

# Technical Documentation



## LOW VOLTAGE THREE PHASE TEFC CAGE MOTORS IE3 Premium 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

## IE3 Premium Efficiency

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# LOW VOLTAGE TEFC CAGE MOTORS

## IE3 Premium 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:  $P_L = 0,5\% P$

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

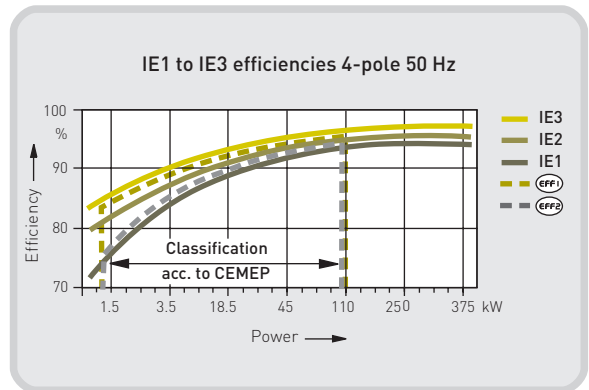
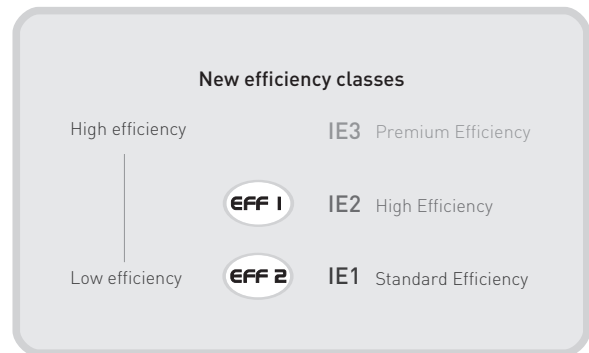
( $P_L$  - additional losses dependent on the work load)

##### 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

<b>SEVER</b>		3~Mot. C.L.F	123456009 -1/10
①	3.ZKE 225 M-6	IMB3 IP55	
②	D/Y 400/690 V	30 kW 50 Hz	} 50 Hz data
③	55/32 A $\cos\phi$ 0,85	985 min <sup>-1</sup>	
④	IE3 - 93,1(100%) - 93,1(75%) - 90,6(50%)		} 60 Hz data
⑤	S1 460 V	30 kW 60 Hz	
⑥	46 A $\cos\phi$ 0,87	1182 min <sup>-1</sup>	
⑦	IE3 - 94,1(100%) - 94,0(75%) - 91,2(50%)		
⑧	IE3 ID# 1234567 340 kg	Made in Serbia	EN 60034

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

# LOW VOLTAGE TEFC CAGE MOTORS

## IE3 Premium Efficiency

### 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 IE2 and IE3. 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	IE2	93,5	119646	1244
	IE3	94,5	118402	

# LOW VOLTAGE TEFC CAGE MOTORS

## IE3 Premium Efficiency

### 4 Electrical data

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

#### Series 3.ZKE

Type	Output P <sub>n</sub> kW	Full load R.P.M. min <sup>-1</sup>	IE	Efficiency $\eta_n$			Power factor $\cos\phi_n$	Full load Current I <sub>n</sub> A	Rated torque T <sub>n</sub> Nm	Moment of inertia J kgm <sup>2</sup>	Weight kg
				100%P <sub>n</sub>	75%P <sub>n</sub>	50%P <sub>n</sub>					
<b>3000 min<sup>-1</sup></b>											
3.ZKE 200 La-2	30	2960	IE3	93,3	93,2	92,2	0,87	53	97	0,173	205
3.ZKE 200 Lb-2	37	2965	IE3	93,7	93,7	92,8	0,87	66	119	0,208	220
3.ZKE 225 Mb-2	45	2965	IE3	94,0	94,0	93,3	0,88	79	145	0,25	300
3.ZKE 250 Ma-2	55	2972	IE3	94,3	93,8	92,4	0,90	94	177	0,44	400
3.ZKE 280 Sa-2	75	2973	IE3	94,7	94,7	93,8	0,91	129	241	0,74	520
3.ZKE 280 Mb-2	90	2975	IE3	95,0	95,0	94,3	0,92	149	289	0,88	610
3.ZKE 315 Sa-2	110	2970	IE3	95,2	95,2	94,4	0,91	183	354	1,17	695
3.ZKE 315 Mb-2	132	2970	IE3	95,4	95,4	94,5	0,91	220	424	1,4	870
3.ZKIE 315 Mc-2	160	2985	IE3	95,6	95,0	93,5	0,90	269	512	2,0	1150
3.ZKIE 315 Md-2	200	2980	IE3	95,8	95,6	94,9	0,91	332	641	2,5	1310
3.ZKIE 315 Lf-2	250	2980	IE3	95,8	95,5	94,7	0,91	414	801	4,7	1460
3.ZKIE 315 Lg-2	315	2982	IE3	95,8	95,5	94,5	0,90	528	1009	5,4	1740
3.ZKIE 355 Ma-2	250	2984	IE3	95,8	95,3	93,8	0,89	424	800	4,7	1550
3.ZKIE 355 Mb-2	315	2983	IE3	95,8	95,8	94,9	0,91	522	1008	5,4	1770
3.ZKIE 355 Mc-2	355	2983	IE3	95,8	95,7	95,2	0,92	582	1137	5,7	1980
3.ZKIE 355 Ld-2	400	2982		96,7			0,92	650	1281	6,5	2550
3.ZKIE 355 Le-2	450	2982		96,7			0,92	730	1441	6,9	2770
3.ZKIE 355 Lf-2	500	2982		96,7			0,92	812	1600	7,5	2910

Bigger motors on request

# LOW VOLTAGE TEFC CAGE MOTORS

## IE3 Premium Efficiency

Electrical data **5**

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

### Series 3.ZKE

Type	Output P <sub>n</sub> kW	Full load R.P.M. min <sup>-1</sup>	IE	Efficiency $\eta_n$			Power factor $\cos\phi_n$	Full load Current I <sub>n</sub> A	Rated torque T <sub>n</sub> Nm	Moment of inertia J kgm <sup>2</sup>	Weight kg
				100%P <sub>n</sub>	75%P <sub>n</sub>	50%P <sub>n</sub>					
<b>1500 min<sup>-1</sup></b>											
3.ZKE 200 Lb-4	30	1475	IE3	93,6	93,3	91,8	0,84	55	194	0,320	250
3.ZKE 225 Sa-4	37	1475	IE3	93,9	93,8	92,1	0,84	68	240	0,4	300
3.ZKE 225 Mb-4	45	1475	IE3	94,2	94,1	92,5	0,85	81	291	0,47	330
3.ZKE 250 Ma-4	55	1482	IE3	94,6	94,5	93,5	0,87	97	354	0,74	445
3.ZKE 280 Sa-4	75	1483	IE3	95,0	94,8	93,6	0,85	134	483	1,06	570
3.ZKE 280 Mb-4	90	1483	IE3	95,2	95,0	93,9	0,86	159	580	1,36	630
3.ZKE 315 Sa-4	110	1485	IE3	95,4	94,9	92,5	0,87	192	707	2,12	800
3.ZKE 315 Mb-4	132	1485	IE3	95,6	95,4	94,1	0,88	227	849	2,54	910
3.ZKIE 315 Mc-4	160	1485	IE3	95,8	95,7	94,6	0,89	271	1029	3,6	1110
3.ZKIE 315 Md-4	200	1485	IE3	96,0	95,8	94,9	0,90	335	1286	4,3	1250
3.ZKIE 315 Lf-4	250	1486	IE3	96,0	95,8	94,4	0,87	433	1607	5,0	1500
3.ZKIE 315 Lg-4	315	1486	IE3	96,0	95,7	94,1	0,88	539	2016	6,0	1770
3.ZKIE 355 Ma-4	250	1487	IE3	96,0	95,9	95,2	0,88	428	1606	7,6	1750
3.ZKIE 355 Mb-4	315	1489	IE3	96,0	95,7	94,6	0,87	545	2020	9,9	1960
3.ZKIE 355 Mc-4	355	1490	IE3	96,0	96,0	95,1	0,88	607	2275	13,0	2150
3.ZKIE 355 Ld-4	400	1492		96,3			0,90	666	2560	14,5	2545
3.ZKIE 355 Le-4	450	1492		96,4			0,90	748	2880	17	2770
3.ZKIE 355 Lf-4	500	1492		96,5			0,91	822	3200	19	2920

# LOW VOLTAGE TEFC CAGE MOTORS

## IE3 Premium Efficiency

### 6 Electrical data

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

#### Series 3.ZKE

Type	Output P <sub>n</sub> kW	Full load R.P.M. min <sup>-1</sup>	IE	Efficiency $\eta_n$			Power factor $\cos\phi_n$	Full load Current I <sub>n</sub> A	Rated torque T <sub>n</sub> Nm	Moment of inertia J kgm <sup>2</sup>	Weight kg
				100%P <sub>n</sub>	75%P <sub>n</sub>	50%P <sub>n</sub>					
<b>1000 min<sup>-1</sup></b>											
3.ZKE 200 La-6	18,5	983	IE3	91,7	91,9	89,9	0,82	36	180	0,225	230
3.ZKE 200 Lb-6	22	980	IE3	92,2	92,3	90,2	0,81	43	214	0,270	260
3.ZKE 225 Mb-6	30	985	IE3	92,9	93,1	90,6	0,85	55	291	0,656	340
3.ZKE 250 Ma-6	37	987	IE3	93,3	93,2	91,7	0,84	68	358	0,90	400
3.ZKE 280 Sa-6	45	988	IE3	93,7	93,6	91,8	0,86	81	435	1,50	515
3.ZKE 280 Mb-6	55	989	IE3	94,1	93,8	92,1	0,87	97	531	1,82	570
3.ZKE 315 Sa-6	75	988	IE3	94,6	94,3	92,6	0,87	132	725	2,70	760
3.ZKE 315 Mb-6	90	988	IE3	94,9	94,8	93,3	0,87	158	870	3,18	870
3.ZKIE 315 Mc-6	110	988	IE3	95,1	95,0	93,1	0,86	194	1063	5,5	1080
3.ZKIE 315 Md-6	132	988	IE3	95,4	95,2	93,0	0,86	232	1276	6,6	1200
3.ZKIE 315 Me-6	160	987	IE3	95,6	95,5	93,9	0,88	275	1548	7,0	1300
3.ZKIE 315 Lf-6	200	990	IE3	95,8	95,4	93,2	0,86	351	1929	7,5	1500
3.ZKIE 315 Lg-6	250	990	IE3	95,8	95,5	93,1	0,86	439	2412	9,3	1750
3.ZKIE 355 Ma-6	200	990	IE3	95,8	95,5	93,9	0,88	343	1929	13,1	1700
3.ZKIE 355 Mb-6	250	990	IE3	95,8	95,7	94,8	0,88	429	2412	14,9	1980
3.ZKIE 355 Mc-6	315	990	IE3	95,8	95,9	95,5	0,88	540	3039	14,5	2240
3.ZKIE 355 Ld-6	355	990	IE3	95,8	96,0	95,6	0,88	609	3424	18	2500
3.ZKIE 355 Le-6	400	990		96,0			0,89	676	3858	20	2700



# LOW VOLTAGE TEFC CAGE MOTORS

## IE3 Premium Efficiency

Electrical data **7**

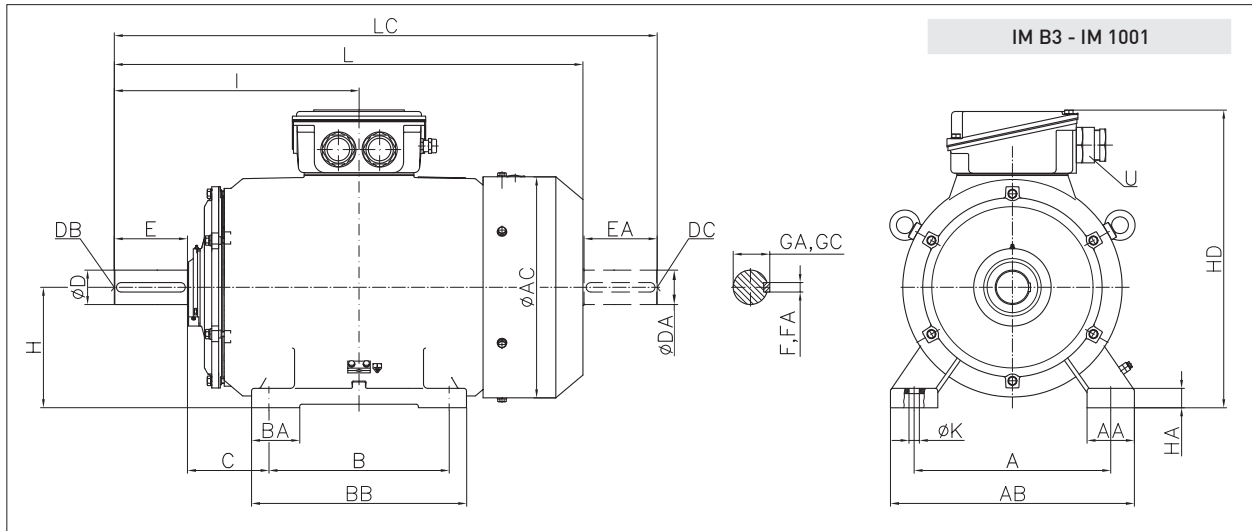
Voltage: 400 V, 50 Hz,  
F/B, IP55

### Series 3.ZKE

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

# LOW VOLTAGE TEFC CAGE MOTORS IE3 Premium Efficiency

## 8 Motor dimensions



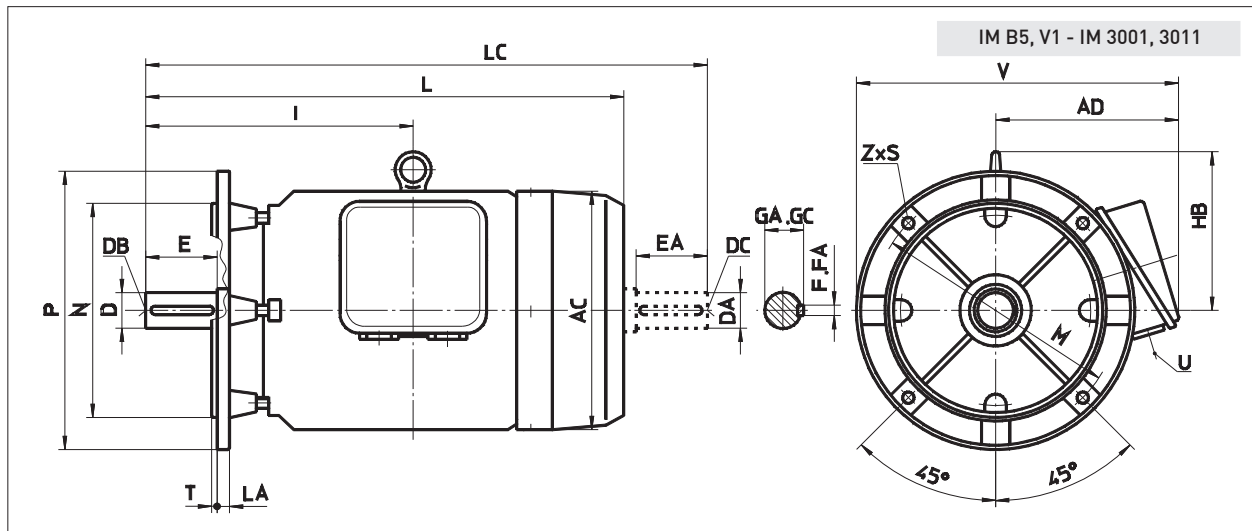
Type	Poles	A	AA	AB	AC	B	BA	BB	C	D	DA	DB	DC	E	EA	F	FA	GA	GC	H	HA	HC	HD	I	K	L	LC	U	
3.ZKE 200	La	2,6	318	80	398	395	305	95	375	133	55	55	M20	M20	110	110	16	16	59	59	200	35	398	514	395.5	18	764	876	M50x1.5
	Lb	2,4,6,8																											
3.ZKE 225	Sa	4,8	356	90	446	418	286	110	355	149	55	55	M20	M20	110	110	16	16	59	59	225	35	438	562	414.5	18	800	927	M50x1.5
	Mb	2 4,6,8																											
3.ZKE 250	Ma	2 4,6,8	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
		65																											
3.ZKE 280	Sa	2 4,6,8	457	110	567	510	368	112	450	190	65	65	M20	M20	140	140	18	18	69	69	280	45	536	659	514	24	973	1128	M50x1.5
	Mb	2 4,6,8																											
3.ZKE 315	Sa	2 4,6,8	508	125	633	562	406	120	500	216	65	65	M20	M20	140	170	18	18	69	69	315	50	599	742	559	28	1072	1219	M63x1.5
	Mb	2 4,6,8																											

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 IE3 Premium Efficiency

Motor dimensions

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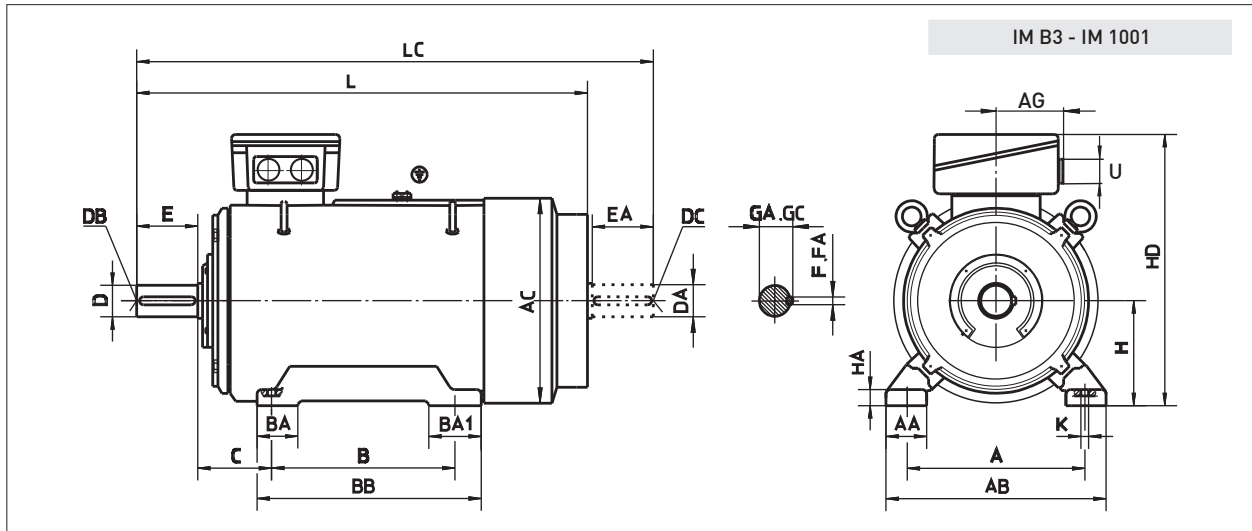
Type	Poles	Flange	AC	AD	D	DA	DB	DC	E	EA	F	FA	GA	GC	HB	I	L	LA	LC	M	N	P	S	Z	T	V	U	
3.ZKE 200	La	2,6	FF 350	395	314	55	55	M20	M20	110	110	16	16	59	59	260	395,5	764	20	876	350	300	400	Ø18,5	4	5	514	M50 x 1.5
	Lb	2,4,6,8																										
3.ZKE 225	Sa	4,8	FF 400	418	337	55	55	M20	M20	110	110	16	16	59	59	275	414,5	800	20	927	400	350	450	Ø18,5	8	5	562	M50 x 1.5
	Mb	4,6,8																										
3.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																										
3.ZKE 280	Sa	2	FF 500	510	379	65	65	M20	M20	140	140	18	18	69	69	327	514	973	22	1128	500	450	550	Ø18,5	8	5	654	M50 x 1.5
		4,6,8																										
	Mb	2																										
		4,6,8																										
3.ZKE 315	Sa	2	FF 600	562	427	65	65	M20	M20	140	140	18	18	69	69	345	559	1072	25	1219	600	550	660	Ø24	8	6	757	M63 x 1.5
		4,6,8																										
	Mb	2																										
		4,6,8																										

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

## IE3 Premium Efficiency

### 10 Motor dimensions



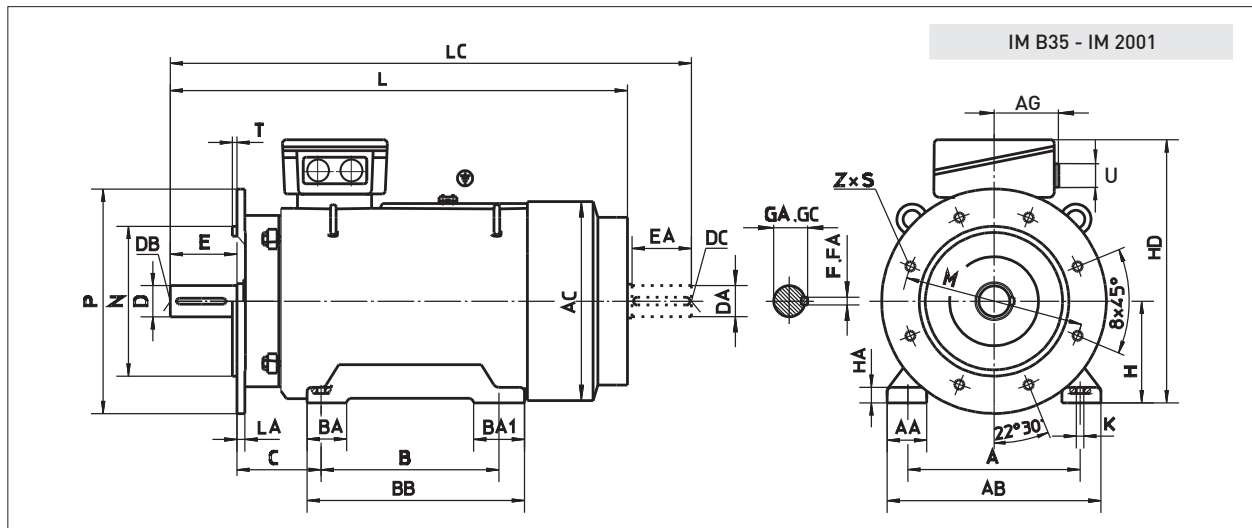
Type		Poles	A	AA	AB	AC	AG	B	BA	BA1	BB	C	D	DA	DB	DC	E	EA	F	FA	GA	GC	H	HA	HD	K	L	LC	U		
3.ZKIE 315	Mc, Md	2											65	65	M20	M20	140	140	18	18	69	69					1276	1426			
	Mc, Md, Me	4,6,8	508	120	633	655	403	457	508	120	152	588	216	90	90	M24	M24	170	170	25	25	95	95	315	40	850	Ø28	1306	1486		
	Le, Lf	2												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 IE3 Premium 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	
3.ZKIE 315	Mc, Md	2																1276	25	1426								
	Mc, Md, Me	4,6,8	FF 600	<b>508</b>	120	633	655	403	<b>457</b>	<b>508</b>	120	152	588	<b>216</b>	315	40	850	<b>Ø28</b>		1306	1486	600	550	660	Ø24	8	6	
	Le, Lf	2																1587	25	1732								
	Lf, Lg	4,6,8	FF 740	<b>560</b>	120	680	655	-		<b>560</b>	<b>630</b>	120	220	780	<b>216</b>	315	40	850	<b>Ø28</b>		1617	1792	740	680	800	Ø24	8	6

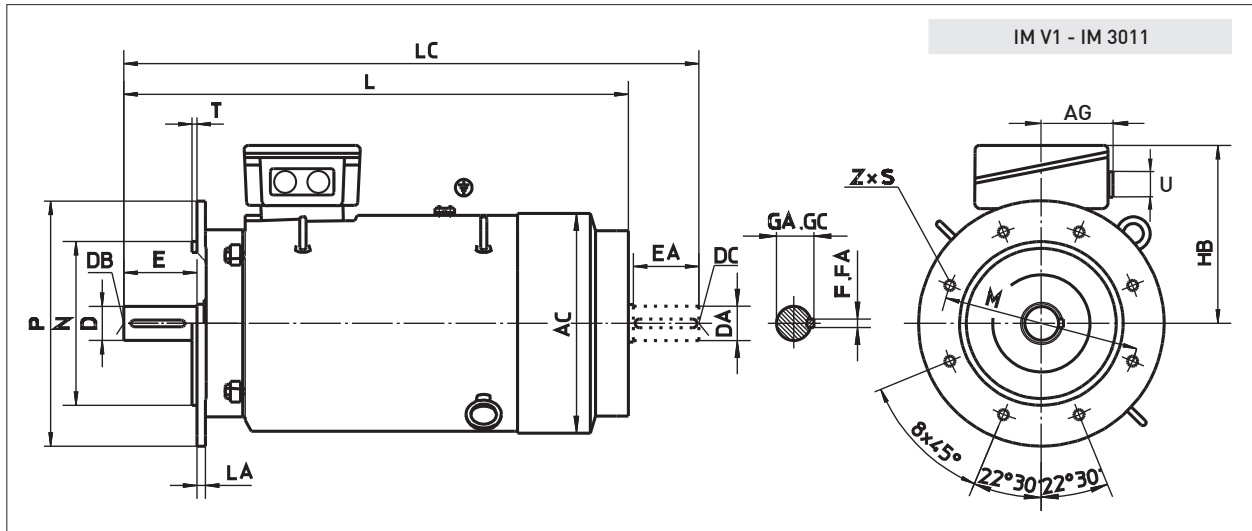
2xM63x1,5

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

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# LOW VOLTAGE TEFC CAGE MOTORS IE3 Premium Efficiency

## 12 Motor dimensions



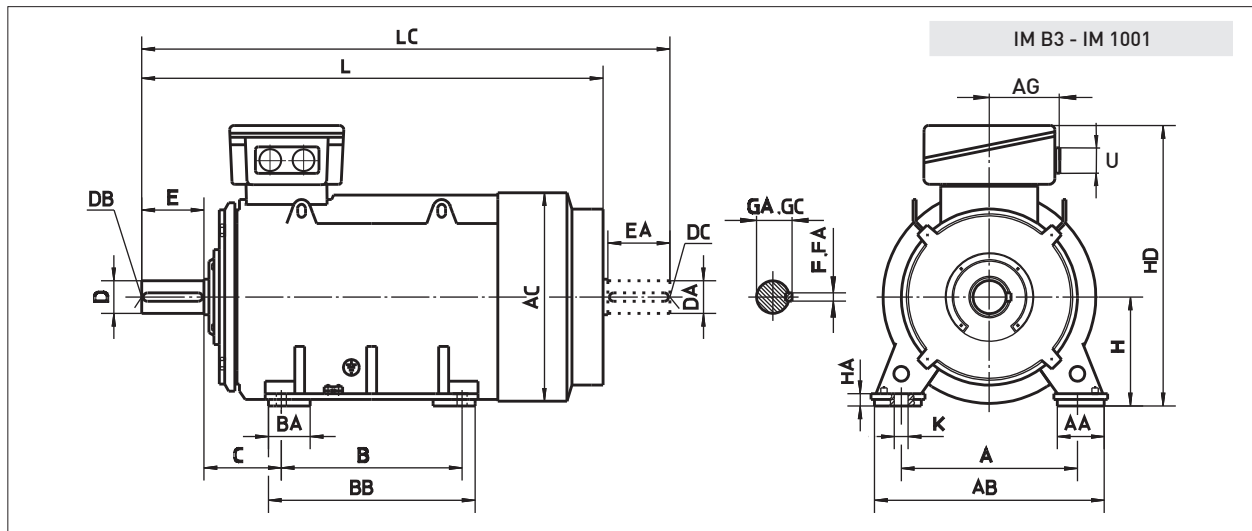
Type	Pole	Flange	AC	AG	D	DA	DB	DC	E	EA	F	FA	GA	GC	HB	L	LA	LC	M	N	P	S	Z	T	U
3.ZKIE 315	Mc, Md	2	FF 600	655	403	<b>65</b>	65	M20	M20	<b>140</b>	140	<b>18</b>	18	<b>69</b>	69	535	25	1426	<b>600</b>	<b>550</b>	<b>660</b>	Ø24	8	6	2xM63x1,5
	Mc, Md, Me	4,6,8				<b>90</b>	90	M24	M24	<b>170</b>	170	<b>25</b>	25	<b>95</b>	95										
	Le, Lf	2	FF 740	655	-	<b>65</b>	65	M20	M20	<b>140</b>	140	<b>18</b>	18	<b>69</b>	69	535	25	1732	<b>740</b>	<b>680</b>	<b>800</b>	Ø24	8	6	
	Lf, Lg	4,6,8				<b>90</b>	90	M24	M24	<b>170</b>	170	<b>25</b>	25	<b>95</b>	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.

# LOW VOLTAGE TEFC CAGE MOTORS IE3 Premium Efficiency

Motor dimensions

13



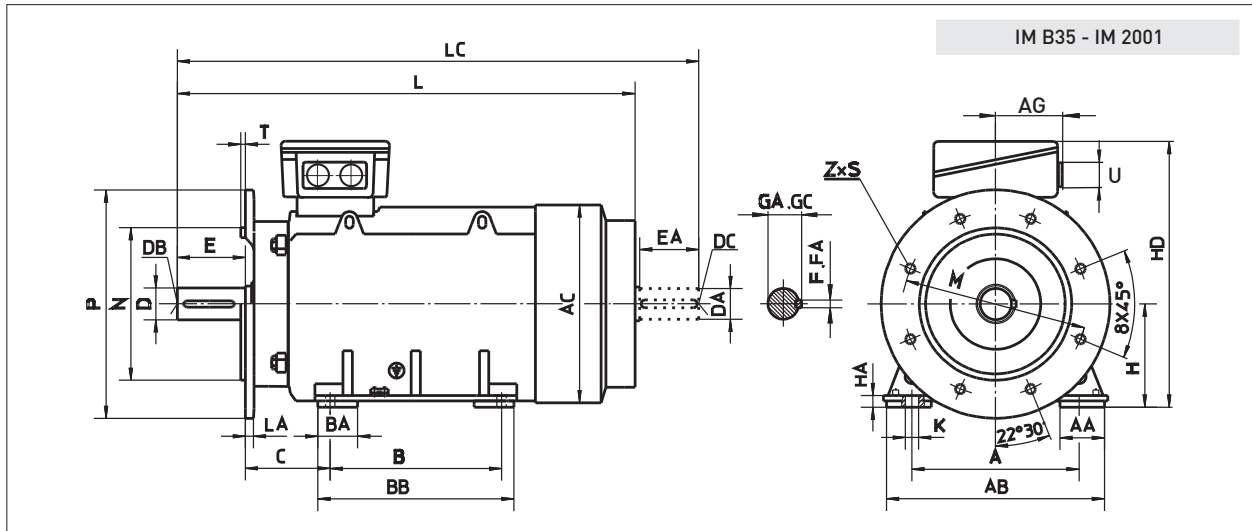
Type	Poles	A	AA	AB	AC	AG	B	BA	BB	C	D	DA	DB	DC	E	EA	F	FA	GA	GC	H	HA	HD	K	L	LC	U		
3.ZKIE 355	Ma, Mb, Mc	2	610				560	150	660	254	75	75	M20	M20	140	140	20	20	79,5	79,5									
	Ld, Le	4, 6, 8	150	780	750	403	800	220	980	200	100	100	M24	M24	210	210	28	28	106	106	355	35	945	Ø28	1493	1648	2xM75x1,5		
	Lf	4	630				800	220	980	200	100	100	M24	M24	210	210	28	28	106	106	355	35	945	Ø35	1890	2110	2xM80x1,5		

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

## IE3 Premium Efficiency

### 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			
3.ZKIE 355	2	FF 740	610		150	780	750	403	560	150	660	254	355	35	945	Ø28	25	1493	1648	740	680	800	Ø24	8	6	2xM75x1,5		
																											1760	1980
	4, 6, 8		630		630	220	980	200									Ø35		1890	2110								2xM80x1,5
Lf	4																											

Type	Poles	D	DA	DB	DC	E	EA	F	FA	GA	GC
3.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.

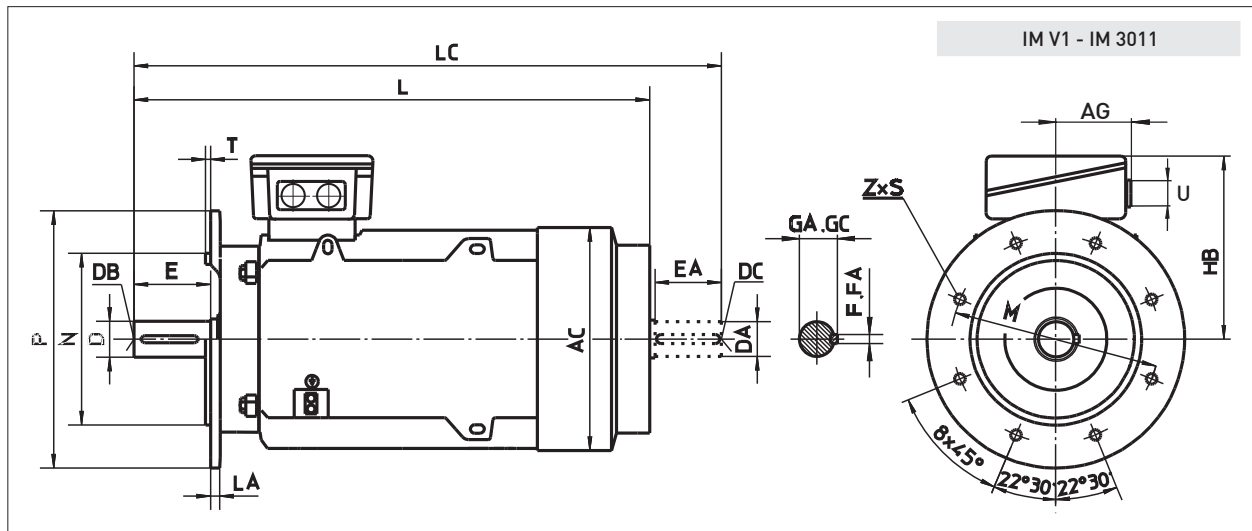


# LOW VOLTAGE TEFC CAGE MOTORS

## IE3 Premium Efficiency

Motor dimensions

15



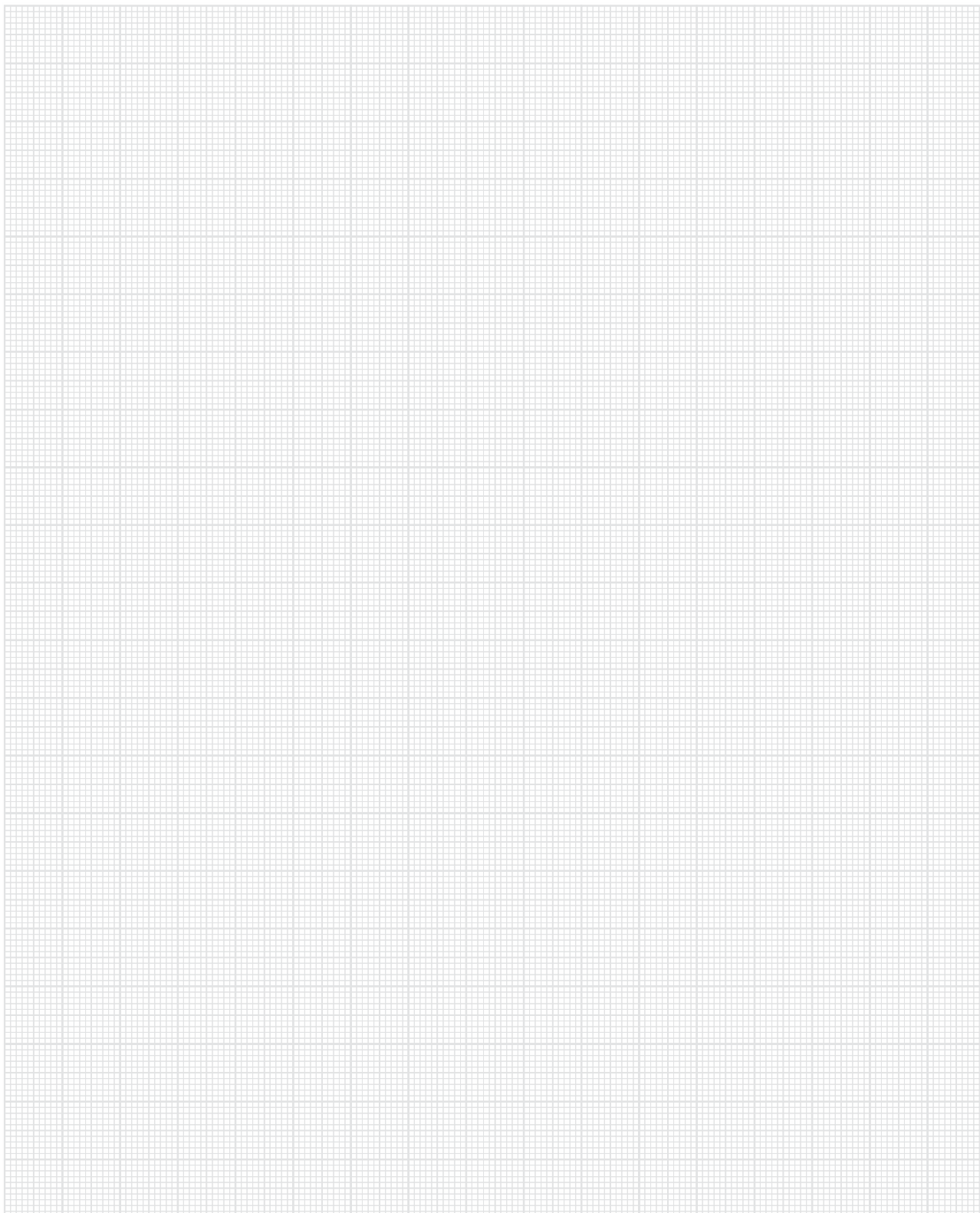
Type	Poles	Flange	AC	AG	D	DA	DB	DC	E	EA	F	FA	GA	GC	HB	L	LA	LC	M	N	P	S	Z	T	U	
3.ZKIE 355	Ma, Mb, Mc	2			75	75	M20	M20	140	140	20	20	79.5	79.5		1493	25	1648	740	680	800	Ø24	8	6	2xM75x1.5	
																1760		1980								
	Ld, Le	4, 6, 8	FF	740	755	403	100	100	M24	M24	210	210	28	28	106	106	1890	25	2110	740	680	800	Ø24	8	6	2xM80x1.5
																	2060		2080							
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

## IE3 Premium 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 \_\_\_\_\_  $J_m$  \_\_\_\_\_  $\text{kgm}^2$

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 ot \_\_\_\_\_

## 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:  $J =$  \_\_\_\_\_  $\text{kgm}^2$

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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