.82	6.6	2.3	2.1	970	89

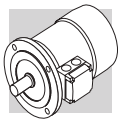
(*) Power /size relation not standardized

BE - IM B5

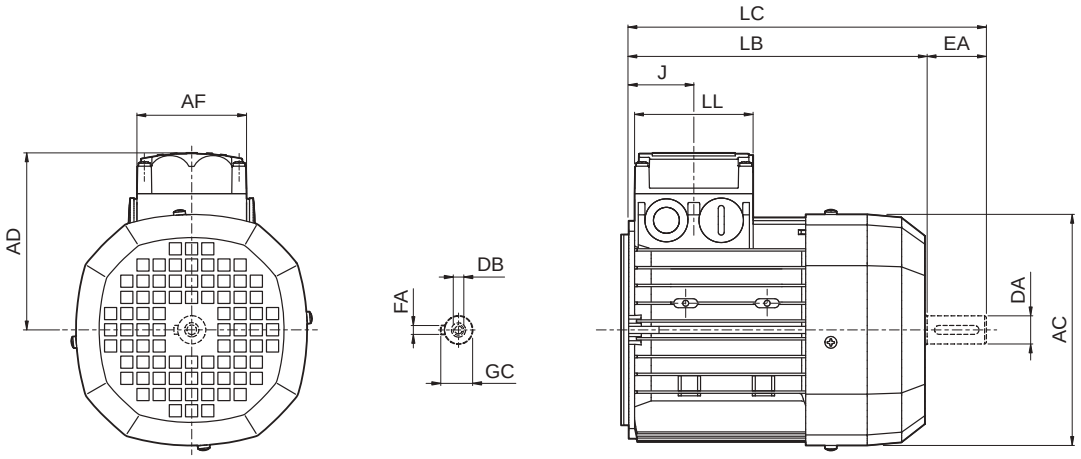


	Shaft					Flange						Motor							
	D DA	**E EA**	**DB**	**GA GC**	**F FA**	**M**	**N**	**P**	**S**	**T**	**LA**	**AC**	**L**	**LB**	**LC**	**AD**	**AF**	**LL**	**V**
BE 71	14	30	M5	16	5	130	110	160	9.5	3.5	10	138	249	219	281	108	74	80	37
BE 80	19	40	M6	21.5	6	165	130	200	11.5		11.5	156	274	234	315	119			38
BE 90 S	24	50	M8	27	8							176	326	276	378	133	98	98	44
BE 90 L																			
BE 100	28	60	M10	31		215	180	250	14	4	14	195	367	307	429	142			50
BE 112											15	219	385	325	448	157			52
BE 132 S	38	80	M12	41	10	265	230	300			20	258	493	413	576	193	118	118	58
BE 132 MA																			
BE 132 MB													528	448	611				
BE 160 M	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
BE 160 L													640	530	724				
BE 180 M	48 42(1)	110 110(1)	M16 M16(1)	51.5 45(1)	14 12(1)						18	348	708	598	823	261			52
BE 180 L																			

N.B.:
1) These values refer to the rear shaft end.



ME



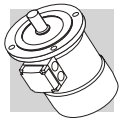
	Rear shaft end					Motor						
	DA	**EA**	**DB**	**FA**	**GC**	**AC**	**LB**	**LC**	**AF**	**LL**	**J**	**AD**
ME 2S	19	40	M6	6	21.5	156	202	245	74	80	44	119
ME 3S	28	60	M10	8	31	195	230	293	98	98	53.5	142
ME 3L							262	325				
ME 4S	38	80	M12	10	41	258	361	444	118	118	64.5	193
ME 4L												
ME 4LB							396	479				
ME 5S						310	418	502	187	187	77	245
ME 5L							462	546				

2P — 3000 min-1 - S1 — 50 Hz

															d.c. brake						a.c. brake				
															FD						FA				
P_n		n	M_n	IE1	η (100%)	η (75%)	η (50%)	cosφ	In 400V	Is / In	Ms / Mn	Ma / Mn	J_m x 10^{-4}	IM B5	Mod	Mb	Z_o 1/h		J_m x 10^{-4}	IM B5	Mod	Mb	Z_o 1/h	J_m x 10^{-4}	IM B5
kW		min-1	Nm		%	%	%		A				kgm²			Nm	NB	SB	kgm²			Nm		kgm²	
0.18	BN 63A	2	2730	0.63	○	59.9	56.9	51.9	0.77	0.56	3.0	2.1	2.0	2.0	3.5	FD 02	1.75	3900	4800	2.6	5.2	FA 02	1.75	4800	2.6	5.0
0.25	BN 63B	2	2740	0.87	○	66.0	64.8	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
0.37	BN 63C	2	2800	1.26	○	69.1	66.8	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
0.37	BN 71A	2	2820	1.25	○	73.8	73.0	70.6	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
0.55	BN 71B	2	2820	1.86	○	76.0	75.8	74.8	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
0.75	BN 71C	2	2810	2.6	○	76.6	76.2	76.2	0.76	1.86	5.1	3.1	2.8	5.0	7.3	FD 03	5	1900	3300	6.1	10.0	FA 03	5	3600	6.1	9.7
0.75	BN 80A	2	2810	2.6	•	76.2	75.5	68.3	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
1.1	BN 80B	2	2800	3.8	•	76.4	76.2	75.0	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
1.5	BN 80C	2	2800	5.1	•	79.1	79.5	77.2	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
1.5	BN 90SA	2	2870	5.0	•	82.0	81.5	78.1	0.80	3.4	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
1.85	BN 90SB	2	2880	6.1	•	82.5	82.0	75.4	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
2.2	BN 90L	2	2880	7.3	•	82.7	82.1	80.8	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
3	BN 100L	2	2860	10.0	•	81.5	81.3	77.4	0.79	6.7	5.6	2.6	2.2	31	20	FD 15	26	700	1600	35	26	FA 15	26	1600	35	27
4	BN 100LB	2	2870	13.3	•	83.1	83.0	77.8	0.80	8.7	5.8	2.7	2.5	39	23	FD 15	40	450	900	43	29	FA 15	40	1000	43	30
4	BN 112M	2	2900	13.2	•	85.5	84.5	83.0	0.82	8.2	6.9	3.0	2.9	57	28	FD 06S	40	—	950	66	39	FA 06S	40	950	66	40
5.5	BN 132SA	2	2890	18.2	•	84.7	84.5	81.2	0.84	11.2	5.9	2.6	2.2	101	35	FD 06	50	—	600	112	48	FA 06	50	600	112	49
7.5	BN 132SB	2	2900	25	•	86.5	86.3	84.4	0.85	14.7	6.4	2.6	2.2	145	42	FD 06	50	—	550	154	55	FA 06	50	550	154	56
9.2	BN 132M	2	2930	30	•	87.0	86.5	83.6	0.86	17.7	6.7	2.8	2.3	178	53	FD 56	75	—	430	189	66	FA 06	75	430	189	67
11	BN 160MR	2	2920	36	•	87.6	87.0	86.0	0.88	20.6	6.9	2.9	2.5	210	65											
15	BN 160MB	2	2930	49	•	89.6	89.4	88.0	0.86	28.1	7.1	2.6	2.3	340	84											
18.5	BN 160L	2	2930	60	•	90.4	90.1	89.0	0.86	34	7.6	2.7	2.3	420	97											
22	BN 180M	2	2930	72	•	89.9	89.7	89.5	0.88	40	7.8	2.6	2.4	490	109											
30	BN 200LA	2	2930	98	•	90.7	90.1	87.6	0.89	54	7.8	2.7	2.9	770	140											

○ = n.a. • = IE1

4P — 1500 min^{-1} - S1 — 50 Hz



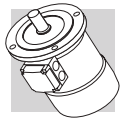
																d.c. brake						a.c. brake				
																FD						FA				
P_n		n	M_n	IE1	η (100%)	η (75%)	η (50%)	cosφ	In 400V	Is / In	Ms / Mn	Ma / Mn	J_m x 10^{-4}	IM B5		Mod	Mb	Z_o 1/h		J_m x 10^{-4}	IM B5	Mod	Mb	Z_o 1/h	J_m x 10^{-4}	IM B5
kW		min^{-1}	Nm		%	%	%		A				kgm^2				Nm	NB	SB	kgm^2			Nm		kgm^2	
0.06	BN 56A	4	1340	0.43	○	46.8	44.2	41.3	0.65	0.28	2.6	2.3	2.0	1.5	3.1											
0.09	BN 56B	4	1350	0.64	○	51.7	47.6	42.9	0.60	0.42	2.6	2.5	2.4	1.5	3.1											
0.12	BN 63A	4	1350	0.85	○	59.8	56.2	47.0	0.62	0.47	2.6	1.9	1.8	2.0	3.5	FD 02	1.75	10000	13000	2.6	5.2	FA 02	1.75	13000	2.6	5.0
0.18	BN 63B	4	1320	1.30	○	54.8	52.9	52.5	0.67	0.71	2.6	2.2	2.0	2.3	3.9	FD 02	3.5	10000	13000	3.0	5.6	FA 02	3.5	13000	3.0	5.4
0.25	BN 63C	4	1340	1.78	○	65.3	65.0	57.9	0.69	0.80	2.7	2.1	1.9	3.3	5.1	FD 02	3.5	7800	10000	3.9	6.8	FA 02	3.5	10000	3.9	6.6
0.25	BN 71A	4	1380	1.73	○	63.7	62.2	59.1	0.73	0.78	3.3	1.9	1.7	5.8	5.1	FD 03	3.5	7700	11000	6.9	7.8	FA 03	3.5	11000	6.9	7.5
0.37	BN 71B	4	1370	2.6	○	66.8	66.7	63.0	0.76	1.05	3.7	2.0	1.9	6.9	5.9	FD 03	5	6000	9400	8.0	8.6	FA 03	5.0	9400	8.0	8.3
0.55	BN 71C	4	1380	3.8	○	69.0	68.9	68.8	0.74	1.55	4.1	2.3	2.3	9.1	7.3	FD 53	7.5	4300	8700	10.2	10.0	FA 03	7.5	8700	10.2	9.7
0.55	BN 80A	4	1390	3.8	○	72.0	71.3	69.7	0.77	1.43	4.1	2.3	2.0	15	8.2	FD 04	10	4100	8000	16.6	12.1	FA 04	10	8000	16.6	12.0
0.75	BN 80B	4	1400	5.1	•	75.0	74.5	69.3	0.78	1.85	4.9	2.7	2.5	20	9.9	FD 04	15	4100	7800	22	13.8	FA 04	15	7800	22	13.7
1.1	BN 80C	4	1400	7.5	•	75.5	76.2	70.4	0.78	2.7	5.1	2.8	2.5	25	11.3	FD 04	15	2600	5300	27	15.2	FA 04	15	5300	27	15.1
1.1	BN 90S	4	1390	7.6	•	76.5	76.2	72.2	0.77	2.70	4.6	2.6	2.2	21	12.2	FD 14	15	4800	8000	23	16.4	FA 14	15	8000	23	16.3
1.5	BN 90LA	4	1410	10.2	•	78.7	78.5	74.9	0.77	3.6	5.3	2.8	2.4	28	13.6	FD 05	26	3400	6000	32	19.6	FA 05	26	6000	32	20.3
1.85	BN 90LB	4	1390	12.7	•	78.6	78.9	77.2	0.79	4.3	5.1	2.8	2.6	30	15.1	FD 05	26	3200	5900	34	21.1	FA 05	26	5900	34	21.8
2.2	BN 100LA	4	1410	14.9	•	81.1	81.4	79.9	0.75	5.2	4.5	2.2	2.0	40	18	FD 15	40	2600	4700	44	25	FA 15	40	4700	44	25
3	BN 100LB	4	1410	20	•	82.6	83.8	83.7	0.77	6.8	5.0	2.3	2.2	54	22	FD 15	40	2400	4400	58	28	FA 15	40	4400	58	29
4	BN 112M	4	1430	27	•	84.4	84.2	81.6	0.81	8.4	5.6	2.7	2.5	98	30	FD 06S	60	—	1400	107	40	FA 06S	60	2100	107	42
5.5	BN 132S	4	1440	36	•	84.7	84.8	82.5	0.81	11.6	5.5	2.3	2.2	213	44	FD 56	75	—	1050	223	57	FA 06	75	1200	223	58
7.5	BN 132MA	4	1440	50	•	86.0	86.3	85.3	0.81	15.5	5.7	2.5	2.4	270	53	FD 06	100	—	950	280	66	FA 07	100	1000	280	71
9.2	BN 132MB	4	1440	61	•	88.4	88.6	87.5	0.81	18.8	5.9	2.7	2.5	319	59	FD 07	150	—	900	342	75	FA 07	150	900	342	77
11	BN 160MR	4	1440	73	•	87.6	87.8	86.0	0.81	22.4	6.0	2.7	2.5	360	70	FD 07	150	—	850	382	86	FA 07	150	850	382	88
15	BN 160L	4	1460	98	•	88.7	88.5	88.4	0.81	30	6.0	2.3	2.1	650	99	FD 08	200	—	750	725	129	FA 08	200	750	710	128
18.5	BN 180M	4	1460	121	•	89.3	89.5	89.2	0.81	37	6.2	2.6	2.5	790	115	FD 08	250	—	700	865	145	FA 08	250	700	850	144
22	BN 180L	4	1460	144	•	89.9	90.0	90.0	0.80	44	6.4	2.5	2.5	1250	135	FD 09	300	—	400	1450	175					
30	BN 200L	4	1460	196	•	91.4	91.7	91.0	0.80	59	7.1	2.7	2.8	1650	157	FD 09	400	—	300	1850	197					

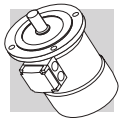
○ = n.a. • = IE1

6P — 1000 min^{-1} - S1 — 50 Hz

															d.c. brake						a.c. brake				
															FD						FA				
P_n		n	M_n	IE1	η (100%)	η (75%)	η (50%)	cosφ	In 400V	Is / In	Ms / Mn	Ma / Mn	J_m x 10^{-4}	IM B5	Mod	Mb	Z_o 1/h		J_m x 10^{-4}	IM B5	Mod	Mb	Z_o 1/h	J_m x 10^{-4}	IM B5
kW		min^{-1}	Nm		%	%	%		A				kgm^2			Nm	NB	SB	kgm^2			Nm		kgm^2	
0.09	**BN 63A 6**	880	0.98	○	41.0	41.0	32.9	0.53	0.60	2.1	2.1	1.8	3.4	4.6	**FD 02**	3.5	9000	14000	4.0	6.3	**FA 02**	3.5	14000	4.0	6.1
0.12	**BN 63B 6**	870	1.32	○	45.0	44.0	41.8	0.60	0.64	2.1	1.9	1.7	3.7	4.9	**FD 02**	3.5	9000	14000	4.3	6.6	**FA 02**	3.5	14000	4.3	6.4
0.18	**BN 71A 6**	900	1.91	○	55.0	55.5	51.0	0.69	0.68	2.6	1.9	1.7	8.4	5.5	**FD 03**	5	8100	13500	9.5	8.2	**FA 03**	5.0	13500	9.5	7.9
0.25	**BN 71B 6**	900	2.70	○	62.0	58.5	51.4	0.71	0.82	2.6	1.9	1.7	10.9	6.7	**FD 03**	5	7800	13000	12	9.4	**FA 03**	5.0	13000	12	9.1
0.37	**BN 71C 6**	910	3.9	○	66.0	60.0	53.3	0.69	1.17	3.0	2.4	2.0	12.9	7.7	**FD 53**	7.5	5100	9500	14	10.4	**FA 03**	7.5	9500	14	10.1
0.37	**BN 80A 6**	910	3.9	○	68.0	67.4	63.3	0.68	1.15	3.2	2.2	2.0	21	9.9	**FD 04**	10	5200	8500	23	13.8	**FA 04**	10	8500	23	13.7
0.55	**BN 80B 6**	920	5.7	○	70.0	69.8	64.3	0.68	1.67	3.9	2.6	2.2	25	11.3	**FD 04**	15	4800	7200	27	15.2	**FA 04**	15	7200	27	15.1
0.75	**BN 80C 6**	920	7.8	•	70.0	70.0	64.4	0.65	2.38	3.8	2.5	2.2	28	12.2	**FD 04**	15	3400	6400	30	16.1	**FA 04**	15	6400	30	16.0
0.75	**BN 90S 6**	920	7.8	•	70.0	69.0	64.2	0.68	2.27	3.8	2.4	2.2	26	12.6	**FD 14**	15	3400	6500	28	16.8	**FA 14**	15	6500	28	16.7
1.1	**BN 90L 6**	920	11.4	•	72.9	72.6	69.1	0.69	3.2	3.9	2.3	2.0	33	15	**FD 05**	26	2700	5000	37	21	**FA 05**	26	5000	37	22
1.5	**BN 100LA 6**	940	15.2	•	75.2	74.2	70.3	0.72	4.0	4.1	2.1	2.0	82	22	**FD 15**	40	1900	4100	86	28	**FA 15**	40	4100	86	29
1.85	**BN 100LB 6**	930	19.0	•	76.6	72.8	62.6	0.73	4.8	4.6	2.1	2.0	95	24	**FD 15**	40	1700	3600	99	30	**FA 15**	40	3600	99	31
2.2	**BN 112M 6**	940	22	•	78.5	79.0	76.5	0.73	5.5	4.8	2.2	2.0	168	32	**FD 06S**	60	—	2100	177	42	**FA 06S**	60	2100	177	44
3	**BN 132S 6**	940	30	•	79.7	77.0	75.1	0.76	7.1	5.1	1.9	1.8	216	36	**FD 56**	75	—	1400	226	49	**FA 06**	75	1400	226	50
4	**BN 132MA 6**	950	40	•	81.4	81.5	79.5	0.77	9.2	5.5	2.0	1.8	295	45	**FD 06**	100	—	1200	305	58	**FA 07**	100	1200	318	63
5.5	**BN 132MB 6**	945	56	•	83.1	80.9	79.1	0.78	12.2	6.1	2.1	1.9	383	56	**FD 07**	150	—	1050	406	72	**FA 07**	150	1050	406	74
7.5	**BN 160M 6**	955	75	•	85.0	85.0	84.8	0.81	15.7	5.9	2.2	2.0	740	83	**FD 08**	170	—	900	815	112	**FA 08**	170	900	815	113
11	**BN 160L 6**	960	109	•	86.4	86.5	85.9	0.81	22.7	6.6	2.5	2.3	970	103	**FD 08**	200	—	800	1045	133	**FA 08**	200	800	1045	133
15	**BN 180L 6**	970	148	•	87.7	88.0	87.3	0.82	30	6.2	2.0	2.4	1550	130	**FD 09**	300	—	600	1750	170					
18.5	**BN 200LA 6**	960	184	•	88.6	88.0	87.3	0.81	37	5.9	2.0	2.3	1700	145	**FD 09**	400	—	450	1900	185					

○ = n.a. • = IE1



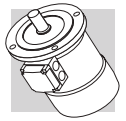


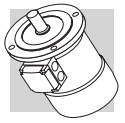
8P	750 min^{-1} - S1	50 Hz

													d.c. brake						a.c. brake				
													FD						FA				
P_n		n	M_n	η	cosφ	In	Is/In	Ms/Mn	Ma/Mn	J_m	IM B5		Mod	Mb	Z_o 1/h		J_m	IM B5	Mod	Mb	Z_o	J_m	IM B5
						400V				x 10^{-4}							x 10^{-4}				1/h	x 10^{-4}	
kW		min^{-1}	Nm	%		A				kgm^2				Nm	NB	SB	kgm^2			Nm		kgm^2	
0.09	**BN 71A**	**8**	680	1.26	47	0.59	0.47	2.3	2.4	2.3	10.9	6.7	**FD 03**	3.5	9000	16000	12.0	9.4	**FA 03**	3.5	16000	12.0	9.1
0.12	**BN 71B**	**8**	680	1.69	51	0.59	0.58	2.1	2.3	2.2	12.9	7.7	**FD 03**	5.0	9000	16000	14.0	10.4	**FA 03**	5.0	16000	14.0	10.1
0.18	**BN 80A**	**8**	690	2.49	51	0.60	0.85	2.4	2.2	2.2	15	8.2	**FD 04**	5.0	6500	11000	16.6	12.1	**FA 04**	5.0	11000	16.6	12.0
0.25	**BN 80B**	**8**	680	3.51	54	0.63	1.06	2.4	2.0	1.9	20	9.9	**FD 04**	10.0	6000	10000	22	13.8	**FA 04**	10.0	10000	23	13.7
0.37	**BN 90S**	**8**	675	5.2	58	0.60	1.53	2.6	2.3	2.1	26	12.6	**FD 14**	15.0	4800	7500	28	16.8	**FA 14**	15.0	7500	28	16.7
0.55	**BN 90L**	**8**	670	7.8	62	0.60	2.13	2.6	2.2	2.0	33	15	**FD 05**	26	4000	6400	37	21	**FA 05**	26	6400	37	22
0.75	**BN 100LA**	**8**	700	10.2	68	0.63	2.53	3.4	1.9	1.7	82	22	**FD 15**	26	2800	4800	86	28	**FA 15**	26	4800	86	29
1.1	**BN 100LB**	**8**	700	15.0	68	0.64	3.65	3.2	1.7	1.7	95	24	**FD 15**	40	2500	4000	99	30	**FA 15**	40	4000	99	31
1.5	**BN 112M**	**8**	710	20.2	71	0.66	4.6	3.7	1.8	1.9	168	32	**FD 06S**	60	—	3000	177	42	**FA 06S**	60	3000	177	44
2.2	**BN 132S**	**8**	710	29.6	75	0.66	6.4	3.8	1.8	2.0	295	45	**FD 56**	75	—	2300	305	58	**FA 06**	75	2300	305	56
3	**BN 132MA**	**8**	710	40.4	76	0.69	8.3	3.9	1.6	1.8	370	53	**FD 06**	100	—	1900	394	69	**FA 07**	100	1900	406	74

2/4P — 3000/1500 min^{-1} - S1 — 50 Hz

													d.c. brake						a.c. brake				
													FD						FA				
P_n kW			n min^{-1}	M_n Nm	η %	cosφ	In 400V A	Is/In	Ms/Mn	Ma/Mn	J_m x 10^{-4} kgm^2	IM B5	Mod	Mb Nm	Z_o 1/h NB	Z_o 1/h SB	J_m x 10^{-4} kgm^2	IM B5	Mod	Mb Nm	Z_o 1/h	J_m x 10^{-4} kgm^2	IM B5
0.20	**BN 63B**	**2**	2700	0.71	55	0.82	0.64	3.5	2.1	1.9	2.9	4.4	**FD 02**	3.5	2200	2600	3.5	6.1	**FA 02**	3.5	2600	3.5	5.9
0.15		**4**	1350	1.06	49	0.67	0.66	2.6	1.8	1.7					4000	5100					5100		
0.28	**BN 71A**	**2**	2700	0.99	56	0.82	0.88	2.9	1.9	1.7	4.7	4.4	**FD 03**	3.5	2100	2400	5.8	7.1	**FA 03**	3.5	2400	5.8	6.8
0.20		**4**	1370	1.39	59	0.72	0.68	3.1	1.8	1.7					3800	4800					4800		
0.37	**BN 71B**	**2**	2740	1.29	56	0.82	1.16	3.5	1.8	1.8	5.8	5.1	**FD 03**	5.0	1400	2100	6.9	7.8	**FA 03**	5.0	2100	6.9	7.5
0.25		**4**	1390	1.72	60	0.73	0.82	3.3	2.0	1.9					2900	4200					4200		
0.45	**BN 71C**	**2**	2780	1.55	63	0.85	1.21	3.8	1.8	1.8	6.9	5.9	**FD 03**	5.0	1400	2100	8.0	8.6	**FA 03**	5.0	2100	8.0	8.3
0.30		**4**	1400	2.0	63	0.73	0.94	3.6	2.0	1.9					2900	4200					4200		
0.55	**BN 80A**	**2**	2800	1.9	63	0.85	1.48	3.9	1.7	1.7	15	8.2	**FD 04**	5.0	1600	2300	17	12.1	**FA 04**	5.0	2300	16.6	12.0
0.37		**4**	1400	2.5	67	0.79	1.01	4.1	1.8	1.9					3000	4000					4000		
0.75	**BN 80B**	**2**	2780	2.6	65	0.85	1.96	3.8	1.9	1.8	20	9.9	**FD 04**	10	1400	1600	22	13.8	**FA 04**	10	1600	22	13.7
0.55		**4**	1400	3.8	68	0.81	1.44	3.9	1.7	1.7					2700	3600					3600		
1.1	**BN 90S**	**2**	2790	3.8	71	0.82	2.73	4.7	2.3	2.0	21	12.2	**FD 14**	10	1500	1600	23	16.4	**FA 14**	10	1600	23	16.3
0.75		**4**	1390	5.2	66	0.79	2.08	4.6	2.4	2.2					2300	2800					2800		
1.5	**BN 90L**	**2**	2780	5.2	70	0.85	3.64	4.5	2.4	2.1	28	14.0	**FD 05**	26	1050	1200	32	20	**FA 05**	26	1200	32	21
1.1		**4**	1390	7.6	73	0.81	2.69	4.7	2.5	2.2					1600	2000					2000		
2.2	**BN 100LA**	**2**	2800	7.5	72	0.85	5.2	4.5	2.0	1.9	40	18.3	**FD 15**	26	600	900	44	25	**FA 15**	26	900	44	25
1.5		**4**	1410	10.2	73	0.79	3.8	4.7	2.0	2.0					1300	2300					2300		
3.5	**BN 100LB**	**2**	2850	11.7	80	0.84	7.5	5.4	2.2	2.1	61	25	**FD 15**	40	500	900	65	31	**FA 15**	40	900	65	32
2.5		**4**	1420	16.8	82	0.80	5.5	5.2	2.2	2.2					1000	2100					2100		
4	**BN 112M**	**2**	2880	13.3	79	0.83	8.8	6.1	2.4	2.0	98	30	**FD 06S**	60	—	700	107	40	**FA 06S**	60	700	107	42
3.3		**4**	1420	22.2	80	0.80	7.4	5.1	2.1	2.0					—	1200					1200		
5.5	**BN 132S**	**2**	2890	18.2	80	0.87	11.4	5.9	2.4	2.0	213	44	**FD 56**	75	—	350	223	57	**FA 06**	75	350	223	58
4.4		**4**	1440	29	82	0.84	9.2	5.3	2.2	2.0					—	900					900		
7.5	**BN 132MA**	**2**	2900	25	82	0.87	15.2	6.5	2.4	2.0	270	53	**FD 06**	100	—	350	280	66	**FA 07**	100	350	293	71
6		**4**	1430	40	84	0.85	12.1	5.8	2.3	2.1					—	900					900		
9.2	**BN 132MB**	**2**	2920	30	83	0.86	18.6	6.0	2.6	2.2	319	59	**FD 07**	150	—	300	342	75	**FA 07**	150	300	342	77
7.3		**4**	1440	48	85	0.85	14.6	5.5	2.3	2.1					—	800					800		



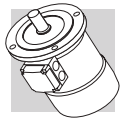


2/6P — 3000/1000 min^{-1} - S3 60/40% — 50 Hz

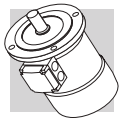
												d.c. brake						a.c. brake				
												FD						FA				
P_n kW		n min^{-1}	M_n Nm	η %	cosφ	In 400V A	Is/In	Ms/Mn	Ma/Mn	J_m x 10^{-4} kgm^2	IM B5	Mod	Mb Nm	Z_o 1/h NB	Z_o 1/h SB	J_m x 10^{-4} kgm^2	IM B5	Mod	Mb Nm	Z_o 1/h	J_m x 10^{-4} kgm^2	IM B5
0.25	**BN 71A**	**2**	2850	0.84	60	0.82	0.73	4.3	1.9	1.8	6.9	5.9	**FD 03**	1.75	1500	1700	8.0	8.6	**FA 03**	2.5	1700	8.0	8.3
0.08		**6**	910	0.84	43	0.70	0.38	2.1	1.4	1.5					10000	13000					13000		
0.37	**BN 71B**	**2**	2880	1.23	62	0.80	1.08	4.4	1.9	1.8	9.1	7.3	**FD 03**	3.5	1000	1300	10.2	10.0	**FA 03**	3.5	1300	10.2	9.7
0.12		**6**	900	1.27	44	0.73	0.54	2.4	1.4	1.5					9000	11000					11000		
0.55	**BN 80A**	**2**	2800	1.88	63	0.86	1.47	4.5	1.9	1.7	20	9.9	**FD 04**	5.0	1500	1800	22	13.8	**FA 04**	5.0	1800	22	13.7
0.18		**6**	930	1.85	52	0.65	0.77	3.3	2.0	1.9					4100	6300					6300		
0.75	**BN 80B**	**2**	2800	2.6	66	0.87	1.89	4.3	1.8	1.6	25	11.3	**FD 04**	5.0	1700	1900	27	15.2	**FA 04**	5.0	1900	27	15.1
0.25		**6**	930	2.6	54	0.67	1.00	3.2	1.7	1.8					3800	6000					6000		
1.10	**BN 90L**	**2**	2860	3.7	67	0.84	2.82	4.7	2.1	1.9	28	14.0	**FD 05**	13	1400	1600	32	20	**FA 05**	13	1600	32	21
0.37		**6**	920	3.8	59	0.71	1.27	3.3	1.6	1.6					3400	5200					5200		
1.5	**BN 100LA**	**2**	2880	5	73	0.84	3.53	5.1	1.9	2.0	40	18.3	**FD 15**	13	1000	1200	44	24	**FA 15**	13	1200	44	25
0.55		**6**	940	5.6	64	0.67	1.85	3.5	1.7	1.8					2900	4000					4000		
2.2	**BN 100LB**	**2**	2900	7.2	77	0.85	4.9	5.9	2.0	2.0	61	25	**FD 15**	26	700	900	65	31	**FA 15**	26	900	65	32
0.75		**6**	950	7.5	67	0.64	2.5	3.3	1.9	1.8					2100	3000					3000		
3	**BN 112M**	**2**	2900	9.9	78	0.87	6.4	6.3	2.0	2.1	98	30	**FD 06S**	40	—	1000	107	40	**FA 06S**	40	1000	107	32
1.1		**6**	950	11.1	72	0.64	3.4	3.9	1.8	1.8					—	2600					2600		
4.5	**BN 132S**	**2**	2910	14.8	78	0.84	9.9	5.8	1.9	1.8	213	44	**FD 56**	37	—	500	223	57	**FA 06**	37	500	223	58
1.5		**6**	960	14.9	74	0.67	4.4	4.2	1.9	2.0					—	2100					2100		
5.5	**BN 132M**	**2**	2920	18.0	78	0.87	11.7	6.2	2.1	1.9	270	53	**FD 56**	50	—	400	280	66	**FA 06**	50	400	280	67
2.2		**6**	960	22	77	0.71	5.8	4.3	2.1	2.0					—	1900					1900		

2/8P — 3000/750 min^{-1} - S3 60/40% — 50 Hz

													d.c. brake						a.c. brake				
													FD						FA				
P_n		n	M_n	η	cosφ	In 400V	Is / In	Ms / Mn	Ma / Mn	J_m x 10^{-4}	IM B5		Mod	Mb	Z_o 1/h		J_m x 10^{-4}	IM B5	Mod	Mb	Z_o 1/h	J_m x 10^{-4}	IM B5
kW		min^{-1}	Nm	%		A				kgm^2				Nm	NB	SB	kgm^2			Nm		kgm^2	
0.25	BN 71A	2	2790	0.86	61	0.87	0.68	3.9	1.8	1.9	10.9	6.7	FD 03	1.75	1300	1400	12	9.4	FA 03	2.5	1400	12	9.1
0.06		8	680	0.84	31	0.61	0.46	2.0	1.8	1.9					10000	13000					13000		
0.37	BN 71B	2	2800	1.26	63	0.86	0.99	3.9	1.8	1.9	12.9	7.7	FD 03	3.5	1200	1300	14	10.4	FA 03	3.5	1300	14	10.1
0.09		8	670	1.28	34	0.75	0.51	1.8	1.4	1.5					9500	13000					13000		
0.55	BN 80A	2	2830	1.86	66	0.86	1.40	4.4	2.1	2.0	20	9.9	FD 04	5.0	1500	1800	22	13.8	FA 04	5.0	1800	22	13.7
0.13		8	690	1.80	41	0.64	0.72	2.3	1.6	1.7					5600	8000					8000		
0.75	BN 80B	2	2800	2.6	68	0.88	1.81	4.6	2.1	2.0	25	11.3	FD 04	10	1700	1900	27	15.2	FA 04	10	1900	27	15.1
0.18		8	690	2.5	43	0.66	0.92	2.3	1.6	1.7					4800	7300					7300		
1.10	BN 90L	2	2830	3.7	63	0.84	3.00	4.5	2.1	1.9	28	14.0	FD 05	13	1400	1600	32	20	FA 05	13	1600	32	21
0.28		8	690	3.9	48	0.63	1.34	2.4	1.8	1.9					3400	5100					5100		
1.5	BN 100LA	2	2880	5.0	69	0.85	3.69	4.7	1.9	1.8	40	18.3	FD 15	13	1000	1200	44	25	FA 15	13	1200	44	25
0.37		8	690	5.1	46	0.63	1.84	2.1	1.6	1.6					3300	5000					5000		
2.4	BN 100LB	2	2900	7.9	75	0.82	5.6	5.4	2.1	2.0	61	25	FD 15	26	550	700	65	31	FA 15	26	700	65	32
0.55		8	700	7.5	54	0.58	2.5	2.6	1.8	1.8					2000	3500					3500		
3	BN 112M	2	2900	9.9	76	0.87	6.5	6.3	2.1	1.9	98	30	FD 06S	40	—	900	107	40	FA 06S	40	900	107	42
0.75		8	690	10.4	60	0.65	2.8	2.5	1.6	1.6					—	2900					2900		
4	BN 132S	2	2870	13.3	73	0.84	9.4	5.6	2.3	2.4	213	44	FD 56	37	—	500	223	57	FA 06	37	500	223	58
1		8	690	13.8	66	0.62	3.5	2.9	1.9	1.8					—	3500					3500		
5.5	BN 132M	2	2870	18.3	75	0.84	12.6	6.1	2.4	2.5	270	53	FD 06	50	—	400	280	66	FA 06	50	400	280	67
1.5		8	690	21	68	0.63	5.1	2.9	1.9	1.9					—	2400					2400		



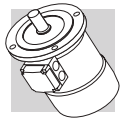
2/12P — **3000/500 min^{-1}** - S3 60/40% — **50 Hz**

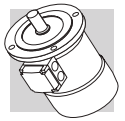


													d.c. brake						a.c. brake				
													FD						FA				
P_n			n	M_n	η	cosφ	In 400V	Is/In	Ms/Mn	Ma/Mn	J_m x 10^{-4}	IM B5	Mod	Mb	Z_o 1/h		J_m x 10^{-4}	IM B5	Mod	Mb	Z_o 1/h	J_m x 10^{-4}	IM B5
kW			min^{-1}	Nm	%		A				kgm^2			Nm	NB	SB	kgm^2			Nm		kgm^2	
0.55	**BN 80B**	**2**	2820	1.86	64	0.89	1.39	4.2	1.6	1.7	25	11.3	**FD 04**	5.0	1000	1300	27	15.2	**FA 04**	5.0	1300	27	15.1
0.09		**12**	430	2.0	30	0.63	0.69	1.8	1.9	1.8					8000	12000					12000		
0.75	**BN 90L**	**2**	2790	2.6	56	0.89	2.17	4.2	1.8	1.7	26	12.6	**FD 05**	13	1000	1150	30	18.6	**FA 05**	13	1150	30	19.3
0.12		**12**	430	2.7	26	0.63	1.06	1.7	1.4	1.6					4600	6300					6300		
1.10	**BN 100LA**	**2**	2850	3.7	65	0.85	2.87	4.5	1.6	1.8	40	18.3	**FD 15**	13	700	900	44	25	**FA 15**	13	900	44	25
0.18		**12**	430	4.0	26	0.54	1.85	1.5	1.3	1.5					4000	6000					6000		
1.5	**BN 100LB**	**2**	2900	4.9	67	0.86	3.76	5.6	1.9	1.9	54	22	**FD 15**	13	700	900	58	28	**FA 15**	13	900	58	29
0.25		**12**	440	5.4	36	0.46	2.18	1.8	1.7	1.8					3800	5000					5000		
2	**BN 112M**	**2**	2900	6.6	74	0.88	4.43	6.5	2.1	2.0	98	30	**FD 06S**	20	—	800	107	40	**FA 06S**	20	800	107	42
0.3		**12**	460	6.2	46	0.43	2.19	2.0	2.1	2.0					—	3400					3400		
3	**BN 132S**	**2**	2920	9.8	74	0.87	6.7	6.8	2.3	1.9	213	44	**FD 56**	37	—	450	223	57	**FA 06**	37	450	223	58
0.5		**12**	470	10.2	51	0.43	3.3	2.0	1.7	1.6					—	3000					3000		
4	**BN 132M**	**2**	2920	13.1	75	0.89	8.6	5.9	2.4	2.3	270	53	**FD 56**	37	—	400	280	66	**FA 06**	37	400	280	67
0.7		**12**	460	14.5	53	0.44	4.3	1.9	1.7	1.6					—	2800					2800		

4/6P — 1500/1000 min^{-1} - S1 — 50 Hz

													d.c. brake						a.c. brake				
													FD						FA				
P_n		n	M_n	η	cosφ	In 400V	Is/In	Ms/Mn	Ma/Mn	J_m x 10^{-4}	IM B5		Mod	Mb	Z_o 1/h		J_m x 10^{-4}	IM B5	Mod	Mb	Z_o	J_m x 10^{-4}	IM B5
kW		min^{-1}	Nm	%		A				kgm^2				Nm	NB	SB	kgm^2			Nm	1/h	kgm^2	
0.22	BN 71B	4	1410	1.5	64	0.74	0.67	3.9	1.8	1.9	9.1	7.3	FD 03	3.5	2500	3500	10.2	10.0	FA 03	3.5	3500	10.2	9.7
0.13		6	920	1.4	43	0.67	0.65	2.3	1.6	1.7					5000	9000					9000		
0.30	BN 80A	4	1410	2.0	61	0.82	0.87	3.5	1.3	1.5	15	8.2	FD 04	5.0	2500	3100	16.6	12.1	FA 04	5.0	3100	16.6	12.0
0.20		6	930	2.1	54	0.66	0.81	3.2	1.9	2.0					4000	6000					6000		
0.40	BN 80B	4	1430	2.7	63	0.75	1.22	3.9	1.8	1.8	20	9.9	FD 04	10	1800	2300	22	13.8	FA 04	10	2300	22	13.7
0.26		6	930	2.7	55	0.70	0.97	2.7	1.5	1.6					3600	5500					5500		
0.55	BN 90S	4	1420	3.7	70	0.78	1.45	4.5	2.0	1.9	21	12.2	FD 14	10	1500	2100	23	16.1	FA 14	10	2100	23	16.3
0.33		6	930	3.4	62	0.70	1.10	3.7	2.3	2.0					2500	4100					4100		
0.75	BN 90L	4	1420	5.0	74	0.78	1.88	4.3	1.9	1.8	28	14	FD 05	13	1400	2000	32	20	FA 05	13	2000	32	21
0.45		6	920	4.7	66	0.71	1.39	3.3	2.0	1.9					2300	3600					3600		
1.1	BN 100LA	4	1450	7.2	74	0.79	2.72	5.0	1.7	1.9	82	22	FD 15	26	1400	2000	86	28	FA 15	26	2000	86	29
0.8		6	950	8.0	65	0.69	2.57	4.1	1.9	2.1					2100	3300					3300		
1.5	BN 100LB	4	1450	9.9	75	0.79	3.65	5.1	1.7	1.9	95	25	FD 15	26	1300	1800	99	31	FA 15	26	1800	99	32
1.1		6	950	11.1	72	0.68	3.24	4.3	2.0	2.1					2000	3000					3000		
2.3	BN 112M	4	1450	15.2	75	0.78	5.7	5.2	1.8	1.9	168	32	FD 06S	40	—	1600	177	42	FA 06S	40	1600	177	44
1.5		6	960	14.9	73	0.72	4.1	4.9	2.0	2.0					—	2400					2400		
3.1	BN 132S	4	1460	20	83	0.83	6.5	5.9	2.1	2.0	213	44	FD 56	37	—	1200	223	57	FA 06	37	1200	223	58
2		6	960	20	77	0.75	4.9	4.5	2.1	2.1					—	1900					1900		
4.2	BN 132MA	4	1460	27	84	0.82	8.8	5.9	2.1	2.2	270	53	FD 06	50	—	900	280	66	FA 06	50	900	280	67
2.6		6	960	26	79	0.72	6.6	4.3	2.0	2.0					—	1500					1500		





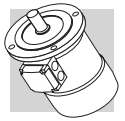
4/8P — 1500/750 min^{-1} - S1 — 50 Hz

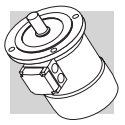
													d.c. brake						a.c. brake				
													FD						FA				
P_n kW			n min^{-1}	M_n Nm	η %	cosφ	In 400V A	Is/In	Ms/Mn	Ma/Mn	J_m x 10^{-4} kgm^2	IM B5	Mod	Mb Nm	Z_o 1/h NB	Z_o 1/h SB	J_m x 10^{-4} kgm^2	IM B5	Mod	Mb Nm	Z_o 1/h	J_m x 10^{-4} kgm^2	IM B5
0.37	**BN 80A**	**4**	1400	2.5	63	0.82	1.03	3.3	1.4	1.4	15	8.2	**FD 04**	10	2300	3500	16.6	12.1	**FA 04**	10	3500	16.6	12.0
0.18		**8**	690	2.5	44	0.60	0.98	2.2	1.5	1.6					4500	7000					7000		
0.55	**BN 80B**	**4**	1390	3.8	65	0.86	1.42	3.8	1.7	1.6	20	9.9	**FD 04**	10	2200	2900	22	13.8	**FA 04**	10	2900	22	13.7
0.30		**8**	670	4.3	49	0.65	1.36	2.3	1.7	1.8					4200	6500					6500		
0.65	**BN 90S**	**4**	1390	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
0.35		**8**	690	4.8	49	0.57	1.81	2.5	2.1	2.2					3500	6000					6000		
0.9	**BN 90L**	**4**	1370	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
0.5		**8**	670	7.1	57	0.62	2.04	2.4	2.1	2.0					2500	4200					4200		
1.30	**BN 100LA**	**4**	1420	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
0.70		**8**	700	9.6	58	0.64	2.72	2.8	1.8	1.8					2000	3400					3400		
1.8	**BN 100LB**	**4**	1420	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
0.9		**8**	700	12.3	62	0.63	3.3	3.2	1.7	1.8					1600	2600					2600		
2.2	**BN 112M**	**4**	1440	14.6	77	0.85	4.9	5.3	1.8	1.8	168	32	**FD 06S**	60	—	1200	177	42	**FA 06S**	60	1200	177	43
1.2		**8**	710	16.1	70	0.63	3.9	3.3	1.9	1.8					—	2000					2000		
3.6	**BN 132S**	**4**	1440	24	80	0.82	7.9	6.5	2.1	1.9	295	45	**FD 56**	75	—	1000	305	58	**FA 06**	75	1000	305	59
1.8		**8**	720	24	72	0.55	6.6	4.6	1.9	2.0					—	1400					1400		
4.6	**BN 132M**	**4**	1450	30	81	0.83	9.9	6.5	2.2	1.9	383	56	**FD 06**	100	—	1000	393	69	**FA 07**	100	1000	406	74
2.3		**8**	720	31	73	0.54	8.4	4.4	2.3	2.0					—	1300					1300		

2P — 3000 min^{-1} - S1 — 50 Hz

															d.c. brake						a.c. brake					
															FD						FA					
P_n		n	M_n	IE1	η (100%)	η (75%)	η (50%)	cosφ	In 400V	Is / In	Ms / Mn	Ma / Mn	J_m x 10^{-4}	IM B5	Mod	Mb	Z_o 1/h		J_m x 10^{-4}	IM B5	Mod	Mb	Z_o 1/h	J_m x 10^{-4}	IM B5
kW		min^{-1}	Nm		%	%	%		A				kgm^2			Nm	NB	SB	kgm^2			Nm		kgm^2	
0.18	**M 05A**	**2**	2730	0.63	○	59.9	56.9	51.9	0.77	0.56	3.0	2.1	2.0	2.0	3.2	**FD 02**	1.75	3900	4800	2.6	4.9	**FA 02**	1.75	4800	2.6	4.7
0.25	**M 05B**	**2**	2740	0.87	○	66.0	64.8	64.8	0.76	0.72	3.3	2.3	2.3	2.3	3.6	**FD 02**	1.75	3900	4800	3.0	5.3	**FA 02**	1.75	4800	3.0	5.1
0.37	**M 05C**	**2**	2800	1.26	○	69.1	66.8	66.8	0.78	0.99	3.9	2.6	2.6	3.3	4.8	**FD 02**	3.5	3600	4500	3.9	6.5	**FA 02**	3.5	4500	3.9	6.3
0.55	**M 1SD**	**2**	2820	1.86	○	76.0	75.8	74.8	0.76	1.37	5.0	2.9	2.8	4.1	5.8	**FD 03**	5	2900	4200	5.3	8.5	**FA 03**	5	4200	5.3	8.2
0.75	**M 1LA**	**2**	2810	2.6	○	76.6	76.2	76.2	0.76	1.86	5.1	3.1	2.8	5.0	6.9	**FD 03**	5	1900	3300	6.1	9.6	**FA 03**	5	3300	6.1	9.3
1.1	**M 2SA**	**2**	2800	3.8	•	76.4	76.2	75.0	0.81	2.57	4.8	2.8	2.4	9.0	8.8	**FD 04**	10	1500	3000	10.6	11.9	**FA 04**	10	3000	10.6	12.6
1.5	**M 2SB**	**2**	2800	5.1	•	79.1	79.5	77.2	0.81	3.4	4.9	2.7	2.4	11.4	10.6	**FD 04**	15	1300	2600	13.0	9.9	**FA 04**	15	2600	13.0	14.4
2.2	**M 3SA**	**2**	2880	7.3	•	82.7	82.1	81.0	0.80	4.8	6.3	2.9	2.7	24	15.5	**FD 15**	26	1100	2400	28	22	**FA 15**	26	2400	28	23
3	**M 3LA**	**2**	2860	10.0	•	81.5	81.3	77.4	0.79	6.7	5.6	2.6	2.2	31	18.7	**FD 15**	26	700	1600	35	25	**FA 15**	26	1600	35	26
4	**M 3LB**	**2**	2870	13.3	•	83.1	83.0	77.8	0.80	8.7	5.8	2.7	2.5	39	22	**FD 15**	40	450	900	43	28	**FA 15**	40	900	43	29
5.5	**M 4SA**	**2**	2890	18.2	•	84.7	84.5	81.2	0.84	11.2	5.9	2.6	2.2	101	33	**FD 06**	50	—	600	112	46	**FA 06**	50	600	112	47
7.5	**M 4SB**	**2**	2900	25	•	86.5	86.3	84.4	0.85	14.7	6.4	2.6	2.2	145	40	**FD 06**	50	—	550	154	53	**FA 06**	50	550	154	54
9.2	**M 4LA**	**2**	2930	30	•	87.0	86.5	83.6	0.86	17.7	6.7	2.8	2.3	178	51	**FD 56**	75	—	430	189	64	**FA 06**	75	430	189	65
11	**M 4LC**	**2**	2920	36	•	87.6	87.0	86.0	0.88	20.6	6.9	2.9	2.5	210	60											
15	**M 5SB**	**2**	2930	49	•	89.6	89.4	88.0	0.86	28.1	7.1	2.6	2.3	340	70											
18.5	**M 5SC**	**2**	2930	60	•	90.4	90.1	89.0	0.86	34	7.6	2.7	2.3	420	83											
22	**M 5LA**	**2**	2930	72	•	89.9	89.7	89.5	0.88	40	7.8	2.6	2.4	490	95											

○ = n.a. • = IE1





4P — 1500 min^{-1} - S1 — 50 Hz

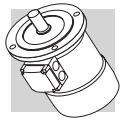
															d.c. brake						a.c. brake				
															FD						FA				
P_n		n	M_n	IE1	η (100%)	η (75%)	η (50%)	cosφ	In 400V	Is / In	Ms / Mn	Ma / Mn	J_m x 10^{-4}	IM B5	Mod	Mb	Z_o 1/h		J_m x 10^{-4}	IM B5	Mod	Mb	Z_o 1/h	J_m x 10^{-4}	IM B5
kW		min^{-1}	Nm		%	%	%		A				kgm^2			Nm	NB	SB	kgm^2			Nm		kgm^2	
0.09	M 0B 4	1350	0.64	○	51.7	47.6	42.9	0.60	0.42	2.6	2.5	2.4	1.5	2.9											
0.12	M 05A 4	1350	0.85	○	59.8	56.2	47.0	0.62	0.47	2.6	1.9	1.8	2.0	3.2	FD 02	1.75	10000	13000	2.6	4.9	FA 02	1.75	13000	2.6	4.7
0.18	M 05B 4	1320	1.30	○	54.8	52.9	52.5	0.67	0.71	2.6	2.2	2.0	2.3	3.6	FD 02	3.5	10000	13000	3.0	5.3	FA 02	3.5	13000	3.0	5.1
0.25	M 05C 4	1340	1.78	○	65.3	65.0	57.9	0.69	0.80	2.7	2.1	1.9	3.3	4.8	FD 02	3.5	7800	10000	3.9	6.5	FA 02	3.5	10000	3.9	6.3
0.37	M 1SD 4	1370	2.6	○	66.8	66.7	63.0	0.76	1.05	3.7	2.0	1.9	6.9	5.5	FD 03	5	6000	9400	8.0	8.2	FA 03	5	9400	8.0	7.9
0.55	M 1LA 4	1380	3.8	○	69.0	68.9	68.8	0.74	1.55	4.1	2.3	2.3	9.1	6.9	FD 53	7.5	4300	8700	10.2	9.6	FA 03	7.5	8700	10.2	9.3
0.75	M 2SA 4	1400	5.1	•	75.0	74.5	69.3	0.78	1.85	4.9	2.7	2.5	20	9.2	FD 04	15	4100	7800	22	13.1	FA 04	15	7800	22	13.0
1.1	M 2SB 4	1400	7.5	•	76.4	76.2	70.4	0.78	2.66	5.1	2.8	2.5	25	10.6	FD 04	15	2600	5300	27	14.5	FA 04	15	5300	27	14.4
1.5	M 3SA 4	1410	10.2	•	79.6	80.5	79.3	0.77	3.5	4.6	2.1	2.1	34	15.5	FD 15	26	2800	4900	38	22	FA 15	26	4900	38	23
2.2	M 3LA 4	1410	14.9	•	81.1	81.4	79.9	0.75	5.2	4.5	2.2	2.0	40	17	FD 15	40	2600	4700	44	24	FA 15	40	4700	44	24
3	M 3LB 4	1410	20	•	82.6	83.8	83.7	0.77	6.8	5.0	2.3	2.2	54	21	FD 15	40	2400	4400	58	27	FA 15	40	4400	58	28
4	M 3LC 4	1400	27	○	82.7	83.1	80.5	0.78	9.0	4.7	2.3	2.2	61	23	FD 55	55	—	1300	65	29	FA 15	40	1300	65	30
5.5	M 4SA 4	1440	36	•	84.7	84.8	82.5	0.81	11.6	5.5	2.3	2.2	213	42	FD 56	75	—	1050	223	55	FA 06	75	1050	223	56
7.5	M 4LA 4	1440	50	•	86.0	86.3	85.3	0.81	15.5	5.7	2.5	2.4	270	51	FD 06	100	—	950	280	64	FA 07	100	950	280	65
9.2	M 4LB 4	1440	61	•	88.4	88.6	87.5	0.81	18.8	5.9	2.7	2.5	319	57	FD 07	150	—	900	342	73	FA 07	150	900	342	75
11	M 4LC 4	1440	73	•	87.6	87.8	86.0	0.81	22.4	6.0	2.7	2.5	360	65	FD 07	150	—	850	382	81	FA 07	150	850	382	83
15	M 5SB 4	1460	98	•	88.7	88.5	88.4	0.81	30.1	6.0	2.3	2.1	650	85	FD 08	200	—	750	725	115	FA 08	200	750	710	114
18.5	M 5LA 4	1460	121	•	89.3	89.5	89.2	0.81	37	6.2	2.6	2.5	790	101	FD 08	250	—	700	865	131	FA 08	250	700	850	130

○ = n.a. • = IE1

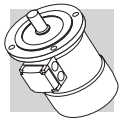
6P — 1000 min^{-1} - S1 — 50 Hz

																d.c. brake						a.c. brake				
																FD						FA				
P_n		n	M_n	IE1	η (100%)	η (75%)	η (50%)	cosφ	In 400V	Is / In	Ms / Mn	Ma / Mn	J_m x 10^{-4}	IM B5		Mod	Mb	Z_o 1/h		J_m x 10^{-4}	IM B5	Mod	Mb	Z_o 1/h	J_m x 10^{-4}	IM B5
kW		min^{-1}	Nm		%	%	%		A				kgm^2				Nm	NB	SB	kgm^2			Nm		kgm^2	
0.09	M 05A	6	880	0.98	○	41.0	41.0	32.9	0.53	0.60	2.1	2.1	1.8	3.4	4.3	FD 02	3.5	9000	14000	4.0	6.0	FA 02	3.5	14000	4.0	5.8
0.12	M 05B	6	870	1.32	○	45.0	44.0	41.8	0.60	0.64	2.1	1.9	1.7	3.7	4.6	FD 02	3.5	9000	14000	4.3	6.3	FA 02	3.5	14000	4.3	6.1
0.18	M 1SC	6	900	1.91	○	55.0	55.5	51.0	0.69	0.68	2.6	1.9	1.7	8.4	5.1	FD 03	5	8100	13500	9.5	7.8	FA 03	5	13500	9.5	7.5
0.25	M 1SD	6	900	2.7	○	62.0	58.5	51.4	0.71	0.82	2.6	1.9	1.7	10.9	6.3	FD 03	5	7800	13000	12	9.0	FA 03	5	13000	12	8.7
0.37	M 1LA	6	910	3.9	○	66.0	60.0	53.3	0.69	1.17	3.0	2.4	2.0	12.9	7.3	FD 53	7.5	5100	9500	14	10.0	FA 03	7.5	9500	14	9.7
0.55	M 2SA	6	920	5.7	○	70.0	69.8	64.3	0.68	1.67	3.9	2.6	2.2	25	10.6	FD 04	15	4800	7200	27	14.5	FA 04	15	7200	27	14.4
0.75	M 2SB	6	920	7.8	•	70.0	70.0	64.4	0.65	2.38	3.8	2.5	2.2	28	11.5	FD 04	15	3400	6400	30	15.4	FA 04	15	6400	30	15.3
1.1	M 3SA	6	920	11.4	•	75.0	74.0	72.0	0.72	2.9	4.3	2.0	1.8	33	17	FD 15	26	2700	5000	37	23	FA 15	26	5000	37	24
1.5	M 3LA	6	940	15.2	•	75.2	74.2	70.3	0.72	4.0	4.1	2.1	2.0	82	21	FD 15	40	1900	4100	86	27	FA 15	40	4100	86	28
1.85	M 3LB	6	930	19.0	•	76.6	72.8	62.6	0.73	4.8	4.6	2.1	2.0	95	23	FD 15	40	1700	3600	99	29	FA 15	40	3600	99	30
2.2	M 3LC	6	930	23	•	77.7	76.8	72.4	0.71	5.8	4.7	2.3	2.1	95	23	FD 55	55	—	1900	99	29	FA 15	40	1900	99	30
3	M 4SA	6	940	30	•	79.7	77.0	75.1	0.76	7.1	5.1	1.9	1.8	216	34	FD 56	75	—	1400	226	47	FA 06	75	1400	226	48
4	M 4LA	6	950	40	•	81.4	81.5	79.5	0.77	9.2	5.5	2.0	1.8	295	43	FD 06	100	—	1200	305	56	FA 07	100	1200	305	57
5.5	M 4LB	6	945	56	•	83.1	80.9	79.1	0.78	12.2	6.1	2.1	1.9	383	54	FD 07	150	—	1050	406	70	FA 07	150	1050	406	72
7.5	M 5SA	6	955	75	•	85.0	85.0	84.8	0.81	15.7	5.9	2.2	2.0	740	69	FD 08	170	—	900	815	98	FA 08	170	900	800	98
11	M 5SB	6	960	109	•	86.4	86.5	85.9	0.81	22.7	6.6	2.5	2.3	970	89	FD 08	200	—	800	1045	119	FA 08	200	800	1030	118

○ = n.a. • = IE1



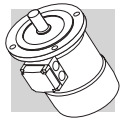
2/4P — 3000/1500 min^{-1} - S1 — 50 Hz



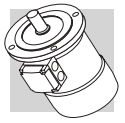
													d.c. brake						a.c. brake				
													FD						FA				
P_n		n	M_n	η	cosφ	In 400V	Is/In	Ms/Mn	Ma/Mn	J_m x 10^{-4}	IM B5		Mod	Mb	Z_o 1/h		J_m x 10^{-4}	IM B5	Mod	Mb	Z_o	J_m x 10^{-4}	IM B5
kW		min^{-1}	Nm	%		A				kgm^2				Nm	NB	SB	kgm^2			Nm	1/h	kgm^2	
0.20	**M 05A**	**2**	2700	0.71	55	0.82	0.64	3.5	2.1	1.9	2.9	4.1	**FD 02**	3.5	2200	2600	3.5	5.8	**FA 02**	3.5	2600	3.5	5.6
0.15		**4**	1350	1.06	49	0.67	0.66	2.6	1.8	1.7					4000	5100					5100		
0.28	**M 1SB**	**2**	2700	0.99	56	0.82	0.88	2.9	1.9	1.7	4.7	4.0	**FD 03**	3.5	2100	2400	5.8	6.7	**FA 03**	3.5	2400	5.8	6.4
0.20		**4**	1370	1.39	59	0.68	1.02	3.1	1.8	1.7					3800	4800					4800		
0.37	**M 1SC**	**2**	2740	1.29	56	0.82	1.16	3.5	1.8	1.8	5.8	4.7	**FD 03**	5	1400	2100	6.9	7.4	**FA 03**	5	2100	6.9	7.1
0.25		**4**	1390	1.72	60	0.73	0.82	3.3	2.0	1.9					2900	4200					4200		
0.45	**M 1SD**	**2**	2780	1.55	63	0.85	1.21	3.8	1.8	1.8	6.9	5.5	**FD 03**	5	1400	2100	8.0	8.2	**FA 03**	5	2100	8.0	7.9
0.30		**4**	1400	2.0	63	0.74	0.93	3.8	2.1	1.9					2900	4200					4200		
0.55	**M 1LA**	**2**	2800	1.9	73	0.79	1.38	4.2	2.0	1.8	9.1	6.9	**FD 03**	5	1600	2200	10.2	9.6	**FA 03**	5	2200	10.2	9.3
0.37		**4**	1400	2.5	68	0.72	1.09	3.9	2.2	2.0					3300	4600					4600		
0.75	**M 2SA**	**2**	2780	2.6	65	0.85	1.96	3.8	1.9	1.8	20	9.2	**FD 04**	10	1400	1600	22	13.1	**FA 04**	10	1600	22	13.0
0.55		**4**	1400	3.8	68	0.81	1.44	3.9	1.7	1.7					2700	3600					3600		
1.1	**M 2SB**	**2**	2730	3.9	65	0.86	2.84	3.9	2.0	1.9	25	10.7	**FD 04**	10	1200	1500	27	14.5	**FA 04**	10	1500	27	14.5
0.75		**4**	1410	5.1	75	0.81	1.78	4.5	2.1	2.0					2300	3100					3100		
1.5	**M 3SA**	**2**	2830	5.1	74	0.83	3.5	4.7	2.1	2.0	34	15.5	**FD 15**	26	700	1000	38	22	**FA 15**	26	1000	38	23
1.1		**4**	1420	7.4	77	0.78	2.6	4.3	2.1	2.0					1600	2600					2600		
2.2	**M 3LA**	**2**	2800	7.5	72	0.85	5.2	4.5	2.0	1.9	40	17	**FD 15**	26	600	900	44	24	**FA 15**	26	900	44	24
1.5		**4**	1410	10.2	73	0.79	3.8	4.7	2.0	2.0					1300	2300					2300		
3.5	**M 3LB**	**2**	2850	11.7	80	0.84	7.5	5.4	2.2	2.1	61	23	**FD 15**	40	500	900	65	29	**FA 15**	40	900	65	30
2.5		**4**	1420	16.8	82	0.80	5.5	5.2	2.2	2.2					1000	2100					2100		
4.8	**M 4 SA**	**2**	2900	15.8	81	0.88	9.7	6.0	2.0	1.9	213	42	**FD 06**	50	—	400	233	55	**FA 06**	50	400	233	56
3.8		**4**	1430	25.4	81	0.84	8.1	5.2	2.1	2.1					—	950					950		
5.5	**M 4SB**	**2**	2890	18.2	80	0.87	11.4	5.9	2.4	2.0	213	42	**FD 56**	75	—	350	223	55	**FA 06**	75	350	223	56
4.4		**4**	1440	29	82	0.84	9.2	5.3	2.2	2.0					—	900					900		
7.5	**M 4LA**	**2**	2900	25	82	0.87	15.2	6.5	2.4	2.0	270	51	**FD 06**	100	—	350	280	64	**FA 07**	100	350	280	65
6		**4**	1430	40	84	0.85	12.1	5.8	2.3	2.1					—	950					950		
9.2	**M 4LB**	**2**	2920	30	83	0.86	18.6	6.0	2.6	2.2	319	57	**FD 07**	150	—	300	342	73	**FA 07**	150	300	342	75
7.3		**4**	1440	48	85	0.85	14.6	5.5	2.3	2.1					—	800					800		

2/6P — 3000/1000 min^{-1} - S3 60/40% — 50 Hz

													d.c. brake						a.c. brake				
													FD						FA				
P_n		n	M_n	η	cosφ	In 400V	Is / In	Ms / Mn	Ma / Mn	J_m x 10^{-4}	IM B5		Mod	Mb	Z_o 1/h		J_m x 10^{-4}	IM B5	Mod	Mb	Z_o 1/h	J_m x 10^{-4}	IM B5
kW		min^{-1}	Nm	%		A				kgm^2				Nm	NB	SB	kgm^2			Nm		kgm^2	
0.25	M 1SA	2	2850	0.84	60	0.82	0.73	4.3	1.9	1.8	6.9	5.5	FD 03	1.75	1500	1700	8.0	8.2	FA 03	1.75	1700	8.0	7.9
0.08		6	910	0.84	43	0.70	0.38	2.1	1.4	1.5					10000	13000					13000		
0.37	M 1LA	2	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		6	900	1.27	44	0.73	0.54	2.4	1.4	1.5					9000	11000					11000		
0.55	M 2SA	2	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
0.18		6	930	1.85	52	0.65	0.77	3.3	2.0	1.9					4100	6300					6300		
0.75	M 2SB	2	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		6	930	2.6	54	0.67	1.00	3.2	1.7	1.8					3800	6000					6000		
1.1	M 3SA	2	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		6	930	3.8	63	0.70	1.21	3.1	1.5	1.8					3500	5000					5000		
1.5	M 3LA	2	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		6	940	5.6	64	0.67	1.85	3.5	1.7	1.8					2900	4000					4000		
2.2	M 3LB	2	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		6	950	7.5	67	0.64	2.5	3.3	1.9	1.8					2100	3000					3000		
3	M 4SA	2	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		6	960	10.9	73	0.68	3.2	4.5	2.2	2.0					—	2200					2200		
4.5	M 4SB	2	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		6	960	14.9	74	0.67	4.4	4.2	1.9	2.0					—	2100					2100		
5.5	M 4LA	2	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		6	960	22	77	0.71	5.8	4.3	2.1	2.0					—	1900					1900		



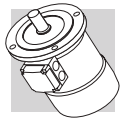
2/8P — **3000/750 min^{-1}** - S3 60/40% — **50 Hz**

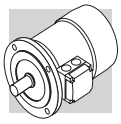


													d.c. brake						a.c. brake				
													FD						FA				
P_n			n	M_n	η	cosφ	In 400V	Is / In	Ms / Mn	Ma / Mn	J_m x 10^{-4}	IM B5	Mod	Mb	Z_o 1/h		J_m x 10^{-4}	IM B5	Mod	Mb	Z_o	J_m x 10^{-4}	IM B5
kW			min^{-1}	Nm	%		A				kgm^2			Nm	NB	SB	kgm^2			Nm	1/h	kgm^2	
0.37	**M 1LA**	**2**	2800	1.26	63	0.86	0.99	3.9	1.8	1.9	12.9	7.3	**FD 03**	3.5	1200	1300	14	10.0	**FA 03**	3.5	1300	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	**M 2SA**	**2**	2830	1.86	66	0.86	1.40	4.4	2.1	2.0	20	9.2	**FD 04**	5	1500	1800	22	13.1	**FA 04**	5	1800	22	13.0
0.13		**8**	690	1.80	41	0.64	0.72	2.3	1.6	1.7					5600	8000					8000		
0.75	**M 2SB**	**2**	2800	2.6	68	0.88	1.81	4.6	2.1	2.0	25	10.6	**FD 04**	10	1700	1900	27	14.5	**FA 04**	10	1900	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	**M 3SA**	**2**	2870	3.7	69	0.84	2.74	4.6	1.8	1.7	34	15.5	**FD 15**	13	1000	1300	38	22	**FA 15**	13	1300	38	23
0.28		**8**	690	3.9	44	0.56	1.64	2.3	1.4	1.7					3400	5000					5000		
1.5	**M 3LA**	**2**	2880	5.0	69	0.85	3.69	4.7	1.9	1.8	40	17	**FD 15**	13	1000	1200	44	24	**FA 15**	13	1200	44	24
0.37		**8**	690	5.1	46	0.63	1.84	2.1	1.6	1.6					3300	5000					5000		
2.4	**M 3LB**	**2**	2900	7.9	75	0.82	5.6	5.4	2.1	2.0	61	23	**FD 15**	26	550	700	65	29	**FA 15**	26	700	65	30
0.55		**8**	700	7.5	54	0.58	2.5	2.6	1.8	1.8					2000	3500					3500		
3	**M 4SA**	**2**	2920	9.8	72	0.85	7.1	5.6	2.0	1.8	162	36	**FD 56**	37	—	600	182	48	**FA 06**	37	600	182	50
0.75		**8**	710	10.1	61	0.64	2.8	3.0	1.7	1.8					—	3400					3400		
4	**M 4SB**	**2**	2870	13.3	73	0.84	9.4	5.6	2.3	2.4	213	42	**FD 56**	37	—	500	223	55	**FA 06**	37	500	223	56
1		**8**	690	13.8	66	0.62	3.5	2.9	1.9	1.8					—	3500					3500		
5.5	**M 4LA**	**2**	2870	18.3	75	0.84	12.6	6.1	2.4	2.5	270	51	**FD 06**	50	—	400	280	64	**FA 06**	50	400	280	65
1.5		**8**	690	21	68	0.63	5.1	2.9	1.9	1.9					—	2400					2400		

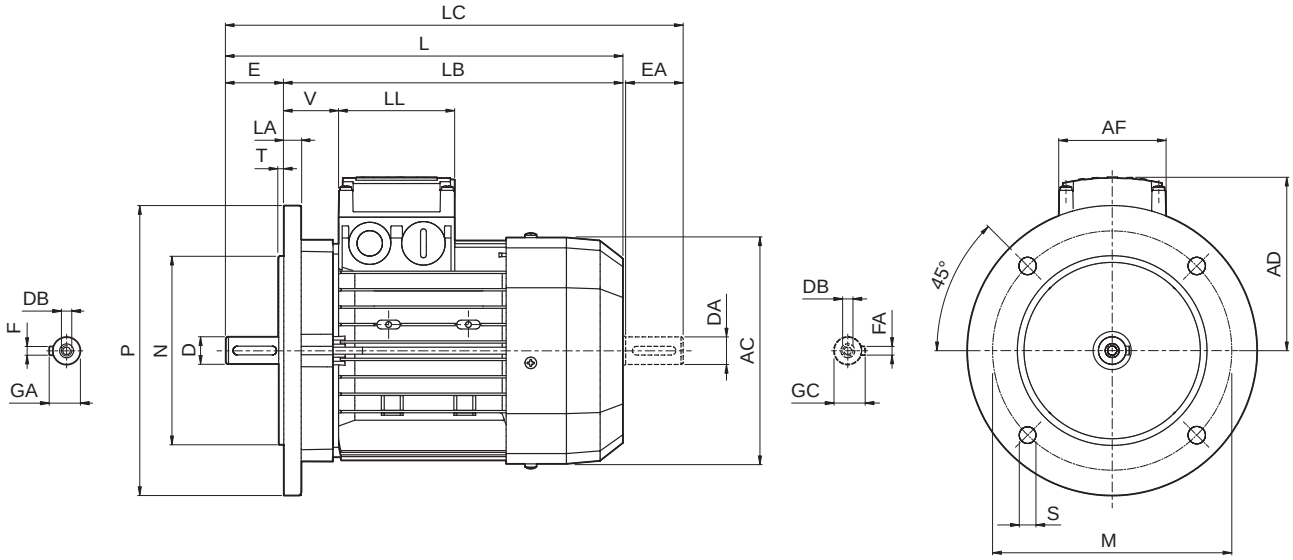
2/12P — 3000/500 min^{-1} - S3 60/40% — 50 Hz

													d.c. brake						a.c. brake				
													FD						FA				
P_n		n	M_n	η	cosφ	In 400V	Is/In	Ms/Mn	Ma/Mn	J_m x 10^{-4}	IM B5		Mod	Mb	Z_o 1/h		J_m x 10^{-4}	IM B5	Mod	Mb	Z_o 1/h	J_m x 10^{-4}	IM B5
kW		min^{-1}	Nm	%		A				kgm^2				Nm	NB	SB	kgm^2			Nm		kgm^2	
0.55	M 2SA	2	2820	1.86	64	0.89	1.39	4.2	1.6	1.7	25	10.6	FD 04	5	1000	1300	27	14.5	FA 04	5	1300	27	14.4
0.09		12	430	2.0	30	0.63	0.69	1.8	1.9	1.8					8000	12000					12000		
0.75	M 3SA	2	2900	2.5	65	0.81	2.06	5.2	1.9	2.1	34	15.5	FD 15	13	700	900	38	22	FA 15	13	900	38	23
0.12		12	460	2.5	33	0.43	1.22	1.9	1.3	1.6					5000	7000					7000		
1.1	M 3LA	2	2850	3.7	65	0.85	2.87	4.5	1.6	1.8	40	17	FD 15	13	700	900	44	24	FA 15	13	900	44	24
0.18		12	430	4.0	26	0.54	1.85	1.5	1.3	1.5					4000	6000					6000		
1.5	M 3LB	2	2900	4.9	67	0.86	3.76	5.6	1.9	1.9	54	21	FD 15	13	700	900	58	27	FA 15	13	900	58	28
0.25		12	440	5.4	36	0.46	2.18	1.8	1.7	1.8					3800	5000					5000		
2	M 3LC	2	2850	6.7	70	0.84	4.9	4.9	1.8	1.7	61	23	FD 55	18	—	700	65	29	FA 15	18	700	65	30
0.3		12	450	6.4	38	0.47	2.4	1.7	1.6	1.7					—	3500					3500		
3	M 4SA	2	2920	9.8	74	0.87	6.7	6.8	2.3	1.9	213	42	FD 56	37	—	450	223	55	FA 06	37	450	223	56
0.5		12	470	10.2	51	0.43	3.3	2.0	1.7	1.6					—	3000					3000		
4	M 4LA	2	2920	13.1	75	0.89	8.6	5.9	2.4	2.3	270	51	FD 56	37	—	400	280	64	FA 06	37	400	280	65
0.7		12	460	14.5	53	0.44	4.3	1.9	1.7	1.6					—	2800					2800		



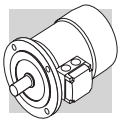


BN - IM B5

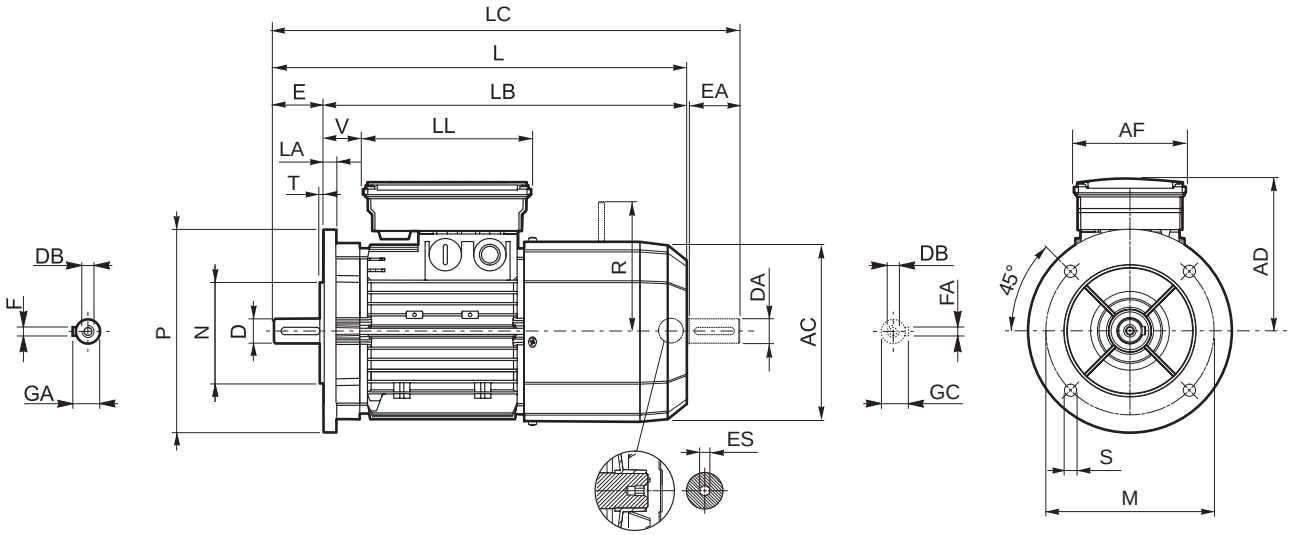


	Shaft					Flange						Motor							
	D DA	E EA	DB	GA GC	F FA	M	N	P	S	T	LA	AC	L	LB	LC	AD	AF	LL	V
BN 56	9	20	M3	10.2	3	100	80	120	7	3	8	110	185	165	207	91	74	80	34
BN 63	11	23	M4	12.5	4	115	95	140	9.5		10	121	207	184	232	95			26
BN 71	14	30	M5	16	5	130	110	160		3.5		138	249	219	281	108			37
BN 80	19	40	M6	21.5	6	165	130	200	11.5		11.5	156	274	234	315	119			38
BN 90	24	50	M8	27	8							176	326	276	378	133	98	98	44
BN 100	28	60	M10	31		215	180	250	14	4	14	195	367	307	429	142			50
BN 112											15	219	385	325	448	157			52
BN 132	38	80	M12	41	10	265	230	300			20	258	493	413	576	193	118	118	58
BN 160 MR	42 38(1)	110 80(1)	M16 M12(1)	45 41(1)	12 10(1)	300	250	350	18.5	5	15		562	452	645				218
BN 160 M												310	596	486	680	245	187	187	51
BN 160 L																			
BN 180 M	48 38(1)	110 110(1)		51.5 41(1)	14 10(1)							310	640	530	724				
BN 180 L	48 42(1)		M16 M16(1)	51.5 45(1)	14 12(1)						18	348	708	598	823	261			52
BN 200 L	55 42(1)		M20 M16(1)	59 45(1)	16 12(1)	350	300	400					722	612	837				66

NOTE:
1) These values refer to the rear shaft end.



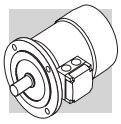
BN_FD ; IM B5



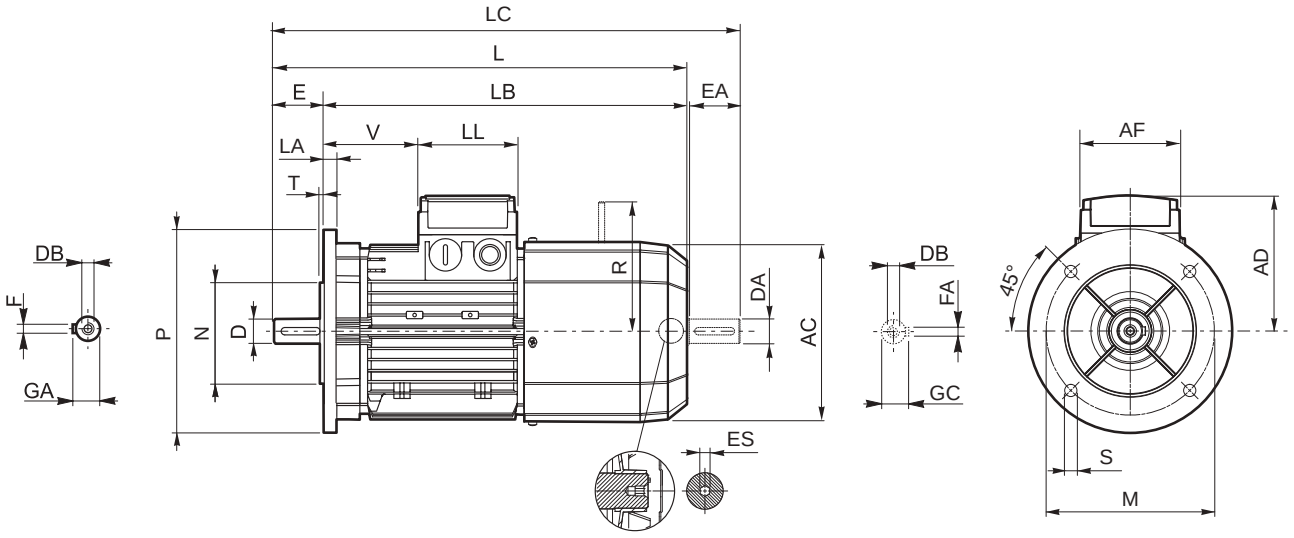
	Shaft					Flange						Motor									
	D DA	E EA	DB	GA GC	F FA	M	N	P	S	T	LA	AC	L	LB	LC	AD	AF	LL	V	R	ES
BN 63	11	23	M4	12.5	4	115	95	140	9.5	3	10	121	272	249	297	122	98	133	14	96	5
BN 71	14	30	M5	16	5	130	110	160	9.5	3.5	11.5	138	310	280	342	135			25	103	
BN 80	19	40	M6	21.5	6	165	130	200	11.5			156	346	306	388	146			41	129	
BN 90 S	24	50	M8	27	8							176	409	359	461	149	110	165	39		6
BN 90 L																146				160	
BN 100	28	60	M10	31		215	180	250	14	4	14	195	458	398	521	158		165	62		
BN 112											15	219	484	424	547	173		165	73	199	
BN 132	38	80	M12	41	10	265	230	300			20	258	603	523	686	210	140	188	46	204(2)	
BN 160 MR	42 38(1)	110 80(1)	M16 M12(1)	45 41(1)	12 10(1)	300	250	350	18.5	5	15		672	562	755				161	226	
BN 160 M												310	736	626	820	245	187	187	51	266	—
BN 160 L	42 38(1)																				
BN 180 M	48 38(1)			51.5 41(1)	14 10(1)								780	670	864						
BN 180 L	48 42(1)	110 110(1)	M16 M16(1)	51.5 45(1)	14 12(1)						18	348	866	756	981	261			52	305	
BN 200 L	55 42(1)		M20 M16(1)	59 45(1)	16 12(1)	350	300	400	18.5				878	768	993				64		

NOTE:
1) These values refer to the rear shaft end.
2) For FD07 brake value R=226.

ES hexagon is not supplied with PS option.



BN_FA - IM B5



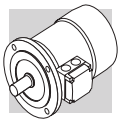
BN-M

	Shaft					Flange						Motor									
	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
BN 63	11	23	M4	12.5	4	115	95	140	9.5	3	10	121	272	249	297	95	74	80	26	116	5
BN 71	14	30	M5	16	5	130	110	160		3.5		138	310	280	342	108			68	124	
BN 80	19	40	M6	21.5	6	165	130	200	11.5		11.5	156	346	306	388	119			83	134	
BN 90	24	50	M8	27	8							176	409	359	461	133	98	98	95	160	6
BN 100	28	60	M10	31		215	180	250	14	4	14	195	458	398	521	142			119		
BN 112											15	219	484	424	547	157			128	198	
BN 132	38	80	M12	41	10	265	230	300			20	258	603	523	686	210	140	188	46	200(2)	
BN 160 MR	42 38(1)	110 80(1)	M16 M12(1)	45 41(1)	12 10(1)	300	250	350	18.5	5	15		672	562	755	193	118	118	218	217	
BN 160 M												310	736	626	820	245	187	187	51	247	—
BN 160 L																					
BN 180 M	48 38(1)			51.5 41(1)	14 10(1)								780	670	864						

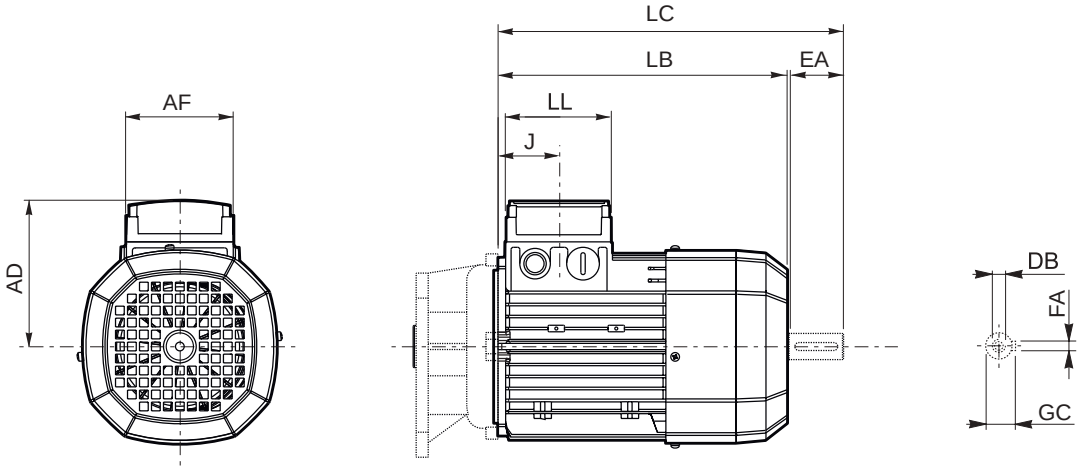
NOTE:
1) These values refer to the rear shaft end.
2) For FA07 brake value R=217.

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

ES hexagon is not supplied with PS option.

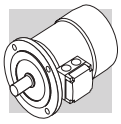


M

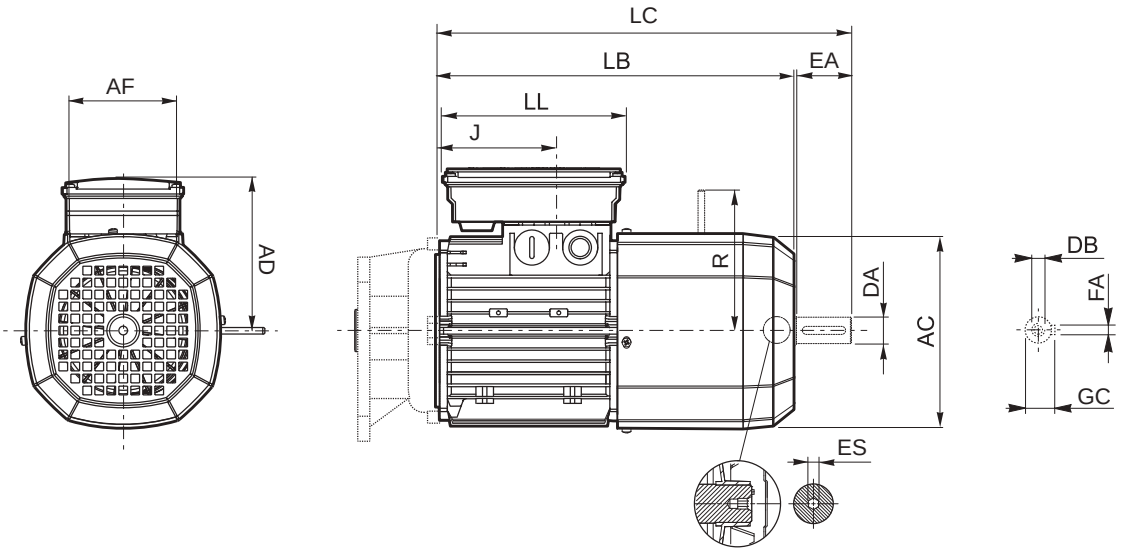


BN-M

	Rear shaft end					Motor						
	DA	**EA**	**DB**	**FA**	**GC**	**AC**	**LB**	**LC**	**AF**	**LL**	**J**	**AD**
M 0	9	20	M3	3	10.2	110	133	155	74	80	42	91
M 05	11	23	M4	4	12.5	121	165	191			48	95
M 1	14	30	M5	5	16	138	187	219			45	108
M 2 S	19	40	M6	6	21.5	156	202	245			44	119
M 3 S	28	60	M10	8	31	195	230	293	98	98	53.5	142
M 3 L							262	325				
M 4	38	80	M12	10	41	258	361	444	118	118	64.5	193
M 4 LC							396	479				
M 5 S						310	418	502	187	187	77	245
M 5 L							462	546				



M_FD

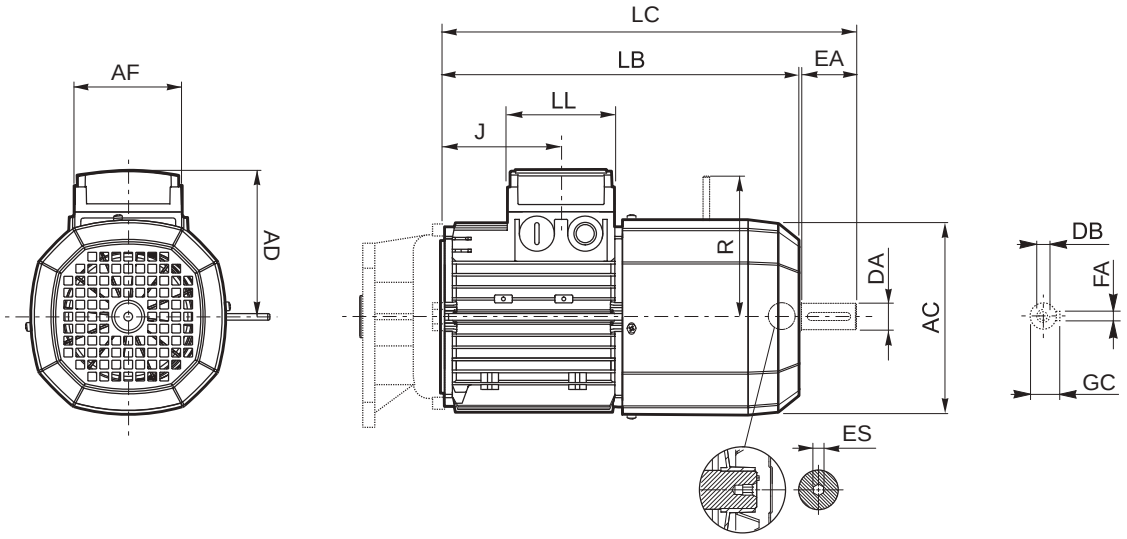


	Rear shaft end					Motor								
	DA	**EA**	**DB**	**FA**	**GC**	**AC**	**LB**	**LC**	**AF**	**LL**	**J**	**AD**	**R**	**ES**
M 05	11	23	M4	4	12.5	121	231	256	98	133	48	122	96	5
M 1	14	30	M5	5	16	138	248	280			73	135	103	
M 2 S	19	40	M6	6	21.5	156	272	314			88	146	129	
M 3 S	28	60	M10	8	31	195	326	389	110	165	124.5	158	160	6
M 3 L							353	416						
M 4	38	80	M12	10	41	258	470	553	140	188	185.5	210	204 (1)	
M 4 LC							495	578			64.5		226	
M 5 S						310	558	642	187	187	77	245	266	—
M 5 L							602	686						

NOTE:
1) For FD07 brake value R=226.

ES hexagon is not supplied with PS option.

M_FA



	Rear shaft end					Motor								
	DA	**EA**	**DB**	**FA**	**GC**	**AC**	**LB**	**LC**	**AF**	**LL**	**J**	**AD**	**R**	**ES**
M 05	11	23	M4	4	12.5	121	231	256	74	80	48	95	116	5
M 1	14	30	M5	5	16	138	248	280			73	108	124	
M 2 S	19	40	M6	6	21.5	156	272	314			88	119	134	
M 3 S	28	60	M10	8	31	195	326	389	98	98	124.5	142	160	6
M 3 L							353	416						
M 4	38	80	M14	10	41	258	470	553	140	188	185.5	210	200 (1)	
M 4 LC							495	578			64.5		217	
M 5 S			M12			310	558	642	187	187	77	245	247	—
M 5 L							602	686						

NOTE:
1) For FA07 brake value R=217.

Dimensions AD, AF, LL and V, relevant to terminal box of motors M…FA featuring the separate brake supply (option SA), are coincident with corresponding dimensions of same-size M…FD motors

ES hexagon is not supplied with PS option.

INDEX OF REVISIONS

BR_CAT_CAFS_IE2-IE3_ENG_R10_0	
	Description
71…73 209…211 361…363	Added the availability of BX 200LA 4, BX 225SA 4, BX 225SB 4, BX 250MA 4, BX 280SA 4, BX 280SB 4 motors.
492...580	Updated electric motors section.

2019 04 12

Bonfiglioli
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We have a relentless commitment to excellence, innovation and sustainability. Our team creates, distributes and services world-class power transmission and drive solutions to keep the world in motion.

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