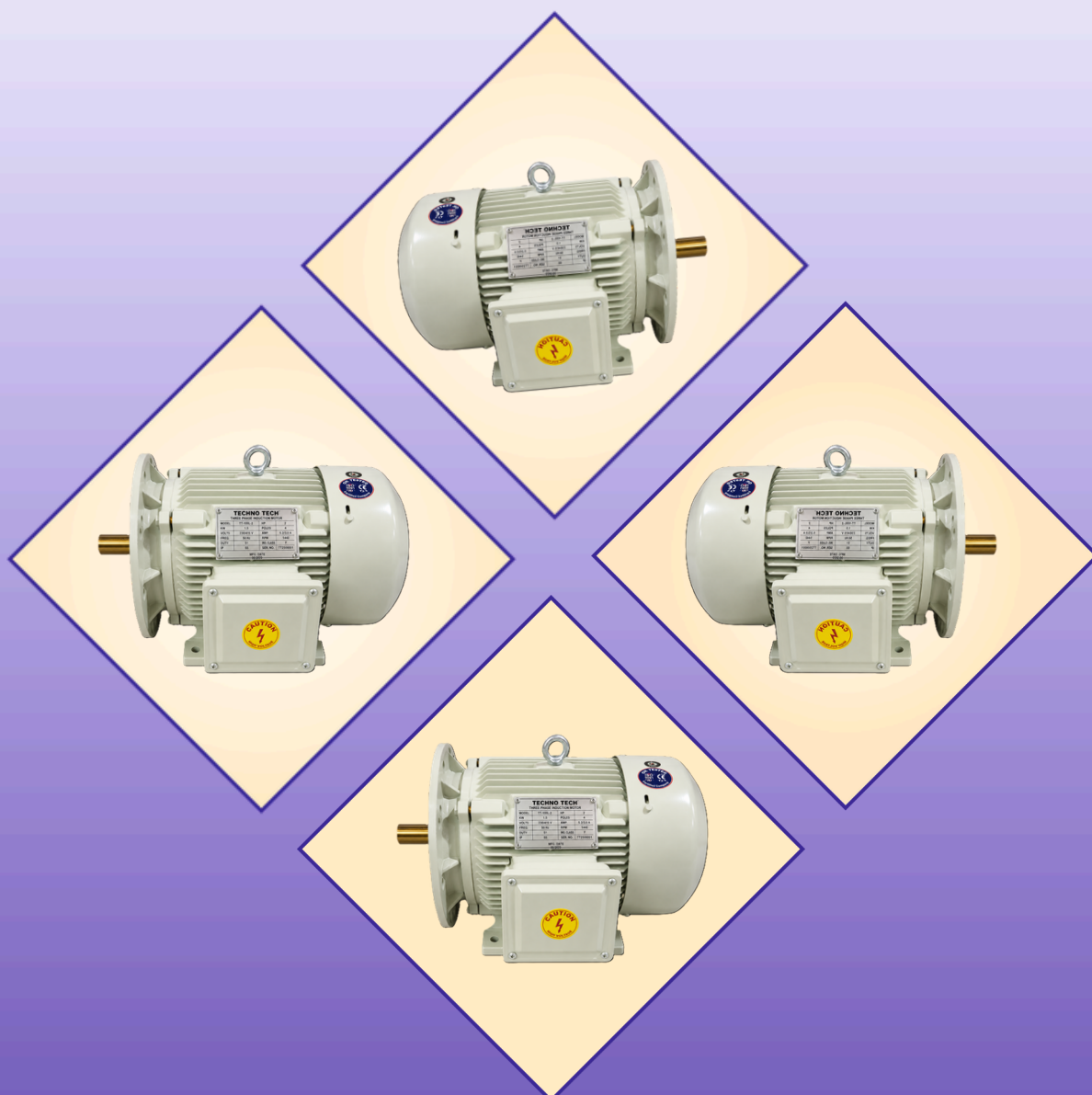




▪ Three Phase Induction Motor ▪ Single Phase Motor ▪ Special Motor

About Moto Tech Engineers: -

Moto Tech Engineers, A manufacturer of a comprehensive range of reliable and high efficiency Single Phase & T.E.F.C squirrel cage three Phase A.C. Industrial Motors for all applications since 1985.

Motor duty cycle: S1

Motor Class/Type : "Class B Motor", "Class A Motor" & Single Phase Motor

Energy Level : High Efficiency

DESIGN FEATURES

All Motors are conforming To IS - 325 / 12615 - 1999 / 2018

All Motors In CI Body fitted with dynamically balanced Aluminum Die Cast Squirrel Cage Rotors.

Motors are fitted with Pre-lubricated antifriction ball bearings.

All Motors are provided with Earthing Terminals located on the Stator Body.

Terminal Box is Located on The Right Hand Side when Viewed from driving end side.

Better Efficiency in Varied Load Conditions.

Totally Enclosed fan Cooled Motors free from Moisture and dust particles.

Non Standard Features as per requirement can be provided on demand and feasibility.

Minimum Electricity Consumption because of Special Grade of Material and Optimize Design.

Balanced three-dimensional Heat Transfer Principal due to special FINS Design of Stator body.

Minimum Rotor losses due use of Electrolytic grade of Aluminum.

Minimum Copper losses due to use of Electrolytic grade of Copper.

Minimum Iron losses due to high grade of Stamping Material.

Minimum Windage losses due to Aerodynamic fan design.

Minimum Friction losses.

Low Payback Period.

Why Moto Tech motor :

Latest designed, Standard Materials, Testing procedure and standard manufacturing practices and customer feedback make our motor efficient in performance and durable.

Ave. fault rate is 0.1 % & All measurements of motor are as per IS 325 (upgraded to 12615).

Techno motor increases profit by reducing system faults, re-purchasing the same products again & Electricity Bill.

Occurring Machine fault or system maintenance cost due to the wrong selection of motor is more than a motor's value per year.

So, motor type, materials used in & standardization is most important to choose motor.

It really gives a remarkable impact on the product due to energy saving especially running constantly for a long time.

Manufacturing practices :

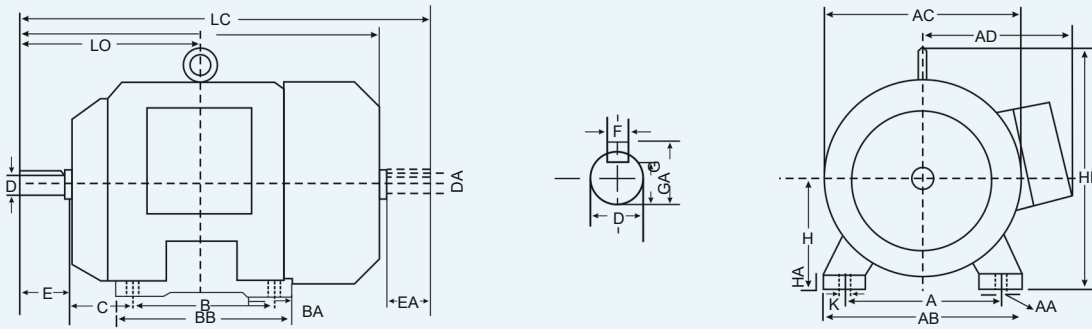
Proper Machines and equipment per unit .

Use always recommended Tools for installation & fitting.

Standard measurement Tools for testing .

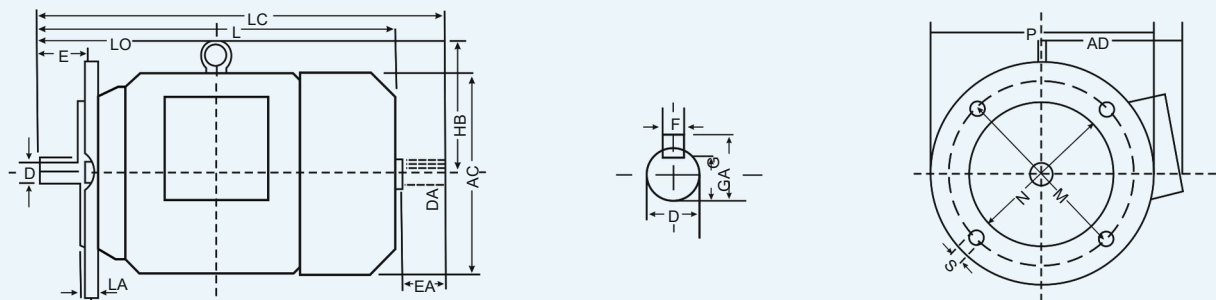
Organized manner enough space for production assembly.

DIMENSIONS HORIZONTAL FOOT MOUNTED MOTORS (B3 CONSTRUCTION) All dimensions in mm



FRAME	A	B	C	H	K	L	LO	AA	AB	AC	BA	AD	BB	HA	HD	D/DA	E/EA	F	G	GA	LC
EN 56	80	71	36	56	M5	190	93	25	110	113	30	54	90	7	150	9	20	3	7.2	10.2	213
EN 63	100	80	40	63	M6	210	105	25	123	127	30	61	100	8	165	11	23	4	8.5	12.5	236
EN 71	112	90	45	71	M6	238	123	30	142	142	35	110	110	10	140	14	30	5	11.0	16.0	271
EN 80	125	100	50	80	M8	270	140	35	155	161	40	120	124	12	160	19	40	6	15.5	21.5	315
EN 90S	140	100	56	90	M8	303	157.5	40	175	180	45	135	130	13	180	24	50	8	20.0	27.0	357
EN 90L	140	125	56	90	M8	328	170	40	175	180	50	135	155	13	180	24	50	8	20.0	27.0	382
EN 100L	160	140	63	100	M10	370	185	40	195	201	55	155	170	14	240	28	60	8	24.0	31.0	434
EN 112M	190	140	70	112	M10	935	200	45	225	225	60	173	180	15	275	28	60	8	24.0	31.0	448
EN 132S	216	140	89	132	M12	470	239	60	265	264	60	255	175	22	265	38	80	10	33	41	560
EN 132M	216	178	89	132	M12	508	258	60	265	264	80	255	215	22	265	38	80	10	33	41	598
EN 160M	254	210	108	160	M12	581	323	70	315	330	90	290	265	25	365	42	110	12	37	45	695
EN 160L	254	254	108	160	M12	625	345	70	315	330	90	290	310	25	385	42	110	12	37	45	739
EN 180M	279	241	121	180	M12	647	351.5	75	360	370	90	310	300	30	415	48	110	14	42.5	51.5	761
EN 180L	279	279	121	180	M12	685	370.5	75	360	370	90	310	340	30	415	48	110	14	42.5	51.5	800
EN 200L	318	305	133	200	M16	745	395.5	80	400	405	100	320	385	30	450	55	110	16	49	59	860

DIMENSIONS FLANGE MOUNTED MOTORS (B5 CONSTRUCTION) All dimensions



FRAME	M	N	P	S	T	L	LO	LA	AD	AC	HB	D/DA	E/EA	F	G	GA	LC
EN 56	115	95	140	10	3	190	93	9	54	113	93	9	20	3	7.2	10.2	213
EN 63	115	95	140	10	3	210	105	9	61	127	100	11	23	4	8.5	12.5	236
EN 71	130	110	160	10	3.5	238	123	9	110	142	70	14	30	5	11.0	16.0	271
EN 80	165	130	200	12	3.5	270	140	10	120	161	79	19	40	6	15.5	21.5	315
EN 90S	165	130	200	12	3.5	303	157.5	10	135	180	89	24	50	8	20	27	357
EN 90L	165	130	200	12	3.5	328	170	10	135	180	89	24	50	8	20	27	382
EN 100L	215	180	250	15	4	370	180	11	155	210	99	28	60	8	24	31	434
EN 112M	215	180	250	15	4	285	200	11	173	225	110	28	60	8	24	31	448
EN 132S	365	230	300	15	4	470	239	12	255	264	270	38	80	10	33	41	560
EN 132M	265	230	300	15	4	508	258	12	255	264	270	38	80	10	33	41	598
EN 160M	300	250	350	19	5	381	323	20	290	330	225	42	110	12	37	45	695
EN 160L	300	250	350	19	5	625	345	20	290	330	225	42	110	12	37	45	739
EN 180M	300	250	350	19	5	647	351.5	20	310	370	235	48	110	14	42.5	51.5	761
EN 180L	300	250	350	19	5	685	370.5	20	310	370	235	48	110	14	42.5	51.5	800
EN 200L	300	300	400	19	5	745	395.5	20	320	405	250	55	110	16	49	59	860

Syn. Speed 3000 RPM (Two Pole)

Rated Output		Frame Size	Operating Characteristics at Rated Output									With DOL Starting		Ratio of Pullout Torque to Rated Torque	Rotor ² GD	Approx WT.
			Speed RPM	Current AMPS	Rated Torque Kg. m.	Power Factor			Efficiency %			Ratio of Starting Current to rated Current	Ratio of Starting Torque to rated Torque			
KW	HP	FL				3/4 L	1/2 L	FL	3/4 L	1/2 L	Torque			Kgm ²	Kg.	
0.18	0.25	63	2790	0.49	0.065	0.830	0.780	0.690	62.00	59.00	57.00	3.50	3.08	3.15	0.0009	8
0.37	0.50	71	2773	0.90	0.133	0.840	0.790	0.700	68.00	66.00	62.00	4.72	3.33	3.50	0.0019	10
0.55	0.75	71	2798	1.06	0.194	0.970	0.940	0.810	73.80	72.00	70.00	5.25	2.29	2.40	0.0019	15
0.75	1.00	80	2833	1.52	0.263	0.890	0.820	0.720	77.00	76.50	74.00	5.70	3.40	3.55	0.0038	16
1.10	1.50	80	2875	2.29	0.384	0.875	0.800	0.680	77.40	75.00	71.00	5.50	2.34	2.50	0.0048	22
1.10	1.50	90S	2800	2.50	0.384	0.830	0.800	0.680	74.00	73.00	68.00	5.50	2.34	2.50	0.0122	23
1.50	2.00	90S	2818	3.11	0.522	0.950	0.940	0.850	78.00	76.00	73.00	6.00	2.30	2.50	0.0125	24
1.50	2.00	90L	2818	3.11	0.522	0.950	0.940	0.850	78.00	76.00	73.00	6.00	2.30	2.50	0.0125	24
2.20	3.00	90L	2800	4.50	0.714	0.900	0.820	0.790	82.00	81.50	78.00	5.50	2.88	2.95	0.0229	28
2.20	3.00	100L	2820	5.10	0.714	0.800	0.740	0.620	74.00	71.00	63.00	6.00	3.19	3.30	0.0252	40
3.70	5.00	100L	2890	7.20	1.278	0.970	0.960	0.880	82.90	80.00	76.00	6.00	2.73	2.85	0.0257	46
3.70	5.0	112M	2840	6.92	1.278	0.930	0.900	0.880	80.00	79.00	76.00	6.00	3.14	3.30	0.0623	52
5.50	7.50	132S	2881	10.10	1.893	0.940	0.920	0.850	84.20	80.00	77.00	6.00	3.62	3.78	0.0853	72
7.50	10.00	132M	2885	12.85	2.572	0.940	0.910	0.870	87.00	86.00	80.00	6.00	2.05	2.20	0.1024	78
9.30	12.50	132M	2900	16.20	3.178	0.940	0.900	0.840	85.30	83.40	80.00	8.00	2.70	2.90	0.1105	96
9.3	12.50	160M	2940	15.94	3.190	0.950	0.910	0.820	86.70	84.00	79.00	6.00	2.26	2.40	0.1556	114
11.0.	15.00	160M	2912	19.00	3.750	0.930	0.920	0.850	87.30	85.00	82.00	5.90	1.89	2.00	0.2029	121
15.0	20.00	160M	2943	23.79	5.110	0.980	0.950	0.900	88.50	85.50	84.00	6.00	2.35	2.50	0.2435	130
15.0	20.00	160L	2943	23.79	5.110	0.980	0.950	0.900	87.70	85.50	84.00	6.00	2.35	2.50	0.2435	150
18.5	25.00	160L	2943	30.37	6.280	0.970	0.940	0.870	89.00	85.50	82.50	6.00	1.92	2.10	0.4179	150
22.0	30.00	180M	2959	34.22	7.470	0.970	0.940	0.900	90.00	88.00	84.50	6.00	2.12	2.25	0.5032	244
30.0	40.00	200L	2950	52.00	9.905	0.940	0.920	0.850	84.50	81.50	74.00	7.62	2.40	2.20	0.9500	295
37.0	50.00	200L	2915	62.00	12.20	0.910	0.900	0.820	86.00	84.00	80.00	6.10	2.00	2.30	0.9950	310

Syn. Speed 1500 RPM (Four Pole)

Rated Output		Frame Size	Operating Characteristics at Rated Output									With DOL Starting		Ratio of Pullout Torque to Rated Torque	Rotor GD ₂ Kgm ²	Approx WT. Kg.
			Speed RPM	Current AMPS	Rated Torque Kg. m.	Power Factor			Efficiency %			Ratio of Starting Current to rated Current	Ratio of Starting Torque to rated Torque			
KW	HP	FL				3/4 L	1/2 L	FL	3/4 L	1/2 L						
0.18	0.25	63	1340	0.70	0.132	0.660	0.558	0.450	59.5	56.5	50.0	2.80	1.70	1.80	0.0016	8
0.37	0.50	71	1415	1.16	0.271	0.730	0.650	0.520	66.0	60.0	53.5	4.15	2.54	2.65	0.0030	10
0.55	0.75	80	1417	1.70	0.400	0.660	0.580	0.510	71.0	66.0	57.0	3.50	2.38	2.50	0.0086	15
0.75	1.00	80	1440	2.14	0.537	0.702	0.630	0.450	73.0	67.0	58.0	3.70	2.36	2.50	0.0093	16
1.10	1.50	90S	1432	2.57	0.782	0.805	0.720	0.560	76.0	73.0	67.0	4.80	2.29	2.50	0.0152	19
1.50	2.00	90L	1412	3.30	1.059	0.859	0.806	0.700	78.0	74.0	70.0	4.30	2.00	2.25	0.0120	22
2.20	3.00	100L	1445	4.40	1.542	0.906	0.850	0.720	80.6	77.2	74.0	6.00	2.15	2.25	0.0272	34
3.70	5.00	112M	1445	7.73	2.556	0.830	0.810	0.620	84.0	83.5	80.5	5.60	1.92	2.10	0.0596	44
5.50	7.50	132S	1460	10.73	3.773	0.830	0.740	0.630	86.0	85.0	81.0	6.00	1.92	2.10	0.0850	68
7.50	10.00	132M	1460	14.20	5.108	0.840	0.770	0.650	86.7	86.0	84.0	6.00	1.80	2.00	0.1181	80
9.30	12.50	160M	1450	17.69	6.334	0.850	0.820	0.725	87.5	85.5	83.5	5.00	1.90	2.00	0.3916	120
11.0.	15.00	160M	1456	20.90	7.440	0.835	0.790	0.700	88.5	86.5	82.0	5.10	1.72	1.85	0.4669	132
15.0	20.00	160L	1456	28.27	10.146	0.830	0.790	0.710	89.4	87.5	83.0	5.00	2.29	2.35	0.6005	152
18.5	25.00	180M	1462	32.05	12.515	0.913	0.863	0.777	90.2	86.8	83.9	5.00	2.66	2.75	0.7355	184
22.0	30.00	180L	1452	35.83	14.881	0.930	0.870	0.780	90.7	89.0	85.0	6.00	2.00	2.20	0.9244	300
30.0	40.00	200L	1474	52.00	20.292	0.900	0.864	0.760	91.3	88.5	84.0	5.70	2.00	2.20	2.5653	311
37.0	50.00	225S	1470	64.50	24.433	0.880	0.850	0.770	92.3	91.2	90.5	5.90	1.90	2.20	2.6600	350

Syn. Speed 1000 RPM (Six Pole)

Rated Output		Frame Size	Operating Characteristics at Rated Output									With DOL Starting		Ratio of Pullout Torque to Rated Torque	Rotor GD Kg ^{m²}	Approx. WT. Kg.
			Speed RPM	Current AMPS	Rated Torque Kg. m.	Power Factor			Efficiency %			Ratio of Starting Current to rated Current	Ratio of Starting Torque to rated Torque			
KW	HP	FL				3/4 L	1/2 L	FL	3/4 L	1/2 L						
0.37	0.50	80	914	1.42	0.419	0.66	0.54	0.45	56.00	56.0	51.0	3.52	2.10	2.25	0.0027	16
0.55	0.75	80	918	1.88	0.623	0.65	0.55	0.46	65.00	60.0	57.0	3.20	2.18	2.30	0.0084	18
0.75	1.00	90S	923	2.00	0.821	0.79	0.70	0.60	72.00	69.0	65.0	3.50	1.90	2.00	0.0122	21
1.10	1.50	90L	925	3.16	1.190	0.71	0.68	0.52	71.50	68.0	66.0	3.50	2.10	2.35	0.0235	23
1.50	2.00	100L	945	3.50	1.623	0.78	0.75	0.64	77.00	76.0	75.0	4.34	2.09	2.30	0.0290	34
2.20	3.00	112M	959	5.28	2.355	0.72	0.62	0.53	80.60	79.0	76.0	5.11	1.93	2.15	0.1069	51
3.70	5.00	132S	910	8.20	3.960	0.85	0.80	0.76	84.00	83.0	82.0	5.24	1.60	1.70	0.2050	78
3.70	5.00	132M	910	8.20	3.960	0.85	0.80	0.76	84.00	83.0	82.0	5.24	1.60	1.70	0.2050	84
5.50	7.50	132M	954	11.30	5.823	0.82	0.78	0.68	82.70	82.0	79.0	6.06	1.60	1.68	0.2432	90
7.50	10.00	160M	970	15.14	7.855	0.79	0.77	0.56	86.70	86.0	85.0	5.81	1.88	1.95	0.2916	131
9.30	12.50	160L	970	18.30	9.338	0.80	0.75	0.55	88.20	88.0	85.0	5.75	1.50	1.65	0.4055	140
11.00	15.00	160L	974	20.13	11.459	0.87	0.78	0.65	87.30	86.0	82.0	6.39	2.10	2.30	0.7765	153
15.00	20.00	180L	973	28.14	15.710	0.84	0.80	0.70	88.70	87.5	86.5	5.25	1.77	1.90	1.2960	221
18.50	25.00	200L	974	32.30	19.375	0.88	0.87	0.78	90.20	90.0	88.0	4.92	1.85	1.95	1.4435	321
22.00	30.00	200L	980	38.48	23.041	0.87	0.84	0.76	91.90	91.0	90.5	4.90	1.45	1.55	1.9654	342
30.00	40.00	225M	945	56.00	31.420	0.84	0.83	0.75	91.30	89.5	87.0	5.00	1.96	2.10	2.8560	400
37.00	50.00	250M	982	66.50	36.700	0.84	0.84	0.78	92.50	92.0	90.3	5.50	1.30	1.50	3.2200	460

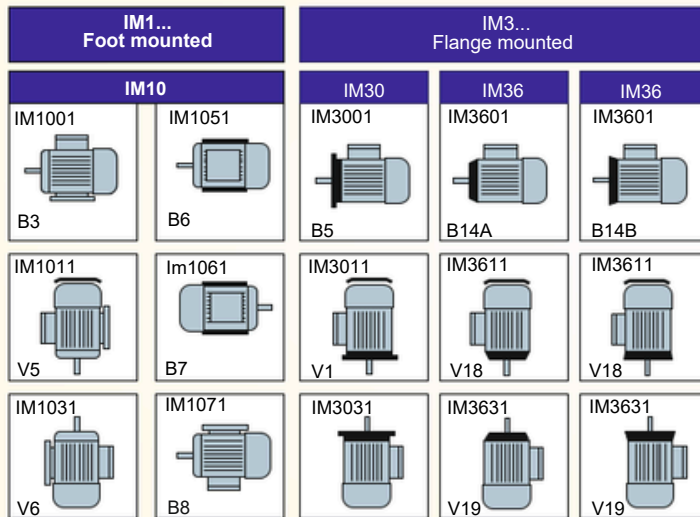
Syn. Speed 750 RPM (Eight Pole)

Rated Output		Frame Size	Operating Characteristics at Rated Output									With DOL Starting		Ratio of Pullout Torque to Rated Torque	Rotor GD Kg ^{m²}	Approx WT. Kg.
			Speed RPM	Current AMPS	Rated Torque Kg. m.	Power Factor			Efficiency %			Ratio of Starting Current to rated Current	Ratio of Starting Torque to rated Torque			
KW	HP					FL	3/4 L	1/2 L	FL	3/4 L	1/2 L					
0.37	0.50	90S	710	1.28	0.522	0.59	0.55	0.50	67.5	65.5	61.0	3.50	2.33	2.50	0.0160	21
0.55	0.75	90L	712	1.76	0.788	0.59	0.52	0.48	70.7	68.0	63.0	3.55	2.66	2.80	0.0210	24
0.75	1.00	100L	720	2.96	1.015	0.56	0.50	-	62.5	55.0	-	3.87	2.32	2.50	0.0300	34
1.10	1.50	100L	719	3.04	1.488	0.68	0.61	0.52	76.6	75.5	71.0	4.50	2.00	2.20	0.0340	37
1.50	2.00	112M	711	4.04	2.029	0.69	0.56	0.50	75.9	73.2	72.0	4.00	1.67	1.80	0.0570	52
2.20	3.00	132S	706	5.98	2.976	0.70	0.60	0.50	77.8	71.0	68.0	4.18	1.66	1.85	0.1740	77
3.70	5.00	160M	731	8.65	4.971	0.73	0.67	0.58	81.5	79.5	76.5	8.35	1.65	1.75	0.2140	118
5.50	7.50	160M	726	12.06	7.389	0.74	0.65	0.56	85.5	85.4	80.0	5.20	1.70	1.85	0.4500	132
7.50	10.00	160L	728	16.50	10.007	0.75	0.65	0.52	84.6	82.0	80.0	5.10	1.34	1.50	0.6300	140
18.5	25.00	225S	732	40.06	24.620	0.83	0.79	0.71	87.0	85.0	83.0	3.60	1.40	1.60	2.9580	410

SIGNLE PHASE 4 POLE 1500 R.P.M BASIC OPERATING CHARACTERISTICS

K.W	H.P	FRAME	RATED CURRENT	RATED SPEED	POWER FACTOR	EFFICIENCY
			A4	R.P.M		
0.37	0.5	90	8.5	1440	0.59	60
0.75	1	100	12.5	1375	0.79	75
1.1	1.5	100	12.5	1380	0.79	75
1.5	2	112	16.5	1380	0.80	76
2.2	3	112	22.5	1390	0.88	75
3.7	5	132		1400	0.91	73

MOUNTING ARRANGEMENT



Note : Motors may be supplied in other than standard frame sizes or according to customer's specifications. improvement in designs being continuously underway, motors actually supplied may differ from the details given in the literature.

Materials are used in Techno motor manufacturing

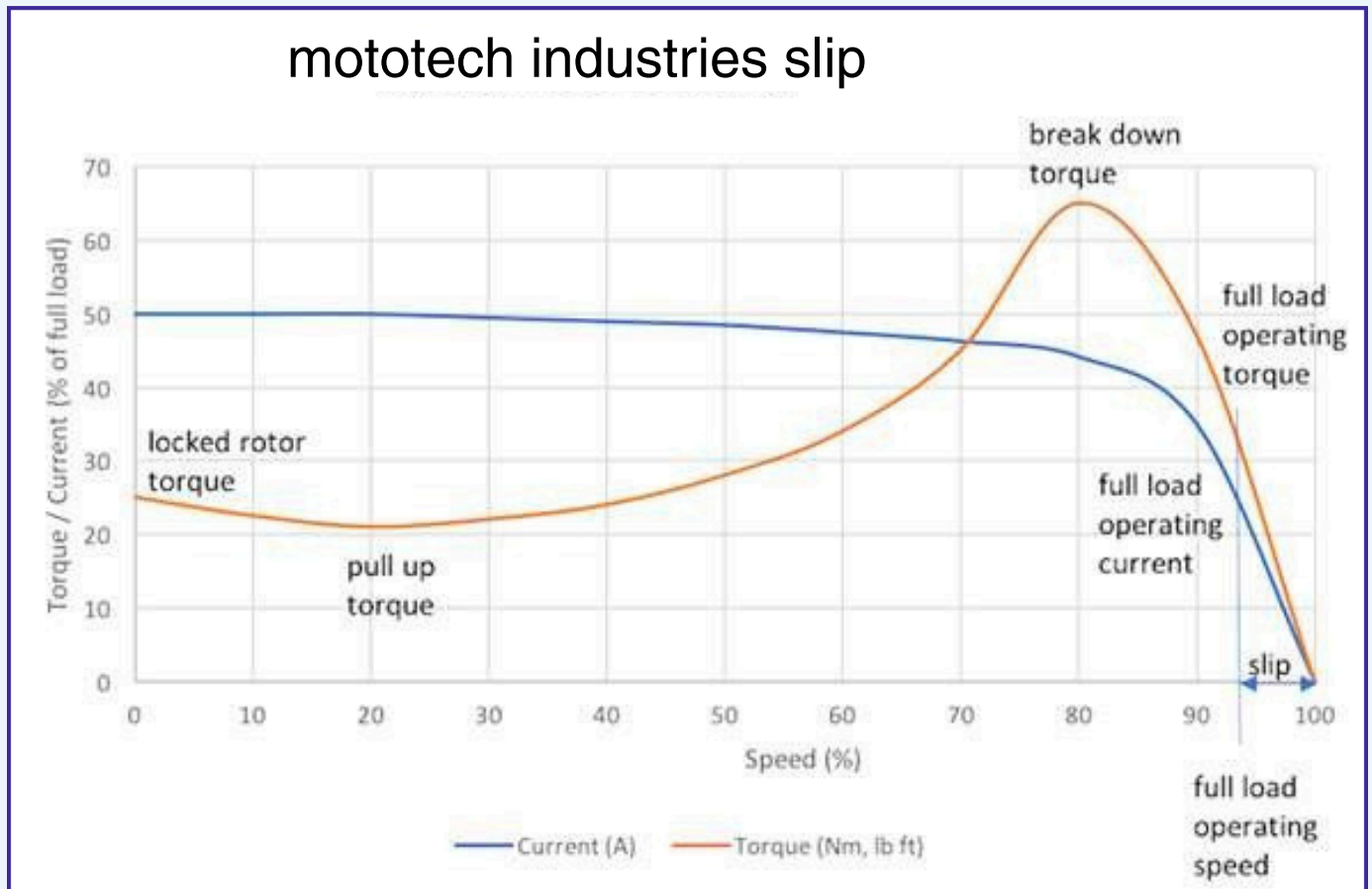
- Motor Stamping: Silicon Stamping
- Motor Copper winding: RR Kable & BIC.
- Motor Insulation material (Class B- Paper): Garware polyester ltd
(Class F-Fibre glass paper): Nomex
- Motor bearing : SKF, NBC & TATA
- Motor Insulating Varnish: Dr Beck

Techno Conducts Testings:

- Hight Voltage test
- Rotor balancing
- Earth continuity and resistance test
- Power supply test
- Motor winding continuity test
- Motor winding resistance test
- Insulation resistance testing
- Running amps test



CHARACTERISTIC OF SLIP, CURRENT AND SPEED AND TORQUE



PROBLEMS IN 3 PHASE INDUCTION MOTOR:

Environmental related faults:

The ambient temperature and the moisture content in the air at sea will affect the operational performance of the induction motor.

The motors are installed on other big machinery (main engine) having their own vibrating frequency, which affects the motor parts.

A wrong installation or loose foundation of the motor or the load it is connected to may also lead to the reduction in the motor efficiency and on a longer run- a failure of the motor.

Electrical-related faults:

Winding Fault : The winding provided in the stator may fail due to the problem in the insulation caused leading to short circuit.

Single Phasing Fault : When any one or more than one phase of the 3 -phase supply is lost, a running 3 phase motor will continue to run but at elevated parameters of temperature and loss. This condition is known as single phasing.

Crawling : This is a mix of electrical and mechanical fault where the induction motor runs at a lower speed (nearly 1/7th of its synchronous speed) even at full load application. It is the result of abnormal magnetomotive force or high harmonic content in the power supply to the motor.

Mechanical-related faults :

Imbalance Rotor : The rotor is the only moving part in a 3 phase induction motor. If there is an imbalance in between the shaft rotational axis and weight distribution axis of the rotor, it will create vibration, additional heat and efficiency loss in the system.

Fatigue Failure : If the maintenance schedule is not proper or the parts used in the motor are of poor quality, weakening of material may lead to fatigue failure which is usually caused by repeatedly applied loads.

Bearing failure : The motor is fitted with two bearings at rotor's each ends for supporting and freely rotating the shaft. The bearing can fail if timely maintenance is not done or due to overloading, wrong installation, contaminated lube oil and operating at an excessive temperature.

Corrosion : The surrounding of the motor installed in a ship is highly corrosive. the moisture present in the atmosphere or the water present in the lubrication (grease) will corrode the bearings, motor shaft and rotors. The insulation can also be affected by the corrosion, and lead to a short circuit between the windings.

Lubrication problem : Lack of lubrication or contamination of the lubricant can lead to increase friction between parts and bearings may worn out quickly.

Protections for 3 phase induction motor

Single phasing protection : To tackle this problem, protection devices are used for 3 phase induction motor. All motors above 500 KW are to be provided with protection devices or equipment to prevent any damage due to single phasing.

Over-temperature : The winding of the motor can be heated due to problems like overloading or single phasing. Fuses, relays etc. are used to protect the motor from overheating.

Soft Starting : As described above one of the disadvantages of 3 phase induction motor is the high current it draws during the starting period. To protect it from this problem, different starting method are used by integrating the motor with soft starter, DOL, Star delta starter, auto transformer etc.



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