

Technical Documentation



LOW VOLTAGE THREE PHASE TEFC CAGE MOTORS
IE2 High Efficiency

Mission, Vision, Targets



Our electric motors and generators are optimized in accordance with our client's technical and economical requests. Our clients will receive from us, within a very short notice, most advanced and high quality technical solutions of electric motors, generators, electric drives and complete technical solutions of small and middle sized hydroelectric power plants, along with economically most favourable conditions.

We are constantly moving your ideas. We are not just manufacturing motors and generators, we turn ambitious concepts of our clients into advanced, innovative and reliable products, which are unique and future oriented. Our reliability, creativity and flexibility will assist our clients in achieving their goals.

Keeping track with newest technological and technical solutions, our products are being constantly developed and therefore we are improving all our activities aimed to fulfil our client's requests. Our view of the future is oriented towards development of high power and big sized electric motors, hydrogenerators for small and middle sized hydroelectric power plants, as well as electric motors designed for extreme working conditions and most complex technical requirements.

LOW VOLTAGE TEFC CAGE MOTORS

IE2 High Efficiency

Main characteristics	2
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Electrical data

Series ZKE 2p=2	4
Series ZKE 2p=4	5
Series ZKE 2p=6	6
Series ZKE 2p=8	7

Motor dimensions

ZKE 200 - ZKE 315; IM B3 - IM 1001	8
ZKE 200 - ZKE 315; IM B5, V1 - IM 3001, 3011	9
ZKIE 315; IM B3 - IM 1001	10
ZKIE 315; IM B35 - IM 2001	11
ZKIE 315; IM V1 - IM 3011	12
ZKIE 355 - 450; IM B3 - IM 1001	13
ZKIE 355; IM B35 - IM 2001	14
ZKIE 355 - 450; IM V1 - IM 3011	15

LOW VOLTAGE TEFC CAGE MOTORS

IE2 High Efficiency

2 Main characteristics

Changing the nomenclature of the IEC motor efficiency level

New labelling and definition methods of IEC motor efficiency level according to IEC 60034-30:2008 and IEC 60034-2-1:2007

Definition of efficiency classes has been done according to different standards. For the purposes of international harmonization, a new standard has been created IEC 60034-30:2008 (Rotation electric machines Part 30: Efficiency level class of one speed, three-phase asynchronous motors with a cage rotor (marking IE)). According to this standard, motors have been defined into new efficiency level classes. This standard has been valid since October 2008. Since then the new nomenclature has been put into practice.

New method of loss measurement according to IEC 60034-2-1:2007

The efficiency level according to IEC 60034-30:2008 is based on determining motor losses by using the standard IEC 60034-2-1:2007, which has been valid since November 2007 and serves as a substitute for the standard IEC 60034-2:1996. With this new measuring technique additional losses are not determined as a percentage [0.5%], but are determined through the process of measuring (by using the standard IEC 60034-2-1:2007). According to the new standard, the nomenclature of the efficiency level is changed from EFF1 to IE2 and from EFF2 to IE1.

Determining loss according to the old and new standard:

Before: $P_{LL} = 0,5\% P$

Now: $P_{LL} = \text{individual measuring}$

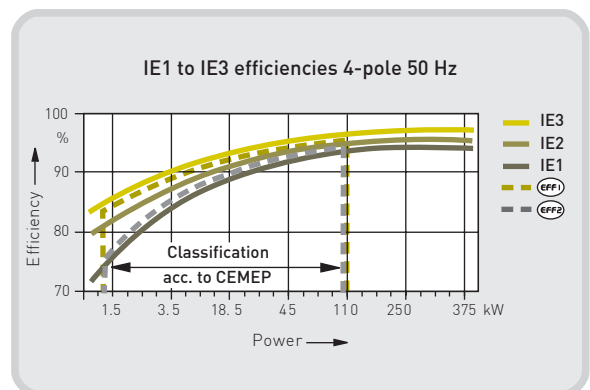
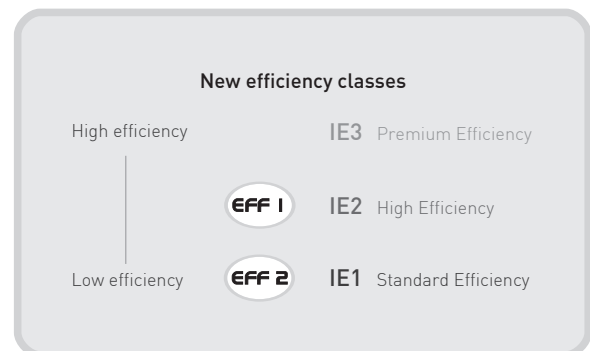
(P_{LL} - additional losses dependent on the work load)

New standard class of the motor efficiency level

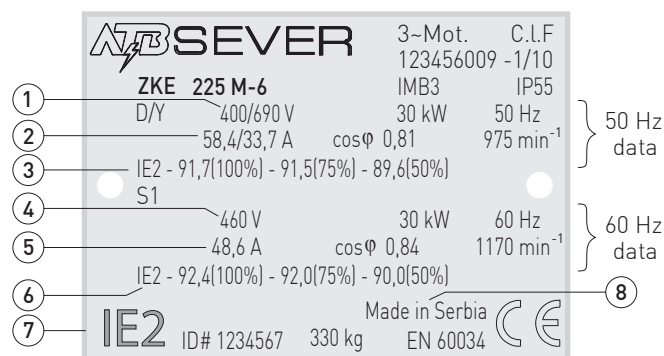
A new signification method is applied to new classes of efficiency levels:

- IE1 standard efficiency
- IE2 high efficiency
- IE3 premium efficiency

(IE marking International efficiency)



Example of rating plates



1. Rated voltage at 50 Hz
2. Rated current at 50 Hz
3. IE efficiency class and nominal efficiency at 50 Hz
4. Rated voltage at 60 Hz
5. Rated current at 60 Hz
6. IE efficiency class and nominal efficiency at 60 Hz
7. Efficiency class logo
8. Country of origin

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Main characteristics 3

The most important changes in the application of the new standard

The nomenclature of the efficiency level class has so far been EFF and the marking was done voluntarily, in arrangement with CEMEP (European sector committee of Manufacturers of Electrical Machines and Power Electronics).

According to the new standard, the identification marking is done with the label IE and it is obligatory. This standard applies to a wider motor power range than the one previously used, and involves motors with power supply directly from the network.

The following table shows motors which are under the obligation of the new standard and the most important characteristics of the new signification method.

Nomenclature	Signification method on voluntary arrangement between the EU board and the European sector committee of Manufacturers of Electrical Machines and Power Electronics (CEMEP)	Signification method on EuP directive, which is based on IEC 60034-30:2008
Number of poles	2, 4	2, 4, 6
Power range	1,1 - 90 kW	0,75 - 375 kW
Efficiency degree	Standard efficiency - EFF3	Standard efficiency - IE1
	High efficiency - EFF2	High efficiency - IE2
	Premium efficiency - EFF1	Premium efficiency - IE3
Voltage	400 V, 50 Hz	< 1000 V, 50/60 Hz
Protection degree	IP5X	All
Brake motor	No	Arrangement
Motor reducers	No	Yes
Ex-motors	No	Yes (provided that explosion prevention has higher priority)
Validity	Voluntary arrangement, will be substituted after the implementation of the EuP directive into national laws and norms	Standard IEC 60034-30 has been valid since October 2008. EuP directive needs to be implemented into national laws and norms

Usage of motors with a determined efficiency level

Motors with a standard efficiency level IE1 are the most frequent types found on the market, but their efficiency has a time limit.

Starting from 16.06.2011, all motors should not be less efficient than IE2.

Starting from 01.01.2015, all motors with a rated output of 7,5 - 375 kW should not be less efficient than the IE3 efficiency level or meet the IE2 efficiency level and be equipped with a variable speed drive.

Starting from 01.01.2017, all motors with a rated output of 0,75 - 375 kW should not be less efficient than the IE3 efficiency level or meet the IE2 efficiency level and be equipped with a variable speed drive.

Using of motors with a high efficiency level

Using motors with a high efficiency level brings significant savings when it comes to energy consumption, and thus decreases the electric energy costs.

The table presents the comparison of electric energy consumption by motors class IE1 and IE2. This particular comparison was given based on motor efficiency during one shift of the year, 2000 work hours.

Motor power kW	Efficiency level class	Efficiency level	Electric energy consumption per year kWh	Electric energy savings per year kWh
55	IE1	92,1	119450	1800
	IE2	93,5	117650	

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4 Electrical data

Voltage: 400 V, 50 Hz,
F/B, IP55

Series ZKE

Type	Output	Full load	IE	Efficiency η_n			Power factor $\cos\phi_n$	Full load Current I_n A	Rated torque M_n Nm	Moment of inertia J kgm ²	Weight kg
	P _n kW	R.P.M. min ⁻¹		100%P _n	75%P _n	50%P _n					

3000 min⁻¹

ZKE 200 La-2	30	2950	IE2	92,0	92,1	90,9	0,88	53	98	0,173	199
ZKE 200 Lb-2	37	2950	IE2	92,5	92,5	91,0	0,87	66	120	0,208	215
ZKE 225 Mb-2	45	2960	IE2	92,9	92,9	90,8	0,87	80	145	0,25	290
ZKE 250 Ma-2	55	2960	IE2	93,2	93,3	92,1	0,89	96	177	0,44	395
ZKE 280 Sa-2	75	2960	IE2	93,8	93,6	92,2	0,89	130	242	0,74	510
ZKE 280 Mb-2	90	2960	IE2	94,1	94,1	93,3	0,92	150	290	0,88	600
ZKE 315 Sa-2	110	2970	IE2	94,3	93,6	91,8	0,88	192	354	1,57	700
ZKE 315 Mb-2	132	2970	IE2	94,6	93,6	91,0	0,88	229	424	1,8	860
ZKIE 315 Mc-2	160	2973	IE2	94,8	94,0	91,9	0,89	275	514	2,0	1120
ZKIE 315 Md-2	200	2976	IE2	95,0	94,9	93,3	0,93	327	642	2,5	1290
ZKIE 315 Lf-2	250	2977	IE2	95,0	94,8	93,0	0,92	413	802	4,7	1450
ZKIE 315 Lg-2	315	2982	IE2	95,0	94,7	92,6	0,92	520	1009	5,4	1720
ZKIE 355 Ma-2	250	2977	IE2	95,0	94,8	93,8	0,92	413	802	4,7	1530
ZKIE 355 Mb-2	315	2982	IE2	95,0	95,0	94,1	0,92	520	1009	5,4	1730
ZKIE 355 Mc-2	355	2982	IE2	95,0	94,9	93,4	0,92	586	1137	5,7	1950

Bigger motors on request

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Electrical data **5**

Voltage: 400 V, 50 Hz,
F/B, IP55

Series ZKE

Type	Output	Full load	IE	Efficiency η_n			Power factor $\cos\varphi_n$	Full load Current I_n	Rated torque M_n	Moment of inertia J	Weight
	P _n	R.P.M.		100%P _n	75%P _n	50%P _n					
	kW	min ⁻¹									
1500 min ⁻¹											
ZKE 200 Lb-4	30	1470	IE2	92,3	92,3	90,0	0,84	56	195	0,32	240
ZKE 225 Sa-4	37	1470	IE2	92,7	92,6	90,3	0,83	69	240	0,40	290
ZKE 225 Mb-4	45	1475	IE2	93,1	93,0	92,2	0,85	82	292	0,47	320
ZKE 250 Ma-4	55	1480	IE2	93,5	93,6	92,2	0,85	100	355	0,74	430
ZKE 280 Sa-4	75	1480	IE2	94,0	93,8	92,6	0,86	134	484	1,06	545
ZKE 280 Mb-4	90	1480	IE2	94,2	93,9	92,4	0,86	161	581	1,36	603
ZKE 315 Sa-4	110	1482	IE2	94,5	93,7	91,6	0,88	191	709	2,66	770
ZKE 315 Mb-4	132	1487	IE2	94,7	94,3	93,0	0,89	226	853	3,16	880
ZKIE 315 Mc-4	160	1486	IE2	94,9	94,4	93,0	0,90	271	1028	3,6	1087
ZKIE 315 Md-4	200	1486	IE2	95,1	94,9	93,3	0,91	334	1285	4,3	1208
ZKIE 315 Lf-4	250	1488	IE2	95,1	95,0	94,2	0,87	437	1605	5,0	1450
ZKIE 315 Lg-4	315	1487	IE2	95,1	94,9	93,5	0,88	544	2023	6,0	1720
ZKIE 355 Ma-4	250	1491	IE2	95,1	94,7	93,3	0,90	422	1601	7,6	1750
ZKIE 355 Mb-4	315	1492	IE2	95,1	94,3	92,8	0,90	532	2016	9,9	1930
ZKIE 355 Mc-4	355	1489	IE2	95,1	94,6	93,1	0,89	606	2272	11	2150
ZKIE 355 Ld-4	400	1490		96,0	96,0	95,5	0,87	692	2564	13	2385
ZKIE 355 Le-4	450	1490		95,5	95,2	94,1	0,87	783	2884	15	2550
ZKIE 355 Lf-4	500	1492		96,1	96,0	95,2	0,86	874	3200	17	2700
ZKIE 400 La-4	560	1492		96,0	95,8	94,9	0,86	568	3584	19	3000
ZKIE 400 Lb-4	630	1492		96,3	96,1	95,3	0,89	616	4033	21	3300
ZKIE 400 Lc-4	710	1492		96,2	96,1	95,4	0,89	695	4545	24	3600
ZKIE 450 La-4	800	1492		96,5	96,6	96,2	0,89	780	5121	27	4400
ZKIE 450 Lb-4	900	1492		96,5	96,6	96,2	0,89	878	5761	30	4650
ZKIE 450 Lc-4	1000	1491		96,4	96,5	96,0	0,89	976	6405	33	4900

With FS 400 and 450 the current data is given for 690 V

LOW VOLTAGE TEFC CAGE MOTORS

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6 Electrical data

Voltage: 400 V, 50 Hz,
F/B, IP55

Series ZKE

Type	Output	Full load	Efficiency η_n				Power factor	Full load	Rated torque	Moment of inertia	Weight
	P _n	R.P.M.	IE				$\cos\varphi_n$	Current I _n	M _n	J	
	kW	min ⁻¹		100%P _n	75%P _n	50%P _n	A	Nm	kgm ²	kg	
1000 min ⁻¹											
ZKE 200 La-6	18,5	970	IE2	90,4	90,1	88,3	0,81	37	182	0,53	201
ZKE 200 Lb-6	22	970	IE2	90,9	90,6	88,2	0,80	44	217	0,62	220
ZKE 225 Mb-6	30	975	IE2	91,7	91,5	89,6	0,84	56	294	0,70	330
ZKE 250 Ma-6	37	980	IE2	92,2	91,8	89,7	0,83	70	361	0,95	390
ZKE 280 Sa-6	45	985	IE2	92,7	92,4	90,3	0,87	80	438	1,59	500
ZKE 280 Mb-6	55	982	IE2	93,1	92,7	90,7	0,84	102	535	1,9	560
ZKE 315 Sa-6	75	987	IE2	93,7	93,5	91,6	0,85	136	726	3,4	760
ZKE 315 Mb-6	90	988	IE2	94,0	93,7	91,5	0,85	163	870	4,8	870
ZKIE 315 Mc-6	110	987	IE2	94,3	94,0	92,2	0,87	194	1064	5,5	1080
ZKIE 315 Md-6	132	988	IE2	94,6	94,4	92,8	0,87	232	1276	6,6	1140
ZKIE 315 Me-6	160	989	IE2	94,8	94,8	94,0	0,87	280	1545	7,0	1260
ZKIE 315 Lf-6	200	987	IE2	95,0	95,0	93,4	0,84	362	1935	7,5	1450
ZKIE 315 Lg-6	250	986	IE2	95,0	94,9	93,0	0,85	447	2421	9,3	1720
ZKIE 355 Ma-6	200	989	IE2	95,0	94,8	92,8	0,87	350	1931	13,1	1636
ZKIE 355 Mb-6	250	988	IE2	95,0	94,7	94,1	0,87	437	2416	14,9	1950
ZKIE 355 Mc-6	315	988	IE2	95,0	95,0	93,8	0,88	545	3045	16,5	2240
ZKIE 355 Ld-6	355	990	IE2	95,0	94,9	93,7	0,86	627	3424	18	2500
ZKIE 355 Le-6	400	992		95,4	95,5	95,0	0,85	715	3851	20	2700
ZKIE 400 La-6	450	995		95,8	95,5	94,4	0,85	463	4319	28	3100
ZKIE 400 Lb-6	500	995		96,3	96,2	95,5	0,86	506	4799	31	3300
ZKIE 400 Lc-6	560	994		95,9	95,9	95,3	0,86	569	5380	34	3500
ZKIE 450 La-6	630	993		95,9	95,7	94,9	0,85	647	6059	49	4450
ZKIE 450 Lb-6	710	994		95,9	95,8	95,2	0,86	721	6821	54	4700
ZKIE 450 Lc-6	800	995		96,1	96,0	95,4	0,84	830	7678	58	4950

With FS 400 and 450 the current data is given for 690 V

LOW VOLTAGE TEFC CAGE MOTORS

IE2 High Efficiency

Electrical data 7

Voltage: 400 V, 50 Hz,
F/B, IP55

Series ZKE

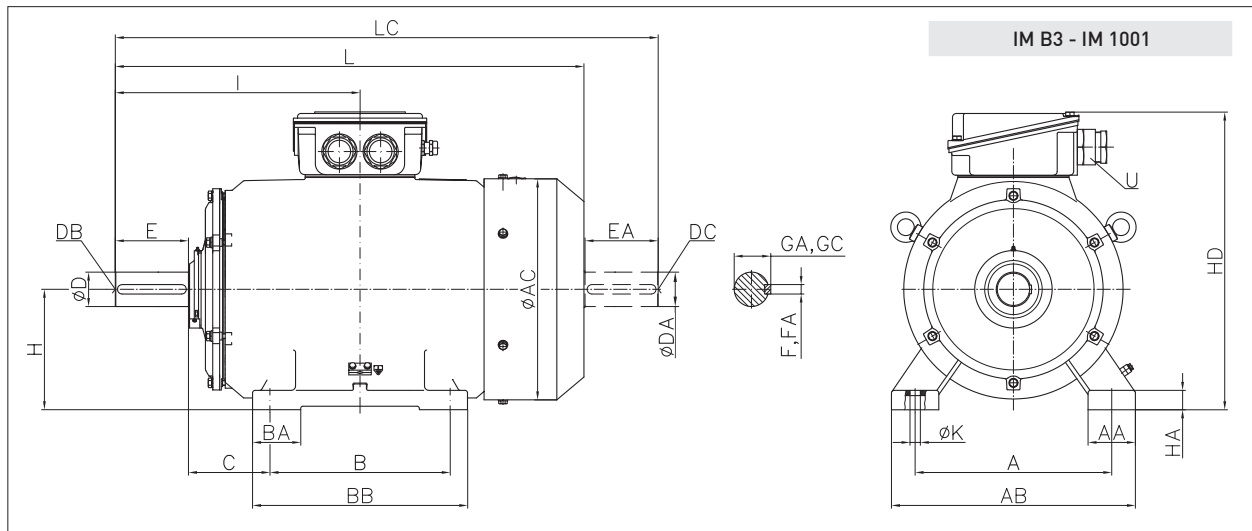
Type	Output	Full load	IE	Efficiency η_n			Power factor $\cos\phi_n$	Full load Current I_n	Rated torque M_n	Moment of inertia J	Weight
	P _n	R.P.M.		100%P _n	75%P _n	50%P _n					
	kW	min ⁻¹						A	Nm	kgm ²	kg
750 min ⁻¹											
ZKE 200 Lb-8	15	725		87,9	87,9	86,2	0,70	35,2	199	0,23	205
ZKE 225 Sa-8	18,5	735		89,1	88,9	87,4	0,75	40	240	0,47	245
ZKE 225 Mb-8	22	735		90,2	90,1	89,2	0,75	47	286	0,56	285
ZKE 250 Ma-8	30	735		91,1	90,8	89,4	0,78	61	390	0,87	370
ZKE 280 Sa-8	37	735		91,7	91,6	90,3	0,78	75	481	1,5	495
ZKE 280 Mb-8	45	735		92,3	92,1	90,9	0,78	90	585	1,8	580
ZKE 315 Sa-8	55	739		92,7	92,4	91,1	0,81	106	710	2,6	750
ZKE 315 Mb-8	75	740		93,4	93,0	91,6	0,81	143	970	3,3	803
ZKIE 315 Mc-8	90	742		93,8	93,6	92,3	0,78	178	1158	6,3	1045
ZKIE 315 Md-8	110	742		94,1	94,0	92,6	0,79	214	1416	7,8	1150
ZKIE 315 Me-8	132	742		94,5	94,4	93,2	0,79	256	1699	8,9	1270
ZKIE 315 Lf-8	160	739		94,7	94,5	93,3	0,81	301	2068	7,5	1450
ZKIE 315 Lg-8	200	739		94,9	94,8	93,8	0,80	381	2585	9,3	1720
ZKIE 355 Ma-8	160	743		94,7	94,6	93,5	0,82	298	2060	19,2	1825
ZKIE 355 Mb-8	200	744		94,9	94,9	93,9	0,82	381	2570	22,4	2090
ZKIE 355 Mc-8	250	744		94,9	94,7	93,4	0,82	464	3209	26,2	2440
ZKIE 355 Ld-8	315	745		94,9	94,9	93,8	0,82	585	4038	28,0	2810
ZKIE 355 Le-8	355	745		94,9	94,9	94,0	0,82	659	4550	30,0	3035

With FS 400 and 450 the current data is given for 690 V

LOW VOLTAGE TEFC CAGE MOTORS

IE2 High Efficiency

8 Motor dimensions



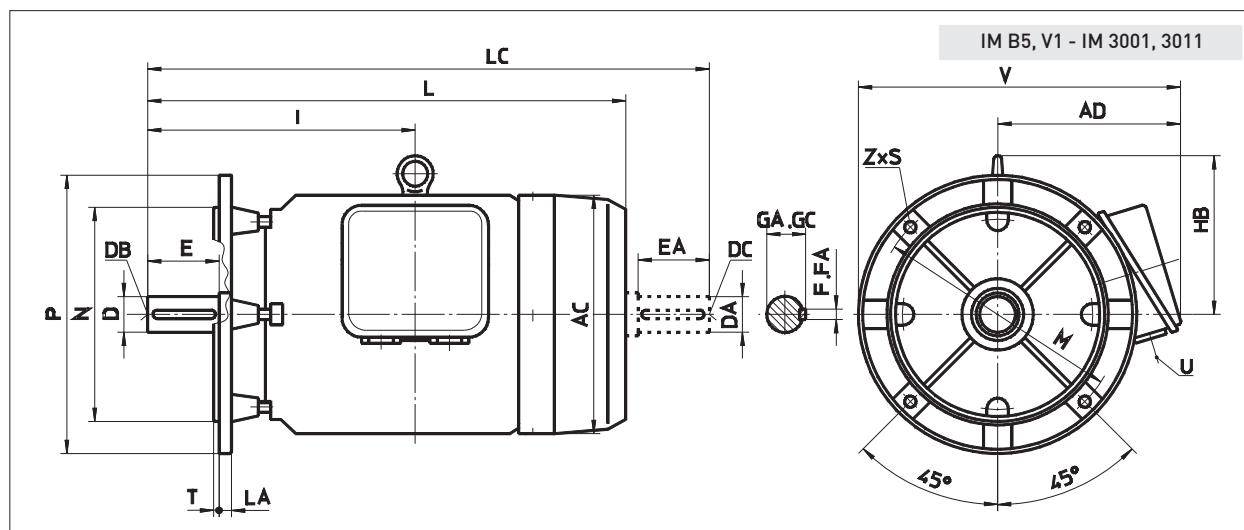
Type		Poles	A	AA	AB	AC	B	BA	BB	C	D	DA	DB	DC	E	EA	F	FA	GA	GC	H	HA	HC	HD	I	K	L	LC	U												
ZKE 200	La	2,6	318	80	398	395	305	95	375	133	55	55	M20	M20	110	110	16	16	59	59	200	35	398	514	395.5	18	764	876	M50x1.5												
	Lb	2,4,6,8																																							
ZKE 225	Sa	4,8	356	90	446	418	286	110	149	55	55	M20	M20	110	110	16	16	59	59	225	35	438	562	432	18	805	962	M50x1.5													
	Mb	2																											311	380	60	60	140	140	16	16	59	59	414.5	800	927
		4,6,8																																							
ZKE 250	Ma	2	406	96	506	474	349	95	430	168	60	60	M20	M20	140	140	18	18	64	64	250	40	487.5	610	482.5	24	906	1060	M50x1.5												
		4,6,8																												65	65	69	69								
ZKE 280	Sa	2	457	110	567	510	368	112	190	65	65	M20	M20	140	140	18	18	69	69	280	45	536	659	514	24	973	1128	M50x1.5													
		4,6,8																											75	75	20	20	79,5	79,5							
	Mb	2																											419	500	65	65	18	18	69	69	539.5	1024	1179		
		4,6,8																																						75	75
ZKE 315	Sa	2	508	125	633	562	406	120	216	65	65	M20	M20	140	140	18	18	69	69	315	50	599	742	559	28	1072	1219	M63x1.5													
		4,6,8																											80	80	170	170	22	22	85	85	589	1102	1279		
	Mb	2																																						457	550
		4,6,8																											80	80	170	170	22	22	85	85	614.5	1153	1330		

The fixing dimensions given in thick 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 TEFC CAGE MOTORS

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Motor dimensions 9



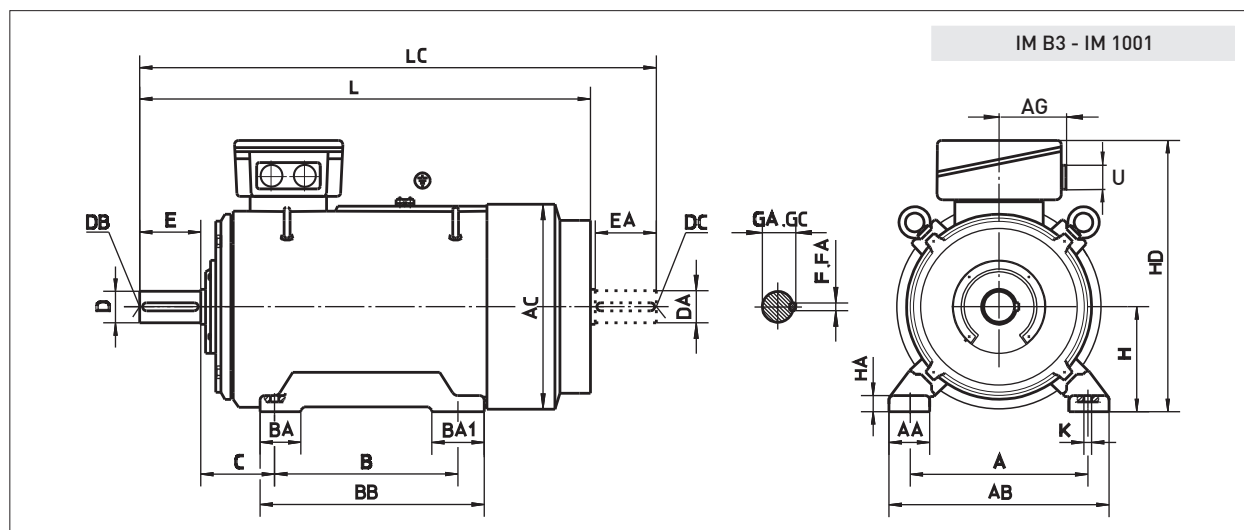
Type		Poles	Flange	AC	AD	D	DA	DB	DC	E	EA	F	FA	GA	GC	HB	I	L	LA	LC	M	N	P	S	Z	T	V	U															
ZKE 200	La	2,6	FF 350	395	314	55	55	M20	M20	110	110	16	16	59	59	260	395.5	764	20	876	350	300	400	Ø18.5	4	5	514	M50 x 1.5															
	Lb	2,4,6,8																																									
ZKE 225	Sa	4,8	FF 400	418	337	60	60	M20	M20	140	140	18	18	64	64	275	432	805		962	400	350	450	Ø18.5	8	5	562	M50 x 1.5															
	Mb	2																											55	55	110	110	16	16	59	59	414.5	800	20	927	400	350	450
		4,6,8				60	60	140	140	18	18	64	64	444.5	830			987																									
ZKE 250	Ma	2	FF 500	474	360	60	60	M20	M20	140	140	18	18	64	64	299	482.5	906	22	1060	500	450	550	Ø18.5	8	5	635	M50 x 1.5															
		4,6,8																											65	65				69	69								
ZKE 280	Sa	2	FF 500	510	379	65	65	M20	M20	140	140	18	18	69	69	327	514	973		1128	500	450	550	Ø18.5	8	5	654	M50 x 1.5															
		4,6,8																											75	75			20	20	79,5	79,5							
	Mb	2				65	65							18	18		69	69	539.5	1024										1179													
		4,6,8				75	75							20	20		79,5	79,5																									
ZKE 315	Sa	2	FF 600	562	427	65	65	M20	M20	140	140	18	18	69	69	345	559	1072		1219	600	550	660	Ø24	8	6	757	M63 x 1.5															
		4,6,8																											80	80			170	170	22	22	85	85	589	1102		1279	
	Mb	2				65	65					140	140	18	18		69	69	584.5	1123										1270													
		4,6,8				80	80					170	170	22	22		85	85																								614.5	1153

The fixing dimensions given in thick 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 TEFC CAGE MOTORS

IE2 High Efficiency

10 Motor dimensions



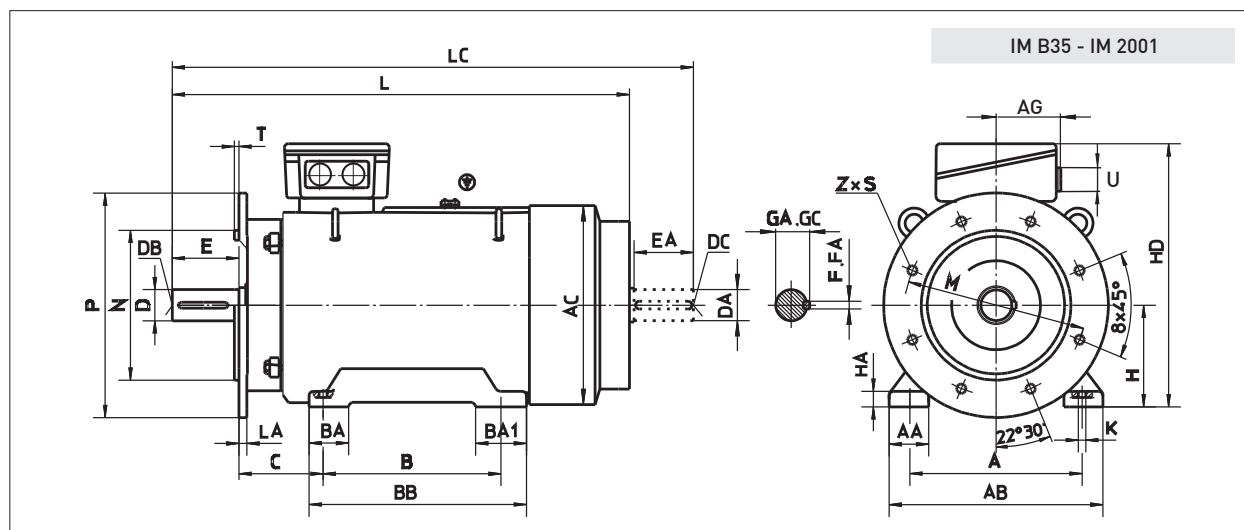
Type		Poles	A	AA	AB	AC	AG	B	BA	BA1	BB	C	D	DA	DB	DC	E	EA	F	FA	GA	GC	H	HA	HD	K	L	LC	U	
ZKIE 315	Mc, Md	2											65	65	M20	M20	140	140	18	18	69	69					1276	1426	2xM63x1.5	
	Mc, Md, Me	4,6,8	508	120	633	655	403	457	508	120	152	588	216	90	90	M24	M24	170	170	25	25	95	95	315	40	850	Ø28	1306		1486
	Le, Lf	2											65	65	M20	M20	140	140	18	18	69	69					1587	1732		
	Lf, Lg	4,6,8	560	120	680	655	-	560	630	120	220	780	200	90	90	M24	M24	170	170	25	25	95	95	315	40	850	Ø28	1617		1792

The fixing dimensions given in thick 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 TEFC CAGE MOTORS

IE2 High Efficiency

Motor dimensions **11**



Type	Poles	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
ZKIE 315	Mc, Md	2															1276	25	1426							
	Mc, Md, Me	4,6,8	FF 600	508	120	633	655	403	457	508	120	152	588	216	315	40	850	Ø28	1306	1486	600	550	660	Ø24	8	6
	Le, Lf	2																								
	Lf, Lg	4,6,8	FF 740	560	120	680	655	-	560	630	120	220	780	216	315	40	850	Ø28	1587	1732	740	680	800	Ø24	8	6
																	1617	1792								2xM63x1,5

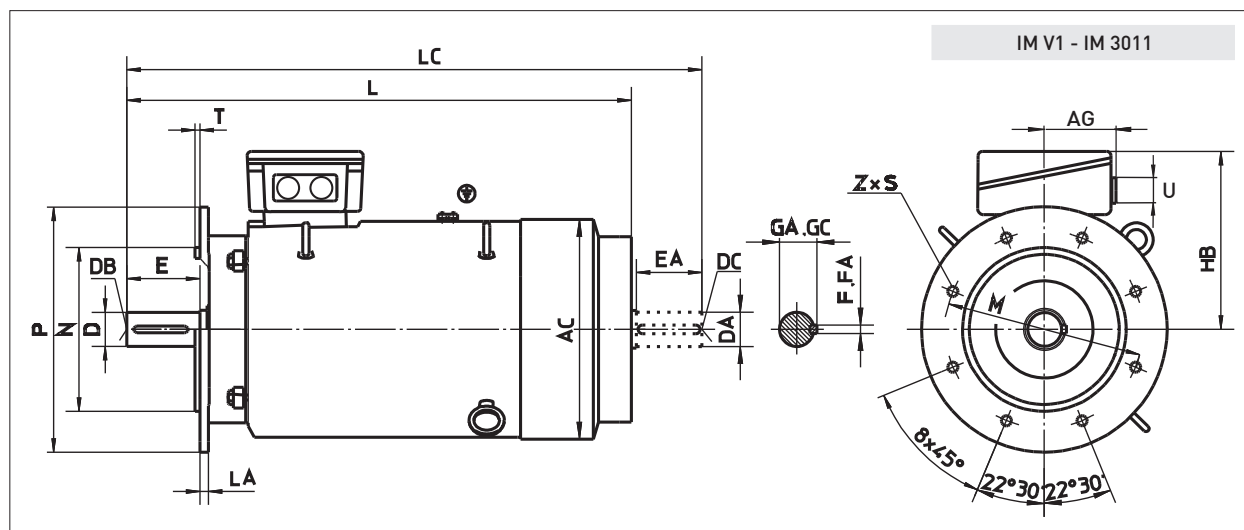
Type		Poles	D	DA	DB	DC	E	EA	F	FA	GA	GC
ZKIE 315	Mc, Md	2	65	65	M20	M20	140	140	18	18	69	69
	Mc, Md, Me	4,6,8	90	90	M24	M24	170	170	25	25	95	95
	Le, Lf	2	65	65	M20	M20	140	140	18	18	69	69
	Lf, Lg	4,6,8	90	90	M24	M24	170	170	25	25	95	95

The fixing dimensions given in thick 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.

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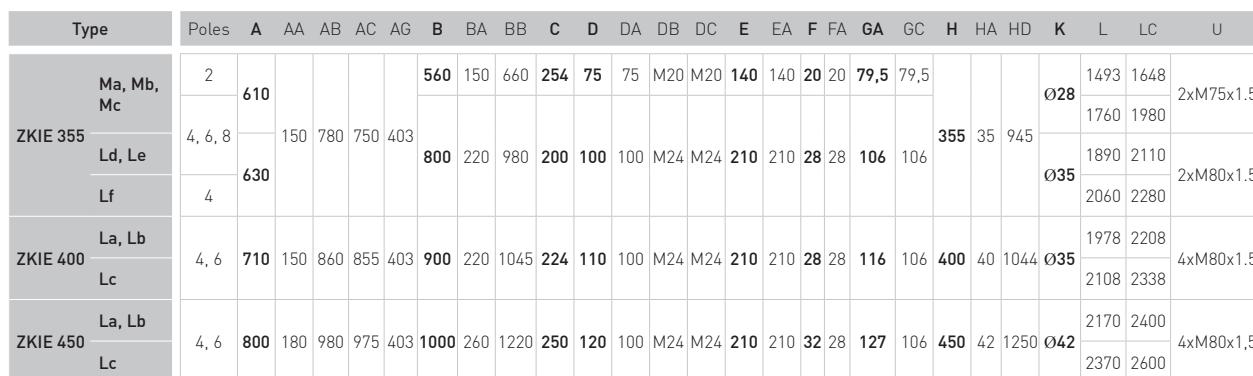
12 Motor dimensions



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
ZKIE 315	Mc, Md	2			65	65	M20	M20	140	140	18	18	69	69	1276		1426		600	550	660	Ø24	8	6	2xM63x1,5
	Mc, Md, Me	4,6,8	FF 600	655	403	90	90	M24	M24	170	170	25	25	95	95	535	1306	25	1486						
	Le, Lf	2			65	65	M20	M20	140	140	18	18	69	69	1587		1732		740	680	800	Ø24	8	6	
	Lf, Lg	4,6,8	FF 740	655	-	90	90	M24	M24	170	170	25	25	95	95	535	1617	25	1792						

The fixing dimensions given in thick 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.

Motor dimensions 13

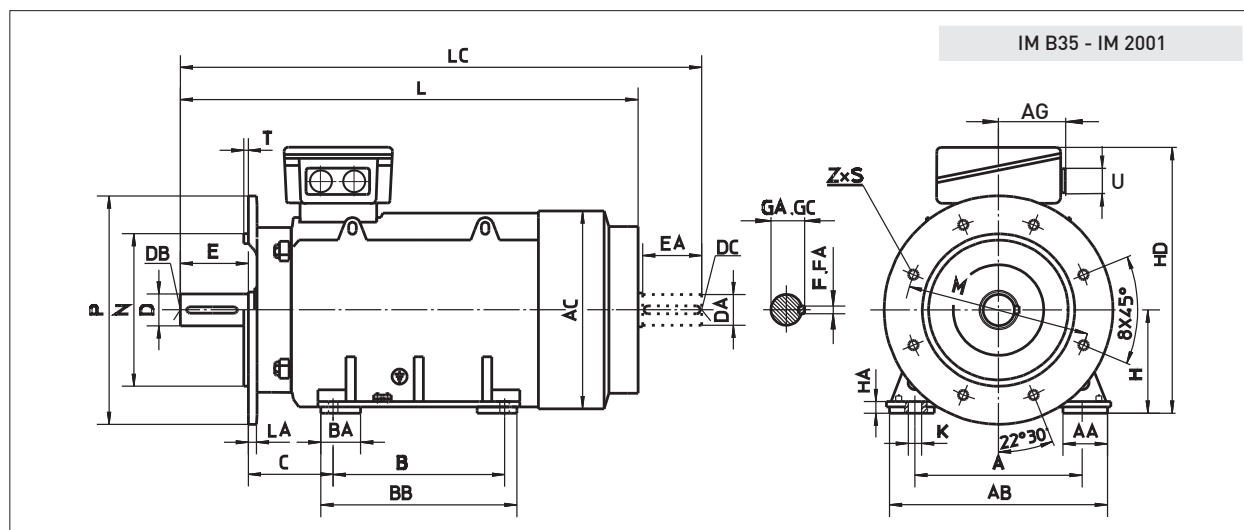


The fixing dimensions given in thick figures are obligatory according to the recommendation of IEC. All other technical data and dimensions during the future development of motors may undergo some changes and therefore they can be considered as obligatory after our confirmation only. All dimensions are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

LOW VOLTAGE TEFC CAGE MOTORS

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14 Motor dimensions



Type		Poles	Flange	A	AA	AB	AC	AG	B	BA	BB	C	H	HA	HD	K	L	LA	LC	M	N	P	S	Z	T	U				
ZKIE 355	Ma, Mb, Mc	2	FF 740	610					560	150	660	254					Ø28	1493		1648	740	680	800	Ø24	8	6	2xM75x1,5			
	Ld, Le	4, 6, 8		150	780	750	403				355	35	945				1760		1980											
																	1890		2110											
	Lf	4		630					630	220	980	200						Ø35	2060								2280			

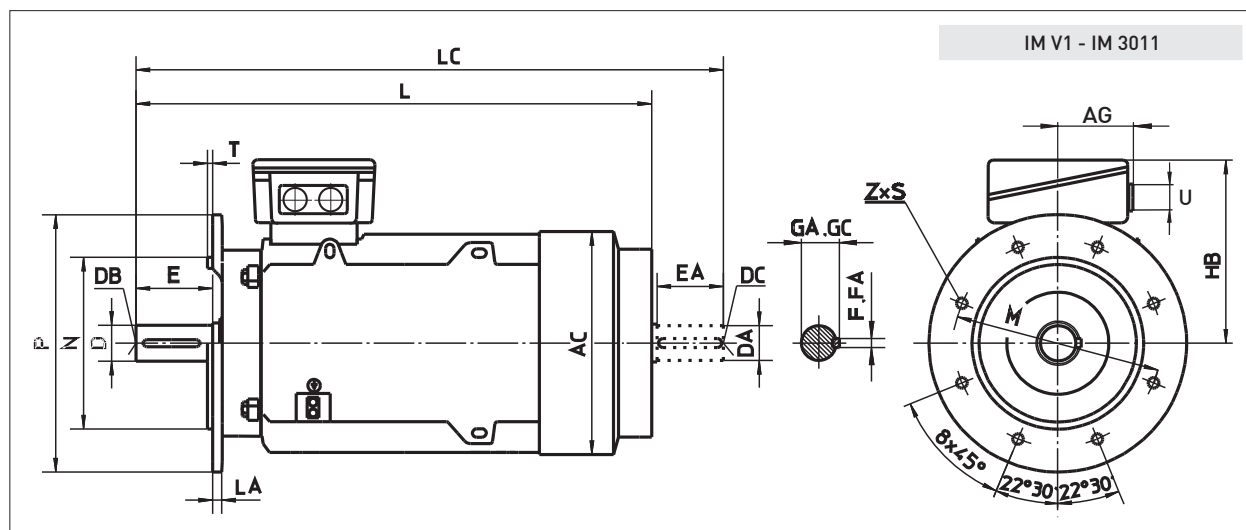
Type	Poles	D	DA	DB	DC	E	EA	F	FA	GA	GC
ZKIE 355	2	75	75	M20	M20	140	140	20	20	79.5	79.5
	4, 6, 8	100	100	M24	M24	210	210	28	28	106	106
	Lf	4									

The fixing dimensions given in thick 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 TEFC CAGE MOTORS

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Motor dimensions **15**



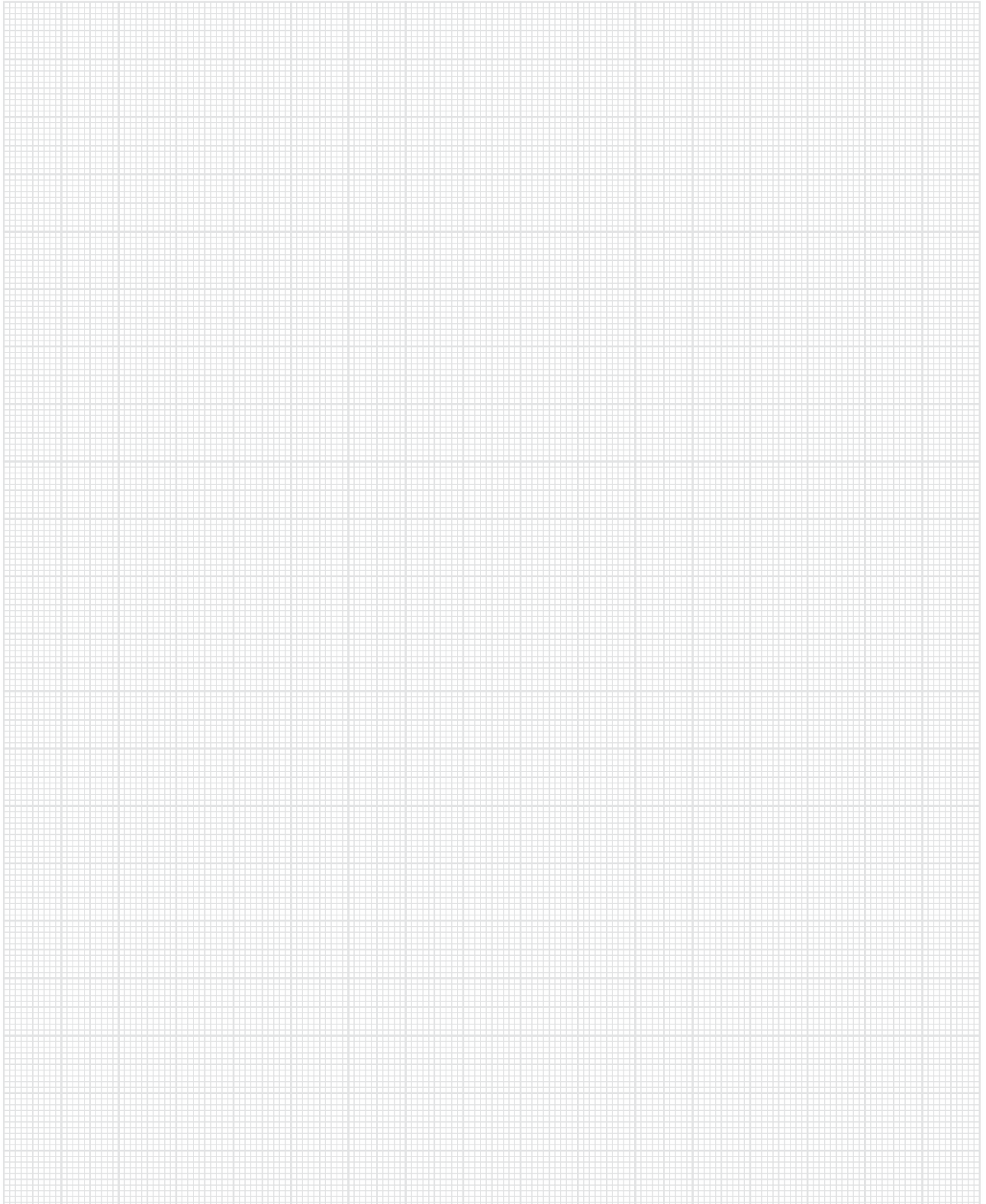
Type		Poles	Flange	AC	AG	D	DA	DB	DC	E	EA	F	FA	GA	GC	HB	L	LA	LC	M	N	P	S	Z	T	U	
ZKIE 355	Ma, Mb, Mc	2				75	75	M20	M20	140	140	20	20	79.5	79.5		1493		1648								2xM75x1.5
	Ld, Le	4, 6, 8	FF 740	755	403	100	100	M24	M24	210	210	28	28	106	106	590	1760	25	1980	740	680	800	Ø24	8	6		
																	1890		2110								
																	2060		2080								2xM80x1.5
ZKIE 400	La, Lb	4, 6	FF 940	855	403	110	100	M24	M24	210	210	28	28	116	106	644	1978	25	2208	940	880	1000	Ø28	8	6	4xM80x1.5	
	Lc																2108		2338								
ZKIE 450	La, Lb	4, 6	FF 1080	975	403	120	100	M24	M24	210	210	32	28	127	106	800	2170	40	2400	1080	1000	1150	Ø40	12	6	4xM80x1,5	
	Lc															2370	2600										

The fixing dimensions given in thick 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 TEFC CAGE MOTORS

IE2 High Efficiency

16 Note



QUESTIONNAIRE FOR THE OFFER OF ASYNCHRONOUS ELECTRIC MOTORS



Enquiry Number: _____

Customer: _____

ITEM: _____

Qty: _____

A MOTOR DATA

1 Motor type: Three phase

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

3 Rated output: $P_N =$ _____ kW

4 Rated voltage $U_N =$ _____ V Connection: Star ☐ Delta ☐

5 Rated frequency: $f_N =$ _____ Hz

6 Rated speed: $n_N =$ _____ rpm

7 Insulation class F ☐ B ☐ H ☐

8 Duty type: S1 ☐ S2 ☐ S3 ☐ S4 ☐ S5 ☐ S6 ☐ S7 ☐ S8 ☐ S9 ☐ S10 ☐
ED % _____ starts /h _____ min _____ J_m _____ kgm^2

9 Standard: IEC _____ or _____

10 Cooling method: IC _____

11 Mounting arrangement: IMB3 ☐ IMB5 ☐ or _____

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

13 Sense of rotation (DE side view): CW ☐ CCW ☐ Both ☐

14 Motor brake: yes ☐ no ☐
Brake torque: _____ Nm
Brake voltage: _____ V/Hz _____ V,DC

15 Rotor data for slip-ring motors: $U_R =$ _____ V $I_R =$ _____ A $\alpha =$ _____

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 referred to motor shaft: $J =$ _____ kgm^2

6 Driven machine special data: _____

C AMBIENT CONDITIONS

1 Ambient temperature: _____ °C

2 Relative humidity: _____ %

3 Altitude (above sea level): _____ m

4 Specific ambient conditions: _____

Note: _____

D POWER TRANSMISSION AND STARTING CONDITIONS

1 Coupling type: _____

2 Starting: _____

3 Number of consecutive startings:
Hot state: _____ per hour Cold state: _____ per hour
_____ per day _____ per day

E ADDITIONAL REQUESTS FOR MOTOR EXECUTION

1 Motor overload: _____ % P_N
Duration: _____ min

2 Temperature rise: F ☐ B ☐

3 Request for: vibration level _____ mm/s
noise level (LpA) _____ dB (A)

4 Terminal box position (DE side view):
left ☐ right ☐ top ☐

5 Shaft load:
axial load _____ N radial load _____ N

6 Variable speed drive: yes ☐ no ☐
Power of converter supplied motor _____ kW
Converter type: _____
Manufacturer: _____
Speed range: from _____ up to _____ rpm

7 Speed sensor: Tacho gen. ☐ Resolver ☐
Encoder ☐ Absolute encoder ☐
Sensor Type: _____

8 Motor flange size: M _____ mm, P _____ mm, N _____ mm

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

10 Other requests and limits: _____

F ADDITIONAL EQUIPMENT, SPARE PARTS AND DOCUMENTATION

1 Winding temperature protection: PTC _____, _____ per phase
Pt100, _____ per phase

2 Bearing temperature sensor Pt100, _____ per bearing

3 Anti-condensation heaters yes ☐ _____ V

4 Packaging: standard ☐
oversea ☐

H CUSTOMER

1 Company: _____

2 Address: _____

3 City: _____

4 Country: _____

5 Person: _____

6 Telefon / Fax: _____

7 e-mail: _____

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