

**MASZYNY ELEKTRYCZNE
CELMA SA**



ISO 9001: 2000 ISO 14001

**THREE-PHASE SQUIRREL-CAGE INDUCTION MOTORS
EXPLOSION-PROOF FRAME 160÷315**

Type: EcS(K,L)g-EP, EcS(K,L)gb-EP, cS(K,L)gb-EP

GENERAL INFORMATION

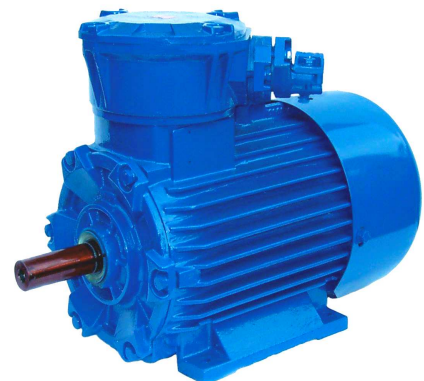
- Motors are devoted to equipment installed in rooms and areas, in which explosive mixtures of combustible gas and vapour with air, classified as group II, temperature class T5 or lower, may appear
- Motors can be operated in zones 1 and 2

Standard Version

- Duty S1
- Voltage 400 V +/-5%
- Frequency 50 Hz
- Insulation class F
- Degree of protection IP 55
- Ambient temperature –from 20°C to +40 °C (class T5)
- Increased safety of terminal box
- Terminal box with one cable inlet
- Cable inlet and terminals adapted for cable with copper wires
- Three terminals for direct on line starting
- According to standards: PN-EN 60034-1, PN-EN 60079-0, PN-EN 60079-1, PN-EN 60079-7
- classified to category 2G acc. to Directive 94/9/WE (ATEX)

Execution for request

- Voltage to 750V
- Frequency 60 Hz
- Degree of protection IP 56
- Insulation class H
- Flame-proof terminal box
- With thermal protection of winding
- With thermal protection of bearings
- With space heaters in winding
- Terminal box with two cable inlets
- Six terminals for star/delta starting
- Adapted for frequency converter supply (motors marked „-f” e.g cSg180M4-EP-f)
- With rubber packing (of cable inlet) for other cable's diameter
- Special execution for low temperatures (less than -20°C) ...-ELT
- With GOST-R certification



OPERATING PARAMETERS

Frame	Rated Output		Rated speed	Data of rated output				Ratio of			Moment bezwładności J	Masa IM B3 M
	P_N			Efficiency	Power factor	current	Torque	Starting torque	Maximal torque	Starting current		
	[kW]	[HP]	η_N	$\cos \varphi$	I_N	T_N	T_L/T_N	T_b/T_N	I_L/I_N			
	[min ⁻¹]	[%]	[-]	[A] _{400V}	[Nm]	[-]	[-]	[-]	[kgm ²]	[kg]		
2p=2 3000 rpm												
160M2A	11	15	2925	88,5	0,89	20,2	36	2,1	2,5	5,7	0,04	150
160M2B	15	20	2920	89,5	0,91	26,6	49	2,1	2,2	6,0	0,05	158
160L2	18,5	25	2925	91,3	0,90	32,5	60	2,4	2,8	6,5	0,06	176
180M2	22	30	2945	91,5	0,89	39	71	2,7	2,6	6,8	0,07	210
200L2A	30	40	2960	92,9	0,89	52	97	1,9	2,3	6,0	0,15	285
200L2B	37	50	2960	93,7	0,89	64	119	2,2	2,5	6,7	0,18	315
225M2	45	60	2968	94,5	0,89	77	145	2,4	2,5	7,0	0,26	375
250M2	55	75	2970	93,5	0,90	94	177	2,0	2,0	6,9	0,36	434
280S2	75	100	2977	94,0	0,90	128	241	2,1	3,3	7,5	0,76	580
280M2	90	125	2970	94,7	0,91	151	289	2,0	3,2	7,0	0,87	620
315S2	110	150	2977	95,1	0,91	183	353	2,2	3,3	8,3	0,91	755
315M2A	132	180	2975	95,0	0,91	220	424	2,1	2,8	8,5	0,98	795
315M2B	160	220	2975	95,4	0,89	272	514	2,3	2,5	9,1	1,20	855
2p=4 1500 rpm												
160M4	11	15	1463	89,5	0,84	21,1	72	2,5	2,9	7,5	0,06	150
160L4	15	20	1460	89,8	0,86	28	98	2,5	3,2	7,9	0,08	172
180M4	18,5	25	1465	90,8	0,90	32,5	121	2,3	2,9	6,9	0,11	205
180L4	22	30	1465	91,5	0,90	38,6	143	2,5	2,9	7,2	0,13	225
200L4	30	40	1472	92,5	0,88	53	195	2,9	2,5	7,1	0,31	310
225S4	37	50	1475	92,6	0,88	66	240	2,1	2,2	6,3	0,44	350
225M4	45	60	1480	94,0	0,88	79	290	2,4	2,3	7,0	0,53	390
250M4	55	75	1483	93,5	0,91	93	354	2,4	2,6	7,3	0,79	465
280S4	75	100	1485	94,2	0,90	128	482	2,5	2,5	7,3	1,37	630
280M4	90	125	1485	94,8	0,91	151	579	2,6	2,6	7,3	1,63	670
315S4	110	150	1480	94,2	0,92	183	710	2,3	2,2	6,9	1,67	785
315M4A	132	180	1487	94,9	0,90	223	848	2,3	2,5	7,6	1,84	825
315M4B	160	220	1483	95,5	0,90	269	1029	2,7	2,6	8,0	2,27	865
2p=6 1000 rpm												
160M6	7,5	10	962	87,5	0,81	15,3	74	2,2	3,0	6,4	0,07	146
160L6	11	15	960	88,2	0,82	22	109	2,2	2,8	6,7	0,10	173
180L6	15	20	973	89,0	0,85	28,6	147	2,4	2,4	5,6	0,19	210
200L6A	18,5	25	980	90,5	0,86	34,5	180	2,5	2,4	6,8	0,41	290
200L6B	22	30	981	90,5	0,88	40	214	2,4	2,2	6,9	0,47	305
225M6	30	40	982	91,9	0,88	54	292	2,1	2,2	6,3	0,76	365
250M6	37	50	985	92,5	0,89	65	359	2,6	2,3	6,8	1,23	458
280S6	45	60	985	93,0	0,87	80	436	2,0	2,3	6,5	1,35	555
280M6	55	75	985	93,5	0,89	95	533	2,2	2,2	6,2	1,61	600
315S6	75	100	985	93,5	0,89	130	727	2,3	2,2	6,6	2,16	785
315M6A	90	125	984	93,7	0,88	158	873	2,5	2,0	6,8	2,29	815
315M6B	110	150	985	94,2	0,89	189	1066	2,3	2,1	7,2	2,86	900
2p=8 750 rpm												
160M8A	4	5,5	710	81,0	0,75	9,5	54	2,1	2,7	5,1	0,06	132
160M8B	5,5	7,5	705	82,5	0,75	12,8	75	2,5	3,1	5,5	0,08	142
160L8	7,5	10	708	83,5	0,78	16,6	101	2,7	3,0	5,7	0,10	162
180L8	11	15	730	88,5	0,76	23,6	144	1,9	2,5	5,5	0,19	208
200L8	15	20	733	89,5	0,83	29,1	195	2,2	2,1	5,5	0,45	290
225S8	18,5	25	735	89,5	0,81	37	240	2,0	2,0	5,6	0,58	320
225M8	22	30	735	90,4	0,80	44	286	2,0	1,8	5,2	0,68	350
250M8	30	40	738	91,5	0,84	56	388	2,5	2,1	6,3	1,27	455
280S8	37	50	737	92,8	0,83	69	479	2,0	1,8	5,3	1,47	575
280M8	45	60	737	92,5	0,84	84	583	2,1	2,0	5,4	1,80	635
315S8	55	75	735	92,7	0,81	106	715	2,0	1,9	5,3	2,16	785
315M8A	75	100	737	93,2	0,82	142	972	2,5	1,9	6,2	2,29	810
315M8B	90	125	737	93,2	0,82	170	1166	2,4	1,9	6,5	2,86	890

SYMBOLS OF OFFERED MOTORS

	Frame of motor and its marking						
Type of motor	Motor with flame-proof enclosure and with increased safety terminal box						
	160	180	200	225	250	280	315
EcS/L,K/g-EP	-	II 2G Exde IIC T5	II 2G Exde IIC T5	-	-	-	-
EcS/L,K/gb-EP	II 2G Exde IIB T5	-	-	II 2G Exde IIB+H ₂ T5	II 2G Exde IIB+H ₂ T5	II 2G Exde IIB+H ₂ T5	II 2G Exde IIB T5
	Motor and terminal box with flame-proof enclosure						
cS/L,K/gb-EP	II 2G Exd IIB T5	II 2G Exd IIB T5	II 2G Exd IIB T5	II 2G Exd IIB T5	II 2G Exd IIB T5	II 2G Exd IIB T5	II 2G Exd IIB T5

OPERATING WITH FREQUENCY CONVERTER

Frame	Temperature class	Range of speed for	
		Torque constans	Ventilators, pumps
		n _N rated speed	
160 ÷ 280	T5	0,3 n _N ÷ 1,2n _N ¹⁾	0 ÷ n _N
315	T5	0,8 n _N ÷ 1,2n _N ¹⁾	0 ÷ n _N
160 ÷ 280	T4	0,2 n _N ÷ 1,2n _N ¹⁾	0 ÷ n _N
315	T4	0,7 n _N ÷ 1,2n _N ¹⁾	0 ÷ n _N

¹⁾ The system „motor-converter“- given tested with converters of firms : DANFOSS series VLT 5000 i 6000, SIEMENS series SIMOVERT MASTERDRIVERS and VACON serii NX

¹⁾ n_N ÷ 1,2n_N – rated output constanst

Parameters of frequency converter for motors:	
EcS.g(b) 160,180-EP-f	EcS.g(b) 200÷315-EP-f
U _{peak} < 0,75 kV	U _{peak} < 1,0 kV
dt > 0,1 μs	
cS.g(b) 160,180-EP-f	cS.g(b) 200÷315-EP-f
U _{peak} < 1,25 kV	U _{peak} < 1,6 kV
dt > 0,1 μs	

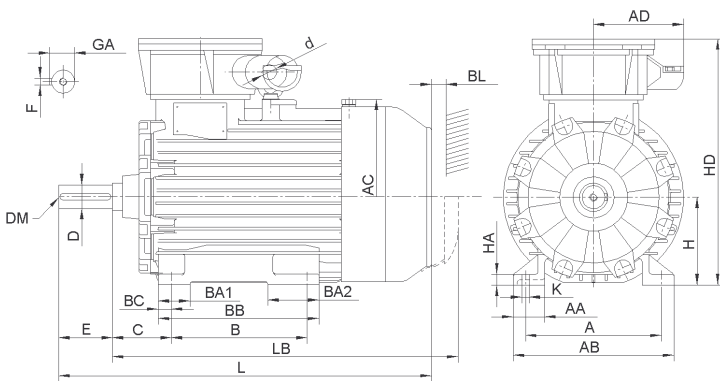
LEVEL OF NOISE [dB(A)]

Frame	Power noise L _{WA} / Pressure noise L _{pAf}			
	for speed			
	3000	1500	1000	750
160	91/82	75/66	70/61	70/61
180	91/82	78/69	75/66	72/63
200	88/78	79/69	75/63	70/60
225	89/79	83/73	83/73	70/60
250	91/79	85/75	78/68	75/65
280	92/82	85/75	78/68	75/65
315	92/82	86/76	78/68	75/65

Dimension drawings

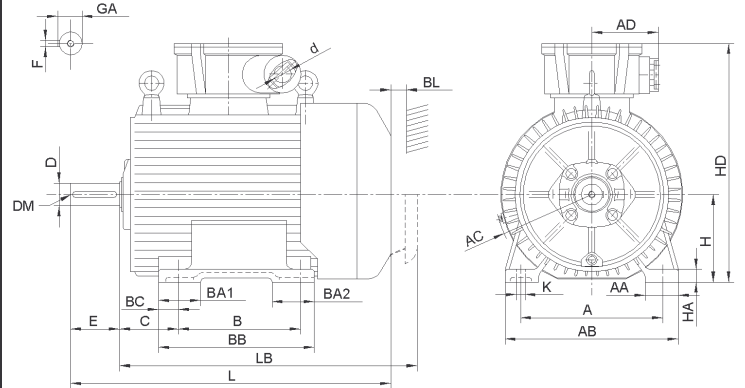
(E)cSg(b) 160, 180 - EP

IM 1001, IM 1011, IM 1031, IM 1051, IM 1061, IM 1071



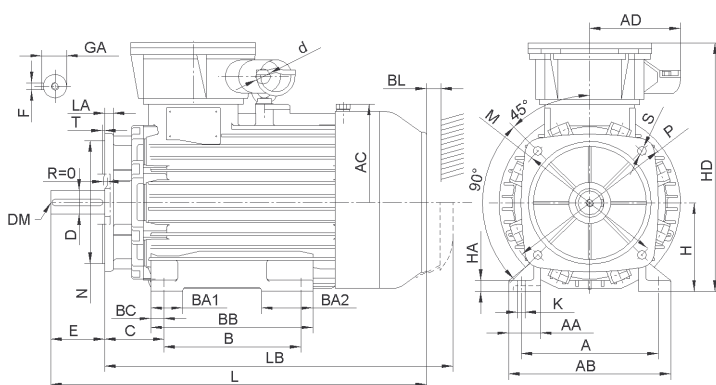
(E)cSg(b) 200 ÷ 315 - EP

IM 1001, IM 1011, IM 1031, IM 1051, IM 1061, IM 1071



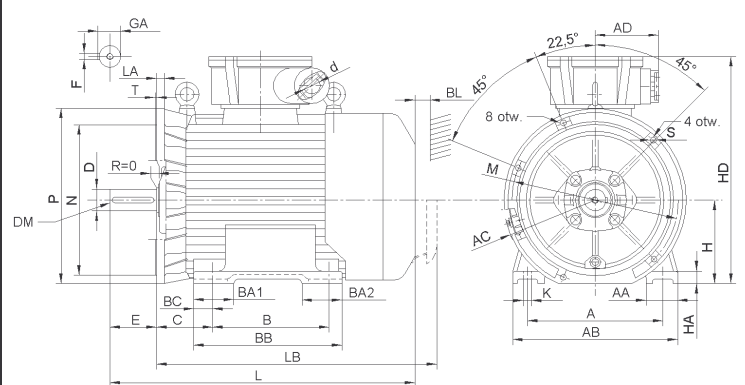
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IM 2001, IM 2011, IM 2031, IM 2051, IM 2061, IM 2071



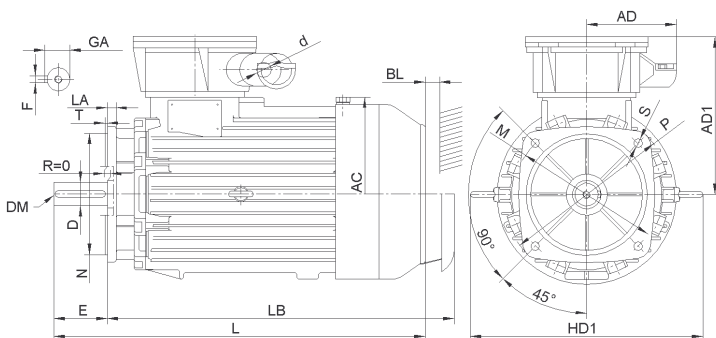
(E)cSLg(b) 200 ÷ 315 - EP

IM 2001, IM 2011, IM 2031, IM 2051, IM 2061, IM 2071



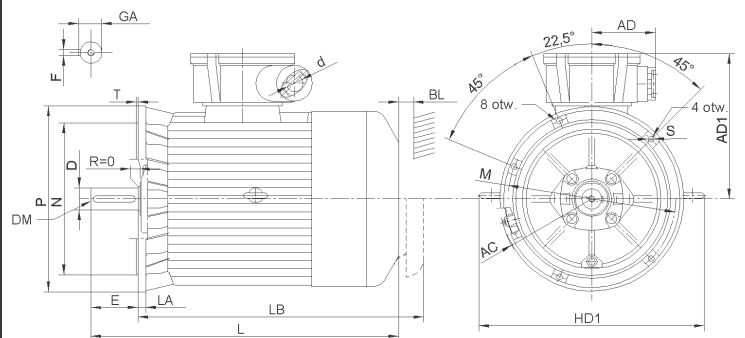
(E)cSKg(b) 160, 180 - EP

IM 3001, IM 3011, IM 3031



(E)cSKg(b) 200 ÷ 315 - EP

200-280: IM 4001, IM 4011, IM 4031
315: IM 3001, IM 3011, IM 3031



Mounting dimension [mm]

Frame	A	B	C	DM	Shaft end				H _{-0.5}	HA	K	Flange							
					D _{m6}	E	F _{h9}	GA				wg PN IEC 72-1	LA	M±0,4	N _{i6}	P	S		T
																	∅	quantity ^a	
160 M	254	210	108	M16	42 _{k6}	110	12	45	160	22	15	FF300	17	300	250	350	18	4	5
160 L	254	254	108	M16	42 _{k6}	110	12	45	160	22	15	FF300	17	300	250	350	18	4	5
180 M	279	241	121	M16	48 _{k6}	110	14	51,5	180	22	15	FF300	18	300	250	350	18	4	5
180 L	279	279	121	M16	48 _{k6}	110	14	51,5	180	22	15	FF300	18	300	250	350	18	4	5
200L	318	305	133	M20	55	110	16	59	200	32	19	FF350	21	350	300	400	18	4	5
225S	356	286	149	M20	60	140	18	64	225	34	19	FF400	22	400	350	450	18	8	5
225M2	356	311	149	M20	55	110	16	59	225	34	19	FF400	22	400	350	450	18	8	5
225M4-8	356	311	149	M20	60	140	18	64	225	34	19	FF400	22	400	350	450	18	8	5
250M2	406	349	168	M20	60	140	18	64	250	37	24	FF500	24	500	450	550	18	8	5
250M4-8	406	349	168	M20	65	140	18	69	250	37	24	FF500	24	500	450	550	18	8	5
280S2	457	368	190	M20	65	140	18	69	280 ₋₁	40	24	FF500	25	500	450	550	18	8	5
280S4-8	457	368	190	M20	75	140	20	79,5	280 ₋₁	40	24	FF500	25	500	450	550	18	8	5
280M2	457	419	190	M20	65	140	18	69	280 ₋₁	40	24	FF500	25	500	450	550	18	8	5
280M4	457	419	190	M20	75	140	20	79,5	280 ₋₁	40	24	FF500	25	500	450	550	18	8	5
315S2	508	406	216	M20	65	140	18	69	315 ₋₁	46	28	FF600	26	600	550 _{is6}	660	22	8	6
315S4-8	508	406	216	M20	80	170	22	85	315 ₋₁	46	28	FF600	26	600	550 _{is6}	660	22	8	6
315M2	508	457	216	M20	65	140	18	69	315 ₋₁	46	28	FF600	26	600	550 _{is6}	660	22	8	6
315M4-8	508	457	216	M20	80	170	22	85	315 ₋₁	46	28	FF600	26	600	550 _{is6}	660	22	8	6

Overall dimensions [mm]

Frame	AA	AB	AC	AD	AD1	BA1	BA2	BB	BC±3	BL	HD	HD1	L	LB	d _{zas}	
															min	max
															160 M	60
160 L	60	300	360	185	315	60	60	300	23	60	475	440	710	650	20	25
180 M	65	330	400	185	335	65	105	330	27	65	515	480	765	715	26	31
180 L	65	330	400	185	335	65	105	330	27	65	515	480	765	715	26	31
200L2-8	80	400	465	190	400	105	105	388	44	70	600	560	810	770	32	37
225S4-6	85	445	510	190	420	115	120	385	47	75	645	610	860	795	32	37
225M2	85	445	510	190	420	115	120	385	47	75	645	610	830	795	32	37
225M4-8	85	445	510	190	420	115	120	385	47	75	645	610	860	795	32	37
250M2	95	495	550	190	440	120	120	445	57	85	690	670	915	850	38	43
250M4-8	95	495	550	190	440	120	120	445	57	85	690	670	915	850	38	43
280S2	100	560	620	190	485	140	170	500	51	85	765	770	1060	995	44	49
280S4-8	100	560	620	190	485	140	170	500	51	85	765	770	1060	995	44	49
280M2	100	560	620	190	485	140	170	500	51	85	765	770	1060	995	44	49
280M4-8	100	560	620	190	485	140	170	500	51	85	765	770	1060	995	44	49
315S2	105	610	625	190	500	140	185	550	45	130	815	770	1210	1150	52	55
315S4-8	105	610	625	190	500	140	185	550	45	130	815	770	1240	1150	52	55
315M2	105	610	625	190	500	140	185	550	45	130	815	770	1210	1150	52	55
315M4-8	105	610	625	190	500	140	185	550	45	130	815	770	1240	1150	52	55

Bearings

Frame	Speed [rpm]							
	3000		1500		1000		750	
	D ¹	ND ²	N	ND	N	ND	N	ND
160	6309 2ZC3		6309 2ZC3		6309 2ZC3		6309 2ZC3	
180	6311 2ZC3		6311 2ZC3		6311 2ZC3		6311 2ZC3	
200	NU 312	6312 C3	NU 312	6312 C3	NU 312	6312 C3	NU 312	6312 C3
225	NU 313	6313 C3	NU 313	6313 C3	NU 313	6313 C3	NU 313	6313 C3
250	NU 315	6315 C3	NU 315	6315 C3	NU 315	6315 C3	NU 315	6315 C3
280	NU 315	6315 C3	NU 317	6317 C3	NU 317	6317 C3	NU 317	6317 C3
315	NU 315	6315 C3	NU 318	6318 C3	NU 318	6318 C3	NU 318	6318 C3

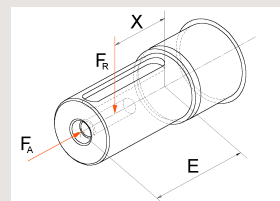
¹ Drive end side

² Non drive end side

PERMISSIBLE FREE SHAFT END LOAD (ON DRIVE SIDE)

Frame	Radial load		Axial load			Weight of rotor [kg]
	x=0 [N]	x=E [N]	horizontal [N]	vertical		
				down [N]	up [N]	
160M2A	2000	1500	1500	1300	1800	24
160M2B	1900	1500	1500	1200	1800	27
160M4	2500	2000	2100	1800	2400	29
160M6	3000	2300	2400	2100	2700	30
160M8A	3400	2700	2700	2500	3000	26
160M8B	3300	2600	2700	2400	3000	30
160L2	1900	1500	1400	1200	1800	31
160L4	2400	1900	2100	1800	2500	35
160L6	2800	2200	2400	2000	2800	39
160L8	3200	2500	2700	2300	3100	37
180M2	2600	2200	2100	1700	2500	37
180M4	3400	2800	2900	2500	3400	45
180L4	3300	2700	2800	2400	3400	50
180L6	3800	3200	3300	2800	3900	55
180L8	4300	3500	3600	3100	4200	55
200L2A	8500	6900	2100	1600	2600	50
200L2B	8300	6800	2000	1500	2700	56
200L4	10300	8400	2600	2000	3400	70
200L6A	11700	9600	3300	2700	4200	77
200L6B	11600	9500	3300	2600	4200	84
200L8	12800	10500	3700	3000	4600	81
225S4	12600	9900	2900	2200	3700	75
225S8	15700	12300	4100	3400	5000	81
225M2	10100	8300	2200	1700	2900	62
225M4	12400	9700	2800	2100	3800	87
225M6	14000	11000	3300	2400	4400	98
225M8	15500	12200	4100	3200	5100	94
250M2	13700	10900	2800	2100	3700	81
250M4	16700	13300	3500	2600	4700	108
250M6	18800	15000	4000	2800	5600	141
250M8	20600	16400	4900	3700	6500	141
280S2	13800	11400	2800	1800	4200	119
280S4	20900	17300	4100	2800	5900	158
280S6	24100	20000	4900	3600	6500	146
280S8	26300	21800	6000	4600	7800	156
280M2	13600	11300	2800	1700	4200	129
280M4	20700	17100	4100	2500	6100	176
280M6	23900	19800	4800	3400	6700	164
280 M8	25900	21500	5300	3700	7300	182
315s2	13600	11700	2900	1500	4700	160
315S4	22500	18800	4600	2800	6900	205
315S6	25500	21300	5300	3200	8000	237
315S8	28100	23400	6600	4500	9300	237
315M2A	13500	11600	2800	1300	4700	170
315M2B	13400	11500	2700	1100	4800	186
315M4A	22400	18600	4600	2500	7100	227
315M4B	22200	18500	4400	2300	7200	245
315M6A	25400	21100	5300	3000	8100	253
315M6B	25100	20900	5000	2500	8300	289
315M8A	27900	23300	5900	3600	8700	253
315M8B	27700	23000	5600	3100	8900	289

- 1 Permissible load as a function of X is linear in the range from X=0 to X=E.
2. $L_h = 30000h$ – bearings life
3. For $L_h = 40\ 000h$ above values decrease about 20%



The manufacturer reserve the right to introduce operating parameter and dimension changes in course of modernisation

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