

REMI

**REMI FOR
RELIABILITY**



FLAME PROOF MOTORS



REMI is pleased to offer you our latest series of three phase Flame Proof Induction Motors as per IS:60079-1:2007.

REMI has to its credit, being one of the pioneering manufacturers of Flame Proof Motors in India. We are also the first to introduce Flame Proof Motors of IEC frame sizes of 63 & 71, which were not manufactured in the Country.

Since 1973, REMI has designed, manufactured and marketed Flame Proof Motors as per applicable IS: Standard which are -

(1) IS:2148:1968, (2) IS:2148:1981, (3) IS:2148:2004 and (4) IS:60079-1:2007. The latest IS: Standards are harmonized Indian standards with IEC standards

FLP induction motors are suitable for use in explosive atmosphere. These motors have to be constructed in such a way that there is no risk of explosion. An explosion occurs in following situations:

- Presence of potentially explosive atmosphere
- Existence of source of ignition
- Possibility of transmission of the explosion

CLASSIFICATION OF HAZARDOUS AREAS (GASES AND VAPOURS)

Zone	Classification of area as per IS:5572	Selection of electrical equipment based on IS:5571
Zone '0'	Hazardous atmosphere is continuously present.	Generally, use of electrical equipments to be avoided. But when this is not practicable, intrinsically safe or pressurized electrical equipment is to be used.
Zone '1'	Hazardous atmosphere is likely to be Present under normal operating conditions	For this area, electrical equipment used, must be in flame proof enclosure type Ex (d) conforming to IS/IEC: 60079-1: 2007
Zone '2'	Hazardous atmosphere is likely to be present only under abnormal operating conditions and for a short period.	Apparatus with type of protection Ex(e) in accordance with IS: 6381 may be used without any special enclosure. Apparatus having type of protection EX (nA) in accordance with IS: 8289 are also permitted for use. Three Phase induction motors having Protection type Ex (nA) Conforming to IS: 9628 are Permitted.

Group Of Enclosure Suitable for a particular Flammable Gas or Vapour IS/IEC-60079-1:2007

Group Of Enclosure	Flammable Gas or Vapour		
I	Methane (fire damp)		
II A	Blast Furnace Gas Propane Butane ISO-octane Benzene Acetone n-propyl Amyl Acetate Ethanol Amyl Alcohol	Carbon Monoxide Pentane Hexane Decane Xylene Ethyl Methyl Ketone Acetale Chloroethylene Iso Butanol Ethyl Nitrite	Heptane Ammonia Cyclohexane Methyl Acetale Methanol n-Butanol n-Butanol Acetate
II B	1.3- Butadiene Ethylene Oxide	Ethylene Town Gas	
II C	Hydrogen Acetylene		

Temperature Class

The ignition temperature of the gas classified as T1 to T6 is as follows:

Temp. Class as per IS: 6381	Ignition Temperature (°C)	
	Above	Upto and Including
T1	450	-
T2	300	450
T3	200	300
T4	135	200
T5	100	135
T6	85	100

- The maximum surface temperature under the worst operating condition should not exceed the ignition temperature of gas
- The maximum surface temperature refers to that surface which is coming in contact with the explosive gas
- In the case of Flame Proof motors Ex(d), this refers to external surface temperatures

Statutory Approvals and Licenses

Motors used in hazardous areas need statutory approvals from various statutory authorities depending upon their area of jurisdiction before marketing. REMI has got their Test Certificates Approval License as given below:

Statutory Authority	Scope	Area of Jurisdiction
ERTL (East), Kolkata	Testing & Certification	–
BIS, Mumbai	Licensing	–
PESO, Nagpur	Approving	All area where explosive liquids/gases are stored & transported.
DGFASLI, Mumbai	Approving	All area where explosive liquids/gases area processed.

Following standards are applicable for Flame Proof Motor

IS : 325	Three phase induction motors - specification
IS : 1231	Dimensions of Foot mounted A.C. Induction motors.
IS : 2223	Dimensions of Flange mounted A.C. Induction motors.
IS : 5572	Classifications of Hazardous areas (other than mining) having flammable gases and vapours for electrical installations.
IS/IEC:60079-1:2007	Electrical Apparatus for explosive gas atmosphere. Flame proof enclosure Ex 'd'
IS/IEC : 60079-14	Code of practice for installation and maintenance of induction motors.

Mechanical Features

- Motors are offered with Totally Enclosed Fan Cooled (TEFC) construction.
- Frame, Endshields, Terminal box and Bearing covering covers are made of grey cast iron
- These motors are designed so that the frame temperature will remain below the ignition temperature of gas-air mixture involved as mentioned in the table 'Classification of Hazardous Gases'.
- All cast iron parts forming flame proof enclosures after final machining are subjected to hydraulic pressure test, as per IS/IEC:60079-1:2007 at 15kg/cm² to ensure soundness of casting i.e. without blow holes and pinholes.

Range

- REMI Flameproof motors Ex'd' are available from frame sizes 63 to 160 in 2,4,6 & 8 pole designs.
- Motors are suitable for continuous duty (S1), temperature class T4 to T6 as per IS/IEC:60079-1:2007.
- Ambient temperature up to 40°C & site altitudes of up to 1000 meters above mean sea level.

Insulation and Endurance

- Motors are provided with Class F insulation system with temperature rise limited to Class B.
- Motors can be overloaded by 10% continuously (SF:1.1) but the temperature rise will be within the limits of Class F.

Protection

- IP55 degree of protection as per IS:4691

Construction

- Construction has been kept simple and sturdy to assure dependable service.
- Low weight to power ratio.
- Suitable for hazardous atmosphere exist in Chemical and Petroleum industries.
- Motors are suitable for Group II A & II B gases as specified in IS 60079-1:2007.
- Dynamically balanced squirrel cage rotor, fitted with anti friction bearings and fan.
- Terminal box & cover, endshield and casing are casted with high strength grey cast iron.

Design Features

Flame proof motors are available in three basic designs, Horizontal foot mounting (B3), Vertical flange mounting B5 and Vertical B14 mounting.

- A wide Variety of mounting positions are possible with these designs.
- The flame proof enclosure consists of sturdy cast iron parts, which are mechanically robust and rugged.
- The cast iron enclosure of motors is built to withstand any internal explosion.
- The motors are so designed that the frame temperature will remain below the ignition temperature of the gas-air mixture involved in the atmosphere.
- Flame proof motors are manufactured to suit the industries such as coalmines, refineries, petro-chemical, where flammable gases, vapours, fumes & coal dust are natural atmospheric hazards.
- Motors above 2.2 kw. (3HP) can be started either by D.O.L. or by star-delta starter, as all the 6 leads are brought to the terminal box.

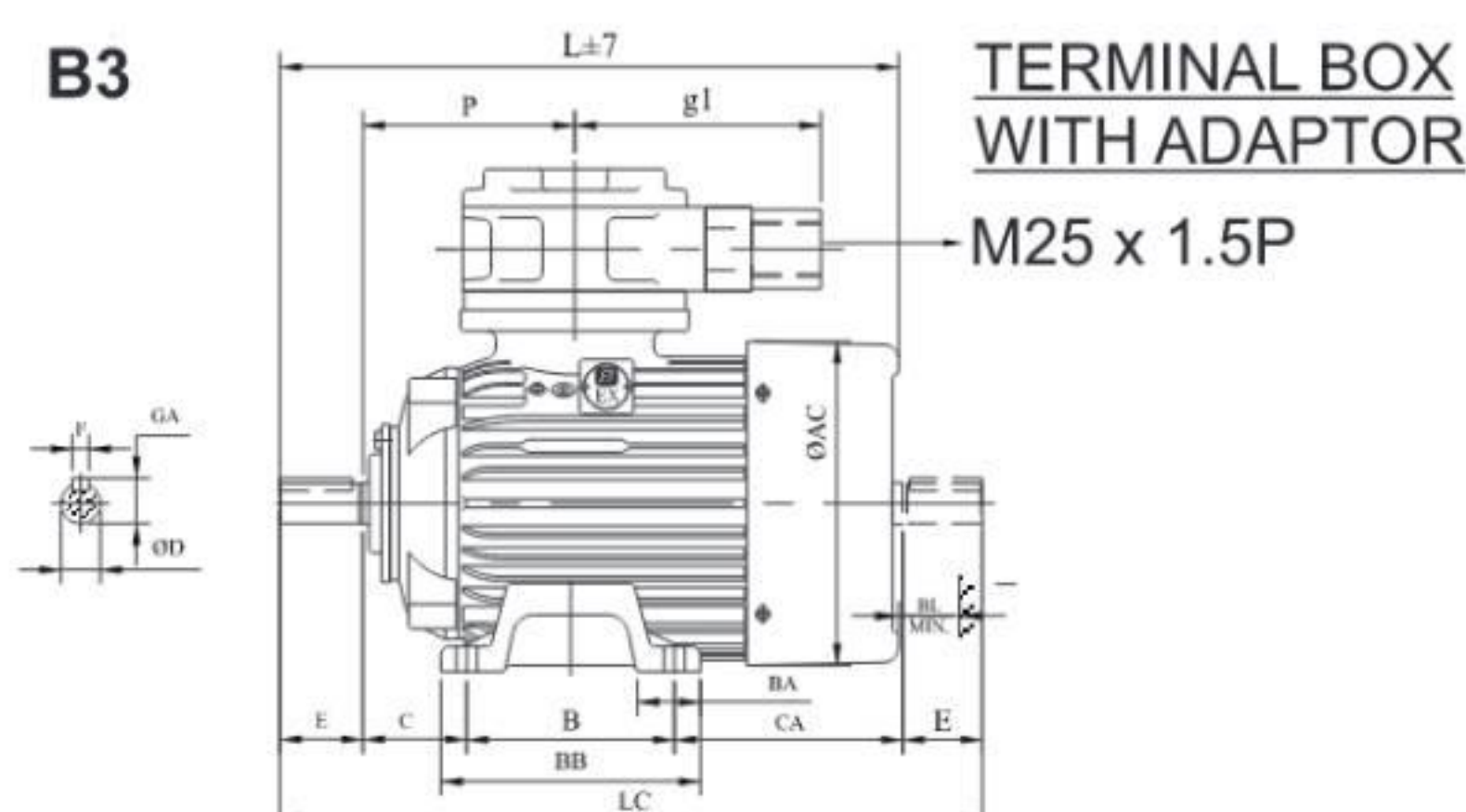
Windings

- Winding is of class 'F' insulation in compliance with IS:1271:2012
- Superior winding material used which is capable of withstanding temperature rise of 80° C over a maximum ambient temperature of 40° C at a relative humidity of 80% referred to 20° C.
- Windings are vacuum impregnated for operating in humid and tropical atmosphere.

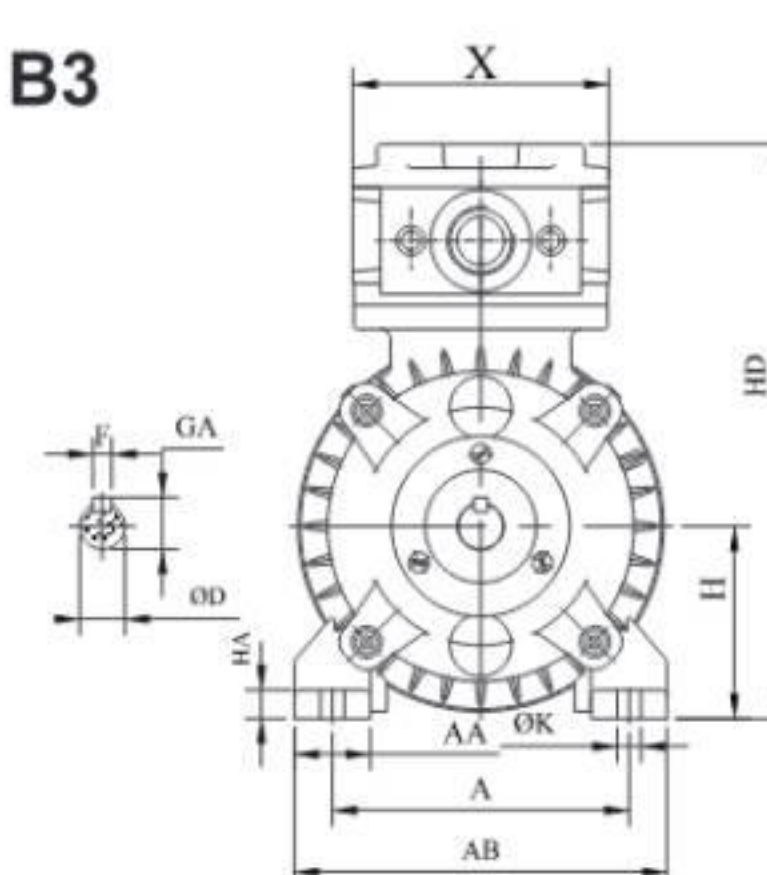
Mechanical Dimensions



B3



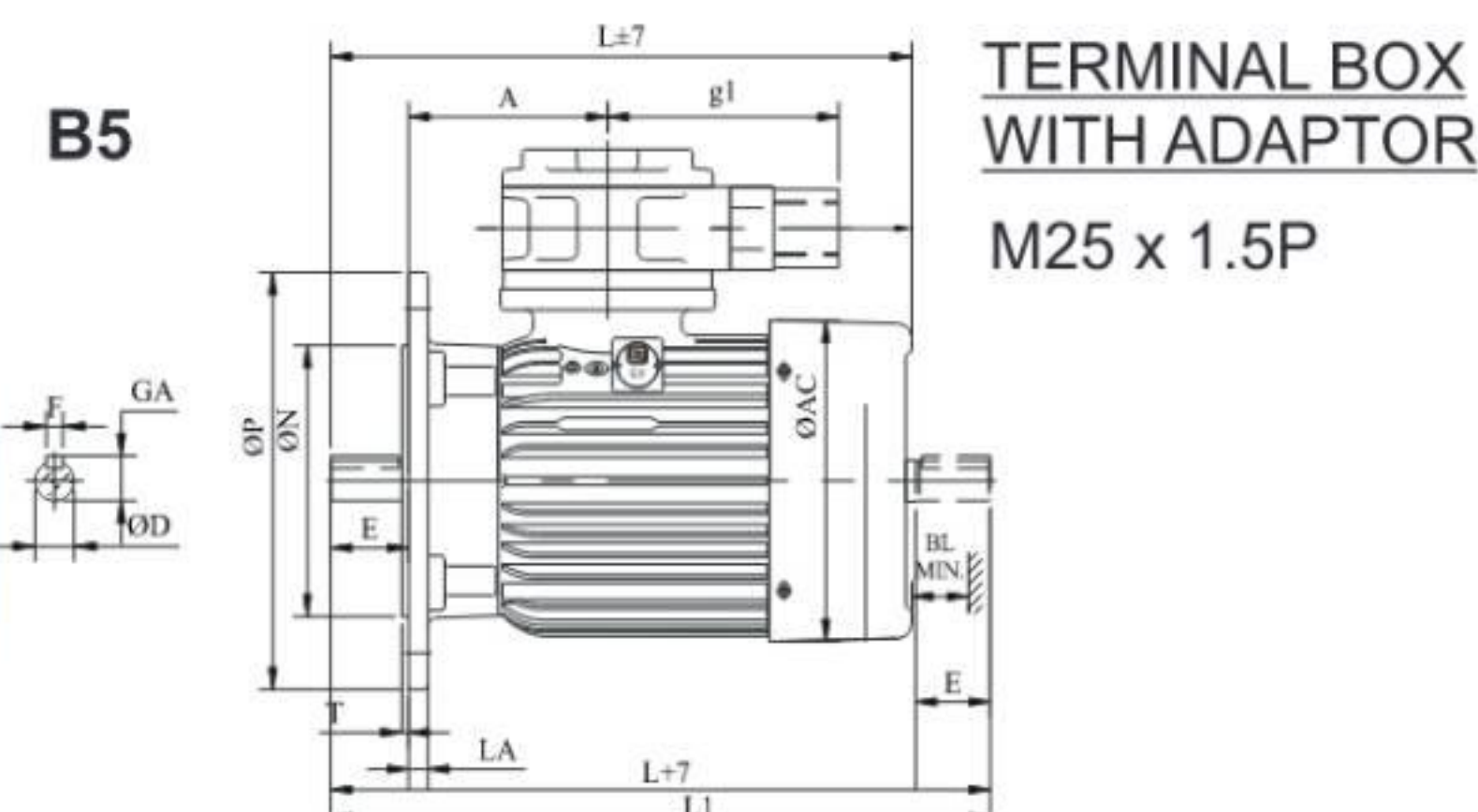
B3



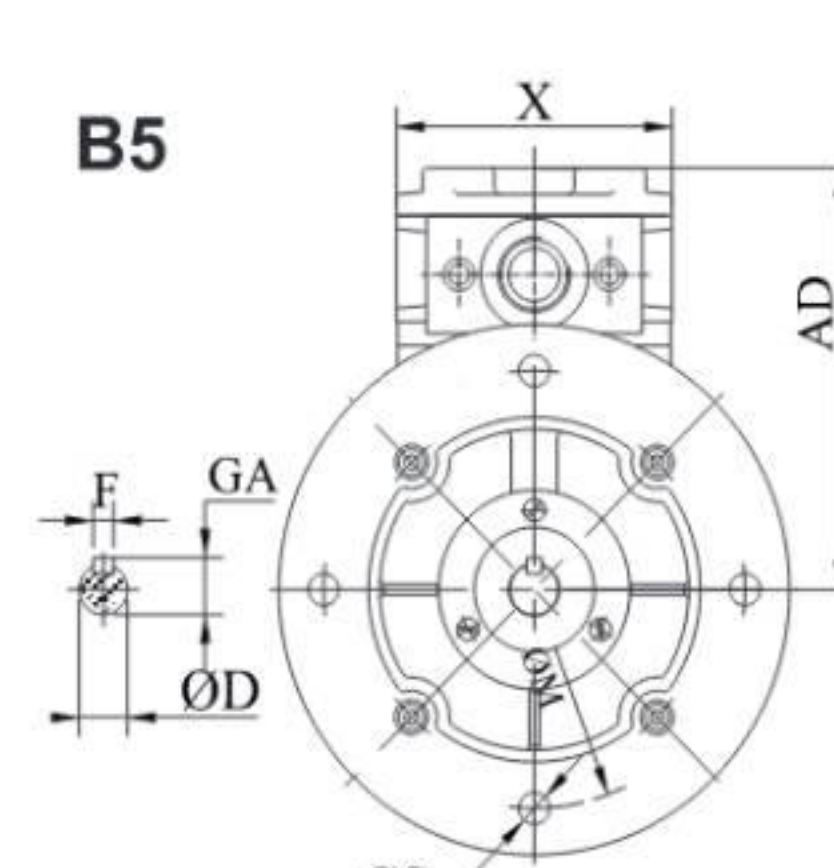
FRAMES	B	A	HA	D	BB	AB	AC	L1	H	X	L	LC	E	BA	AA	HD	K	GA	F	C	CA	P	BL Min
63B	80	100	10	11j6	105	125	122	113	63	112	218	246	23	28	25	205	7	13	4	40	80	73	14
71A	90	112	11	14j6	115	140	138	113	71	112	239	274	30	32	28	225	7	17	5	45	79	85	16
71B	90	112	11	14j6	115	140	138	113	71	112	259	294	30	32	28	225	7	17	5	45	99	85	16
80A	100	125	12	19j6	125	157	155	113	80	112	298	343	40	30	32	239	10	22	6	50	113	102	16
80B	100	125	12	19j6	125	157	155	113	80	112	318	363	40	30	32	239	10	22	6	50	113	102	16
90SB	100	140	13	24j6	130	175	173	113	90	112	354	409	50	35	35	257	10	28	8	56	153	113	18
90LB	125	140	13	24j6	155	175	173	113	90	112	354	409	50	35	35	257	10	28	8	56	128	113	18
90LC	125	140	13	24j6	155	175	173	113	90	112	374	429	50	35	35	257	10	28	8	56	148	113	18
90LC	125	140	13	24j6	155	175	173	113	90	112	374	429	50	35	35	257	10	28	8	56	148	113	18
100LB	140	160	15	28j6	175	200	193	113	100	112	415	480	60	42	40	257	12	32	8	63	157	116	20
100LC	140	160	15	28j6	175	200	193	113	100	112	447	512	60	42	40	257	12	32	8	63	189	116	20
112MB (3L)	140	160	18	28j6	180	232	217	113	112	112	419	484	60	44	46	299	12	32	8	70	154	107	20



B5



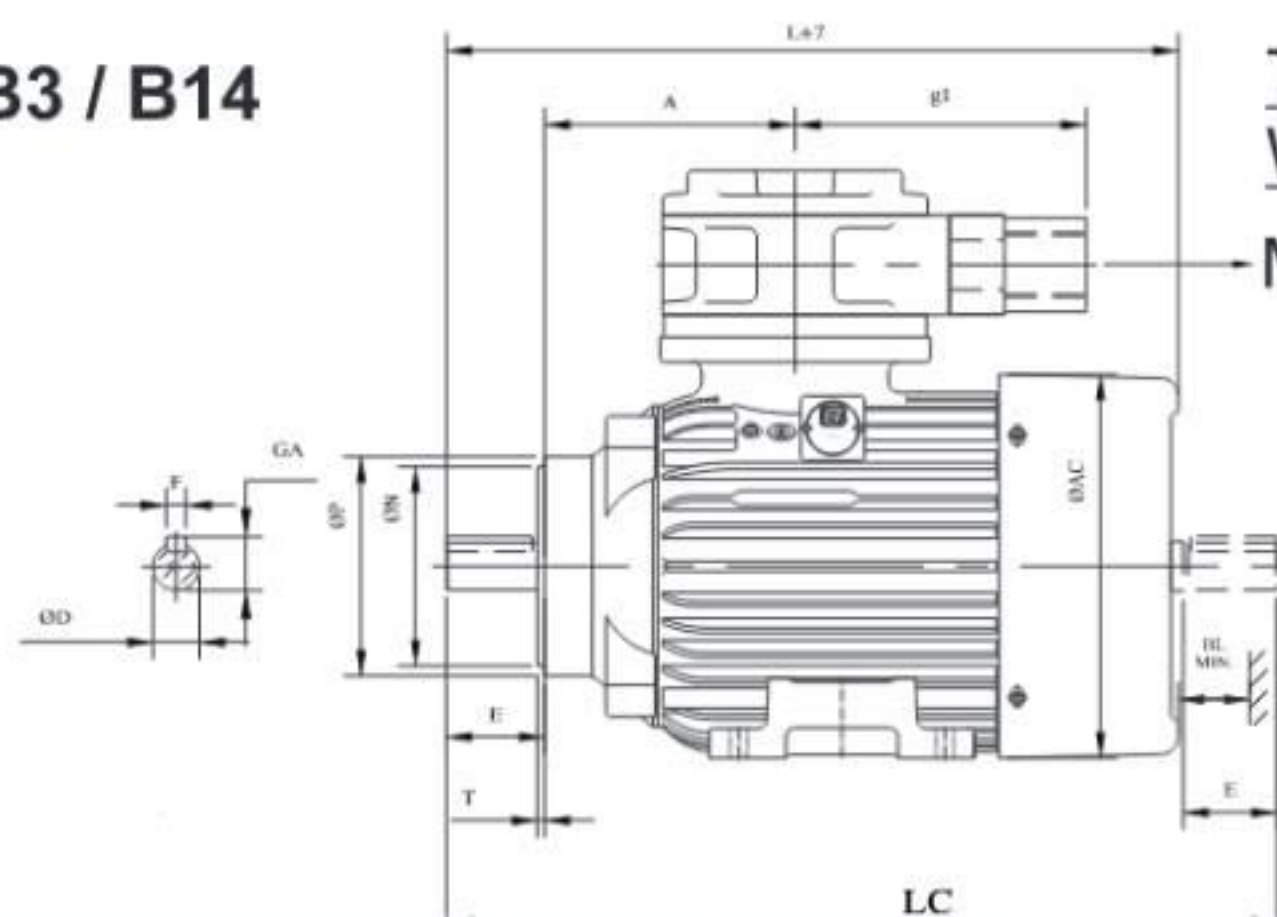
B5



FRAMES	P	N	LA	D	M	T	AC	g1	X	E	L	L1	GA	F	AD	S	A	BL Min
63A	140	95j6	10	11j6	115	3	122	113	112	23	204	410	13	4	142	10	73	14
63B	140	95j6	10	11j6	115	3	122	113	112	23	218	424	13	4	142	10	73	14
71A	160	110j6	10	14j6	130	3.5	38	113	112	30	239	463	16.5	5	154	10	85	16
71B	160	110j6	10	14j6	130	3.5	138	113	112	30	259	294	16.5	5	154	10	85	16
80A	200	130j6	10	19j6	165	3.5	155	113	112	40	298	343	22	5	160	12	102	16
80B	200	130j6	10	19j6	165	3.5	155	113	112	40	318	363	22	6	160	12	102	16
90SB	200	130j6	12	24j6	165	3.5	173	113	112	50	354	409	27.5	8	167	12	113	18
90LB	200	130j6	12	24j6	165	3.5	173	113	112	50	354	409	27.5	8	167	12	113	18
90LC	200	130j6	12	24j6	165	3.5	173	113	112	50	374	429	27.5	8	167	12	113	18
100LB	250	180j6	12	28j6	215	4	193	113	112	60	415	480	32	8	175	15	116	20
100LC	250	180j6	12	28j6	215	4	193	113	112	60	447	512	32	8	175	15	116	20
112MB (3L)	250	180j6	16	28j6	215	4	217	113	112	60	419	484	32	8	187	15	107	22



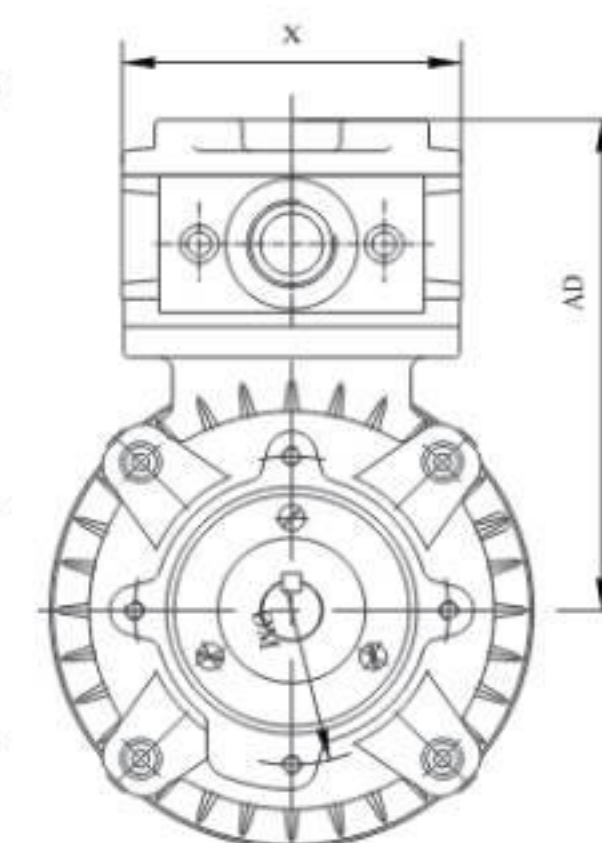
B3 / B14



TERMINAL BOX
WITH ADAPTOR
M25 x 1.5P



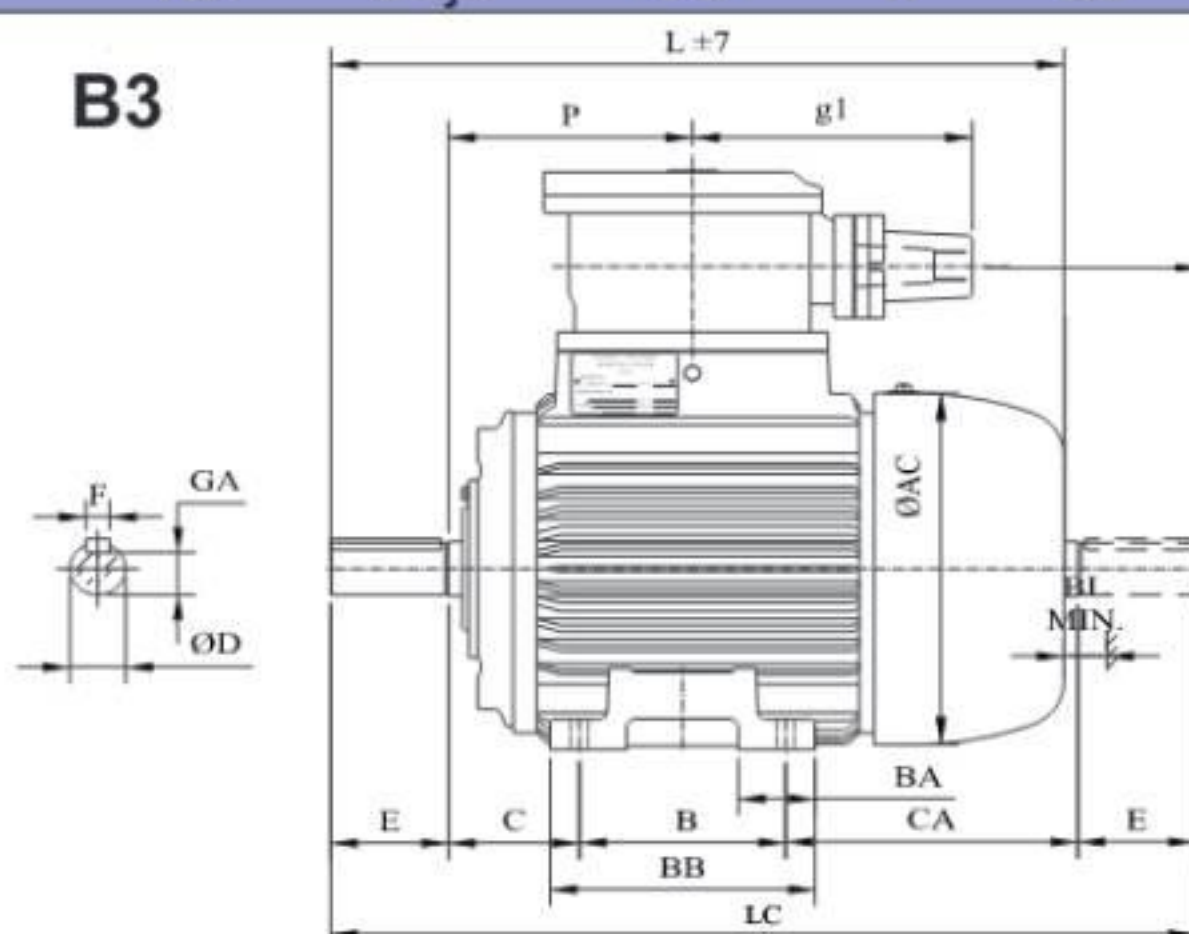
B14



FRAMES	L	AC	AD	D	E	F	GA	P	M	N	S	T	X	L1	A	BL Min
63A	204	122	142	11j6	23	4	13	66	75	60j6	M5	2.5	112	113	73	14
63B	218	122	142	11j6	23	4	13	66	75	60j6	M5	2.5	112	113	73	14
71A	239	138	154	14j6	30	5	16.5	76	85	70j6	M6	2.5	112	113	85	16
71B	259	138	154	14j6	30	5	16.5	76	85	70j6	M6	3	112	113	85	16
80A	298	155	160	19j6	40	6	22	88	100	80j6	M6	3	112	113	102	16
80B	318	155	160	19j6	40	6	22	88	100	80j6	M6	3	112	113	102	16
90SB	354	173	167	24j6	50	8	27.5	102	115	95j6	M8	3	112	113	113	18
90LB	354	173	167	24j6	50	8	27.5	102	115	95j6	M8	3	112	113	113	18
90LC	374	193	167	24j6	50	8	27.5	102	115	95j6	M8	3	112	113	113	18
100LB	415	193	175	28j6	60	8	32	118	130	110j6	M8	3.5	112	113	116	20
100LC	447	193	175	28j6	60	8	32	118	130	110j6	M8	3.5	112	113	116	20
112MB(3L)	419	217	187	28j6	60	8	32	132	130	110j6	M8	3.5	112	113	107	22
112MB(6L)	419	217	187	28j6	60	8	32	132	130	110j6	M8	3.5	168	142	186	22



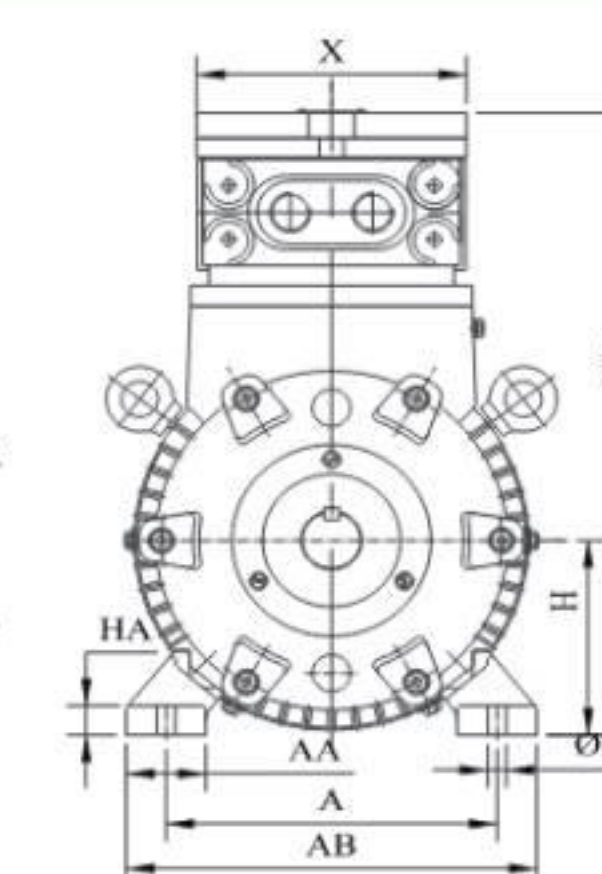
B3



TERMINAL BOX
WITH ADAPTOR
M25 x 1.5P



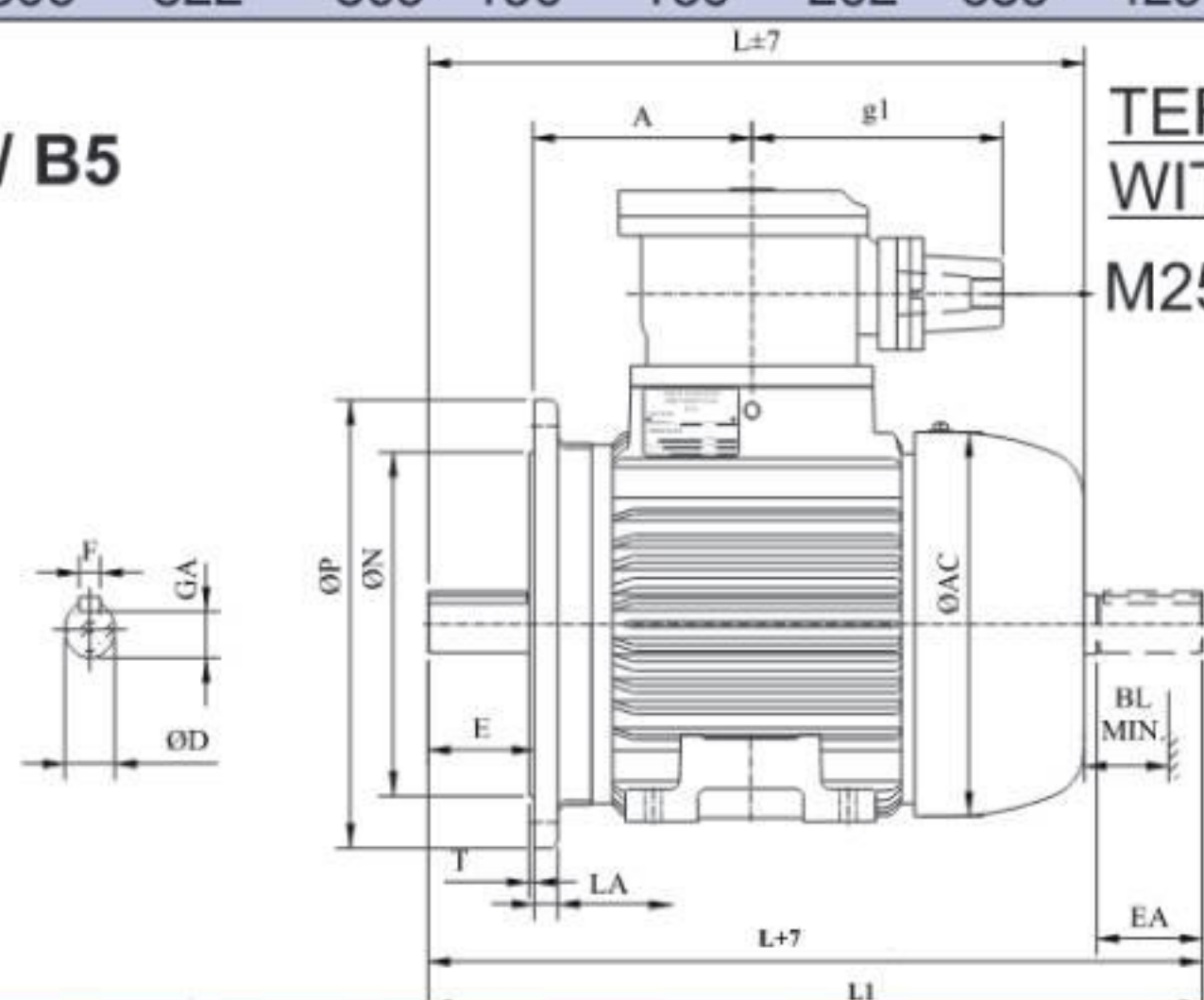
B3



FRAMES	B	A	H	AD	BB	AB	AC	L1	H	X	L	LC	E	BA	AA	HD	K	GA	F	C	CA	P	BL Min
112MB(6L)	140	190	18	28j6	180	232	217	142	112	168	419	484	23	28	25	205	7	13	4	40	80	73	14
132 SA	140	216	20	38j6	180	268	257	190	132	202	494	274	30	32	28	225	7	17	5	45	79	85	16
132 SB	140	216	20	38j6	180	268	257	190	132	202	531	294	30	32	28	225	7	17	5	45	99	85	16
132 MB	178	216	20	38j6	218	268	257	190	132	202	531	343	40	30	32	239	10	22	6	50	113	102	16
160 MA	210	254	22	42j6	262	322	309	190	160	202	577	363	40	30	32	239	10	22	6	50	113	102	16
160 MB	210	254	22	42j6	262	322	309	190	160	202	609	409	50	35	35	257	10	28	8	56	153	113	18
160 MC	210	254	22	42j6	262	322	309	190	160	202	659	409	50	35	35	257	10	28	8	56	128	113	18
160 LC	254	254	22	42j6	306	322	309	190	160	202	659	429	50	35	35	257	10	28	8	56	148	113	18



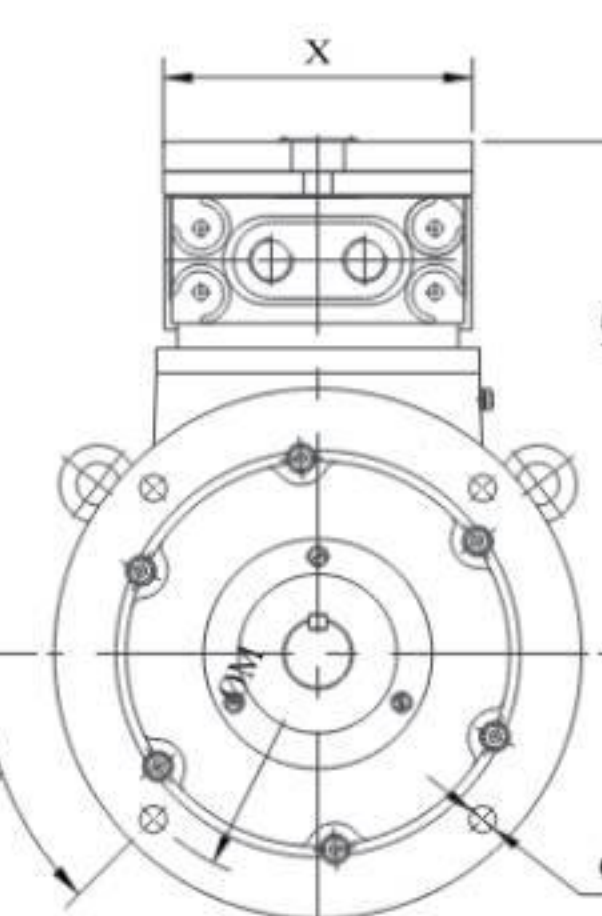
B3 / B5



TERMINAL BOX
WITH ADAPTOR
M25 x 1.5P



B5



FRAMES	P	N	LA	D	M	T	AC	g1	X	E	L	L1	GA	F	AD	S	A	BL Min
112MB(6L)	250	180j6	16	28j6	215	4	217	142	168	60	419	484	32	8	187	15	186	22
132 SA	300	230h6	18	38k6	265	4	257	190	202	80	494	579	42	10	295	15	166	25
132 SB	300	230h6	18	38k6	265	4	257	190	202	80	531	616	42	10	295	15	166	25
132 MB	300	230h6	18	38k6	265	4	257	190	202	80	531	616	42	10	295	15	166	25
160 MA	350	250h6	20	42k6	300	5	309	190	202	110	577	692	46.5	12	315	19	178	30
160 MB	350	250h6	20	42k6	300	5	309	190	202	110	609	724	46.5	12	315	19	178	30
160 MC	350	250h6	20	42k6	300	5	309	190	202	110	659	724	46.5	12	315	19	178	30
160 LC	350	250h6	20	42k6	300	5	309	190	202	110	659	724	46.5	12	315	19	178	30

REMI FLAME PROOF MOTOR RATING CHART

IE2

Frame Size	kW	HP	RPM	Current @ 415V	Eff %	PF	STG C % FLC	STG T % FLT
SPEED 3000 RPM								
63 B/2 Qd	0.12	0.16	2800	0.32	53.6	0.84	430	200
63 B/2 Rd	0.18	0.25	2800	0.52	60.4	0.78	400	200
63 B/2 d	0.25	0.33	2750	0.7	64.8	0.76	415	220
71 B/2 Rd	0.37	0.50	2860	0.9	69.5	0.80	550	220
71 B/2 d	0.55	0.75	2870	1.5	74.1	0.80	600	260
80 B/2 Rd	0.75	1.0	2820	1.8	77.4	0.82	650	260
80 B/2 d	1.1	1.5	2870	2.4	79.6	0.82	650	240
90 SC/2 Rd	1.5	2.0	2880	3.0	81.3	0.86	650	260
90 LC/2 d	2.2	3.0	2850	4.3	83.2	0.88	650	230
100 LC/2 d	3.7	5.0	2880	7.1	85.5	0.88	700	250
132 SB/2 Rd	5.5	7.5	2900	11.0	87.0	0.85	700	210
132 SB/2 d	7.5	10.0	2890	14.8	88.1	0.86	700	215
SPEED 1500 RPM								
63 B/4 Rd	0.12	0.16	1360	0.38	59.1	0.76	275	170
63 B/4 d	0.18	0.25	1350	0.60	64.7	0.74	275	170
71 B/4 Rd	0.25	0.33	1340	0.74	68.5	0.71	330	180
71 B/4 d	0.37	0.50	1370	1.1	72.7	0.72	400	200
80 B/4 Rd	0.55	0.75	1430	1.6	77.1	0.60	500	250
80 B/4 d	0.75	1.0	1430	1.9	79.6	0.69	600	300
90 SC/4 Rd	1.1	1.5	1430	2.9	81.4	0.70	600	300
90 LC/4 d	1.5	2.0	1430	3.6	82.8	0.71	600	300
100L C/4 d	2.2	3.0	1435	5.0	84.3	0.82	650	210
112MB/4 d	3.7	5.0	1440	7.4	86.3	0.82	700	240
132 SB/4 Rd	5.5	7.5	1450	11.4	87.7	0.83	680	180
132 MB/4 d	7.5	10.0	1450	15.0	88.7	0.84	650	170
SPEED 1000 RPM								
71 B/6 Rd	0.12	0.16	875	0.60	50.6	0.62	280	160
71 B/6 d	0.18	0.25	900	0.80	56.6	0.62	300	160
80 B/6 Qd	0.25	0.33	900	0.90	61.6	0.68	330	200
80 B/6 Rd	0.37	0.50	890	1.1	67.6	0.76	350	180
80 B/6 d	0.55	0.75	910	1.6	73.1	0.68	390	250
90 SC/6 Rd	0.75	1.0	920	2.1	75.9	0.72	390	190
90 LC/6 d	1.1	1.5	930	3.2	78.1	0.68	430	230
100 LC/6 d	1.5	2.0	930	3.7	79.8	0.78	480	200
112 MB/6 d	2.2	3.0	950	5.1	81.8	0.78	580	220
132 SB/6 Rd	3.7	5.0	960	8.6	84.3	0.73	700	250
132 MB/6 d	5.5	7.5	960	12.7	86.0	0.73	600	200
SPEED 750 RPM								
80 B/8 Rd	0.18	0.25	670	0.8	45.9	0.62	260	180
80 B/8 d	0.25	0.33	670	1.1	50.6	0.58	280	200
90 SC/8 Rd	0.37	0.50	670	1.5	56.1	0.60	300	200
90 LC/8 d	0.55	0.75	680	2.1	61.7	0.60	330	200
100 LC/8 Rd	0.75	1.0	690	2.7	66.2	0.60	360	200
100 LC/8 d	1.10	1.5	690	3.5	70.8	0.62	380	250
112 MB/8 d	1.50	2.0	700	4.5	74.1	0.64	450	220
132 SB/8 d	2.20	3.0	700	5.6	77.6	0.76	400	145

* 3 or 6 Lead

Note: 1. Efficiency measurement are without seals.
2. All performance values are subject to IS tolerance as per IS-325.
3. Motors are subject to continuous improvement.



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