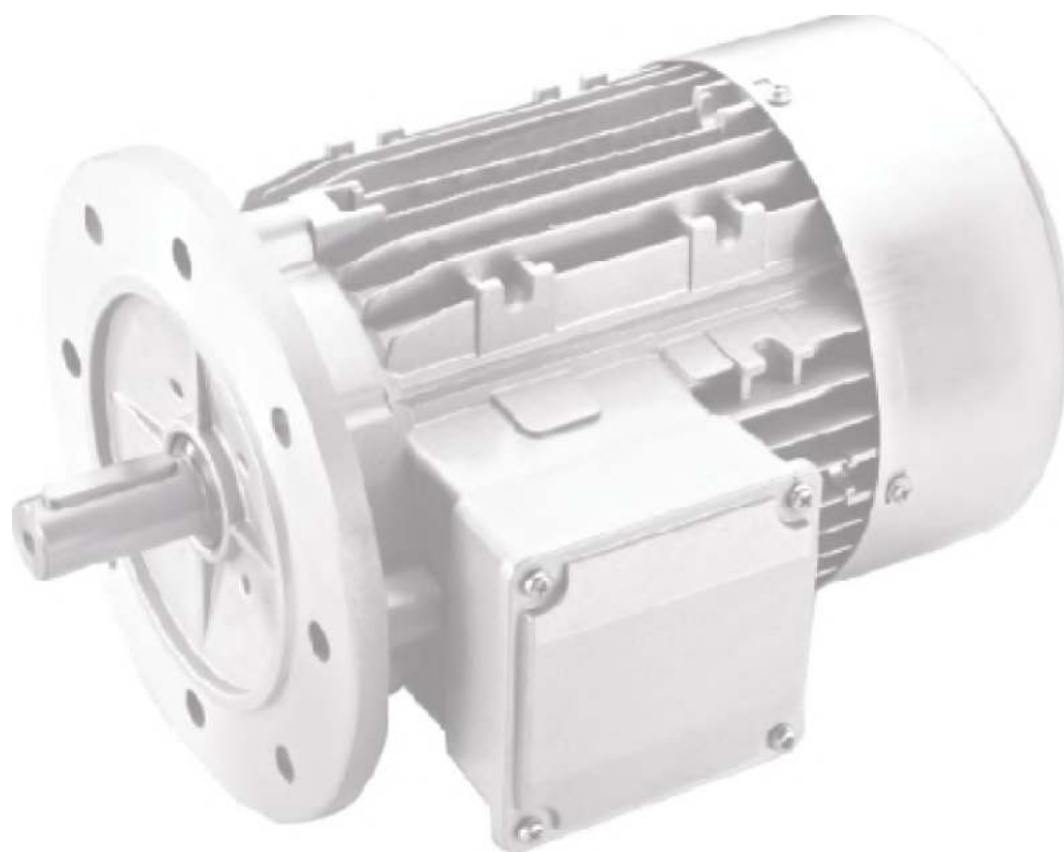





J.K. Fenner (India) Limited



FM Series Motor



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1. INTRODUCTION

Fenner offers three phase asynchronous motors from 63 frame size to 112 frame in 2, 4 & 6 pole and conform to efficiency class **Eff2**

2. ELECTRICAL TOLERANCE

Values for	Tolerance
Efficiency η – machines up to and include 50 kW	-0.15 (1 – η)
Power-factor, $\cos\phi$, for induction motors	$-(1-\cos\phi)/6$ Minimum absolute value 0.02 Maximum absolute value 0.07
Slip of induction motors (at full load and at working temperature) $P_N < 1$ kW $P_N \geq 1$ kW	$\pm 30\%$ of the slip $\pm 20\%$ of the slip
Locked rotor current of cage induction motors	+20% of the current
Locked rotor torque of cage induction motors	-15% and +25% of the torque
Breakdown torque of induction motors	-10%
Moment of inertia	$\pm 10\%$ of the value

3. MECHANICAL TOLERANCE

Component	Code	Dimensions	Tolerance
Shaft End	D - DA	$\emptyset 11$ to 28	j6
Key	F - FA		h9
Flange	N	$\emptyset < 250$	j6
		$\emptyset \geq 250$	h6

4. VOLTAGE & FREQUENCY

The motors are suitable for 415 Voltage $\pm 10\%$, Frequency 50Hz $\pm 5\%$ with 3 phase in Star connection.

The motors are suitable for 240 Voltage $\pm 10\%$, Frequency 50Hz $\pm 5\%$ with 3 phase in delta connection.

5. INSULATION

The motor insulating materials (Enameled wire, Surface insulation treatments & impregnation type) are provided with class F & temperature rise limited to class B.

6. TYPE OF DUTY

S1 Duty (Continuous Duty) – The motor operated under rated condition continuously.

7. AMBIENT TEMPERATURE

All motors in our standard design are suitable for an ambient temperature from -15°C to $+50^{\circ}\text{C}$ and altitude above sea level $\leq 1000\text{m}$. Motors can be used at ambient temperatures from 50°C to 60°C as long as the derating factors listed as below table are applied:

Ambient temperature ($^{\circ}\text{C}$)	50°	55°	60°
% of rated power	100%	95%	90%













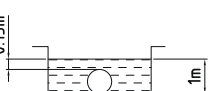
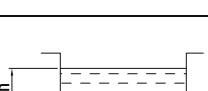
8. BEARINGS

All motors are fitted with life lubricated radial ball bearings and the types of bearings in use are listed in the below table.

FRAME SIZE	DRIVE END	NON-DRIVE END (FAN SIDE)
63	6201-2Z/C3 (Special Grease)	6201-2Z/C3 (Special Grease)
71	6202-2Z/C3 (Special Grease)	6202-2Z/C3 (Special Grease)
80	6204-2Z/C3	6204-2Z/C3
90	6205-2Z/C3	6205-2Z/C3
100	6206-2Z/C3	6206-2Z/C3
112	6207-2Z/C3	6207-2Z/C3

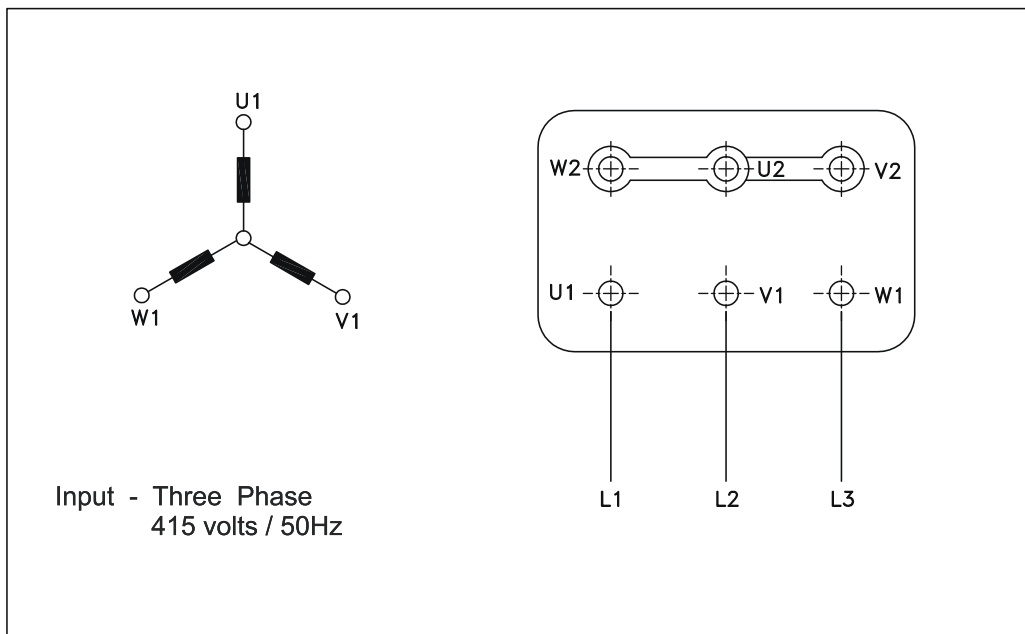
9. PROTECTION CLASS

Motors are designed with standard IP55 protection class. For outdoor installation, motors has to be protected from direct sunlight and if mounted vertically with shaft downwards, The rain canopy must be provided.

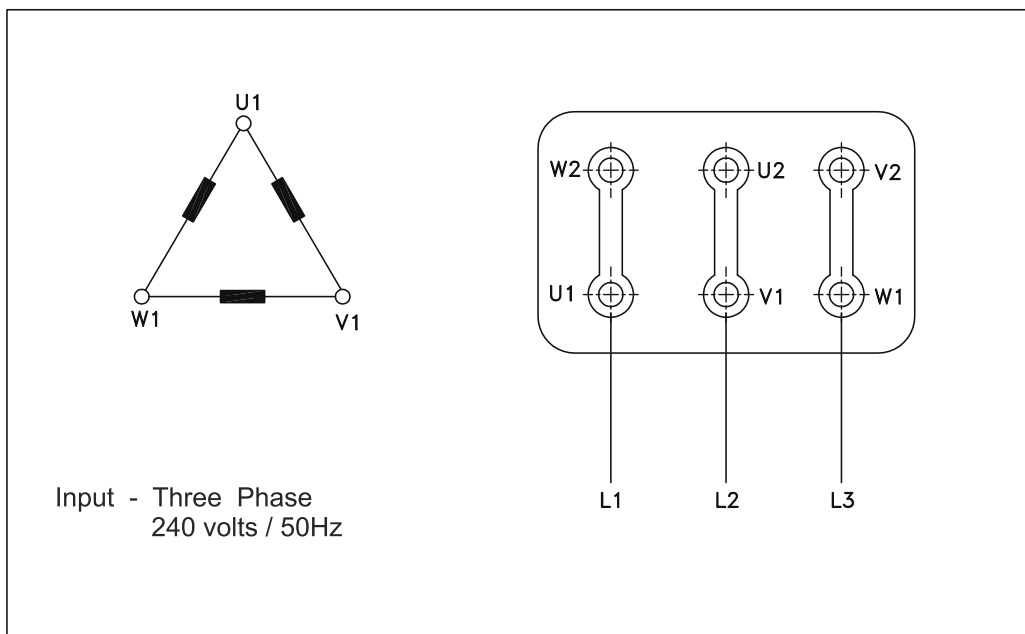
IP		5	5
0		No special protection	
1		Protection against solid foreign bodies having $\geq 50 \text{ mm } \varnothing$	
2		Protection against solid foreign bodies having $\geq 12.5 \text{ mm } \varnothing$	
3		Protection against solid foreign bodies having $\geq 2.5 \text{ mm } \varnothing$	
4		Protection against solid foreign bodies having $\geq 1 \text{ mm } \varnothing$	
5		Protected against dust	
6		Dust-tight	
0		No special protection	
1		Protected against vertical water drips	
2		Dripping water (15° tilted)	
3		Protected against spraying water	
4		Protected against splashing water	
5		Protected against jetting water	
6		Protected against powerful jetting water	
7		Protected against temporary immersion	
8		Protected against continuous immersion	

10. CONNECTION DIAGRAMS

STAR CONNECTION



DELTA CONNECTION

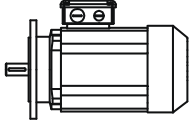
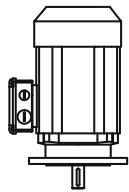
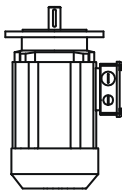
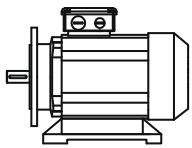
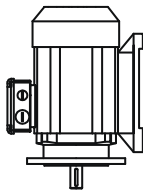
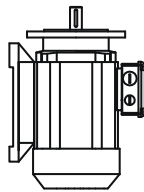
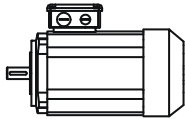
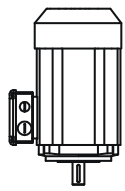
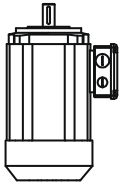
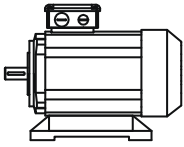
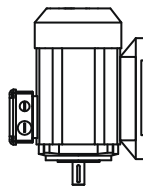
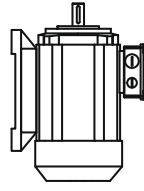
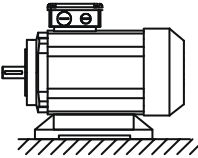
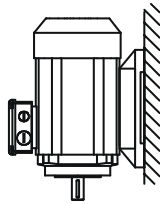
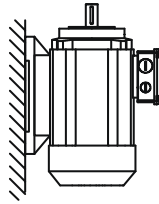
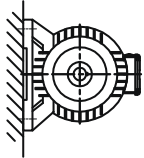
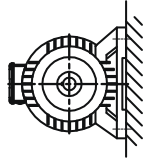
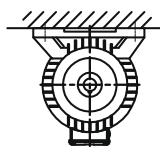


11. BRAKE DETAILS

The brake motors are fitted with DC type fail safe brake with a brake power supply of 240V \pm 10%.

PRINCIPLE OF OPERATION : When electric current is given to the brake coil the armature plate is attracted to the stator against the spring force, thus releasing the rotor. When current is cut off, strong compression springs push the armature plate back to its original position, which clamps the friction plate providing the braking torque.

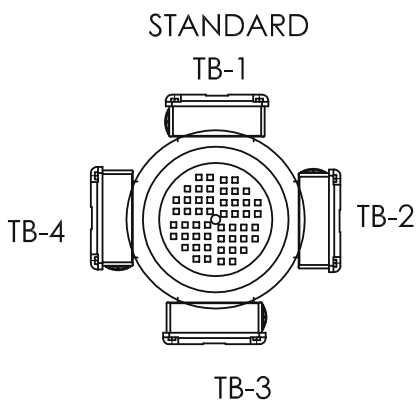
12. MOUNTING POSITIONS DIAGRAM

FLANGE MOUNT			FLANGE AND FOOT MOUNT		
					
IM - B5	IM - V1	IM - V3	IM - B3 / B5	IM - V5 / V1	IM - V6 / V3
SHORT (FACE) MOUNT			SHORT (FACE) AND FOOT MOUNT		
					
IM - B14	IM - V18	IM - V19	IM - B3 / B14	IM - V5 / V18	IM - V6 / V19
FOOT MOUNT					
					
IM - B3	IM - V5	IM - V6	IM - B6	IM - B7	IM - B8

13. MODEL DESIGNATION

FM 63 A	4	B5	DCB	SPL. OPTIONS
MOTOR SIZE	Number Of Poles	Mounting	DC Brake	
FM 63 A (or) FM 63 B (or) FM 71 A (or) FM 71 B (or) FM 80 A (or) FM 80 B (or) FM 90 S (or) FM 90 L (or) FM 100 L (or) FM 112 M	2 Pole (or) 4 Pole (or) 6 Pole	B5 - Flange (or) B14 - Sort Flange (or) B3 - Foot (or) B3 / B5 - Foot With Flange (or) B3 / B14 - Foot with Sort Flange	190 DC Volts with Release Lever	Option - 1 TB - 1 (or) TB - 2 (or) TB - 3 (or) TB - 4 Option - 2 - D-ES Option - 3 - N-ES Option - 4 - FC

Option - 1 : Terminal Box Position

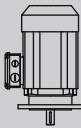
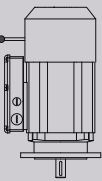


Option - 2 : Driven Side Extension Shaft (D-ES)

Option - 3 : Non Driven Side Extension Shaft (N-ES)

Option - 4 : Forced Cooling Fan (FC)

14. MOTOR ELECTRICAL PERFORMANCE CHART FOR 2 POLE

Model 	Rated Output		Frame Size	Pole	Rated Speed RPM	Rated Current at 415V,50HZ		Efficiency (100%)	Efficiency (75%)	Power Factor cosφ	Rated Torque Nm	Locked Rotor Current / Rated Current	Break Down Torque / Rated Torque	Locked Rotor Torque / Rated Torque	GD ² of Rotor kgfm ²	IM B5 Motor Weight Kg	DC Brake Motor 	DC Brake Torque Nm
	HP	KW				A	A											
FM 63 A2	0.25	0.18	63	2	2772	0.54	0.93	61.83	59.67	0.81	0.62	5.1	3.0	2.3	0.0010	4.2	FM 63 A2 DCB	5
FM 63 B2	0.33	0.25	63	2	2803	0.74	1.28	65.50	62.84	0.79	0.85	6.0	3.8	3.0	0.0010	4.5	FM 63 B2 DCB	5
FM 71 A2	0.5	0.37	71	2	2790	1.02	1.77	64.91	63.03	0.85	1.27	5.5	3.1	2.3	0.0010	6	FM 71 A2 DCB	10
FM 71 B2	0.75	0.55	71	2	2820	1.45	2.51	68.90	66.48	0.84	1.86	6.7	4.0	3.1	0.0020	6.7	FM 71 B2 DCB	10
FM 80 A2	1	0.75	80	2	2811	1.62	2.80	76.85	77.02	0.87	2.55	5.5	2.8	1.7	0.0040	9.2	FM 80 A2 DCB	20
FM 80 B2	1.5	1.1	80	2	2773	2.23	3.86	78.29	79.95	0.89	3.79	4.9	2.4	1.4	0.0040	10.15	FM 80 B2 DCB	20
FM 90 S2	2	1.5	90	2	2838	3.01	5.21	80.91	81.62	0.87	5.05	6.0	2.8	1.5	0.0050	12.6	FM 90 S2 DCB	20
FM 90 L2	3	2.2	90	2	2847	4.31	7.46	83.04	83.45	0.87	7.40	6.5	3.1	1.7	0.0070	14.2	FM 90 L2 DCB	20
FM 100 L2	5	3.7	100	2	2865	6.86	11.88	84.79	85.17	0.90	12.33	7.2	3.4	1.8	0.0150	20.8	FM 100 L2 DCB	35

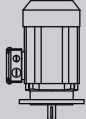
All Values Subject to Tolerance as per IS325.

15. MOTOR ELECTRICAL PERFORMANCE CHART FOR 4 POLE

Model	Rated Output		Frame Size	Pole	Rated Speed	Rated Current		Rated Current at 240V, 50HZ	Efficiency (100%)	Efficiency (75%)	Power Factor	Rated Torque	Locked Rotor Current / Rated Current	Break Down Torque / Rated Torque	Locked Rotor Torque / Rated Torque	GD ² of Rotor	IM B5 Motor Weight	DC Brake Motor Model	DC Brake Torque
	HP	KW				A	A												
FM 63 A4	0.16	0.12	63	4	1370	0.49	0.85	0.85	55.7	52.16	0.64	0.84	3.7	2.9	2.3	0.001	3.8	FM 63 A4 DCB	5
FM 63 B4	0.25	0.18	63	4	1363	0.71	1.23	1.23	56.63	53.53	0.66	1.26	3.7	2.8	2.2	0.001	4.2	FM 63 B4 DCB	5
FM 71 A4	0.33	0.25	71	4	1386	0.79	1.36	1.36	63.95	62.00	0.73	1.72	4.1	2.6	1.7	0.002	5.7	FM 71 A4 DCB	10
FM 71 B4	0.5	0.37	71	4	1387	1.11	1.92	1.92	67.08	65.74	0.72	2.55	4.2	2.6	1.6	0.003	6.5	FM 71 B4 DCB	10
FM 80 A4	0.75	0.55	80	4	1404	1.35	2.34	2.34	74.47	74.38	0.77	3.74	4.8	2.5	1.5	0.006	8.9	FM 80 A4 DCB	20
FM 80 B4	1	0.75	80	4	1404	1.82	3.15	3.15	75.73	75.70	0.77	5.10	4.9	2.6	1.6	0.007	10.1	FM 80 B4 DCB	20
FM 90 S4	1.5	1.1	90	4	1423	2.83	4.90	4.90	76.70	76.14	0.72	7.38	5.1	2.8	1.4	0.009	12	FM 90 S4 DCB	20
FM 90 L4	2	1.5	90	4	1421	3.60	6.23	6.23	79.24	79.12	0.74	10.10	5.2	2.8	1.4	0.012	14.5	FM 90 L4 DCB	20
FM 100 L4	3	2.2	100	4	1430	4.82	8.35	8.35	82.24	82.26	0.78	14.69	6.2	3.2	1.7	0.023	21.8	FM 100 L4 DCB	35
FM 112 M4	5	3.7	112	4	1440	7.46	12.92	12.92	84.95	85.02	0.82	23.80	6.4	3.2	1.5	0.047	31.2	FM 112 M4 DCB	65

All Values Subject to Tolerance as per IS325.

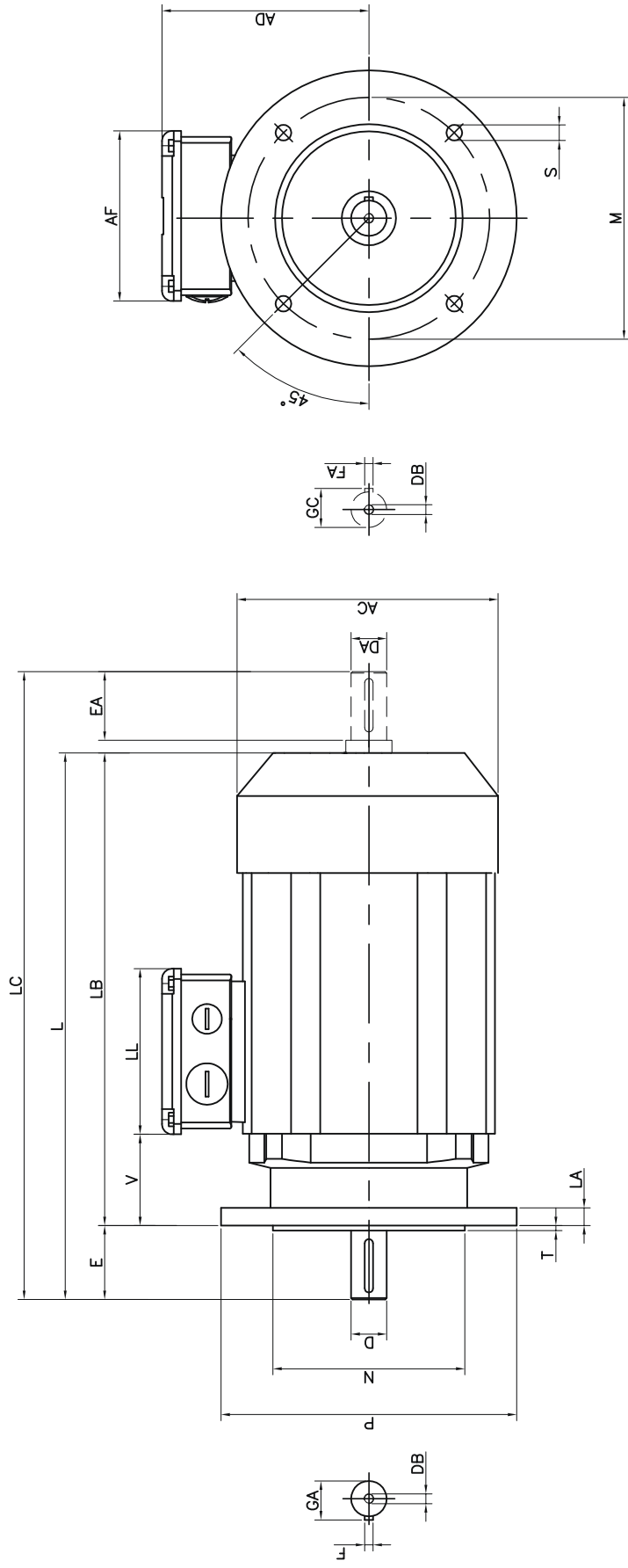
16. MOTOR ELECTRICAL PERFORMANCE CHART FOR 6 POLE

Model	Rated Output Frame Size		Pole	Rated Speed	Rated Current at 415V,50HZ	Rated Current at 240V,50HZ	Efficiency (100%)	Efficiency (75%)	Power Factor	Rated Torque	Locked Rotor Current / Rated Current	Break Down Torque / Rated Torque	Locked Rotor Torque / Rated Torque	GD ² of Rotor	IM B5 Motor Weight	DC Brake Motor	
	HP	KW														Model	Nm
 FM 71 A6	0.25	0.18	71	6	927	0.68	1.18	57.14	0.65	1.85	3.4	2.3	1.4	0.004	5.1	FM 71 A6 DCB	10
FM 71 B6	0.33	0.25	71	6	922	0.92	1.59	58.60	0.66	2.59	3.5	2.3	1.6	0.005	6.2	FM 71 B6 DCB	10
FM 80 A6	0.5	0.37	80	6	917	1.10	1.90	68.74	0.69	3.85	3.6	2.3	1.4	0.007	7.9	FM 80 A6 DCB	20
FM 80 B6	0.75	0.55	80	6	911	1.62	2.80	69.79	0.68	5.76	3.6	2.3	1.5	0.008	10.8	FM 80 B6 DCB	20
FM 90 S6	1	0.75	90	6	925	2.19	3.79	70.77	0.68	7.74	3.6	2.2	1.1	0.015	11.8	FM 90 S6 DCB	20
FM 90 L6	1.5	1.1	90	6	927	3.13	5.42	73.15	0.68	11.33	3.9	2.5	1.4	0.020	15.1	FM 90 L6 DCB	20
FM 100 L6	2	1.5	100	6	942	3.87	6.70	76.81	0.71	15.20	4.6	2.7	1.4	0.041	21.3	FM 100 L6 DCB	35
FM 112 M6	3	2.2	112	6	944	4.94	8.56	81.84	0.76	22.25	4.7	2.6	1.2	0.074	27.8	FM 112 M6 DCB	65

All Values Subject to Tolerance as per IS325.

17. DIMENSIONS

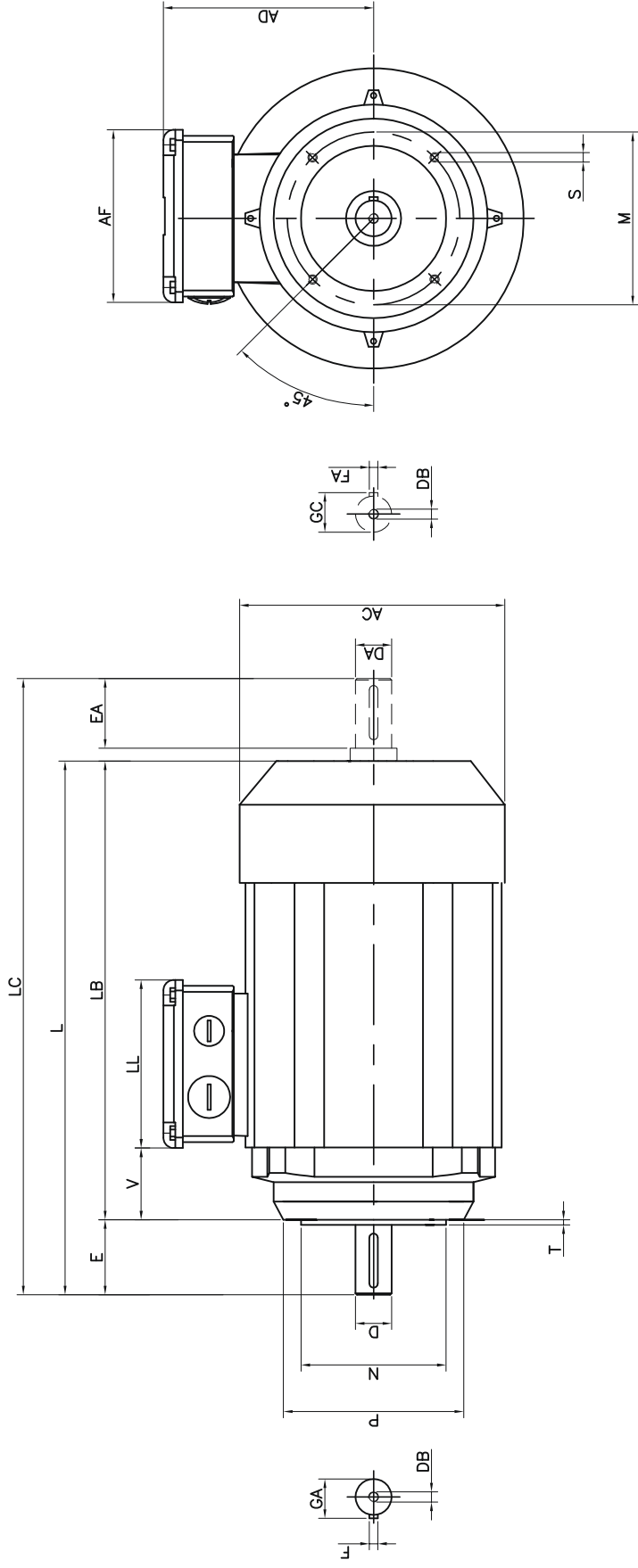
B5



MECHANICAL DIMENSIONS (FLANGE MOUNTED MOTORS- B5)

Frame	FLANGE						SHAFT						OVERALL DIMENSIONS						
	N	M	P	S	T	LA	D DA	E EA	GA GC	F FA	DB	AC	L	LB	LC	AD	LL	V	AF
FM 63	95	115	140	9	3	10	11	23	12.5	4	M4	120	207	184	235	98	89	17	89
FM 71	110	130	160	9	3.5	10	14	30	16	5	M5	140	231	201	266	109	89	23.5	89
FM 80	130	165	200	11.5	3.5	11.5	19	40	21.5	6	M6	156	267	227	312	131	106	23	106
FM 90 S	130	165	200	11.5	3.5	11.5	24	50	27	8	M8	172	322	272	377	136	106	25.5	106
FM 90 L	130	165	200	11.5	3.5	11.5	24	50	27	8	M8	172	322	272	377	136	106	25.5	106
FM 100	180	215	250	14	4	14	28	60	31	8	M10	198	372	312	437	145	106	32.5	106
FM 112	180	215	250	14	4	15	28	60	31	8	M10	217	380	320	445	154	106	36	106

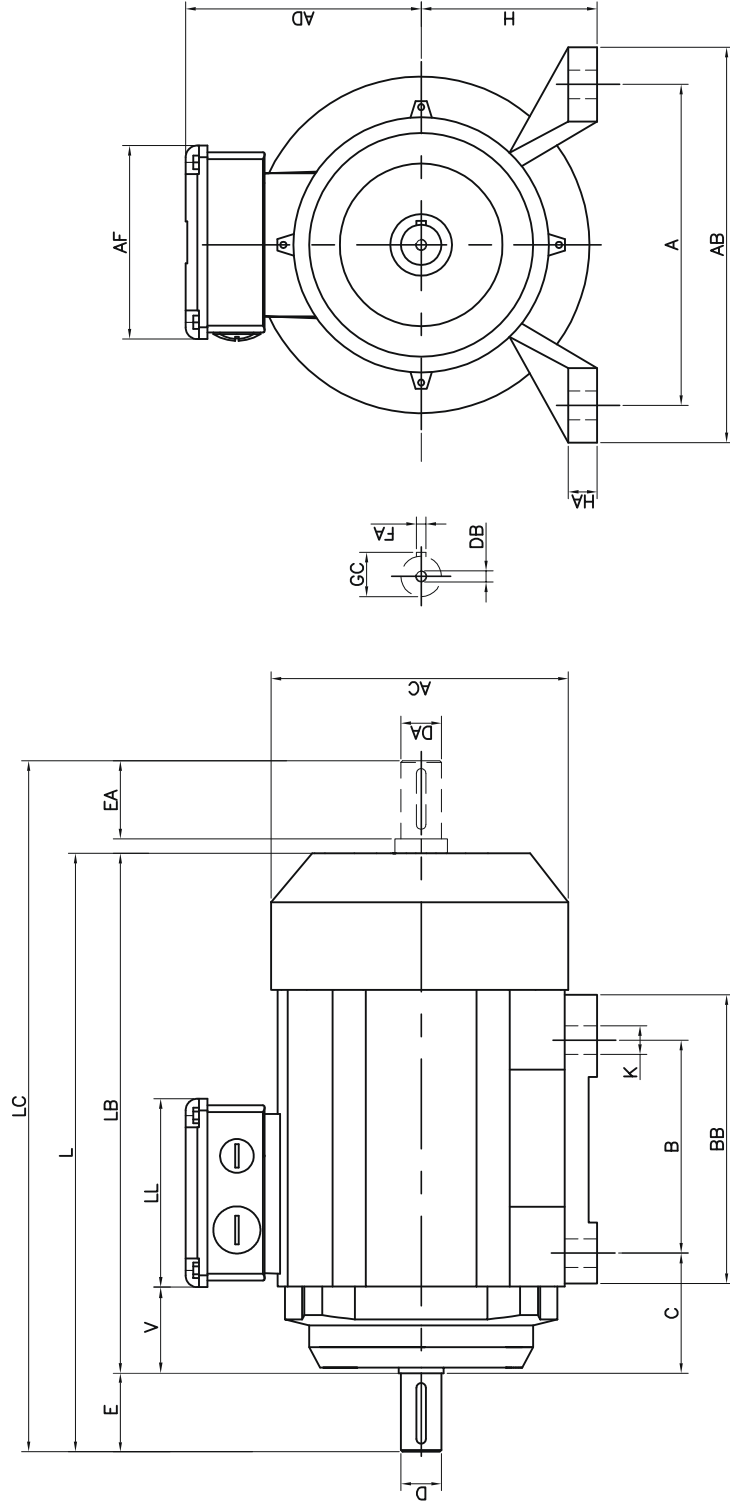
B14



MECHANICAL DIMENSIONS (FLANGE MOUNTED MOTORS- B14)

Frame	FLANGE						SHAFT						OVERALL DIMENSIONS					
	N	M	P	S	T	D DA	E EA	GA GC	F FA	DB	AC	L	LB	LC	AD	LL	V	AF
FM 63	60	75	90	M5	2.5	11	23	12.5	4	M4	120	207	184	235	98	89	17	89
FM 71	70	85	105	M6	2.5	14	30	16	5	M5	140	231	201	266	109	89	23.5	89
FM 80	80	100	120	M6	3	19	40	21.5	6	M6	156	267	227	312	131	106	23	106
FM 90 S	95	115	140	M8	3	24	50	27	8	M8	172	322	272	377	136	106	25.5	106
FM 90 L	95	115	140	M8	3	24	50	27	8	M8	172	322	272	377	136	106	25.5	106
FM 100	110	130	160	M8	3.5	28	60	31	8	M10	198	372	312	437	145	106	32.5	106
FM 112	110	130	160	M8	3.5	28	60	31	8	M10	217	380	320	445	154	106	36	106

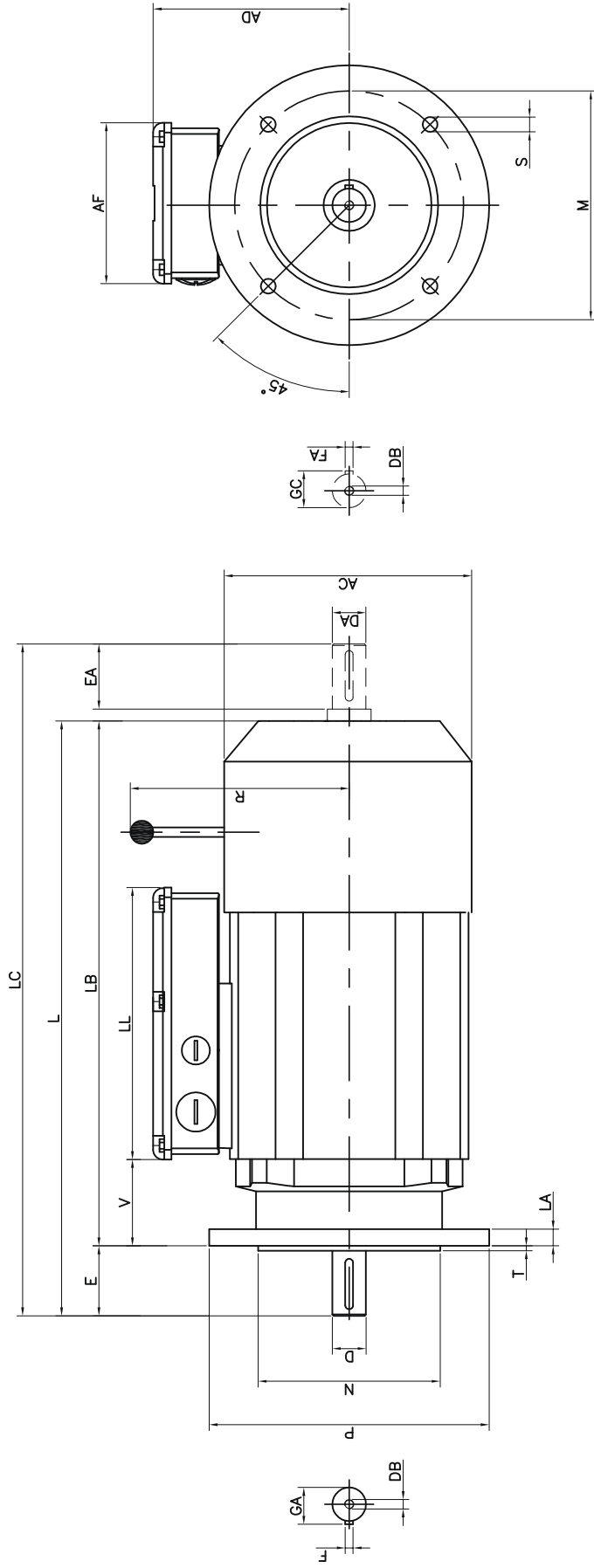
B3



MECHANICAL DIMENSIONS (FOOT MOUNTED MOTORS- B3)

Frame	FOOT											SHAFT											OVERALL DIMENSIONS										
	A	B	HA	BB	AB	K	C	H	D DA	E EA	GA GC	F FA	DB	AC	L	LB	LC	AD	LL	V	AF												
FM 63	100	80	9.3	105	125	8	40	63	11	23	12.5	4	M4	120	207	184	235	98	89	17	89												
FM 71	112	90	9.5	108	140	8	45	71	14	30	16	5	M5	140	231	201	266	109	89	23.5	89												
FM 80	125	100	13	125	154	10.5	50	80	19	40	21.5	6	M6	156	267	227	312	131	106	23	106												
FM 90 S	140	100	14	130	174	11.5	56	90	24	50	27	8	M8	172	322	272	377	136	106	25.5	106												
FM 90 L	140	125	15	155	177	11.5	56	90	24	50	27	8	M8	172	322	272	377	136	106	25.5	106												
FM 100	160	140	15	175	190	13	63	100	28	60	31	8	M10	198	372	312	437	145	106	32.5	106												
FM 112	190	140	15	175	225	13	70	112	28	60	31	8	M10	217	380	320	445	154	106	36	106												

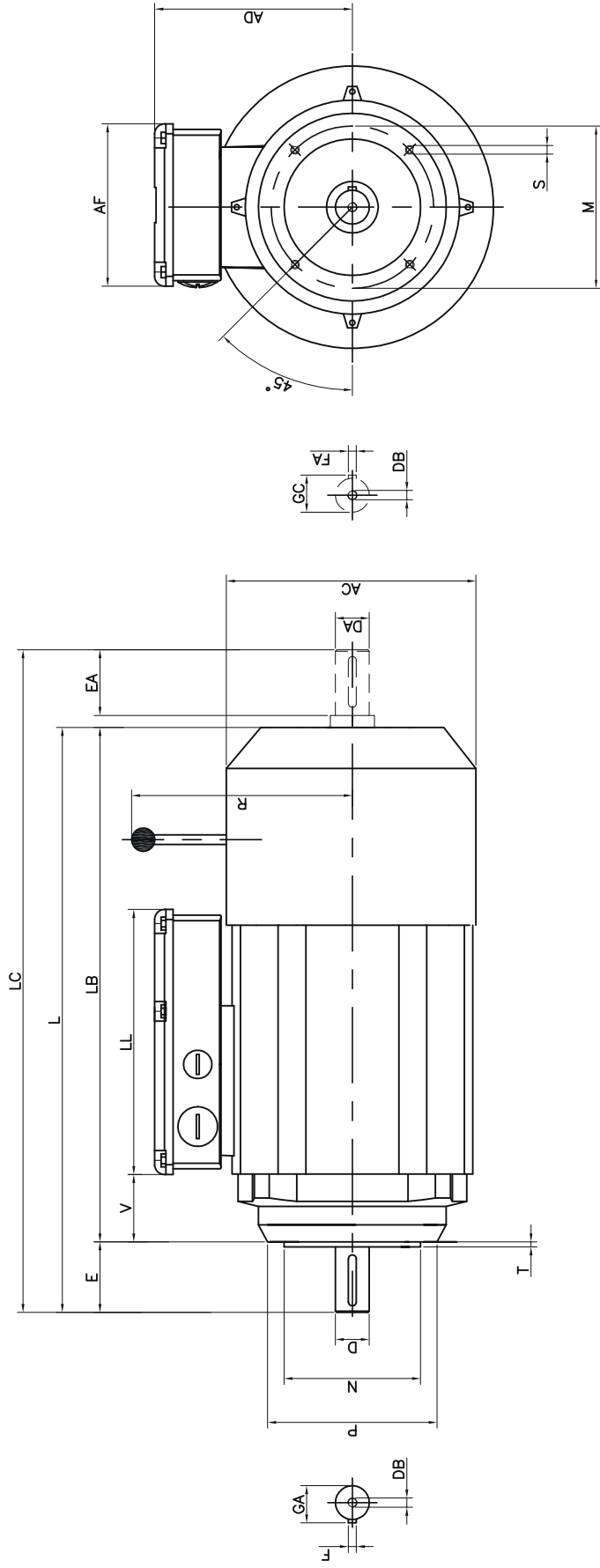
B5 DCB



MECHANICAL DIMENSIONS (FLANGE MOUNTED MOTORS- B5 DCB)

Frame	FLANGE							SHAFT						OVERALL DIMENSIONS						
	N	M	P	S	T	LA	D DA	E EA	GA GC	F FA	DB	AC	L	LB	LC	AD	LL	V	AF	R
FM 63	95	115	140	9	3	10	11	23	12.5	4	M4	120	270	247	298	100	137	12	92	120
FM 71	110	130	160	9	3.5	10	14	30	16	5	M5	140	288	258	323	112	137	23	92	130
FM 80	130	165	200	11.5	3.5	11.5	19	40	21.5	6	M6	156	330	290	375	133.5	152	23.5	108	140
FM 90 S	130	165	200	11.5	3.5	11.5	24	50	27	8	M8	172	372	322	427	136	152	24	108	146
FM 90 L	130	165	200	11.5	3.5	11.5	24	50	27	8	M8	172	372	322	427	136	152	24	108	146
FM 100	180	215	250	14	4	14	28	60	31	8	M10	198	447	387	512	146	152	31	108	158
FM 112	180	215	250	14	4	15	28	60	31	8	M10	217	455	395	520	156	152	33	108	168

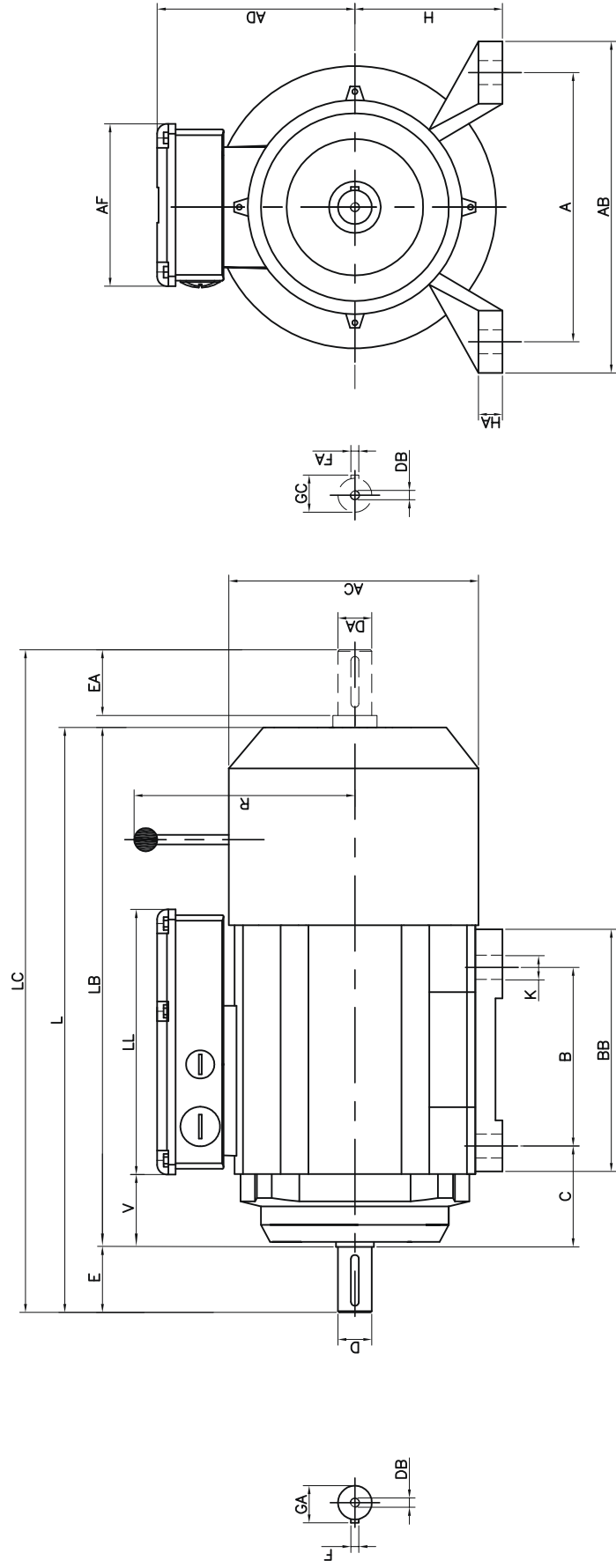
B14 DCB



MECHANICAL DIMENSIONS (FLANGE MOUNTED MOTORS- B14 DCB)

Frame	FLANGE						SHAFT						OVERALL DIMENSIONS						
	N	M	P	S	T	D DA	E EA	GA GC	F FA	DB	AC	L	LB	LC	AD	LL	V	AF	R
FM 63	60	75	90	M5	2.5	11	23	12.5	4	M4	120	270	247	298	100	137	12	92	120
FM 71	70	85	105	M6	2.5	14	30	16	5	M5	140	288	258	323	112	137	23	92	130
FM 80	80	100	120	M6	3	19	40	21.5	6	M6	156	330	290	375	133.5	152	23.5	108	140
FM 90 S	95	115	140	M8	3	24	50	27	8	M8	172	372	322	427	136	152	24	108	146
FM 90 L	95	115	140	M8	3	24	50	27	8	M8	172	372	322	427	136	152	24	108	146
FM 100	110	130	160	M8	3.5	28	60	31	8	M10	198	447	387	512	146	152	31	108	158
FM 112	110	130	160	M8	3.5	28	60	31	8	M10	217	455	395	520	156	152	33	108	168

B3 DCB



MECHANICAL DIMENSIONS (FOOT MOUNTED MOTORS- B3 DCB)

Frame	FOOT										Shaft										Overall Dimensions						
	A	B	HA	BB	AB	K	C	H	D DA	E EA	GA GC	F FA	DB	AC	L	LB	LC	AD	LL	V	AF	R					
FM 63	100	80	9.3	105	125	8	40	63	11	23	12.5	4	M4	120	270	247	298	100	137	12	92	120					
FM 71	112	90	9.5	108	140	8	45	71	14	30	16	5	M5	140	288	258	323	112	137	23	92	130					
FM 80	125	100	13	125	154	10.5	50	80	19	40	21.5	6	M6	156	330	290	375	133.5	152	23.5	108	140					
FM 90 S	140	100	14	130	174	11.5	56	90	24	50	27	8	M8	172	372	322	427	136	152	24	108	146					
FM 90 L	140	125	15	155	177	11.5	56	90	24	50	27	8	M8	172	372	322	427	136	152	24	108	146					
FM 100	160	140	15	175	180	13	63	100	28	60	31	8	M10	198	447	387	512	146	152	31	108	158					
FM 112	190	140	15	175	225	13	70	112	28	60	31	8	M10	217	455	395	520	156	152	33	108	168					