Technical Documentation

LOW VOLTAGE THREE PHASE TEFC CAGE MOTORS

IE2 High Efficiency

ELV12EN

ATB SEVER
Technology in Motion

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 developped 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

2 Main characteristics

Changing the nomenclature of the IEC motor efficiency level

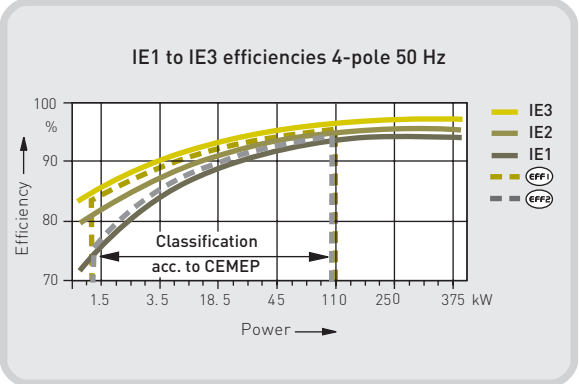
New labelling and definition methods of IEC motor efficiency level according to IEC 60034-30:2008 and IEC 60034-2-1:2007

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



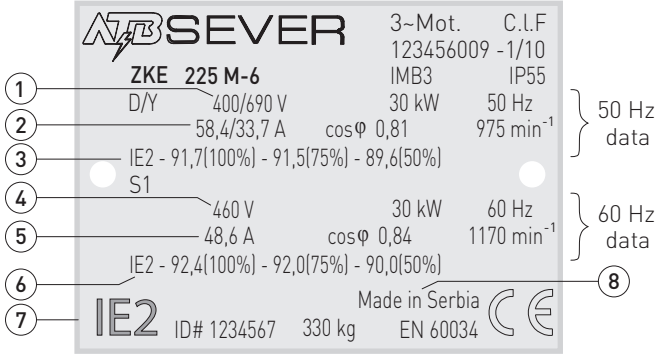
New standard class of the motor efficiency level

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

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 reductors	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	

LOW VOLTAGE TEFC CAGE MOTORS
IE2 High Efficiency

4 Electrical data

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

Series ZKE

Type	Output Pn kW	Full load R.P.M. min^{-1}	IE	Efficiency ηn 100%Pn	75%Pn	50%Pn	Power factor cosφn	Full load Current In A	Rated torque Mn Nm	Moment of inertia J kgm^2	Weight kg
3000 min^{-1}											
ZKE 160 Ma-2	11	2910	IE2	89,4	89,3	87,2	0,87	20,4	36	0,046	126
ZKE 160 Mb-2	15	2910	IE2	90,3	90,2	89,1	0,88	27,2	49	0,061	140
ZKE 160 Lc-2	18,5	2910	IE2	90,9	90,8	89,0	0,88	33,4	61	0,071	150
ZKE 180 Ma-2	22	2920	IE2	91,3	91,3	90,2	0,88	39,5	72	0,125	190
ZKE 200 La-2	30	2935	IE2	92,0	92,1	90,9	0,88	53	98	0,173	199
ZKE 200 Lb-2	37	2940	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
ZKIE 315 Sa-2	110	2970	IE2	94,3	93,6	91,8	0,88	192	354	1,57	890
ZKIE 315 Mb-2	132	2970	IE2	94,6	93,6	91,0	0,88	229	424	1,8	1070
ZKIE 315 Mc-2	160	2973	IE2	94,8	94,0	91,9	0,91	268	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	1700
ZKIE 355 Mb-2	315	2982	IE2	95,0	95,0	94,1	0,92	520	1009	5,4	1920
ZKIE 355 Mc-2	355	2982	IE2	95,0	94,9	93,4	0,92	586	1137	5,7	2150

Bigger motors on request

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

Series ZKE

Type	Output Pn kW	Full load R.P.M. min^{-1}	IE	Efficiency ηn 100%Pn	75%Pn	50%Pn	Power factor cosφn	Full load Current In A	Rated torque Mn Nm	Moment of inertia J kgm^2	Weight kg
1500 min^{-1}											
ZKE 160 Mb-4	11	1440	IE2	89,8	89,8	87,9	0,83	21,3	73	0,069	130
ZKE 160 Lc-4	15	1440	IE2	90,6	90,4	88,9	0,82	29,1	99	0,091	145
ZKE 180 Ma-4	18,5	1460	IE2	91,2	91,1	89,4	0,82	35,7	121	0,24	205
ZKE 180 Lb-4	22	1460	IE2	91,6	91,4	89,8	0,81	42,8	144	0,28	225
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
ZKIE 315 Sa-4	110	1482	IE2	94,5	93,7	91,6	0,88	191	709	2,66	890
ZKIE 315 Mb-4	132	1477	IE2	94,7	94,3	93,0	0,89	226	853	3,16	1000
ZKIE 315 Mc-4	160	1486	IE2	94,9	94,4	93,0	0,90	271	1028	3,6	1090
ZKIE 315 Md-4	200	1486	IE2	95,1	94,9	93,3	0,91	334	1285	4,3	1250
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	1950
ZKIE 355 Mc-4	355	1492	IE2	95,1	94,6	93,1	0,89	606	2272	11	2250
ZKIE 355 Ld-4	400	1490		96,0	96,0	95,5	0,87	692	2564	13	2380
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
IE2 High Efficiency

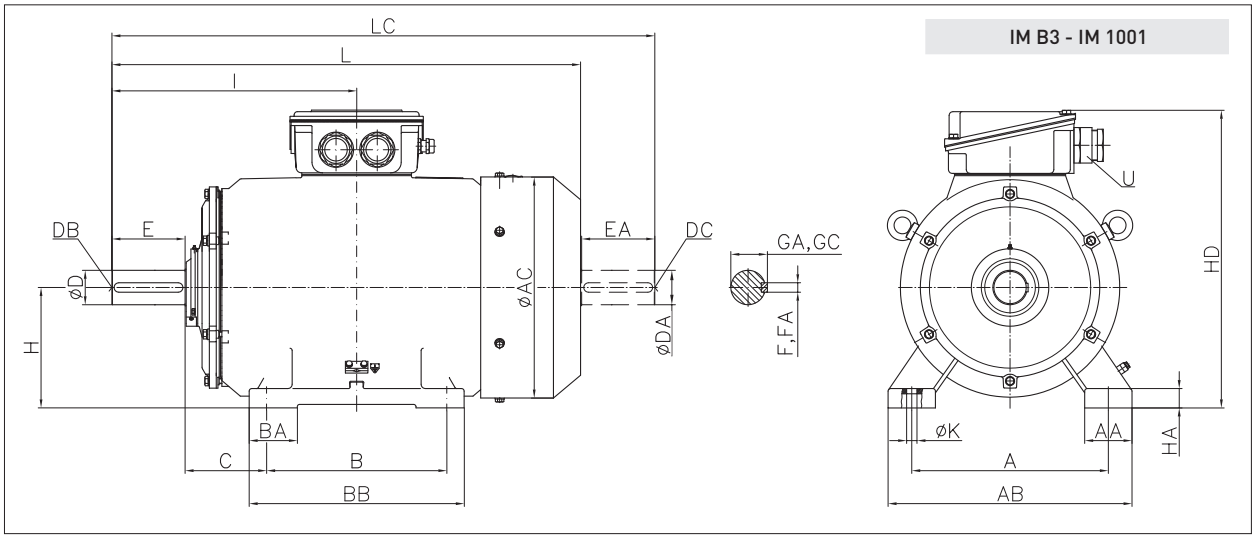
6 Electrical data

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

Series ZKE

Type	Output Pn kW	Full load R.P.M. min^{-1}	IE	Efficiency ηn 100%Pn	75%Pn	50%Pn	Power factor cosφn	Full load Current In A	Rated torque Mn Nm	Moment of inertia J kgm^2	Weight kg
1000 min^{-1}											
ZKE 160 Mb-6	7,5	950	IE2	87,2	87,1	85,7	0,77	16,1	75	0,102	125
ZKE 160 Lc-6	11	950	IE2	88,7	88,6	87,1	0,78	23	111	0,14	145
ZKE 180 Lb-6	15	960	IE2	89,7	89,7	88,5	0,82	29,5	149	0,37	220
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	0,81	58	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	982	IE2	92,7	92,4	90,3	0,85	83	438	1,59	500
ZKE 280 Mb-6	55	982	IE2	93,1	92,7	90,7	0,84	102	535	1,9	560
ZKIE 315 Sa-6	75	987	IE2	93,7	93,5	91,6	0,85	136	726	4,2	870
ZKIE 315 Mb-6	90	988	IE2	94,0	93,7	91,5	0,85	163	870	4,8	990
ZKIE 315 Mc-6	110	987	IE2	94,3	94,0	92,2	0,87	194	1064	5,5	1070
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	1800
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	2170
ZKIE 355 Ld-6	355	990	IE2	95,0	94,9	93,7	0,86	627	3424	18	2400
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

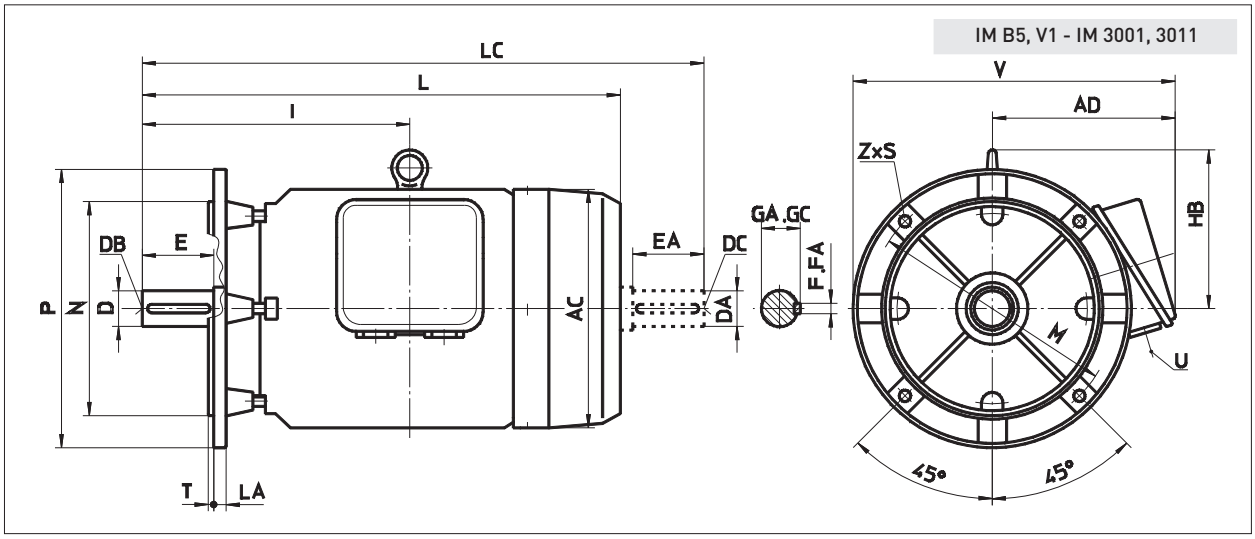
With FS 400 and 450 the current data is given for 690 V



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 160 Ma	2	254	60	314	318	210	67	260	108	42	42	M16	M16	110	110	12	12	45	45	160	25	315	368	323	15	589	709	M40x1.5
ZKE 160 Mb	2, 4, 6																											
ZKE 160 Lc	2, 4, 6					254		304																345		633	753	
ZKE 180 Ma	2, 4	279	70	349	354	241	82	296	121	48	48	M16	M16	110	110	14	14	51,5	51,5	180	30	355	417	351.5	15	652	772	M40x1.5
ZKE 180 Lb	4, 6					279		334																370.5		690	810	
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
ZKE 200 Lb	2, 4, 6																											
ZKE 225 Sa	4	356	90	446	418	286	110	355	149	60	60	M20	M20	140	140	18	18	64	64	225	35	438	562	432	18	805	962	M50x1.5
ZKE 225 Mb	2					311		380		55	55			110	110	16	16	59	59					414.5		800	927	
ZKE 225 Mb	4, 6									60	60			140	140	18	18	64	64					444.5		830	987	
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
ZKE 250 Ma	4, 6									65	65							69	69									
ZKE 280 Sa	2	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
ZKE 280 Sa	4, 6									75	75					20	20	79,5	79,5									
ZKE 280 Mb	2					419		500		65	65					18	18	69	69					539.5		1024	1179	
ZKE 280 Mb	4, 6									75	75					20	20	79,5	79,5									
ZKIE 315 Sa	2	508	125	633	562	406	120	500	216	65	65	M20	M20	140	140	18	18	69	69	315	50	599	742	559	28	1072	1217	M63x1.5
ZKIE 315 Sa	4, 6									80	80			170	170	22	22	85	85					589		1102	1277	
ZKIE 315 Mb	2					457		550		65	65			140	140	18	18	69	69					584.5		1123	1268	
ZKIE 315 Mb	4, 6									80	80			170	170	22	22	85	85					614.5		1153	1328	

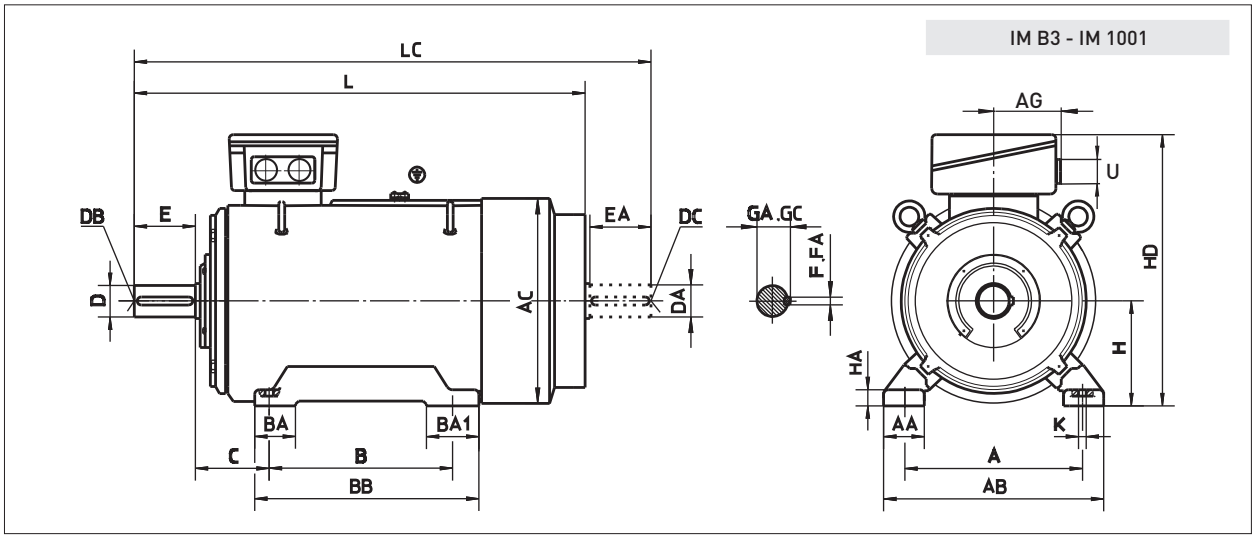
The fixing dimensions given in thick figures are obligatory according to the recommendation of IEC. All other technical data and dimensions during the future development of motors may undergo some changes and therefore they can be considered as obligatory after our confirmation only. All dimensions are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

8 Motor dimensions



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 160 Ma	2	FF 300	318	258	**42**	42	M16	M16	**110**	110	**12**	12	**45**	45	208	323	589	20	709	**300**	**250**	**350**	Ø18.5	**4**	**4**	421	M40 x 1.5
ZKE 160 Mb	2,4,6																										
ZKE 160 Lc	2,4,6															345	633		753								
ZKE 180 Ma	2,4	FF 300	354	278	**48**	48	M16	M16	**110**	110	**14**	14	**51,5**	51,5	237	351.5	652	20	772	**300**	**250**	**350**	Ø18.5	**4**	**5**	435	M40 x 1.5
ZKE 180 Lb	4,6															370.5	690		810								
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**	499	M50 x 1.5
ZKE 200 Lb	2, 4, 6																										
ZKE 225 Sa	4	FF 400	418	337	**60**	60	M20	M20	**140**	140	**18**	18	**64**	64	275	432	805	20	962	**400**	**350**	**450**	Ø18.5	**8**	**5**	537	M50 x 1.5
ZKE 225 Mb	2				**55**	55			**110**	110	**16**	16	**59**	59		414.5	800		927								
	4, 6				**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				**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	22	1128	**500**	**450**	**550**	Ø18.5	**8**	**5**	654	M50 x 1.5
	4, 6				**75**	75					**20**	20	**79,5**	79,5													
ZKE 280 Mb	2				**65**	65					**18**	18	**69**	69		539.5	1024		1179								
	4, 6				**75**	75					**20**	20	**79,5**	79,5													
ZKIE 315 Sa	2	FF 600	562	427	**65**	65	M20	M20	**140**	140	**18**	18	**69**	69	345	559	1072	25	1232	**600**	**550**	**660**	Ø24	**8**	**6**	757	M63 x 1.5
	4, 6				**80**	80			**170**	170	**22**	22	**85**	85		589	1102		1292								
ZKIE 315 Mb	2				**65**	65			**140**	140	**18**	18	**69**	69		584.5	1123		1283								
	4, 6				**80**	80			**170**	170	**22**	22	**85**	85		614.5	1153		1328								

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.



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	**508**	125	633	626	403	**457**	**508**	101	152	588	**216**	**65**	65	M20	M20	**140**	140	**18**	18	**69**	69	**315**	40	850	**Ø28**	1238	1393	2xM63x1.5
	Mc, Md, Me	4, 6											**90**	90	M24	M24	**170**	170	**25**	25	**95**	95					1306	1486	
	Le, Lf	2	**560**	120	680	655	-	**560**	**630**	120	200	780	**216**	**65**	65	M20	M20	**140**	140	**18**	18	**69**	69	**315**	40	850	**Ø28**	1587	1732	
	Lf, Lg	4, 6											**90**	90	M24	M24	**170**	170	**25**	25	**95**	95					1617	1792	

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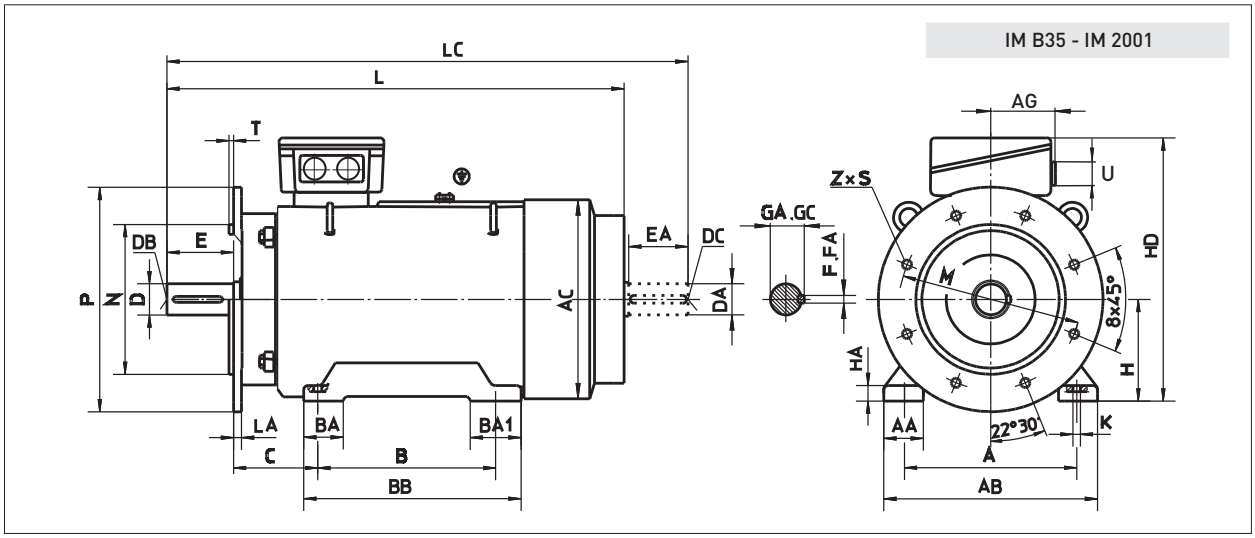
10 Motor dimensions



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	FF 600	**508**	125	633	626	403	**457**	**508**	101	152	588	**216**	315	45	890	**Ø28**	1238	25	1393	**600**	**550**	**660**	**Ø24**	**8**	**6**	2xM63x1.5
	Mc, Md, Me	4, 6																	1268		1453							
	Le, Lf	2	FF 740	**560**	120	680	655	-	**560**	**630**	120	200	780	**216**	315	40	850	**Ø28**	1587	25	1732	**740**	**680**	**800**	**Ø24**	**8**	**6**	
	Lf, Lg	4, 6																	1617		1792							

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	**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	**90**	90	M24	M24	**170**	170	**25**	25	**95**	95

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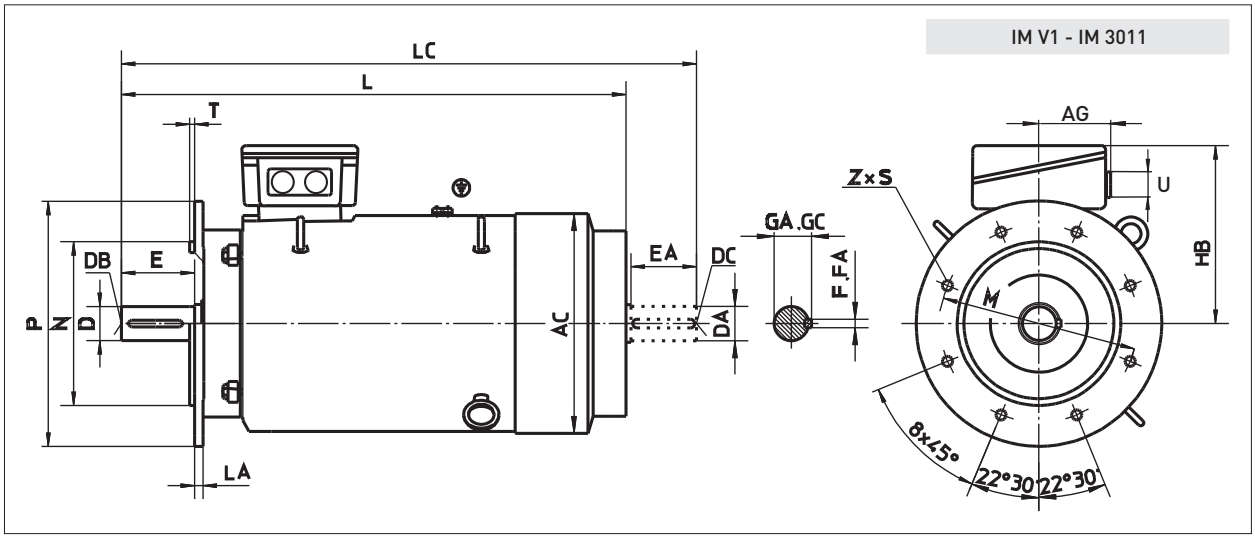

Type		Pole	Flange	AC	AG	D	DA	DB	DC	E	EA	F	FA	GA	GC	HB	L	LA	LC	M	N	P	S	Z	T	U
ZKIE 315	Mc, Md	2	FF 600	626	403	**65**	65	M20	M20	**140**	140	**18**	18	**69**	69	575	1238	25	1393	**600**	**550**	**660**	Ø24	**8**	**6**	2xM63x1.5
	Mc, Md, Me	4, 6				**90**	90	M24	M24	**170**	170	**25**	25	**95**	95		1306		1486							
	Le, Lf	2	FF 740	655	-	**65**	65	M20	M20	**140**	140	**18**	18	**69**	69	535	1587	25	1732	**740**	**680**	**800**	Ø24	**8**	**6**	
	Lf, Lg	4, 6				**90**	90	M24	M24	**170**	170	**25**	25	**95**	95		1617		1792							

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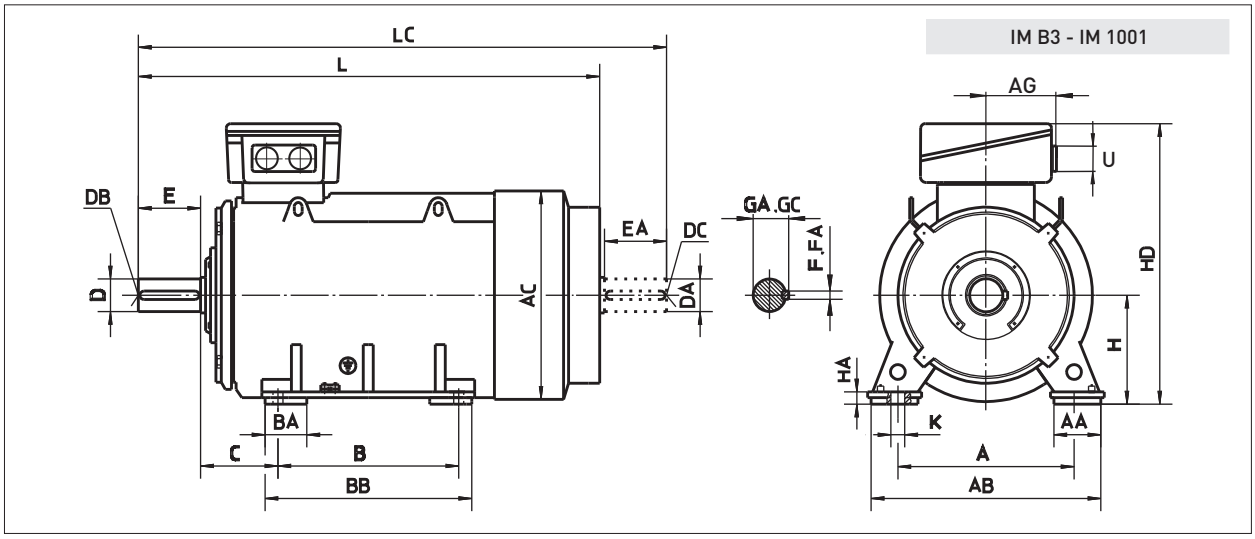
12 Motor dimensions



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
ZKIE 355	Ma, Mb, Mc	2	610	150	780	750	403	560	140	660	254	75	75	M20	M20	140	140	20	20	79,5	79,5	355	35	945	Ø28	1463	1618	2xM75x1.5
																										1533	1758	
	Ld, Le	4, 6	630					800	220	980	200	100	100	M24	M24	210	210	28	28	106	106				Ø35	1890	2110	
	Lf																									2060	2280	
ZKIE 400	La, Lb, Lc	2	710	150	860	855	403	900	220	1045	224	80	80	M20	M20	170	170	22	22	85	85	400	40	1044	Ø35	1938	2128	4xM63x1.5
	La, Lb	4, 6										110	100	M24	M24	210	210	28	28	116	116					1978	2208	
	Lc																									2108	2338	
ZKIE 450	La, Lb, Lc	2	800	180	980	975	403	1000	260	1220	250	90	90	M24	M24	170	170	25	25	95	95	450	42	1250	Ø42	2118	2308	4xM63x1.5
		4, 6										120	100			210	210	28	28	116	116					2158	2388	

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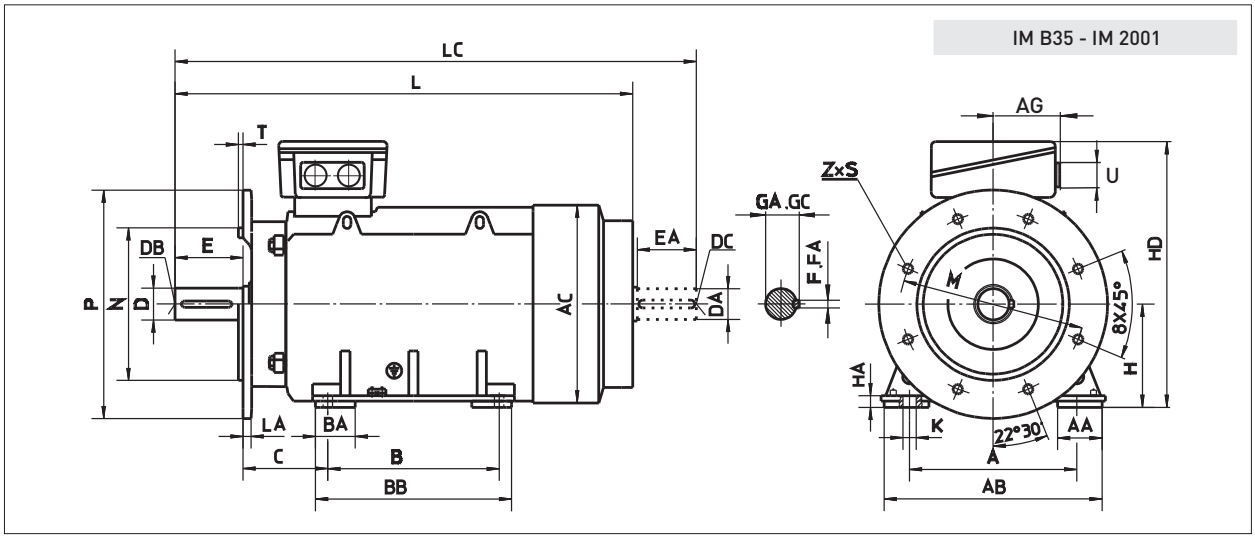
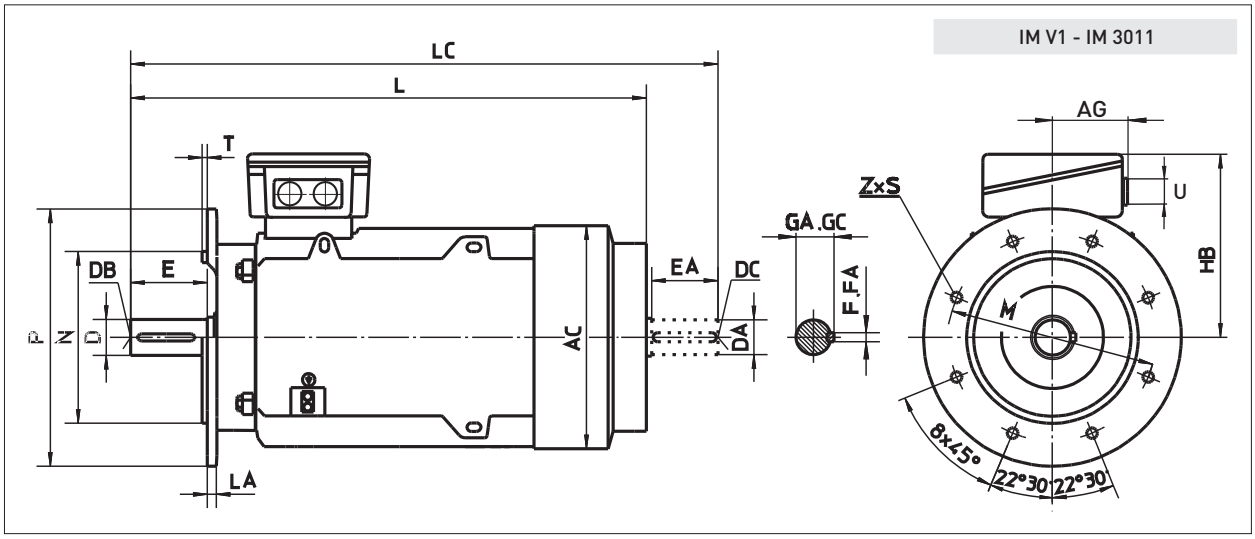


Type		Poles	Flange	A	AA	AB	AC	AG	B	BA	BB	C	H	HA	HD	K	L	LA	LC	M	N	P	S	Z	T	U
ZKIE 355	Ma, Mb, Mc	2	FF 740	**150**	780	750	735	403	**560**	140	660	**254**	**355**	35	945	Ø28	1463	25	1618	**740**	**680**	**800**	Ø24	**8**	**6**	2xM75x1.5
																	1533		1758							
	Ld, Le	4, 6							**800**	220	980	**200**				Ø35	1890		2110							
	Lf																2060		2280							

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

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.

14 Motor dimensions



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	FF 740	735	403	**75**	75	M20	M20	**140**	140	**20**	20	**79.5**	79.5	590	1463	25	1618	**740**	**680**	**800**	**Ø24**	**8**	**6**	2xM75x1.5
	Ld, Le	4, 6				**100**	100	M24	M24	**210**	210	**28**	28	**106**	106		1890		2110							
	Lf																2060		2280							
ZKIE 400	La, Lb, Lc	2	FF 940	855	403	**80**	80	M20	M20	**170**	170	**22**	22	**85**	85	644	1938	25	2128	**940**	**880**	**1000**	**Ø28**	**8**	**6**	4xM63x1.5
	La, Lb	4, 6				**110**	100	M24	M24	**210**	210	**28**	28	**116**	106		1978		2208							
	Lc																2108		2338							
ZKIE 450	La, Lb, Lc	2	FF 1080	975	403	**90**	90	M24	M24	**170**	170	**25**	25	**95**	95	800	2118	40	2308	**1080**	**1000**	**1150**	**Ø40**	**12**	**6**	4xM63x1.5
		4, 6				**120**	100			**210**	210	**32**	28	**127**	106		2158		2388							

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16 Note

QUESTIONNAIRE FOR THE OFFER OF ASYNCHRONOUS ELECTRIC MOTORS

ATB SEVER
Technology in Motion

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

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 _____ per day
Cold state: _____ per hour _____ 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 (LpfA) _____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-condesation 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:

The Questionnaire is available on line at http://www.sever.rs/upiti/uen.html

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