cranes

SIEMENS

Electric Motors For Hoisting / Crane Duty

Siemens CHAMPION series Crane and Hoist duty motors are suitable for short time and intermittent duties. These motors are specially designed for frequent starts/stops and reversals. The Motors are available in the wide range. These motors have a high efficiency and high uptime. Consequently the productivity is higher and energy consumption lower. The motors have low life cycle costs, hence great saving!!!

Diverse Applications

These motors are widely used in following application:

- Crane duty and Hoist duty application including LT and CT Drives
- Material Handling
- Weirs and sluices
- Lift duty

Voltage and Frequency

These motors are suitable for 415V ±10%, 50Hz ±5%, combined ±10%, 3 phase AC supply. Other voltages can be provides on request.

Ambient Temperature

All motors in normal design are suitable for an ambient temperature up to 50°C.

Insulation

Insulation system comprises dual coat enameled wires with a temperature class200 and widely proven NOMEX based insulating material combined with alkyd-based varnish. The system ensures high thermal, mechanical and electrical strength and also long life for the motors.The insulation system offers excellent protection for the windings against corrosive gases, vapours, dust, oil and high humidity, as well as excellent resistance to the normal stresses of vibration.

Standards

Performance conforms to IS:325 and dimensions conform to IS:1231, IS:8223.

Degree of Protection

Motors are designed for degree of protection IP 55 according to IS:4691

Paint

The normal paint is in shade RAL 7030(Dusty Grey). This paint is suitable for climate group 'worldwide' as per DIN IEC 60721 Part 2-1, and also for aggressive atmospheres upto 1% acid and alkali concentration or permanent dampness in sheltered rooms.

Operation with VFDs

Operation of the motors with 'MASTER DRIVES' - Variable voltage, Variable frequency drives - is possible at voltages< 500V. It is also possible to use these motors with PWM drive converters with voltage rise times of t S > 0.1µs at the motor terminals.

Rating Plate

The 50Hz data, and 'CE ' marking are provided on the rating plate of all motors.

Winding Connection

The motors rated up to 1.5kW will be 'Star Connected for 415V / 50Hz supply, and 6 leads will be brought out to the terminal box.The motors rated 2.2kW and above will have 6 leads of the windings brought out inthe terminal box and have to be connectedin 'Delta' for 415V / 50Hz supply.

Cooling Fan and Fan cover

The external cooling fan is of anti-static,thermo-plastic and is suitable for both directions of rotation. The fan cover is manufactured from corrosion resistant sheet steel.

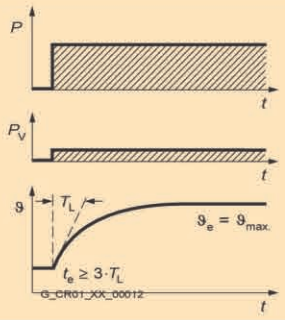
Terminal box

The terminal boxes for all the motors are mounted on top as a standard. Other sides can be provided on request.

Continuous duty (S1)

Definition

Operation with a constant load state, the duration of which is sufficient to attain thermal equilibrium.



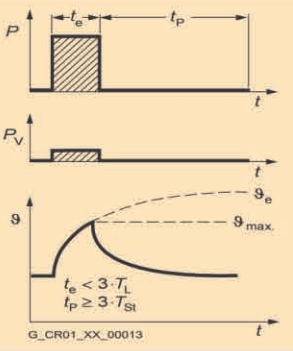
Explanation

The operating time t_e of the motor must be greater than 3 x T_L to ensure that thermal equilibrium is attained. The rated motor output for continuous duty must be designed such that the final temperature ϑ_e matches the permissible winding temperature. Start-up is deliberately discounted under the assumption that a single high-inertia start will not achieve the final temperature. The length of the subsequent idle time is insignificant. Caution is advised, however, when high-inertia starting is carried out on a warm machine or when a machine is started up several times in succession. Certain restrictions may apply or advice from a third party should be sought.

Short-time duty (S2)

Definition

Operation with a constant load state which does not, however, last long enough to attain thermal equilibrium, followed by idle time that lasts until the machine temperature differs from the coolant temperature by no more than 2 K.



Explanation

The operating time t_e must be less than 3 x T_L to ensure that the theoretical final temperature is not reached. The rated motor output and the operating time are harmonized in such a way that the maximum winding temperature ϑ_{max} does not exceed the permissible values. Here, too, start-up is deliberately discounted because it is assumed that the machine starts up cold and the start-up procedure is short with respect to the operating time t_e.

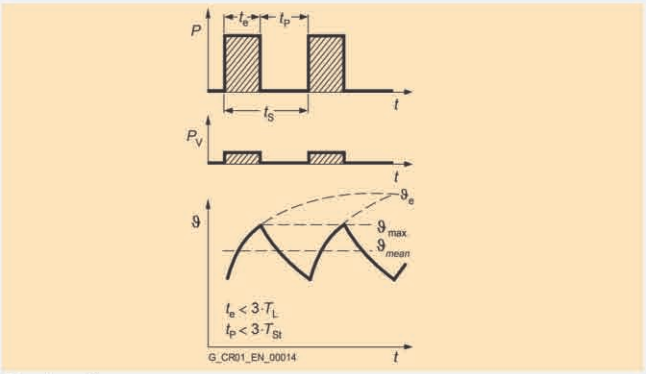
The rated motor output for short-time duty can be higher than for continuous duty, although the permissible operating time must also be specified. The shorter the operating time, the higher the rated output of the machine. Operating times of 10, 30, 60, and 90 min are recommended (see also "Selection and ordering data" for "1LT9 and 1LT8 three-phase slip ring motors ").

The subsequent idle time must be sufficiently long to ensure that the machine can cool back down to the ambient temperature (i.e. t_P is greater than or equal to 3 x T_{St}) because otherwise the maximum temperature will be exceeded the next time a similar duty cycle is carried out.

Intermittent duty without the effect of the start-up process (S3)

Definition

Operation that involves a sequence of similar duty cycles, each with a constant-load period and idle time, whereby the starting current does not have a noticeable effect on the temperature rise (the duty cycle duration is generally short enough to ensure that thermal equilibrium is not attained).



Explanation

The operating time t_e must be less than 3 x T_L to ensure that the theoretical final temperature ϑ_e is not reached. The subsequent idle time t_p, however, is also less than 3 x T_{St}, which means that the ambient temperature is no longer reached. A mean steady-state value ϑ_{mean} develops around which the temperature varies, but is below the theoretical final temperature ϑ_e.

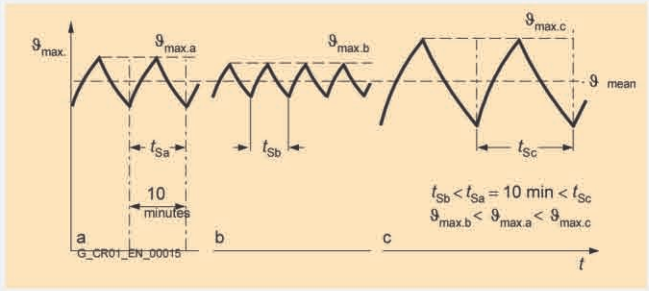
The rated motor output during intermittent duty is greater than during continuous duty. The time constants T_L and T_{St} may be different. This influences the rated output during intermittent duty and is taken into account in the S3 motor tables.

To determine the most suitable motor, therefore, a knowledge of the operating and idle times is required in addition to the required output during the operating time. These are specified by the duty cycle duration (total time) and the cyclic duration factor (CDF) as a percentage of the duty cycle duration. If the duty cycle duration is not specified, it is assumed to be 10 minutes (in accordance with EN 60034-1). The S3 motor tables are based on this value. Values of 15, 25, 40, and 60% are recommended for the cyclic duration factor.

Effect of varying duty cycle durations

The S3 rated output is designed in such a way that the temperature peaks ϑ_{max} match the permissible values with a 10 minute duty cycle duration (see "a" in diagram below). Shorter duty cycle durations are not critical because lower temperature peaks occur at the same mean winding temperature ϑ_{mean} (see "b" in diagram below). Since longer duty cycle durations result in higher temperature peaks (see "c" in diagram below) which, in turn, reduce the service life of the insulation, advice from a third party should be sought in this case.

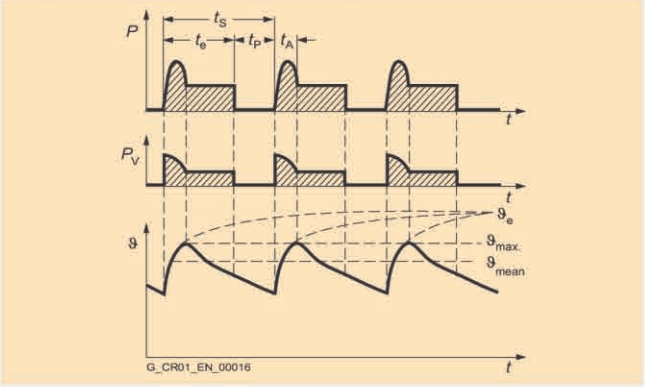
In S3 duty, the start-up processes are not discounted; the relevant standard assumes that they do not have any significant influence on the temperature rise. Any number of duty cycles can be carried out per hour provided that this standard is fulfilled.



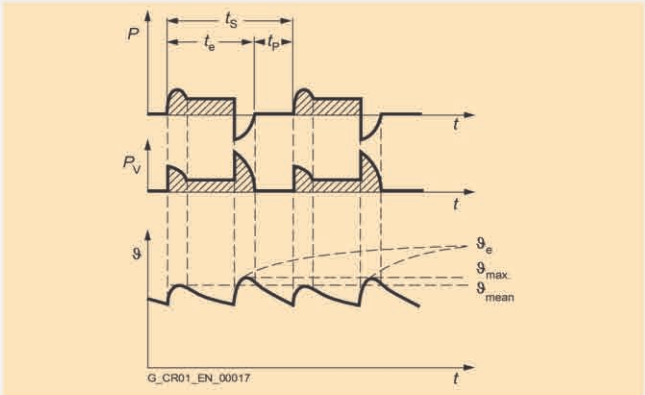
Intermittent duty with effect of the start-up process (S4) Intermittent duty with effect of the start-up process and electrical braking (S5)

Definition

Operation that involves a sequence of similar duty cycles, each with a noticeable start-up time, a constant-load period, a period of rapid electrical braking (with S5), and idle time.



Intermittent duty S4



Intermittent duty S5

Explanation

These operating modes closely resemble S3 duty, except that the temperature rise caused by start-up and, in some cases, electrical braking is also detected. This additional power loss depends on the acceleration torque and the time in which this occurs; in other words, it depends on the linear and rotating masses to be accelerated (kinetic energy). The masses that are moved, therefore, must be known. These are based on the moment of inertia referred to the motor shaft. How often and over what period of time the masses are subject to acceleration and braking procedures must also be known.

The more duty cycles performed by the drives in hoisting gear in each hour (e.g. short traveling distances or low hoisting heights), the greater the importance of the acceleration work for motor dimensioning purposes.

To accurately dimension a motor for operating modes S4 and S5, therefore, the following specifications are required in addition to the steady-state output:

- Cyclic duration factor (CDF)
- External moment of inertia
- Acceleration or acceleration torque
- Accelerating time
- Number of working cycles per hour.

General performance specifications for motors in S4/S5 duty are not possible because they always vary depending on the specific conditions under which the driven machine is operating (external moment of inertia) and the operating mode (working cycles, ON duration). The hoisting gear drives do not have a constant load across several working cycles but instead have a collective load.

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Permissible output for S4 Duty

1LA0 TEFC Squirrel Cage Motors frame size (63 - 132M)

Degree of protection IP55, Insulation Class F, Ambient 50°C, 415V±10%, 50Hz±5%, combined V and F variation ±10%
Basic design
Factor of Inertia , FI = 2, i.e. M.I. of load is equal to M.I. of motor

Standard Output, (S1-duty) kW	Frame	Motor type	Output in kW S4-Duty					
			CDF 25%		CDF 40%		CDF 60%	
			90 starts / hr	150 starts / hr	90 starts / hr	150 starts / hr	90 starts / hr	150 starts / hr
1500 RPM, 4 POLE, 50Hz								
0.12	63	1LA0 060-4	0.16	0.16	0.15	0.14	0.13	0.13
0.18	63	1LA0 063-4	0.25	0.24	0.22	0.22	0.20	0.19
0.25	71	1LA0 070-4	0.34	0.33	0.31	0.30	0.27	0.27
0.37	71	1LA0 073-4	0.52	0.51	0.46	0.45	0.41	0.40
0.55	80	1LA0 080-4	0.79	0.76	0.69	0.67	0.61	0.59
0.75	80	1LA0 083-4	1.05	1.00	0.92	0.89	0.82	0.80
1.1	90S	1LA0 090-4	1.50	1.50	1.30	1.30	1.20	1.10
1.5	90L	1LA0 096-4	2.10	2.00	1.80	1.70	1.60	1.50
2.2	100L	1LA0 106-4	3.00	2.90	2.60	2.50	2.30	2.30
3	100L	1LA0 107-4	4.00	3.80	3.50	3.30	3.10	3.00
3.7	112M	1LA0 113-4	4.60	4.40	4.10	3.90	3.70	3.50
5.5	132S	1LA0 130-4	6.40	5.60	5.70	5.00	5.20	4.60
7.5	132M	1LA0 133-4	9.00	8.00	8.00	7.20	7.20	6.60
1000 RPM, 6 POLE, 50Hz								
0.18	71	1LA0 070-6	0.24	0.24	0.22	0.21	0.20	0.19
0.25	71	1LA0 073-6	0.35	0.34	0.31	0.31	0.28	0.27
0.37	80	1LA0 080-6	0.54	0.52	0.46	0.45	0.41	0.40
0.55	80	1LA0 083-6	0.80	0.77	0.70	0.67	0.61	0.60
0.75	90S	1LA0 090-6	1.10	1.10	0.90	0.97	0.85	0.84
1.1	90L	1LA0 096-6	1.70	1.60	1.40	1.40	1.20	1.20
1.5	100L	1LA0 106-6	2.00	1.90	1.80	1.70	1.60	1.50
2.2	112M	1LA0 113-6	2.90	2.70	2.50	2.40	2.30	2.20
3.7	132S	1LA0 131-6	4.70	4.30	4.10	3.90	3.70	3.50
5.5	132M	1LA0 134-6	6.70	6.10	5.90	5.50	5.40	5.00
750 RPM, 8 POLE, 50Hz								
0.12	71	1LA0 070-8	0.13	0.13	0.12	0.12	0.12	0.11
0.18	80	1LA0 080-8	0.22	0.22	0.21	0.21	0.19	0.19
0.25	80	1LA0 083-8	0.31	0.31	0.30	0.29	0.27	0.26
0.37	90S	1LA0 090-8	0.49	0.48	0.46	0.45	0.41	0.41
0.55	90L	1LA0 096-8	0.72	0.71	0.68	0.67	0.62	0.60
0.75	100L	1LA0 106-8	1.00	0.96	0.90	0.88	0.81	0.80
1.1	100L	1LA0 107-8	1.40	1.30	1.20	1.20	1.10	1.10
1.5	112M	1LA0 113-8	1.80	1.70	1.70	1.60	1.50	1.40
2.2	132S	1LA0 131-8	2.90	2.70	2.50	2.40	2.30	2.20
3.7	132M	1LA0 134-8	4.90	4.70	4.30	4.10	3.90	3.70

1. Refer MTR 2.6-104 for details of order no suffix, the current in Amp at required output can be informed on request
2. Details applicable for non-forced braking
3. Enquiry should be made to in case F.I. >2
4. Refer fig 1 below for details of S4 duty cycle

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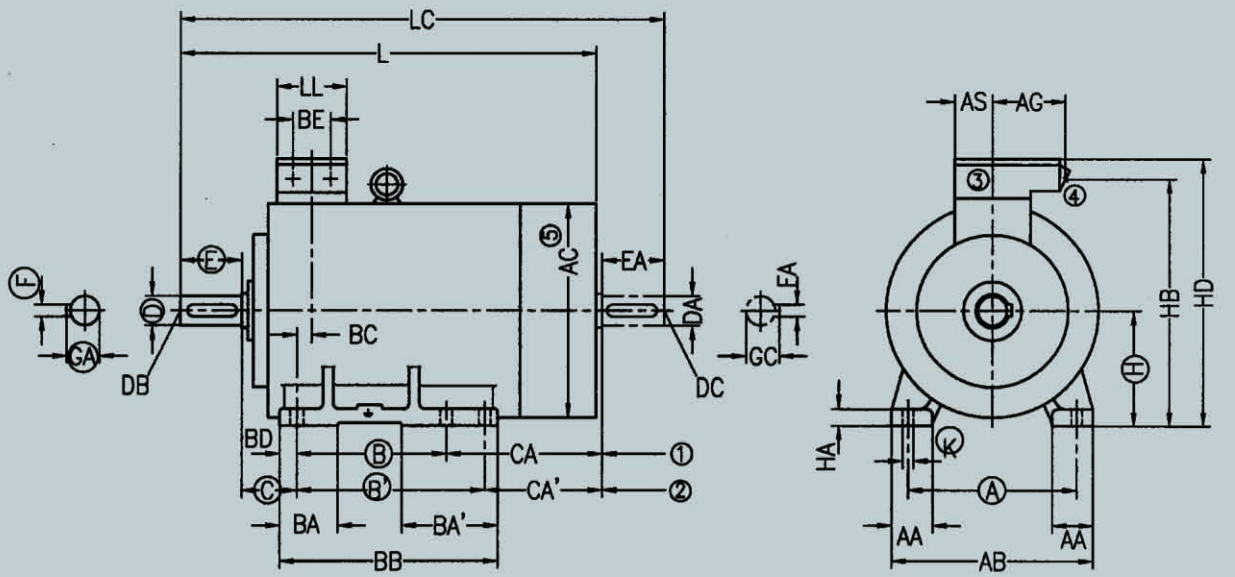
Output of motors (Champion & N-Compact) for crane duty application operated through VFD.

Champion Series Motors
Degree of protection IP 55, Insulation class F, Ambient 50°C
415V±10%, 50Hz±5%, Combined V and F variation ±10%

Motor Type	CDF = 25%		CDF = 40%		CDF = 60%		CDF = 100%	
	Output (kW)	Rated Current (A)	Output (kW)	Rated Current (A)	Output (kW)	Rated Current (A)	Output (kW)	Rated Current (A)
	4 Pole							
1LA0163-4	15	29	13	25	12	23	11	21
1LA0166-4	20	38	18	34	16	30	15	29
1LA0183-4	26	48	23	42	20	37	18.5	34
1LA0186-4	31	57	27	49	24	44	22	40
1LA0207-4	40	72	37	66	33	59	30	54
1LA0221-4	52	90	46	80	41	71	37	64
1LA0224-4	63	109	56	97	50	86	45	78
1SE0254-4	78	136	69	120	61	106	55	96
1SE0281-4	106	183	96	166	85	147	75	130
1SE0284-4	127	221	115	200	102	177	90	157
1SE0311-4	150	257	141	242	124	213	110	189
1SE0314-4	180	308	169	289	149	255	132	226
1SE0318-4	218	368	205	346	181	306	160	270
1SE0319-4	255	429	230	387	204	343	180	303
	6 Pole							
1LA0163-6	10	21	9	18	8	16	7.5	15
1LA0166-6	15	29	13	26	12	24	11	22
1LA0186-6	19	37	19	37	16	31	15	30
1LA0206-6	24	47	23	45	20	39	18.5	36
1LA0207-6	28	54	27	52	24	46	22	42
1LA0223-6	39	73	37	69	33	62	30	56
1SE0254-6	48	88	46	84	41	75	37	67
1SE0281-6	58	103	56	99	50	89	45	80
1SE0284-6	71	125	69	122	61	108	55	97
1SE0311-6	106	184	94	163	84	146	75	130
1SE0314-6	127	220	113	196	101	175	90	156
1SE0318-6	156	270	139	240	123	213	110	190
1SE0319-6	165	284	165	284	148	255	132	227
	8 Pole							
1LA0164-8	7	16	7	16	6	14	5.5	13
1LA0166-8	9	20	9	20	8	18	7.5	17
1LA0186-8	13	29	13	29	12	27	11	25
1LA0207-8	18	37	18	37	16	33	15	31
1LA0220-8	23	45	23	45	20	39	18.5	36
1LA0223-8	27	55	27	55	24	49	22	44
1SE0254-8	37	70	37	70	33	62	30	57
1SE0281-8	46	86	46	86	41	77	37	69
1SE0284-8	56	103	56	103	50	92	45	83
1SE0311-8	75	137	69	126	61	111	55	100
1SE0314-8	102	185	94	171	84	152	75	136
1SE0318-8	122	220	113	204	101	182	90	162
1SE0319-8	150	270	139	250	123	221	110	198

Dimensions in mm – 1LA0 / (without brake)



① B is valid in all frames

② B' & CA' are valid for 90 frame only 90S: B=100 & CA=128, 90L: B'=125 & CA'=103

③ Terminal box can be rotated in steps of 90°

④ Conduit entry 1x¾" for frame size 63-90 & 2x1" for frame size 100-132, as per IS:1653

⑤ Measured over bolt heads

⑥ Shaft extension as per IS:1231

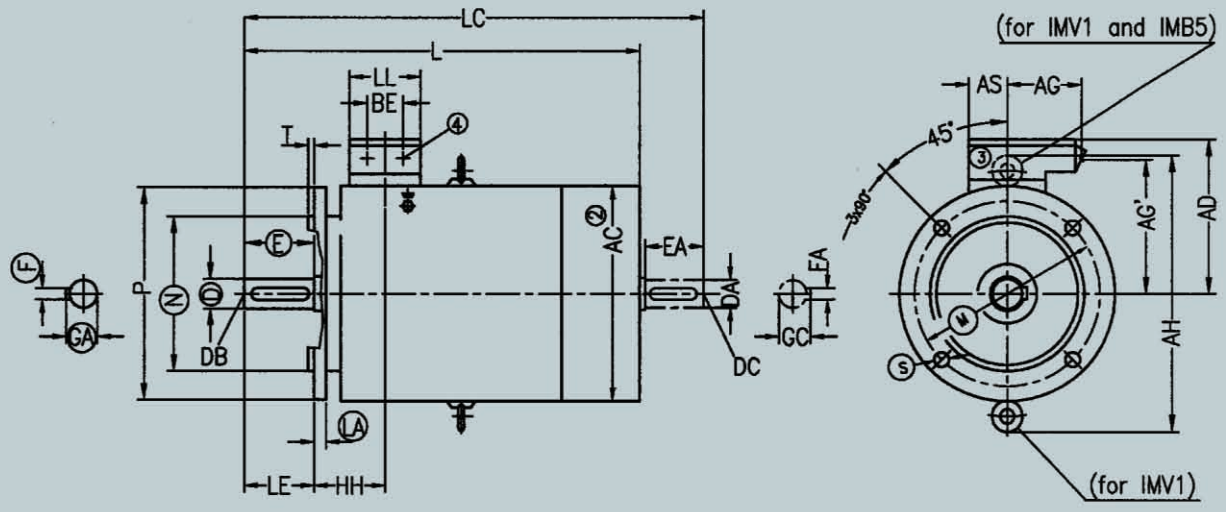
Mechanical Dimensions [Foot Mounted Motors (IMB3)]

Frame Size	A	AA	AB	AC	AG	AS	B	BA	BA'	BB	BC	BD	BE	C	CA	H	HA
63	100	27	122	132	44.5	44.5	80	26	26	102	19.5	11	–	40	70	63	6
71	112	28	134	148	44.5	44.5	90	26	26	112	15.5	11	–	45	77	71	7
80 $	125	29	150	168	44.5	44.5	100	30	30	124	15.5	12	–	50	96	80	9
90S/L #	140	32	168	190	44.5	44.5	②	32	57	149	23.5	12	–	56	②	90	10
100L	160	43	200	208	82	50	140	46	46	180	25.5	20	40	63	117	100	14
112M	190	52	230	233	82	50	140	47	47	180	19	20	40	70	134	112	15.5
132S	216	53	256	274	82	50	140	46	46	180	12	20	40	89	149	132	16
132M	216	53	256	274	82	50	178	46	46	218	12	20	40	89	149	132	16

Frame Size	HB	HD	K	L	LC	LL	Shaft Extension									
							Drive End					Non-drive End				
							D	DB	E	F	GA	DA	DC	EA	FA	GC
63	140.5	169	7	208	236	89	11	M4x9	23	4	12.5	11	M4x9	23	4	12.5
71	157	186	7	240	272	89	14	M5x12	30	5	16	14	M5x12	30	5	16
80 $	176	204	10	282	326	89	19	M6x16	40	6	21.5	19	M6x16	40	6	21.5
90S/L #	194.5	223	10	326	374	89	24	M8x20	50	8	27	19	M6x16	40	6	21.5
100L	224.5	256	12	373	430	112	28	M10x24	60	8	31	24	M8x20	50	8	27
112M	249.5	281	12	398	454	112	28	M10x24	60	8	31	24	M8x20	50	8	27
132S	289	320	12	452	538	112	38	M12x28	80	10	41	38	M12x28	80	10	41
132M	289	320	12	490	576	112	38	M12x28	80	10	41	38	M12x28	80	10	41

Definitive Dimensions:
A, B, B', C, H, K, D, E, F, GA are binding dimensions for all standard motors.
All other dimensions are subject to change. For valid dimensions, please contact Regional Office in your region.
$ for 1SE0 80 frame, add 20mm on L & LC dimensions
# for 1SE0 90 S/L frame, add 43mm on L & LC dimensions

Dimensions in mm – 1LA0 /(without brake)



① Shaft extension as per IS:1231
② Measured over bolt heads
③ Terminal box can be rotated in steps of 90°
④ Conduit entry 1x¾" for frame 63-90 & 2x1" for frame size 100-132, as per IS:1653
⑤ Flange as per IS:2223

Mechanical Dimensions [Flange Mounted Motors (IMB5)]

Frame Size	AC	AD	AG	AG'	AH	AS	BE	HH	L	LC	LE	LL
63	132	106	44.5	77.5	–	44.5	–	59.5	208	236	23	89
71	148	115	44.5	86	–	44.5	–	60.5	240	272	30	89
80 $	168	124	44.5	96	–	44.5	–	65.5	282	326	40	89
90S/L #	190	133	44.5	105	246	44.5	–	79.5	326	374	50	89
100L	208	156	82	125	270	50	40	88.5	373	430	60	112
112M	233	169	82	138	306	50	40	89	398	454	60	112
132S	274	188	82	157	350	50	40	101	452	538	80	112
132M	274	188	82	157	350	50	40	101	490	576	80	112

Frame Size	Shaft Extension										Flange						
	Drive End					Non-drive End						⑤					
	D	DB	E	F	GA	DA	DC	EA	FA	GC	Number	LA	M	N	P	S	T
63	11	M4x9	23	4	12.5	11	M4x9	23	4	12.5	F115B	9	115	95	140	10	3
71	14	M5x12	30	5	16	14	M5x12	30	5	16	F130B	9	130	110	160	10	3.5
80 $	19	M6x16	40	6	21.5	19	M6x16	40	6	21.5	F165B	10	165	130	200	12	3.5
90S/L #	24	M8x20	50	8	27	19	M6x16	40	6	21.5	F165B	10	165	130	200	12	3.5
100L	28	M10X24	60	8	31	24	M8x20	50	8	27	F215B	11	215	180	250	15	4
112M	28	M10X24	60	8	31	24	M8x20	50	8	27	F215B	11	215	180	250	15	4
132S	38	M12x28	80	10	41	38	M12x28	80	10	41	F265B	12	265	230	300	15	4
132M	38	M12x28	80	10	41	38	M12x28	80	10	41	F265B	12	265	230	300	15	4

Definitive Dimensions:
M, N, S, D, E, F, GA and LA are binding dimensions for all standard motors.
All other dimensions are subject to change. For valid dimensions, please contact Regional Office in your region.
$ for 1SE0 80 frame, add 20mm on L & LC dimensions
# for 1SE0 90 S/L frame, add 43mm on L & LC dimensions

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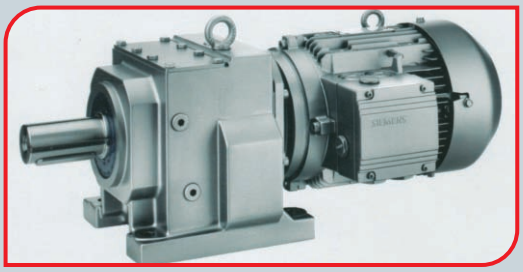
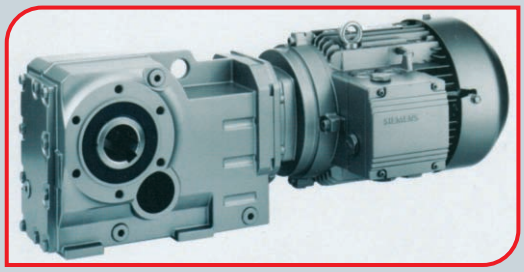
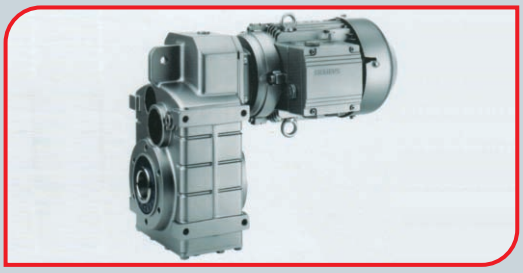
OTHER RANGE OF PRODUCTS



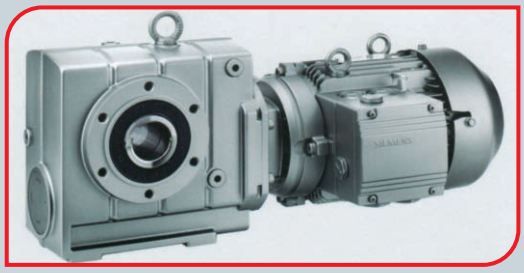
Helical Geared Motors



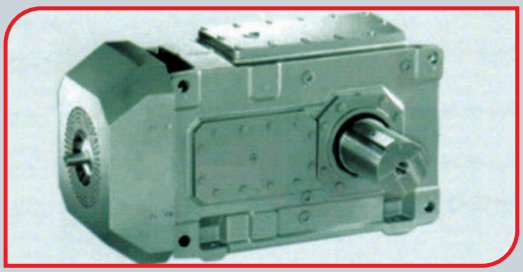
Helical Bevel Geared Motors



Parallel Shaft Geared Motors



Helical Worm Geared Motors



Siemens Gear Box

Brake Motors

Spl. MOTORS

TDEC

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