

Technical Documentation



LOW VOLTAGE THREE PHASE
TEFC CAGE MOTORS

LV10EN

Vision



We set your ideas in motion. We do not merely manufacture motors, but instead turn the ambitious concepts of our customers into modern, innovative and reliable products, which are unique and point the way to the future. We bring our customers closer to their goals with reliability, creativity and flexibility.

Business Units



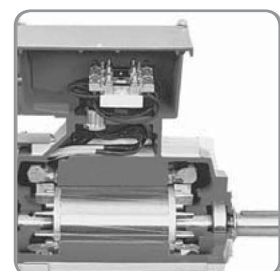
Serial Motors



New Businesses



Home Appliances



Project Motors

Low voltage three phase totally enclosed fan cooled cage motors

Electrical Data

1

Mechanical protection: IP 55

Voltage: 400 V, 50 Hz

Type	Output power P_N kW	Rated speed n_N min^{-1}	Efficiency η %	Power factor $\cos \varphi$	Rated current I_N A	Rated torque T_N Nm	I_1/I_N	T_1/T_N	T_b/T_N	Torque class KR	Moment of inertia J kgm^2	Mass kg
3000 min^{-1}												
1.ZK 63 A-2	0.18	2700	60.0	0.80	0.54	0.64	3.2	2.0	2.4	16	0.00014	4.2
1.ZK 63 B-2	0.25	2730	62.0	0.80	0.72	0.87	3.5	2.2	2.4	16	0.00017	4.6
1.ZK 71 A-2	0.37	2750	63.0	0.81	1.1	1.30	3.4	2.0	2.2	16	0.00023	5.4
1.ZK 71 B-2	0.55	2760	69.0	0.81	1.4	1.90	4.8	2.2	2.6	16	0.00033	6.3
1.ZK 80 A-2	0.75	2770	71.0	0.80	1.9	2.60	4.8	2.1	2.5	16	0.00055	8.3
1.ZK 80 B-2	1.1	2770	73.0	0.84	2.6	3.80	4.4	2.2	2.3	16	0.00066	9.1
1.ZK 90 S-2	1.5	2810	74.0	0.85	3.4	5.10	5.0	2.2	2.4	16	0.00123	12.5
1.ZK 90 L-2	2.2	2830	80.0	0.85	4.7	7.40	6.0	2.8	3.1	16	0.00184	16
2.ZK 100 L-2	3	2820	78.0	0.83	6.7	10	6.5	2.7	3.2	16	0.00378	19
2.ZK 112 M-2	4	2830	82.0	0.90	7.8	13	7.6	3.2	3.3	16	0.005	24
1.ZK 132 Sk-2	5.5	2840	86.0	0.88	10.7	18	8.5	3.6	3.8	16	0.01	47
1.ZK 132 S-2	7.5	2860	84.0	0.90	14.3	25	8.8	3.7	4.0	16	0.013	56
1.ZK 160 Mk-2	11	2910	86.0	0.87	21	36	8.5	3.7	3.9	16	0.021	89
1.ZK 160 M-2	15	2910	87.0	0.88	29	49	8.5	3.7	3.9	16	0.028	108
1.ZK 160 L-2	18.5	2910	88.0	0.88	34	61	8.9	3.7	3.9	16	0.034	113
1.ZK 180 M-2	22	2920	89.0	0.88	41	72	8.0	3.5	3.4	16	0.057	138
1.ZK 200 Lk-2	30	2935	89.5	0.89	55	98	7.5	3.1	3.1	16	0.11	199
1.ZK 200 L-2	37	2940	90.0	0.88	68	120	7.9	3.2	3.2	16	0.13	215
1.ZK 225 M-2	45	2960	91.5	0.87	82	145	7.2	2.7	2.9	16	0.23	290
1.ZK 250 M-2	55	2960	93.0	0.87	99	177	7.5	2.5	3.0	16	0.36	395
1.ZK 280 S-2	75	2960	93.0	0.89	131	242	7.5	2.1	2.8	16	0.67	510
1.ZK 280 M-2	90	2960	93.5	0.89	156	290	7.5	2.5	3.1	16	0.81	600
1.ZK 315 S-2	110	2970	93.0	0.94	181	354	8.0	1.8	3.7	13	1.17	680
1.ZK 315 M-2	132	2970	93.5	0.93	219	424	8.0	1.8	3.8	13	1.4	840
1.ZKI 315 Mk-2	160	2973	95.0	0.91	270	515	7.0	1.7	2.3	10	2.0	1100
1.ZKI 315 M-2	200	2976	95.5	0.91	335	643	7.5	1.9	2.4	13	2.5	1290
2.ZKI 315 Lk-2	250	2977	96.3	0.93	403	802	7.0	1.8	2.5	10	4.7	1450
2.ZKI 315 L-2	315	2982	96.3	0.93	508	1010	7.5	1.7	2.5	10	5.4	1720
2.ZKI 355 Mk-2	250	2977	96.3	0.91	412	802	7.0	1.3	2.9	10	4.7	1530
2.ZKI 355 M-2	315	2982	96.3	0.92	505	1010	7.5	1.8	3.3	10	5.4	1730
2.ZKI 355 Md-2	355	2982	96.7	0.92	576	1137	7.7	1.8	3.3	10	5.7	1950
2.ZKI 355 Lk-2	400	2982	96.7	0.92	650	1281	8.0	2.0	3.5	10	6.5	2550
2.ZKI 355 L-2	450	2982	96.7	0.92	730	1441	8.2	2.0	3.6	10	6.9	2770
2.ZKI 355 Ld-2	500	2982	96.7	0.92	812	1600	8.2	2.1	3.7	10	7.5	2910
2.ZKI 400 Lk-2	560											
2.ZKI 400 L-2	630											
2.ZKI 400 Ld-2	710											

On request!

I_1/I_N - Locked rotor current ratio, T_1/T_N - Locked rotor torque ratio, T_b/T_N - Break down torque ratio, Mass - For IM B3

Low voltage three phase totally enclosed fan cooled cage motors

2 Electrical Data

Mechanical protection: IP 55

Voltage: 400 V, 50 Hz

Type	Output power P_N kW	Rated speed n_N min^{-1}	Efficiency η %	Power factor $\cos \varphi$	Rated current I_N A	Rated torque T_N Nm	I_1/I_N	T_1/T_N	T_b/T_N	Torque class KR	Moment of inertia J kgm^2	Mass kg
1500 min^{-1}												
1.ZK 63 A-4	0.12	1310	60.0	0.66	0.44	0.87	3.0	1.8	2.1	13	0.00027	4.4
1.ZK 63 B-4	0.18	1330	63.0	0.74	0.56	1.29	3.2	2.2	2.1	13	0.00037	5
1.ZK 71 A-4	0.25	1340	63.0	0.76	0.75	1.80	3.2	1.7	1.9	13	0.00038	5.3
1.ZK 71 B-4	0.37	1340	62.0	0.75	1.1	2.60	3.5	2.0	2.1	13	0.00055	6.3
1.ZK 80 A-4	0.55	1375	69.0	0.75	1.5	3.80	3.8	1.9	2.0	13	0.0009	8.2
1.ZK 80 B-4	0.75	1375	72.0	0.75	2.0	5.20	3.8	2.1	2.2	13	0.0011	9
1.ZK 90 S-4	1.1	1410	74.0	0.78	2.8	7.50	4.1	2.0	2.3	16	0.0023	13.2
1.ZK 90 L-4	1.5	1405	77.0	0.78	3.6	10	4.6	2.1	2.8	16	0.0032	15.8
2.ZK 100 L-4	2.2	1410	78.0	0.81	5.0	15	5.4	2.2	2.8	16	0.0054	20.5
2.ZK 100 Ld-4	3	1410	76.0	0.80	7.1	20	5.7	2.4	2.7	16	0.0071	22.6
2.ZK 112 M-4	4	1420	81.0	0.82	8.6	27	6.5	2.9	3.0	16	0.013	28.4
1.ZK 132 S-4	5.5	1450	85.0	0.82	11.4	36	6.5	2.5	3.1	16	0.019	53
1.ZK 132 M-4	7.5	1450	86.0	0.80	15.7	49	6.5	2.4	3.2	16	0.025	64
1.ZK 160 M-4	11	1440	88.0	0.83	22	73	6.5	2.8	3.0	16	0.055	89
1.ZK 160 L-4	15	1440	88.0	0.82	30	99.5	6.8	3.0	3.0	16	0.073	118
1.ZK 180 M-4	18.5	1460	88.0	0.82	37	121	6.2	2.8	2.6	16	0.086	140
1.ZK 180 L-4	22	1460	89.0	0.81	44	144	6.2	2.8	2.5	16	0.102	155
1.ZK 200 L-4	30	1470	90.0	0.84	57	195	7.5	2.9	2.8	16	0.27	230
1.ZK 225 S-4	37	1470	92.0	0.83	70	240	6.2	2.3	2.3	16	0.362	280
1.ZK 225 M-4	45	1470	92.0	0.82	83	292	6.2	2.3	2.5	16	0.442	320
1.ZK 250 M-4	55	1480	92.5	0.85	101	355	6.2	2.1	2.4	16	0.64	415
1.ZK 280 S-4	75	1480	93.0	0.86	135	486	7.0	2.4	2.4	16	1.1	545
1.ZK 280 M-4	90	1480	93.0	0.86	162	581	7.0	2.4	2.4	16	1.31	603
1.ZK 315 S-4	110	1482	93.7	0.92	184	710	7.0	1.9	2.4	13	2.12	750
1.ZK 315 M-4	132	1477	94.0	0.92	221	855	6.8	1.9	2.4	13	2.54	850
1.ZKI 315 Mk-4	160	1486	94.5	0.90	275	1030	7.3	2.0	2.8	13	3.6	1087
1.ZKI 315 M-4	200	1486	95.0	0.91	335	1285	7.0	1.7	2.2	13	4.3	1208
2.ZKI 315 Lk-4	250	1488	95.2	0.87	436	1605	7.8	1.9	2.9	13	5.0	1450
2.ZKI 315 L-4	315	1487	95.4	0.88	542	2023	7.7	2.0	2.8	13	6.0	1720
2.ZKI 355 Mk-4	250	1491	95.7	0.90	419	1600	7.3	2.0	3.0	10	7.6	1750
2.ZKI 355 M-4	315	1492	96.0	0.90	535	2016	7.3	2.1	3.2	13	9.9	1930
2.ZKI 355 Md-4	355	1492	96.2	0.89	592	2272	8.3	2.5	3.2	13	13.0	2150
2.ZKI 355 Lk-4	400	1492	96.3	0.90	666	2560	8.4	2.6	3.3	13	14.5	2545
2.ZKI 355 L-4	450	1492	96.4	0.90	748	2880	8.5	2.6	3.3	13	17.0	2770
2.ZKI 355 Ld-4	500	1492	96.5	0.91	822	3200	8.5	2.6	3.3	13	19.0	2920
2.ZKI 400 Lk-4	560											
2.ZKI 400 L-4	630											
2.ZKI 400 Ld-4	710											

On request!

I_1/I_N - Locked rotor current ratio, T_1/T_N - Locked rotor torque ratio, T_b/T_N - Break down torque ratio, Mass - For IM B3

Low voltage three phase totally enclosed fan cooled cage motors

Electrical Data

3

Mechanical protection: IP 55

Voltage: 400 V, 50 Hz

Type	Output power P_N kW	Rated speed n_N min^{-1}	Efficiency η %	Power factor $\cos \varphi$	Rated current I_N A	Rated torque T_N Nm	I_1/I_N	T_1/T_N	T_b/T_N	Torque class KR	Moment of inertia J kgm^2	Mass kg
1000 min^{-1}												
1.ZK 63 A-6	0.09	870	44.0	0.68	0.45	0.98	2.1	1.7	1.8	13	0.00027	4.4
1.ZK 63 B-6	0.12	880	43.0	0.63	0.64	1.3	2.3	2.2	2.6	13	0.00037	5
1.ZK 71 A-6	0.18	900	57.0	0.65	0.70	1.9	2.6	1.9	2.0	13	0.00055	6.1
1.ZK 71 B-6	0.25	890	57.0	0.64	1.0	2.7	2.6	1.8	2.1	13	0.00071	6.8
1.ZK 80 A-6	0.37	910	62.0	0.69	1.2	3.9	3.3	2.0	2.2	13	0.0018	9
1.ZK 80 B-6	0.55	910	68.0	0.66	1.8	5.7	3.5	2.4	2.4	13	0.0024	11.6
1.ZK 90 S-6	0.75	920	70.0	0.72	2.1	7.8	3.3	1.9	2.1	16	0.0037	13
1.ZK 90 L-6	1.1	910	70.0	0.70	3.3	11.2	3.8	2.2	2.4	16	0.0054	16.3
2.ZK 100 L-6	1.5	920	72.0	0.75	4.0	16.0	4.2	2.1	2.2	13	0.0054	20.5
2.ZK 112 M-6	2.2	930	76.0	0.75	5.6	23.0	4.5	2.0	2.1	16	0.012	27
1.ZK 132 S-6	3	940	77.0	0.78	7.2	30.0	4.5	2.0	2.1	13	0.015	47
1.ZK 132 Mk-6	4	940	82.0	0.77	9.1	40.2	4.5	1.9	2.0	13	0.02	57
1.ZK 132 M-6	5.5	950	83.0	0.77	12.4	55.3	4.5	1.9	2.1	13	0.028	68
1.ZK 160 M-6	7.5	950	84.0	0.77	17	75	5.5	2.0	2.4	16	0.049	90
1.ZK 160 L-6	11	950	84.0	0.78	24.5	110	6.0	2.2	2.5	16	0.07	120
1.ZK 180 L-6	15	960	87.0	0.82	30.5	149	6.0	2.2	2.7	16	0.144	150
1.ZK 200 Lk-6	18.5	970	89.0	0.81	38	182	6.5	2.0	2.7	16	0.225	205
1.ZK 200 L-6	22	970	90.0	0.80	44	217	6.5	2.0	2.7	16	0.27	230
1.ZK 225 M-6	30	975	91.0	0.81	59	294	6.5	2.0	2.7	16	0.656	330
1.ZK 250 M-6	37	980	91.0	0.83	71	361	6.0	2.0	2.2	13	0.9	390
1.ZK 280 S-6	45	982	92.5	0.85	83	438	6.9	2.4	2.8	16	1.5	500
1.ZK 280 M-6	55	982	93.0	0.84	102	533	6.9	2.3	2.6	16	1.82	560
1.ZK 315 S-6	75	987	92.7	0.87	134	725	7.3	2.2	2.6	16	2.7	720
1.ZK 315 M-6	90	988	93.0	0.88	160	870	7.5	2.2	2.6	16	3.18	840
1.ZKI 315 Mk-6	110	987	94.0	0.87	195	1064	6.5	1.75	2.4	16	5.5	1035
1.ZKI 315 M-6	132	988	94.5	0.87	235	1276	7.0	1.8	2.6	16	6.6	1140
1.ZKI 315 Md-6	160	989	95.0	0.87	280	1545	7.0	2.0	2.7	16	7.0	1260
2.ZKI 315 Lk-6	200	987	94.9	0.84	362	1935	7.2	2.3	2.5	13	7.49	1450
2.ZKI 315 L-6	250	986	95.0	0.85	447	2421	7.0	2.2	2.4	13	9.32	1720
2.ZKI 355 Mk-6	200	989	95.7	0.87	348	1930	6.2	2.3	2.5	13	13.1	1636
2.ZKI 355 M-6	250	988	95.7	0.87	436	2417	6.1	2.3	2.5	13	14.9	1950
2.ZKI 355 Md-6	315	988	95.7	0.88	540	3045	6.2	2.3	2.5	13	16.5	2240
2.ZKI 355 Lk-6	355	990	95.9	0.89	600	3425	6.5	2.3	2.6	13	18	2767
2.ZKI 355 L-6	400	990	96.0	0.89	676	3858	6.8	2.3	2.6	13	20	2990
2.ZKI 400 Lk-6	450											
2.ZKI 400 L-6	500											
2.ZKI 400 Ld-6	560											

On request!

I_1/I_N - Locked rotor current ratio, T_1/T_N - Locked rotor torque ratio, T_b/T_N - Break down torque ratio, Mass - For IM B3

Low voltage three phase totally enclosed fan cooled cage motors

4 Electrical Data

Mechanical protection: IP 55

Voltage: 400 V, 50 Hz

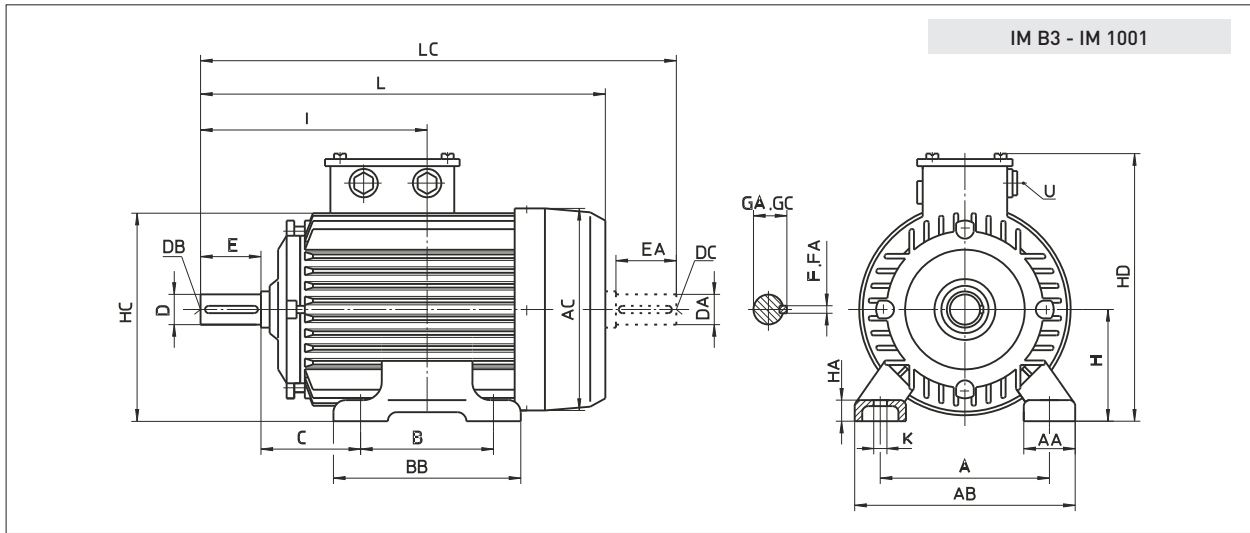
Type	Output power P_N kW	Rated speed n_N min^{-1}	Efficiency η %	Power factor $\cos \varphi$	Rated current I_N A	Rated torque T_N Nm	I_1/I_N	T_1/T_N	T_b/T_N	Torque class KR	Moment of inertia J kgm^2	Mass kg
750 min^{-1}												
1.ZK 63 A-8	0.055	610	34	0.66	0.35	0.9	1.8	1.7	1.8	13	0.00027	4.4
1.ZK 71 A-8	0.09	670	43.0	0.50	0.60	1.3	2.2	1.8	2.0	16	0.00055	6.1
1.ZK 71 B-8	0.12	680	46.0	0.50	0.75	1.7	2.2	1.9	2.2	16	0.00071	6.8
1.ZK 80 A-8	0.18	680	55.0	0.55	0.86	2.5	2.8	2.2	2.5	16	0.0018	9
1.ZK 80 B-8	0.25	680	59.0	0.56	1.10	3.5	2.8	2.3	2.5	16	0.0024	11.6
1.ZK 90 S-8	0.37	700	57.0	0.62	1.5	5.0	2.9	1.7	1.8	13	0.0037	13
1.ZK 90 L-8	0.55	700	61.0	0.61	2.1	7.5	3.0	2.0	2.0	13	0.0054	16.3
2.ZK 100 L-8	0.75	690	64.0	0.67	2.5	10.0	3.7	2.0	2.4	13	0.0054	20.5
2.ZK 100 Ld-8	1.1	670	64.0	0.70	3.5	15.7	3.5	2.1	2.4	13	0.0071	22.6
2.ZK 112 M-8	1.5	680	69.0	0.71	4.4	21	3.6	1.8	2.2	13	0.012	27
1.ZK 132 S-8	2.2	700	72.0	0.72	6.1	30	3.6	1.8	2.1	13	0.015	47
1.ZK 132 M-8	3	700	76.0	0.72	7.9	40	4.0	1.8	2.1	13	0.028	68
1.ZK 160 Mk-8	4	710	78.0	0.68	11.1	54	4.3	1.9	2.2	13	0.037	87
1.ZK 160 M-8	5.5	710	79.0	0.68	15	74	4.4	1.9	2.2	13	0.053	91.5
1.ZK 160 L-8	7.5	710	81.0	0.70	19	101	4.4	1.9	2.2	13	0.076	122
1.ZK 180 L-8	11	715	84.0	0.72	26.5	148	4.4	1.9	2.1	13	0.16	160
1.ZK 200 L-8	15	725	87.0	0.70	36	199	5.0	1.8	2.2	13	0.225	205
1.ZK 225 S-8	18.5	735	88.5	0.75	41	240	4.8	1.7	2.2	13	0.47	245
1.ZK 225 M-8	22	735	89.5	0.75	48	286	4.8	1.6	2.3	13	0.56	285
1.ZK 250 M-8	30	735	89.5	0.78	62	390	5.0	1.6	2.2	13	0.87	370
1.ZK 280 S-8	37	735	92.0	0.78	75	481	5.1	1.6	2.0	13	1.5	495
1.ZK 280 M-8	45	735	92.0	0.78	91	585	5.1	1.6	2.0	13	1.82	580
1.ZK 315 S-8	55	739	92.5	0.81	106	710	6.8	2.0	2.6	10	2.56	750
1.ZK 315 M-8	75	740	92.8	0.81	145	970	6.8	2.0	2.6	10	3.32	803
1.ZKI 315 Mk-8	90	742	93.5	0.78	180	1158	5.7	2.0	2.6	10	6.3	1045
1.ZKI 315 M-8	110	742	93.5	0.79	215	1416	5.5	2.0	2.5	10	7.8	1150
1.ZKI 315 Md-8	132	742	94.0	0.79	260	1699	5.5	2.0	2.5	10	8.9	1270
2.ZKI 315 Lk-8	160	739	94.2	0.81	301	2068	6.5	1.4	2.7	13	7.49	1450
2.ZKI 315 L-8	200	739	94.5	0.80	382	2585	6.8	1.5	2.9	13	9.32	1720
2.ZKI 355 Mk-8	160	743	95.4	0.82	297	2060	6.0	2.0	2.9	13	19.2	1825
2.ZKI 355 M-8	200	744	95.5	0.82	367	2570	6.0	2.1	3.0	13	22.4	2090
2.ZKI 355 Md-8	250	744	95.6	0.82	462	3209	6.1	2.1	3.0	13	26.2	2440
2.ZKI 355 Lk-8	315	745	95.7	0.82	580	4038	6.1	2.1	3.0	13	28	2810
2.ZKI 355 L-8	355	745	95.8	0.82	653	4550	6.2	2.1	3.1	13	30	3035
2.ZKI 400 Lk-8	400											
2.ZKI 400 L-8	450											
2.ZKI 400 Ld-8	500											

On request!

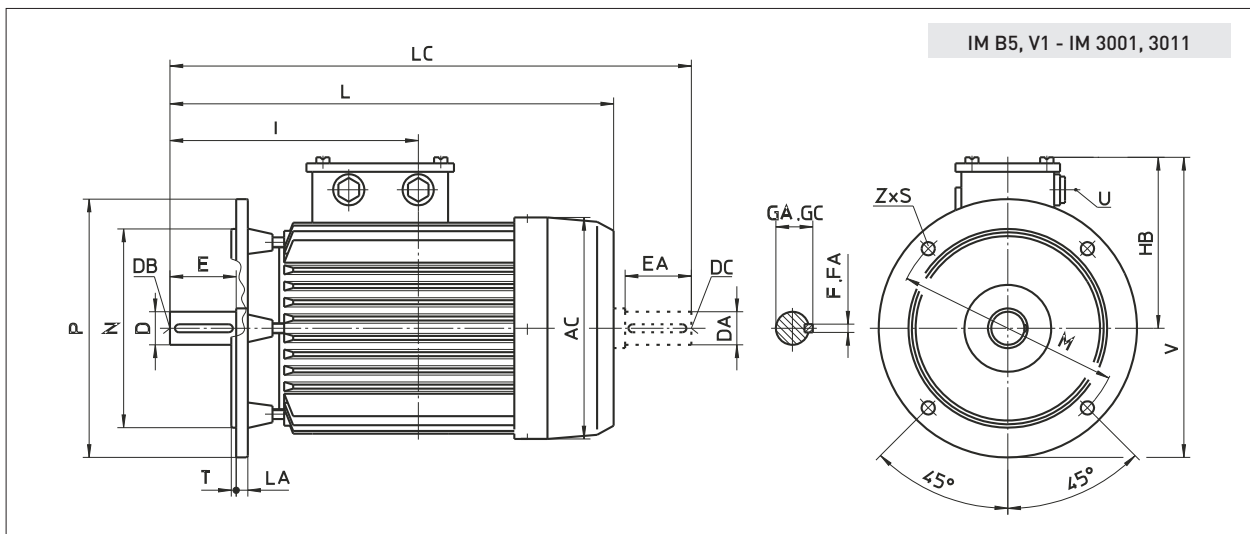
I_1/I_N - Locked rotor current ratio, T_1/T_N - Locked rotor torque ratio, T_b/T_N - Break down torque ratio, Mass - For IM B3

Low voltage three phase totally enclosed fan cooled cage motors

Electrical Data



Type	Pole	A	AA	AB	AC	B	BB	C	D	DA	DB	DC	E	EA	F	FA	GA	GC	H	HA	HC	HD	I	K	L	LC	U	
1.ZK 63	2,4,6,8	100	24	124	125	80	106	40	11	11	M4	M4	23	23	4	4	12.5	12.5	63	8	123	160	103	7	213	240	M20 x 1.5	
1.ZK 71	2,4,6,8	112	34	142	140	90	114	45	14	11	M5	M4	30	23	5	4	16	12.5	71	8	142	176	120	7	241	267	M20 x 1.5	
1.ZK 80	2,4,6,8	125	38	155	154	100	130	50	19	14	M6	M5	40	30	6	5	21.5	16	80	9	158	190	140	10	274	307	M20 x 1.5	
1.ZK 90	S L	2,4,6,8	140	40	180	170	100 125	130 155	56	24	24	M8	M8	50	50	8	8	27	27	90	12	177	211	10	156 168.5	307 332	360 385	M25 x 1.5

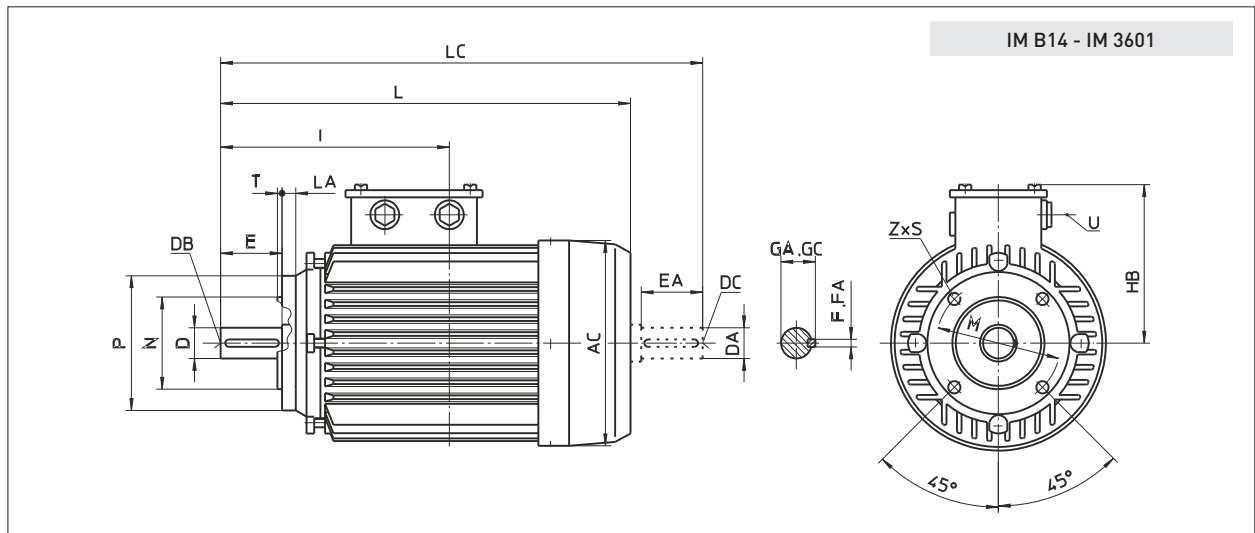


Type	Pole	Flange	AC	D	DA	DB	DC	E	EA	F	FA	GA	GC	HB	I	L	LA	LC	M	N	P	S	Z	T	V	U
1.ZK 63	2,4,6,8	FF 115	125	11	11	M4	M4	23	23	4	4	12.5	12.5	97	103	213	8	240	115	95	140	Ø10	4	3	167	M20 x 1.5
1.ZK 71	2,4,6,8	FF 130	140	14	11	M5	M4	30	23	5	4	16	12.5	105	120	241	10	267	130	110	160	Ø10	4	3.5	185	M20 x 1.5
1.ZK 80	2,4,6,8	FF 165	154	19	14	M6	M5	40	30	6	5	21.5	16	110	140	274	12	307	165	130	200	Ø12	4	3.5	210	M20 x 1.5
1.ZK 90	S L	FF 165	170	24	24	M8	M8	50	50	8	8	27	27	121	156 168.5	307 332	12	360 385	165	130	200	Ø12	4	3.5	221	M25 x 1.5

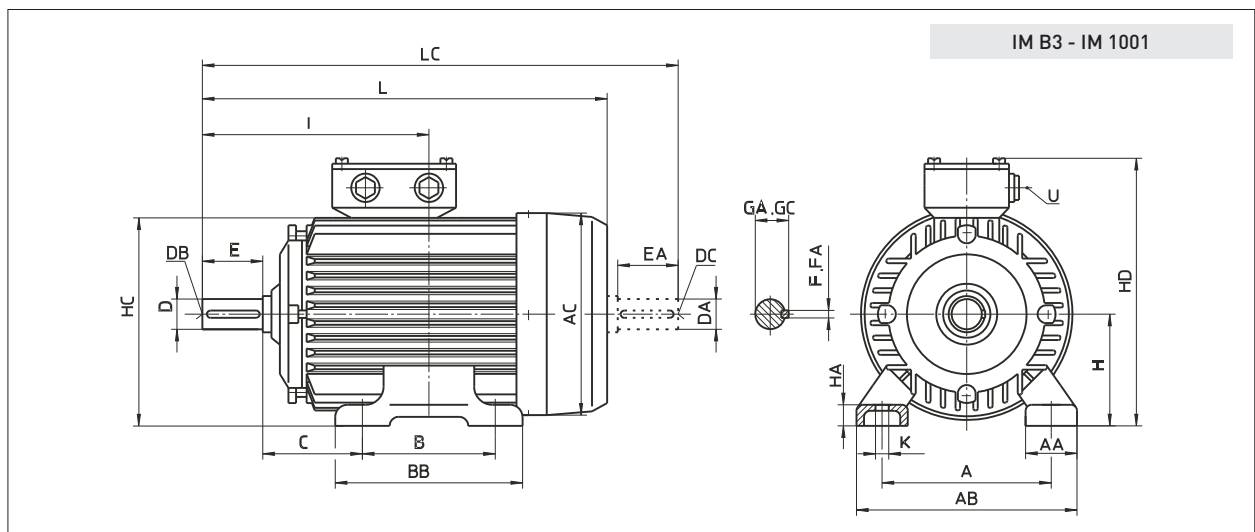
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Low voltage three phase totally enclosed fan cooled cage motors

6 Motor dimensions



Type	Pole	Flange	AC	D	DA	DB	DC	E	EA	F	FA	GA	GC	HB	I	L	LA	LC	M	N	P	S	Z	T	U
1.ZK 63	2,4,6,8	FT 75	125	11	11	M4	M4	23	23	4	4	12.5	12.5	97	103	213	8	240	75	60	90	M5	4	2.5	M20 x 1.5
		FT 100	100	11	11	M4	M4	23	23	4	4	12.5	12.5	97	103	213	8	240	100	80	120	M6	4	3	
1.ZK 71	2,4,6,8	FT 85	140	14	11	M5	M4	30	23	5	4	16	12.5	105	120	241	8	267	85	70	105	M6	4	2.5	M20 x 1.5
		FT 115	115	14	11	M5	M4	30	23	5	4	16	12.5	105	120	241	10	267	115	95	140	M8	4	3	
1.ZK 80	2,4,6,8	FT 100	154	19	14	M6	M5	40	30	6	5	21.5	16	110	140	274	10	304	100	80	120	M6	4	3	M20 x 1.5
		FT 130	130	19	14	M6	M5	40	30	6	5	21.5	16	110	140	274	12	304	130	110	160	M8	4	3.5	
1.ZK 90	S	FT 115	170	24	24	M8	M8	50	50	8	8	27	27	121	156	307	10	360	115	95	140			3.5	M25 x 1.5
		FT 130	130	24	24	M8	M8	50	50	8	8	27	27	121	156	307	10	360	130	110	160	M8	4	3.5	
	L	FT 115	170	24	24	M8	M8	50	50	8	8	27	27	121	168.5	332	10	385	115	95	140			3.5	
		FT 130	130	24	24	M8	M8	50	50	8	8	27	27	121	168.5	332	10	385	130	110	160			3.5	

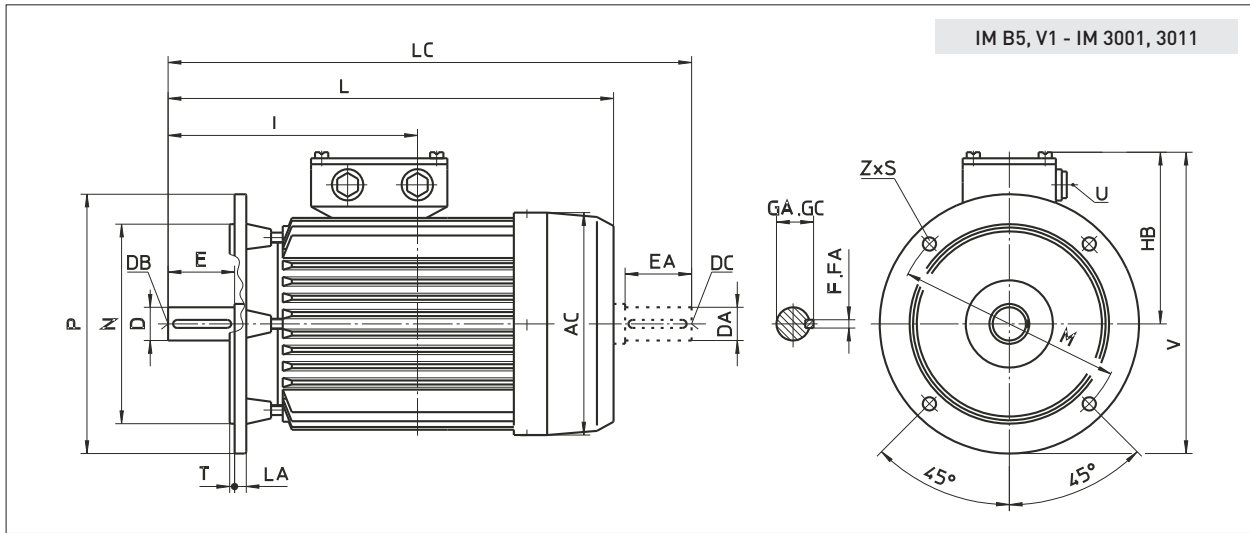


Type	Pole	A	AA	AB	AC	B	BB	C	D	DA	DB	DC	E	EA	F	FA	GA	GC	H	HA	HC	HD	I	K	L	LC	U
2.ZK 100 L	2,4,6,8	160	44	204	193	140	175	63	28	28	M10	M10	60	60	8	8	31	31	100	14	194	257	193	12	370	438	M25 x 1.5
2.ZK 100 Ld	4,8	160	44	204	193	140	175	63	28	28	M10	M10	60	60	8	8	31	31	100	14	194	257	193	12	370	438	M25 x 1.5
2.ZK 112 M	2,4,6,8	190	46	236	216	140	175	70	28	28	M10	M10	60	60	8	8	31	31	112	16	218	281	200	12	380	445	M25 x 1.5

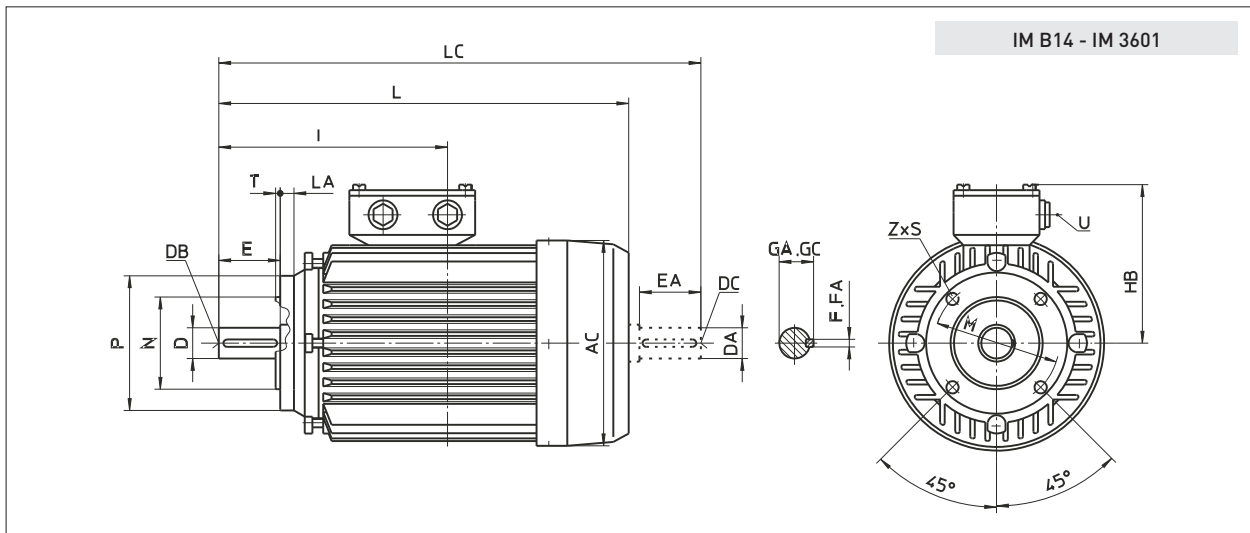
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Low voltage three phase totally enclosed fan cooled cage motors

Motor dimensions



Type	Pole	Flange	AC	D	DA	DB	DC	E	EA	F	FA	GA	GC	HB	I	L	LA	LC	M	N	P	S	Z	T	V	U	
2.ZK 100 L	2,4,6,8			193	28	28	M10	M10	60	60	8	8	31	31	157	193	370	15	438	215	180	250	Ø14.5	4	4	282	M25 x 1.5
2.ZK 100 Ld	4,8	FF 215		193	28	28	M10	M10	60	60	8	8	31	31	157	193	370	15	438	215	180	250	Ø14.5	4	4	282	M25 x 1.5
2.ZK 112 M	2,4,6,8			216	28	28	M10	M10	60	60	8	8	31	31	169	200	380	16	445	215	180	250	Ø14.5	4	4	294	M25 x 1.5



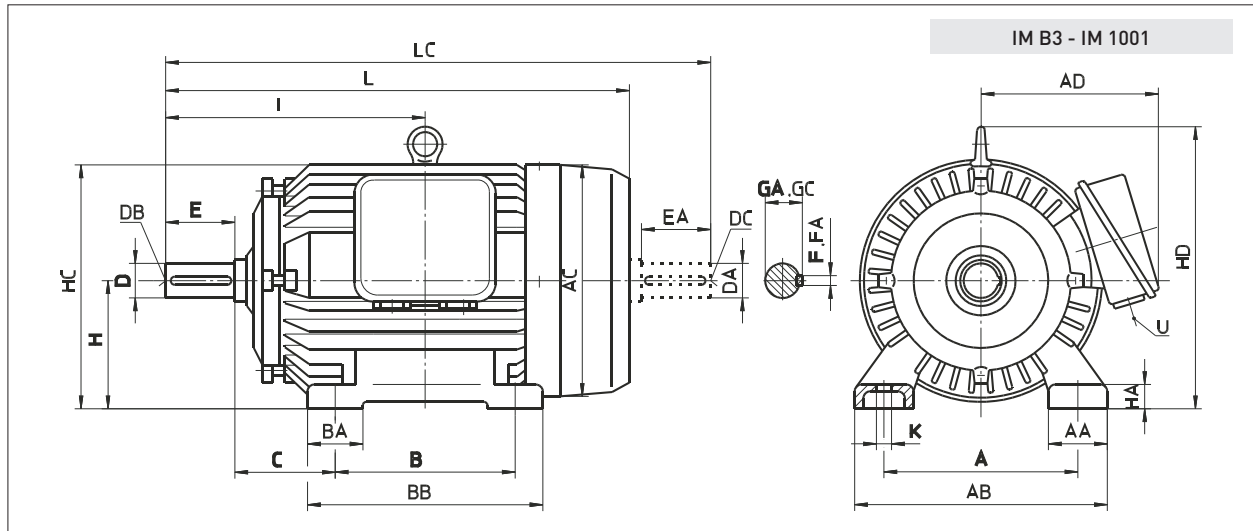
Type	Pole	Flange	AC	D	DA	DB	DC	E	EA	F	FA	GA	GC	HB	I	L	LA	LC	M	N	P	S	Z	T	U
2.ZK 100 L	2,4,6,8	FT 130															10	130	110	160	M8	4			
		FT 165															12	165	130	200	M10	4			
2.ZK 100 Ld	4,8	FT 130	193	28	28	M10	M10	60	60	8	8	31	31	157	193	370	10	438	130	110	160	M8	4	3.5	M25 x 1.5
		FT 165															12	165	130	200	M10	4			
2.ZK 112 M	2,4,6,8	FT 130															10	445	130	110	160	M8	4	3.5	M25 x 1.5
		FT 165	216	28	28	M10	M10	60	60	8	8	31	31	169	200	380	12	165	130	200	M10	4			

The dimensions given in bold figures are obligatory according to the recommendation of IEC. All other technical data and dimensions during the future development of motors may undergo some changes and therefore they can be considered as obligatory after our confirmation only. All dimensions are given in millimetres.

Low voltage three phase totally enclosed fan cooled cage motors

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Motor dimensions

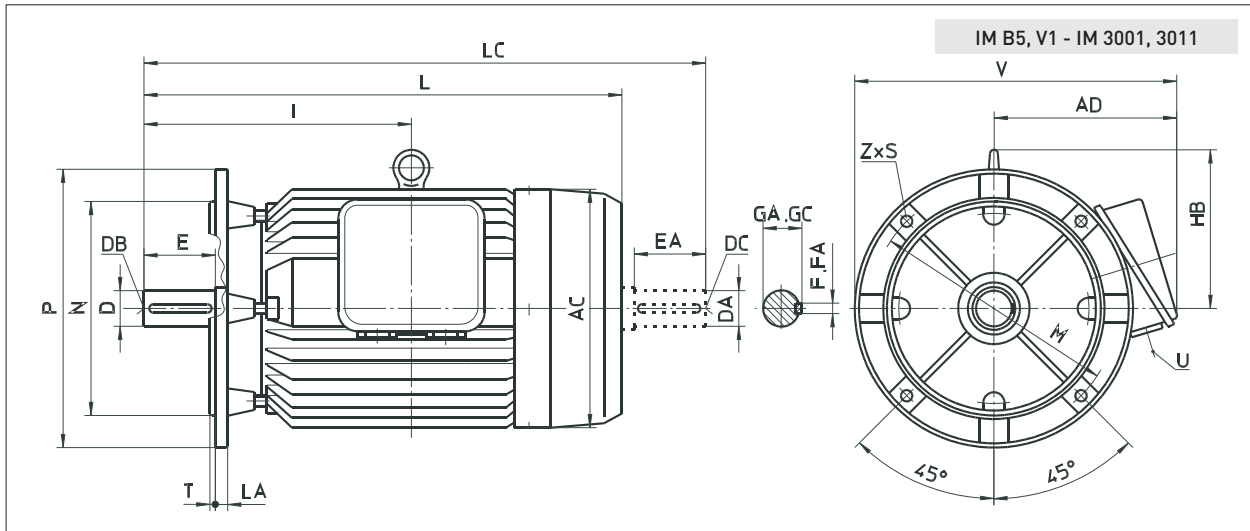


Type	Pole	A	AA	AB	AC	AD	B	BA	BB	C	D	DA	DB	DC	E	EA	F	FA	GA	GC	H	HA	HC	HD	I	K	L	LC	U		
1.ZK 132	Sk	2					140	180																	239	441	529				
	S	2,4,6,8	216	55	271	247	190	50	89	38	38	M12	M12	80	80	10	10	41	41	132	21	255	291		12	258	479	567		M32x1.5	
	Mk	6					178	218																							
	M	4,6,8																													
1.ZK 160	Mk	2,8					210	260																	323	15	589	709		M40x1.5	
	M	2,4,6,8	254	60	314	285	246	65	108	42	42	M16	M16	110	110	12	12	45	45	160	23	300.5	345		345	633	753				
	L	2,4,6,8					254	304																							
1.ZK 180	M	2,4					241	296																	351.5	15	652	772		M40x1.5	
	L	4,6,8	279	70	349	323	260	82	121	48	48	M16	M16	110	110	14	14	51.5	51.5	180	28	342	387		370.5	690	810				
1.ZK 200	Lk	2,6					305	375																	395.5	18	764	876		M50x1.5	
	L	2,4,6,8	318	80	398	369	299	95	133	55	55	M20	M20	110	110	16	16	59	59	200	30	387.5	440								
1.ZK 225	S	4,8					286	355			60	60			140	140	18	18	64	64					432		805	962			
	M	2	356	90	446	418	337	110	149	55	55	M20	M20	110	110	16	16	59	59	225	35	438	500		414.5	18	800	927		M50x1.5	
	M	4,6,8					311	380			60	60			140	140	18	18	64	64					444.5		830	987			
1.ZK 250	M	2	406	96	506	474	360	95	168	60	60	M20	M20	140	140	18	18	64	64	250	40	487.5	549		482.5	24	906	1060		M50x1.5	
	M	4,6,8					349	430		65	65			140	140	18	18	69	69												
1.ZK 280	S	2					368	450			65	65			18	18	69	69							514		973	1128			
	M	4,6,8	457	110	567	510	379	112	190	75	75	M20	M20	140	140	20	20	79.5	79.5	280	45	536	607		414.5	24	1024	1179		M50x1.5	
	M	2					419	500			65	65			18	18	69	69							539.5		1024	1179			
1.ZK 315	S	2					406	500			65	65			140	140	18	18	69	69					559		1072	1217			
	M	4,6,8	508	125	633	562	427	120	216	80	80	M20	M20	170	170	22	22	85	85	315	50	599	670		589	28	1102	1277		M63x1.5	
	M	2					457	550			65	65			140	140	18	18	69	69					584.5		1123	1268			
	M	4,6,8					457	550			80	80			170	170	22	22	85	85					614.5		1153	1328			

Note: On request, motors type 132, 225, 250 and 280 are available with top mounted terminal box.

Low voltage three phase totally enclosed fan cooled cage motors

Motor dimensions

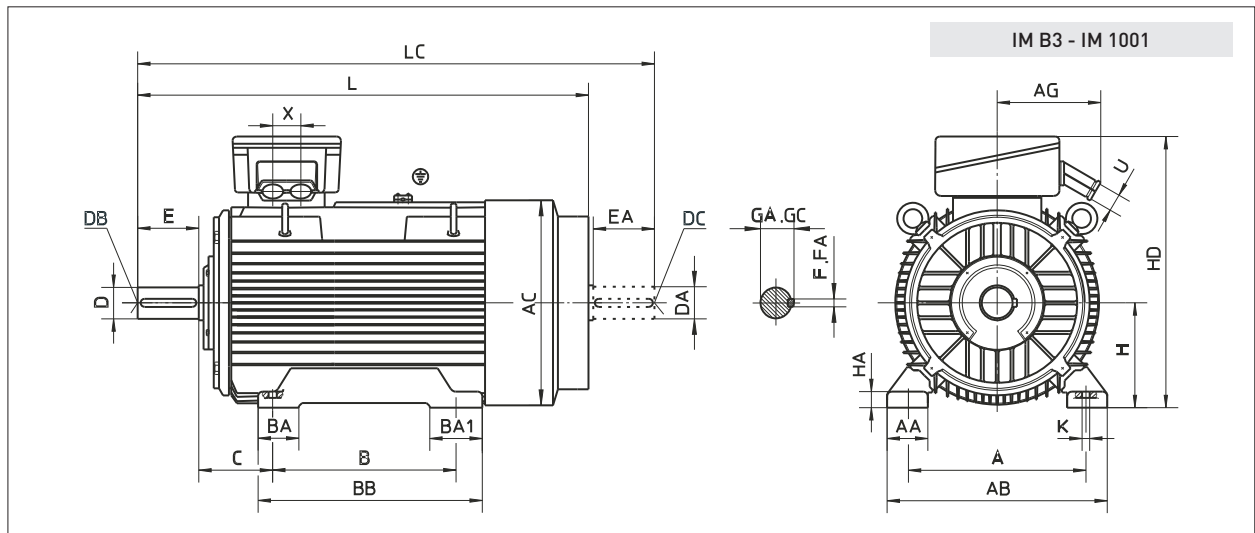


Type	Pole	Flange	AC	AD	D	DA	DB	DC	E	EA	F	FA	GA	GC	HB	I	L	LA	LC	M	N	P	S	Z	T	V	U	
1.ZK 132	Sk	2														239	441		529									
	S	2,4,6,8	FF 265	247	190	38	38	M12	M12	80	80	10	10	41	41	159		16		265	230	300	Ø14.5	4	4	340	M32 x 1.5	
	Mk	6														258	479		567									
	M	4,6,8																										
1.ZK 160	Mk	2,8																										
	M	2,4,6,8	FF 300	285	246	42	42	M16	M16	110	110	12	12	45	45	185		20		300	250	350	Ø18.5	4	4	421	M40 x 1.5	
	L	2,4,6,8														345	633		753									
1.ZK 180	M	2,4	FF 300	323	260	48	48	M16	M16	110	110	14	14	51.5	51.5	207		20		300	250	350	Ø18.5	4	5	435	M40 x 1.5	
	L	4,6,8														351.5	652		772									
																370.5	690		810									
1.ZK 200	Lk	2,6	FF 350	369	299	55	55	M20	M20	110	110	16	16	59	59	240		20		350	300	400	Ø18.5	4	5	499	M50 x 1.5	
	L	2,4,6,8														395.5	764		876									
1.ZK 225	S	4,8				60	60			140	140	18	18	64	64													
			FF 400	418	337	55	55	M20	M20	110	110	16	16	59	59	275		20		400	350	450	Ø18.5	8	5	537	M50 x 1.5	
	M	4,6,8				60	60			140	140	18	18	64	64													
1.ZK 250	M	2	FF 500	474	360	60	60	M20	M20	140	140	18	18	64	64	299		22		500	450	550	Ø18.5	8	5	635	M50 x 1.5	
						65	65			140	140	18	18	69	69													
						65	65			140	140	18	18	69	69													
1.ZK 280	S	2				65	65			140	140	18	18	69	69													
			FF 500	510	379	75	75	M20	M20	140	140	20	20	79.5	79.5	327		22		500	450	550	Ø18.5	8	5	654	M50 x 1.5	
	M	4,6,8				65	65			140	140	18	18	69	69													
1.ZK 315	M	4,6,8				75	75			140	140	20	20	79.5	79.5													
	S	2				65	65			140	140	18	18	69	69													
			FF 600	562	427	80	80	M20	M20	170	170	22	22	85	85	345		25		600	550	660	Ø24	8	6	757	M63 x 1.5	
					65	65			140	140	18	18	69	69														
					80	80			170	170	22	22	85	85														

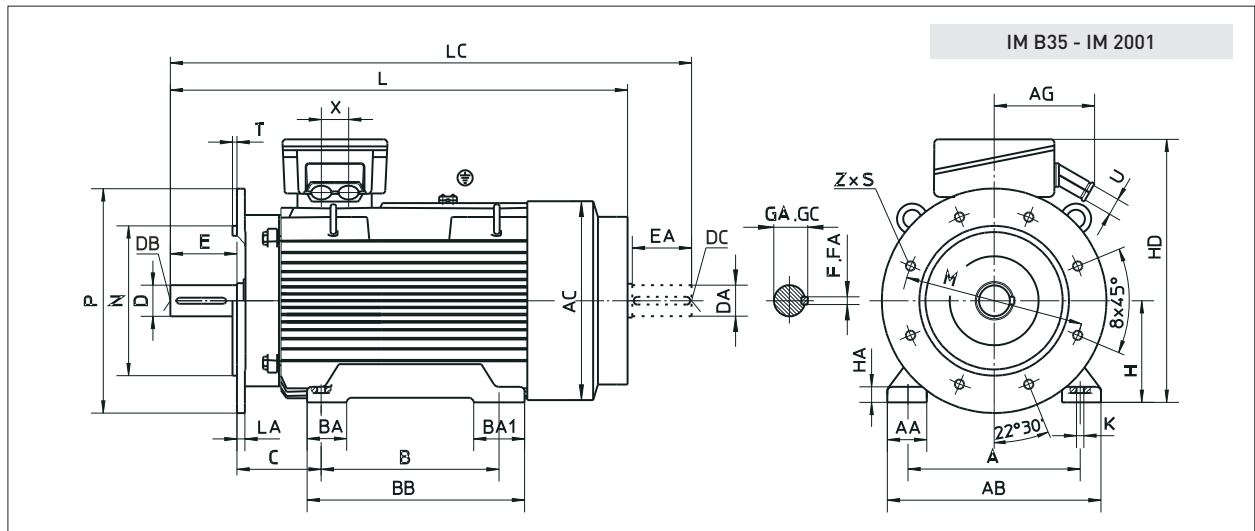
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Low voltage three phase totally enclosed fan cooled cage motors

10 Motor dimensions



Type	Pole	A	AA	AB	AC	AG	B	BA	BA1	BB	C	D	DA	DB	DC	E	EA	F	FA	GA	GC	H	HA	HD	K	L	LC	U	X	
1(2).ZKI 315 Mk, M	2	508	125	633	626	403	457	508	101	152	588	216	65	65	M20	M20	140	140	18	18	69	69	315	45	890	Ø28	1238	1393	Ø70	90
1(2).ZKI 315 Mk, M, Md	4,6,8											90	90	M24	M24	170	170	25	25	95	95					1268	1453			
1(2).ZKI 315 Lk, L	2	560	120	680	655	-	560	630	120	200	780	200	65	65	M20	M20	140	140	18	18	69	69	315	40	850	Ø28	1587	1732	Ø60	120
1(2).ZKI 315 Lk, L	4,6,8											90	90	M24	M24	170	170	25	25	95	95					1617	1792			



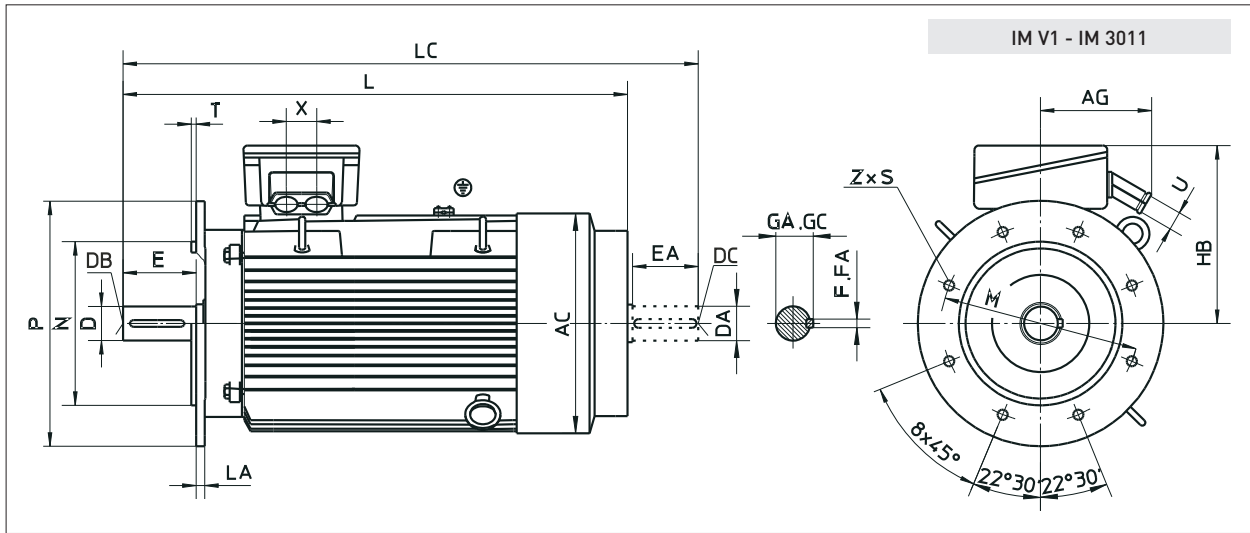
Type	Pole	Flange	A	AA	AB	AC	AG	B	BA	BA1	BB	C	H	HA	HD	K	L	LA	LC	M	N	P	S	Z	T	U	X	
1(2).ZKI 315 Mk, M	2	FF	600	508	125	633	626	403	457	508	101	152	588	216	315	45	890	Ø28	25	1393	600	550	660	Ø24	8	6	Ø70	90
1(2).ZKI 315 Mk, M, Md	4,6,8																			1268	1453							
1(2).ZKI 315 Lk, L	2	FF	740	560	120	680	655	-	560	630	120	200	780	216	315	40	850	Ø28	25	1732	740	680	800	Ø24	8	6	Ø60	120
1(2).ZKI 315 Lk, L	4,6,8																			1617	1792							

Type	Pole	D	DA	DB	DC	E	EA	F	FA	GA	GC
1(2).ZKI 315 Mk, M	2	65	65	M20	M20	140	140	18	18	69	69
1(2).ZKI 315 Mk, M, Md	4,6,8	90	90	M24	M24	170	170	25	25	95	95
1(2).ZKI 315 Lk, L	2	65	65	M20	M20	140	140	18	18	69	69
1(2).ZKI 315 Lk, L	4,6,8	90	90	M24	M24	170	170	25	25	95	95

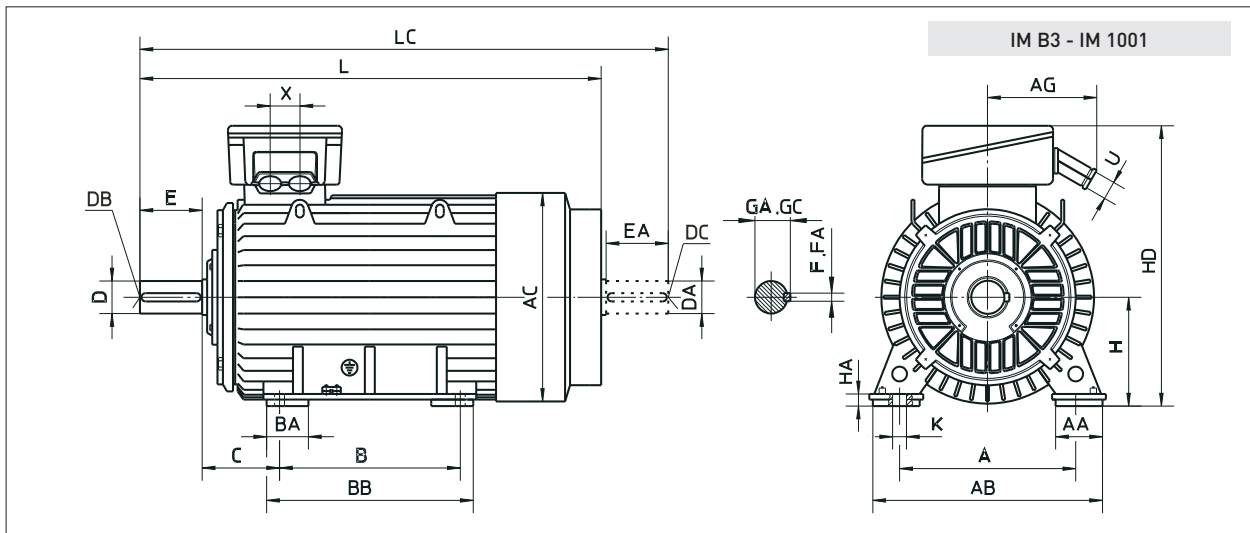
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Low voltage three phase totally enclosed fan cooled cage motors

Motor dimensions



Type	Pole	Flange	AC	AG	D	DA	DB	DC	E	EA	F	FA	GA	GC	HB	L	LA	LC	M	N	P	S	Z	T	U	X
1(2).ZKI 315	Mk, M	2	FF 600	626	403	65	65	M20	M20	140	140	18	18	69	69	575	1238	1393	600	550	660	Ø24	8	6	Ø70	90
	Mk, M, Md	4,6,8				90	90	M24	M24	170	170	25	25	95	95	1268	25	1453								
2.ZKI 315	Lk, L	2	FF 740	655	-	65	65	M20	M20	140	140	18	18	69	69	535	1587	1732	740	680	800	Ø24	8	6	Ø60	120
	Lk, L	4,6,8				90	90	M24	M24	170	170	25	25	95	95	1617	25	1792								

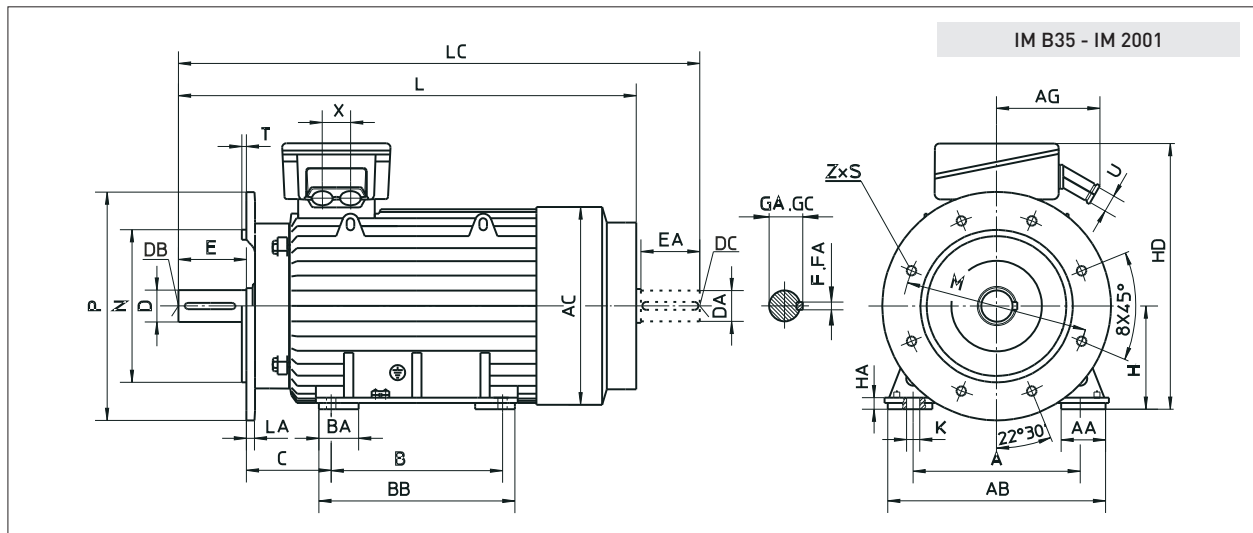


Type	Pole	A	AA	AB	AC	AG	B	BA	BB	C	D	DA	DB	DC	E	EA	F	FA	GA	GC	H	HA	HD	K	L	LC	U	X	
2.ZKI 355	Mk, M, Md	610	140	750			560	140	660	254	75	75	M20	M20	140	140	20	20	79.5	79.5				Ø28	1463	1618			
	Lk, L, Ld	630	150	780			800	220	980	200														Ø35	1794	1949			
	Mk, M				713	403	560	140	660	254	100	100	M24	M24	210	210	28	28	106	106	355	35	945	Ø28	1533	1758	Ø70	90	
	Md	4,6,8					560	140	660	254														Ø28	1651	1876			
	Lk, L, Ld	630	150	780			800	220	980	200														Ø35	1864	2089			

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Low voltage three phase totally enclosed fan cooled cage motors

12 Motor dimensions

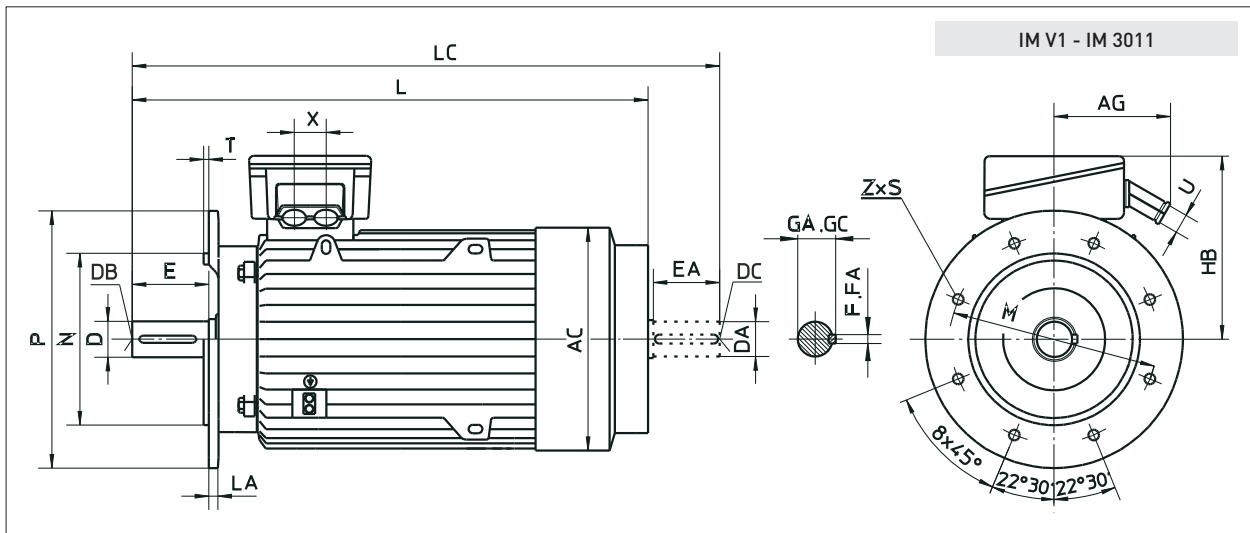


Type	Pole	Flange	A	AA	AB	AC	AG	B	BA	BB	C	H	HA	HD	K	L	LA	LC	M	N	P	S	Z	T	U	X	
Mk, M, Md	2		610	140	750			560	140	660	254					Ø28	1463	1618									
Lk, L, Ld			630	150	780			800	220	980	200						Ø35	1794	1949								
2.ZKI 355 Mk, M	4,6,8	FF 740	610	140	750	735	403	560	140	660	254	355	35	945		Ø28	1533	25	1758	740	680	800	Ø24	8	6	Ø70	90
Md			630	150	780			800	220	980	200						Ø28	1651		1876							
Lk, L, Ld			630	150	780			800	220	980	200						Ø35	1864		2089							

Type	Pole	D	DA	DB	DC	E	EA	F	FA	GA	GC
Mk, M, Md	2	75	75	M20	M20	140	140	20	20	79.5	79.5
Lk, L, Ld											
2.ZKI 355 Mk, M	4,6,8	100	100	M24	M24	210	210	28	28	106	106
Md											
Lk, L, Ld											

Low voltage three phase totally enclosed fan cooled cage motors

Motor dimensions



Type	Pole	Flange	AC	AG	D	DA	DB	DC	E	EA	F	FA	GA	GC	HB	L	LA	LC	M	N	P	S	Z	T	U	X
Mk, M, Md Lk, L	2				75	75	M20	M20	140	140	20	20	79.5	79.5		1463		1618								
2.ZKI 355	Mk, M	FF 740	735	403	100	100	M24	M24	210	210	28	28	106	106	590	1533	25	1758	740	680	800	\varnothing 24	8	6	\varnothing 70	90
																1651		1876								
	Md Lk, L, Ld															1864		2089								

The dimensions given in bold figures are obligatory according to the recommendation of IEC. All other technical data and dimensions during the future development of motors may undergo some changes and therefore they can be considered as obligatory after our confirmation only. All dimensions are given in millimetres.

Low voltage three phase totally enclosed fan cooled cage motors

14 Main characteristics

STANDARDS AND REGULATIONS

- IEC 60034-1 Rating and performance
- IEC 60034-2 Methods for determining losses and efficiency
- IEC 60034-5 Degree of mechanical protection
- IEC 60034-6 Methods of cooling
- IEC 60034-7 Mounting arrangements
- IEC 60034-8 Terminal markings
- IEC 60034-9 Noise limits
- IEC 60034-11 Built-in thermal protection
- IEC 60034-12 Starting performances
- IEC 60034-14 Mechanical vibrations, limit values
- IEC 60034-17 Converter fed induction motors
- IEC 60038 IEC standard voltage
- IEC 60072-1 Mounting dimensions
- IEC 60085 Insulation material classification
- IEC 60721 Suitability for climate groups

The motors carry CE mark as a sign of product conformity to the requirements of all applicably directives of European Union, especially concerning safety, life and health protection, environment protection and consumer protection:

- Low Voltage Directive 73/23/EEC, modified by 93/68/EEC;
- Electromagnetic Compatibility Directive: 89/336/EEC, modified by 92/31/EEC;
- Machinery Directive 89/392/EEC modified by 91/368/EEC, 93/44/EEC and 93/68/EEC.

Quality assurance system of the SEVER motor factories is certified according to the international standard ISO 9001.

VOLTAGE AND FREQUENCY

The motors are designed for rated supply voltage 3x400 V $\pm 10\%$, 50Hz according to IEC 60038. Motors up to 1.5kW are connected in star (Y) and above that in delta (Δ) connection. On a special request motors can be designed for other voltages and winding connections up to 690 V.

However, motors with a 50 Hz winding can be used with 60 Hz system but with appropriate variations in performance and electrical parameters.

OUTPUT

Rated motor outputs given in the performance data tables refers to continuous running duty (S1) at rated voltage, rated frequency and maximum ambient temperature of 40°C. Motors for special operating conditions (temperature above 40°C, altitude above 1000 m ASL, frequent starting, load torque starting, driving heavy flywheel masses etc.) are available on a special request.

SPEED

Rotation speed given in the performance data tables refers to the rated load at rated voltage and frequency. According to IEC 60034-8 the internal connection of each machine to

its own terminals is for clockwise direction of rotation from the drive side.

MECHANICAL DESIGN AND MOUNTING ARRANGEMENTS

The main mounting motor parts and the basic materials used in design are shown in the following table:

Motor parts	Frame size														
	63	71	80	90	100	112	132	160	180	200	225	250	280	315	355
Stator frame	Aluminum alloy						Cast iron						Steel		
End shield B3	Aluminum alloy						Cast iron						Steel		
Flange B5	Cast iron												Steel		
Flange B14	Cast iron						Not available								
Feet	Cast on		Bolted			Cast on ⁽¹⁾				Weld.					
Fan cover	Steel										Al. alloy ⁽²⁾		Steel		
Fan	Polypropylene										Al. alloy ⁽³⁾		Steel		

⁽¹⁾ Only 1. ZKI 315 bolted, ⁽²⁾ Only 1. ZKI 315 steel made,

⁽³⁾ Only 1. ZKI 315 steel made

The motors are designed for three basic mounting arrangements: IM B3 (IM1001), IM B5 (IM3001) and up to frame size 112 for IM B14 (IM3601). All mounting arrangements are in accordance with the IEC 60034-7.

MECHANICAL PROTECTION

The motors are built with IP55 degree of mechanical protection meaning that they are protected against penetration of water jet and dust. The terminal box is built with the same protection degree - IP55.

TOLERANCES

All mechanical dimensions of electrical motors are in accordance with the IEC 60072-1 which also indicates allowed tolerances.

The main mounting dimension tolerances are shown in the following table:

Term	Designation	Dimension	Tolerance
Shaft extension diameter	D, DA	≤ 28 mm	j6
		> 28 mm	k6
		> 50 mm	m6
Flange spigot diameter	N	< 450 mm	j6
		> 450 mm	h6
Flange pitch diameter	M	≤ 200 mm	± 0.25 mm
		> 200 mm	± 0.50 mm
		> 500 mm	± 1.00 mm
Foot fixing dimensions	A, B	≤ 250 mm	± 0.75 mm
		> 250 mm	± 1.00 mm
		> 500 mm	± 1.50 mm
Shaft height	H	≤ 250 mm	- 0.50 mm
		> 250 mm	- 1.00 mm

Low voltage three phase totally enclosed fan cooled cage motors

Main characteristics

All electrical tolerances for rated values and performance are in accordance with the IEC 60034-1, and are shown in the following table:

Term	Designation	Dimension	Tolerance
Efficiency	η	$P_N \leq 50 \text{ kW}$ $P_N > 50 \text{ kW}$	- 0.15 (1- η) - 0.10 (1- η)
Power factor	$\cos\phi$		$\frac{1-\cos\phi}{6}$ Min 0.02 Max 0.07
Slip	s	$P_N < 1 \text{ kW}$ $P_N \geq 1 \text{ kW}$	$\pm 30 \%$ $\pm 20 \%$
Locked rotor current	I_l		+ 20 %
Locked rotor torque	T_l		- 15 % + 25 %
Break down torque	T_b		- 10 %
Moment of inertia	J		$\pm 10 \%$

TERMINAL BOX

The motors up to frame size 112 are designed with terminal box on the top. From the frame size 132 up to 315 the motors are designed with right hand side (RHS) terminal box, left hand side (LHS) and top mounted terminal box are available on request. Motors type 1.ZKI 315 are designed with terminal box on the top - LHS or RHS position on request. 2.ZKI motors are available with top mounted terminal box only.

Terminal markings are in accordance with the IEC 60034-8. The main terminal box data are shown in the Table 2, page 17.

ROTOR AND SHAFT EXTENSION

The rotors are cage type, normally designed with one free cylindrical shaft extension. Second shaft extension, taper shaft extension and other special shaft extensions are available on a request. The dimensions of shaft extension, key and keyway are in conformity with the IEC 60072. In order to keep load of bearings and of shaft extension within allowed limits, there must be paid attention to radial and axial forces and to the type of transmission from a motor to a working machine.

BEARINGS

The design of the end shields and selected bearings provides quiet and long-term motor operation. The nominal bearing life of the motors with horizontal arrangements and normal conditions of use, is at least 40.000 hours. The bearings are shown in the Table 1, page 17.

LUBRICATION

The bearings for motors up to frame size 160 are lubricated for life and regreasing is not possible. For frame sizes 180, 200 and 225 the bearings are lubricated by the motor manufacturer and cannot be relubricated without deassembling of the motor end shields. The motors from frame size 250 up to 400 are fitted with regreasing device.

The type of grease, grease quantity and regreasing time are imprinted to the rating plate. Full range data are shown in the Table 1, page 17.

COOLING

The motors are surface cooled with self circulation. The type of cooling is IC 411, according to the IEC 60034-6. The cooling is performed by fan located on non drive side of the motor and protected by fan cover. All the motors up to frame size 200 have fans made of polypropylene. For all other frame sizes fans are made of aluminum alloy except for frame size 355 and 400 which are made of steel.

WINDING INSULATION

The motor windings are designed with insulation in class "F". This system of insulation is suitable for temperature rise limit of 105 K but motors of this catalogue meet temperature rise requirements of the insulation in class "B" (80 K) under the normal conditions of use.

VIBRATIONS AND BALANCING

The rotors are balanced dynamically with half key to vibration severity grade N (standard) in accordance with the IEC 60034-14. The limits of vibration severity are shown in the following table:

Grade	Limits of vibration severity in mms^{-1} (effective) for frame size H in mm				
	Speed range min^{-1}	Free suspension			
		$56 < H \leq 132$	$132 < H \leq 225$	$255 < H \leq 400$	$H > 400$
N	$\geq 600 \leq 3600$	1.80	2.80	3.50	3.50
	$\geq 600 \leq 1800$	0.71	1.12	1.80	2.80
R	$> 1800 \leq 3600$	1.12	1.80	2.80	2.80
	$\geq 600 \leq 1800$	0.45	0.71	1.12	-
S	$> 1800 \leq 3600$	0.71	1.12	1.80	-

Vibration severity grade "R" or "S" available on a request

OVERLOAD CAPACITY

According to the IEC 60034-1, motors can be overloaded meaning that motors heated to an operating temperature can withstand current equal to 1.5 times the rated current for not less than 2 minutes. The same way, they can be overloaded by the torque 1.6 times the rated one for 15 seconds without stalling or abrupt in speed.

TORQUE CLASS

Motors of this catalogue and their characteristics of the starting torque are type "H", according to the IEC 60034-12. The motors are classified on the basis of torque class as follows: KR 10, KR 13 and KR 16. The motors of torque class KR 10 provide safe direct starting with torque load of 100 %, KR 13 with 130 % and KR 16 with 160 % of rated torque.

Low voltage three phase totally enclosed fan cooled cage motors

16 Main characteristics

THERMAL PROTECTION

On a special request stator winding of the motor can be protected from overheating by using PTC thermistors. In order to protect all the windings of the motor one PTC thermistor is embedded in each phase of the winding. The PTC thermistors are connected in series and two ends of such connection are led out in the terminal box. These two ends have to be connected to the control unit. Besides, the motors can be equipped with additional thermistors for alarm.

HEATERS

As a protection against condensed water the motors can be equipped with heaters. During the motor stand still the heaters must be switched on. The power and supply voltage of the heating elements are shown in the following table:

Frame size H, mm	Supply voltage V	Heater's power P _g , W
71-80	115 ili 230	8
90-112		25
132-160		40
180-250		80
280-315		130
355		200
400		280

NOISE

The motors satisfy the noise level emission in accordance with the IEC 60034-9. The noise levels shown in the following table refer to a no load motor, 400 V, 50 Hz, cooling type IC 411 and protection IP55. Tolerance is + 3dB (A).

Noise levels dB (A)	Frame size															
	63	71	80	90	100	112	132	160	180	200	225	250	280	315	355	
2 pole	L _{pfA} ⁽¹⁾	45	58	62	65	71	73	78	80	78	85	82	75	84	85	85
	L _{wA} ⁽²⁾	56	69	73	77	83	85	90	94	92	98	96	89	98	99	99
4 pole	L _{pfA}	42	41	50	52	55	60	62	65	73	71	74	77	79	84	85
	L _{wA}	53	52	61	64	67	72	74	78	87	84	88	92	94	98	99
6 pole	L _{pfA}	-	39	46	51	59	58	71	66	61	67	72	69	68	75	85
	L _{wA}	-	50	57	63	71	70	83	78	75	81	86	83	82	89	99
8 pole	L _{pfA}	-	37	45	51	52	55	57	62	64	64	71	63	61	80	82
	L _{wA}	-	48	56	63	64	67	69	74	77	77	86	75	74	94	96

⁽¹⁾ - L_{pfA} - Sound pressure, ⁽²⁾ - L_{wA} - Sound power

CONVERTER FED MOTORS

The motors are suitable for operation by electronic converters since the winding insulation of the motors endures certain voltage overloading. Generally, motors operated by converters have higher level of losses, vibrations and noise. So, during the motor operation performed from converter it is necessary to de-rate the motor, depending on speed range, torque-speed characteristics of the load, type of cooling and type of converter. Therefore when placing an order note that the motor will be operated by converter.

FINISH PAINTING

Standard finish painting of the motors is performed by protective alkyd paint (RAL 5010). For special climate conditions, according to IEC 60721-2-1, painting is performed by epoxy paint.

PACKING

The motors of frame size 63 up to 132 are packed in individual cardboard boxes while the motors of frames 160 and bigger are packed in wooden crates.

In order to prevent damaging of the bearings during the motor transportation and from excessive vibrations during the motor stand still, the motors of frame size 160-400 are equipped with special rotor blocking system.

QUESTIONNAIRE

Please, answer the questions from the attached questionnaire as fully as possible, to enable offering motors which will satisfy your requirements the best.

Low voltage three phase totally enclosed fan cooled cage motors

Table of Bearings and Terminal box

17

TABLE 1. - BEARINGS

Motor type	Drive end	Opposite end		Grease Insulation class		Grease quantity		Regreasing period, h			
		Horizontal design	Vertical design	B, F	H	g	cm ³	Number of poles			
								2	4	6	8,10,12
1.ZK 63	6002 2Z C3	6002 2Z C3									
1.ZK 71	6203 2Z C3	6203 2Z C3									
1.ZK 80	6204 2Z C3	6204 2Z C3									
1.ZK 90	6205 2Z C3	6205 2Z C3									
2.ZK 100	6206 2Z C3	6206 2Z C3						For life lubricated			
2.ZK 112	6206 2Z C3	6206 2Z C3									
1.ZK 132 M, S	6208 2Z C3	6208 2Z C3									
1.ZK 160 M, L	6210 2Z C3	6210 2Z C3									
1.ZK 180 M, L	6310 C3	6310 C3						11500			
1.ZK 200 L	6312 C3	6312 C3				Without regreasing device		10000	20000		
1.ZK 225 M, S	6313 C3	6313 C3									
1.ZK 250 M	6314 C3	6314 C3									
1.ZK 280 M, S	2p=2 2p=4,6,8	6216 C3	6216 C3								
1.ZK 315 M, S	2p=2 2p=4,6,8	6217 C3	6217 C3								
1.ZKI 315 M	2p=2 2p=4,6,8	6317 C3	6317 C3	7317 B							
2.ZKI 355 M, L	2p=2 2p=4,6,8	6317 C3	6317 C3	7317 B							
2.ZKI 400 L	2p=2 2p=4,6,8	6319 C3	6319 C3	7319 B							
		6324 C3	6322 C3	7322 B							

Lithium based grease

Silicon based grease

Table 2. - Terminal box

Motor type	Number of terminals	Terminal stud thread	Maximal permissible current, A	Number of entries	Dimension of entries	Max. cable diameter mm	Terminal box position		
1.ZK 63	6 ^[1]	M4	16	2	M20 x 1.5	13	Top mounted only		
1.ZK 71							Top mounted only		
1.ZK 80							Top mounted only		
1.ZK 90							Top mounted only		
2.ZK 100							M25 x 1.5	17	Top mounted ^[2]
2.ZK 112							M32 x 1.5	21	Top mounted ^[2]
1.ZK 132							M5	25	Top mounted ^[2]
1.ZK 160							M6	63	Right hand side (left hand side and top position on request)
1.ZK 180							M8	100	Right hand side (left hand side and top position on request)
1.ZK 200							M10	160	Right hand side (left hand side and top position on request)
1.ZK 225							M12	250	Right hand side (left hand side and top position on request)
1.ZK 250							M16	315	Right hand side (left hand side and top position on request)
1.ZK 280							M16	315	Right hand side (left hand side and top position on request)
1.ZK 315							M20	630	Right hand side (left hand side and top position on request)
1.(2.)ZKI 315 Mk, M, Md	12	M16	730	4	M80 x 2	64*	Top mounted only		
2.ZKI 315 Lk, L					M80 x 2	64*	Top mounted only		
2.ZKI 355 Mk, M					M80 x 2	64*	Top mounted only		
2.ZKI 355 Md					M80 x 2	64*	Top mounted only		
2.ZKI 355 Lk, L, Ld					M80 x 2	64*	Top mounted only		
2.ZKI 400					M80 x 2	64*	Top mounted only		

Note: ^[1] - 12 terminals available on a request., ^[2] - Right or left hand side on a request.

* - Cable Glands - metallic, Terminal box with front plate for entries

Low voltage three phase totally enclosed fan cooled cage motors

18 QUESTIONNAIRE FOR THE OFFER OF ASYNCHRONOUS ELECTRIC MOTORS



Enquiry Number: _____

Customer: _____ ITEM: _____
Qty: _____

A MOTOR DATA

1 Motor type: Three phase: _____ Single phase: _____

2 Rotor type: Squirrel cage: _____ Slip-ring: _____

3 Rated output: $P_N =$ _____ kW

4 Rated voltage: $U_N =$ _____ V Connect: Star _____ Delta _____

5 Rated frequency: $f_N =$ _____ Hz

6 Rated speed: $n_N =$ _____ rpm

7 Insulation class: F B

8 Duty type: S1 S2 S3 S4 S5 S6 S7 S8 S9 S10

ED %

starts /h _____ min _____ J_{mot} _____ kgm^2

9 Standard: _____ IEC or _____

10 Cooling method: _____ IC _____

11 Mounting arrangement: IM _____

12 Protection degree: Motor IP: _____ Terminal box IP: _____

13 *Sense of rotation: Left _____ Right _____ Both _____

14 Motor brake: yes no

Braking moment: _____ Nm

Brake voltage: _____ V/Hz _____ V,DC _____

15 No-load regime? (single phase motor) yes _____ no _____

16 Rotor data: $U_{2c} =$ _____ V $I_{2n} =$ _____ A

B DATA ABOUT THE DRIVEN MACHINE

1 Type: _____

2 Required power: _____

3 Required speed: _____

4 Load torque characteristic: Constant _____ Squared _____ or _____

Speed %: 0 25 50 75 100

Torque Nm: _____

5 Moment of inertia: $J =$ _____ kgm^2

6 Running machine special data: _____

C AMBIENT CONDITIONS

1 Ambient temperature: _____ C

2 Relative humidity: _____ %

3 Altitude (above sea level): _____ m

4 Specific ambient conditions: _____

D POWER TRANSMISSION AND STARTING CONDITIONS

1 Coupling type: _____

2 Starting: _____

3 Number of consecutive startings: _____

Hot state: _____ per hour _____ per day

Cold state: _____ per hour _____ per day

E ADDITIONAL REQUESTS FOR MOTOR EXECUTION

1 Overloading from: _____ % P_N
Duration: _____ min

2 Temperature rise: F B

3 Request for: vibration level _____ mm/s
noise level _____ db

4 *Terminal box position: left right On top

5 Additional shaft loading sense
axial force _____ radial force _____

6 Converter feed operation: yes no

Converter type: _____
Manufacturer: _____
Speed range: from _____ to _____ rpm

7 Sensor category (mark in lower field):
Tacho gen. _____ Encoder _____ Absolute _____ Resolver _____

Sensor Type: _____

8 Flange size: _____ mm

9 Second shaft end: yes no
DA= _____ mm EA= _____ mm

10 Other requests and limits: _____

F ADDITIONAL EQUIPMENT, SPARE PARTS AND DOCUMENTATION

1 Thermal protection: yes no
Type: _____

2 Bearings thermometers yes no

3 Anti-condensation heaters yes no

4 Spare parts yes no

5 Guarantee sheet yes no

6 Language of instruction list: _____

7 Other requests for packing: _____

H CUSTOMER

1 Company: _____

2 Address: _____

3 City: _____

4 Country: _____

5 Person: _____

6 Telefon / Telefax: _____

7 e-mail: _____

You are kindly requested to provide us with as much data as possible thus enabling us to offer satisfactorily

* OBSERVED FROM DRIVE END

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