mototek®

motor technology at its best

QUALITY

EFFICIENCY

SUPPORT

COMMITMENT

mototek

Powerful ... Reliable ... Durable ... Performance ..... Forever

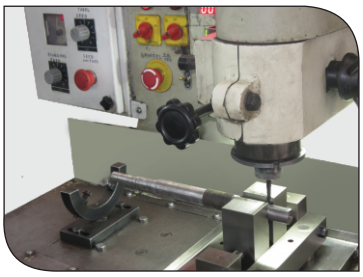
CE

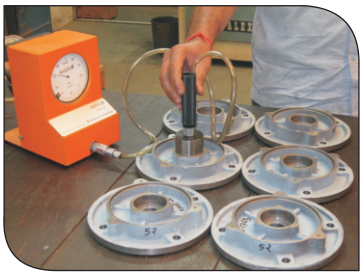
IS:12615

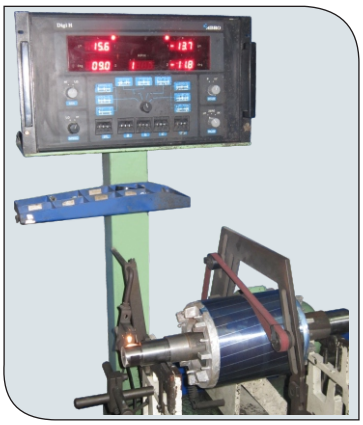
CM/L-7200109193

ISO 9001:2015 COMPANY

INTRODUCTION







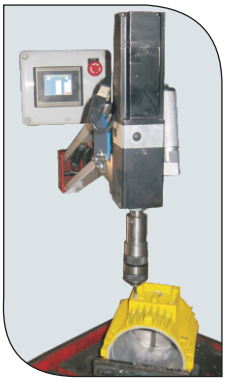
Power Drives (Gujarat) Private Limited is an ISO : 9001 Company established in 1982, providing industrial and power distribution solutions. With an extensive field experience of more than 30 years of electric motor design and development, Power Drives (Gujarat) Private Limited launched range of "mototek " electric motors, engineered for best performance.

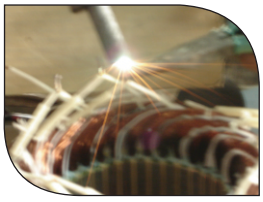
The company has concentrated and excelled in designing, manufacturing, marketing and servicing industrial and domestic squirrel cage induction electric motors of various types catering to the need of verity of industries. The range of products include three phase motors up to 75HP (55kW), Single Phase Motors up to 2HP (1.5kW), Frequency Inverter duty Motors with or without servo ventilation system & encoder, Brake Motors, Torque Generators , Dual speed Motors, Crane Duty Motors, Hollow Shaft Motors, Multi and Custom Built Motors. "mototek" motors cater to Textile, Plastic & Packaging, Food Processing, Power, and Pharmaceutical, Bio-mass, Cattle & Poultry Feed, Dairy, Machine Tooling Industries and many more. Now “mototek” also caters Railway Industries (e.g. Metro, EMU, etc.).

"mototek" ensures timely deliveries with the best in class quality, optimum performance with economically attractive quantities and product cost. "mototek" intent to achieve and maintain the highest standard of quality in total range, achieved with complete manufacturing and testing equipments in house. "mototek" has a full fledge Machine shop where motor frame up to 280 size can be machined and manufactured.

"mototek" custom built range also covers special ratings with 690V, 415V, 380V, 230V, and 115V in 50Hz / 60 Hz / 87 Hz frequency. For specific requirements any combination of voltage and frequency are also manufactured to suit the industrial requirements.

Team "mototek" has motivated, inspiring and energetic members and are committed to a common goal to produce world class motors and support the customer to their satisfaction.





STANDARD FEATURES

Mechanical Features :

Basic components of "mototek" motors are designed and manufactured with a view to provide sturdy construction and accuracy. This results in optimum performance, reduced vibration, precision class tolerances, which reduces bearing noise and friction losses which in turn improves bearing life and efficiency and noise less working.

Body Frame : 63 to 100 frames are available in aluminum constructions as default. Gray Cast Iron bodies are also available on request. 112 to 280 frame motors are available in Gray Cast Iron Frame designed esthetically well and to withstand heavy shocks.

Terminal Box and Cable Entry : Gray Cast Iron frame has integrated and sufficiently large terminal box for better protection from atmospheric dust and other particles. Aluminum frames has separate terminal boxes secured with proper gasketing to provide such protections. For cable entry proper sized PG threads are provided on the terminal boxes. B.S. Conduit, Metric and other threads can be provided if asked in advance. All the terminal boxes are secured with MS pressed covers which give good esthetics and protection as secured with gasketing.

End Covers : The flanges and end covers for 63 to 280 frames are made from Gray Cast Iron with integrated bearing housing ensuring lifelong wear resistance. For special application, motors with reduced flange and enlarged flanges are possible.

Rotor Shaft : Rotor shafts are normally manufactured with EN 8 D steel and are precisely ground to accuracy. For specific application, Rotor Shaft with EN24 / EN31 or any other EN steel can be manufactured. Rotor with fusion SS shaft can be manufactured for chemical and food processing application.

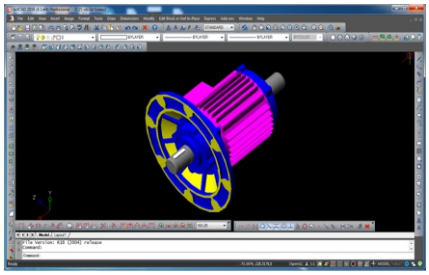
Bearings, Lubrication and Sealing : "mototek" motors normally come with Single Row Deep Groove Ball Bearings with rubber seals on both sides(2RS) up to 180 frame. This ensures IP55 protection as standard on the shafts. These bearings are pre lubricated ensuring proper lubrication and need not to be lubricated. Bigger frames have fitted bearing covers and have provision for re-lubrication on the end covers. In such case, the bearings are lubricated with high temperature grease of lithium Complex soap based type NLGI 2 and are protected with "V" ring or oil seals to safe guard the bearings from external dust.

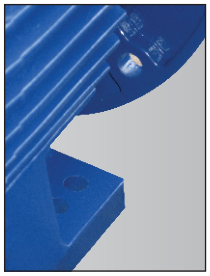
Mounting : All the Motor frames are available in Foot Mounting (B3), Flange Mounting (B5) & Combination Foot + Flange Mounting (B35). Motor Frame up to 132 are available with Face Mounting (B14) and combination Foot +Face (B34). Motors with special mounting can be designed and manufactured to suit customer's requirements.

Noise Level : “mototek” Motors are manufactured to perform silently-feel the power of silence. The noise level are much lower than the specified limits as per EN and IS standards.

Fan & Fan Cover : Aerodynamically designed fan & Fan Covers are used to provide sufficient cooling and yet minimum loading for better efficiency of the "mototek" motors. Thicker gauge of fan covers are used so the aerodynamic shape is maintained and provide maximum operator's safety by protecting accidental approach to the fan while under operation.

Balancing and Vibration : All rotating parts, mainly rotor with shaft are dynamically balanced on high performance NC balancing machine up to grade “2.5” for vibration free running. For high frequency or such specific requirement, rotors can be balanced up to grade “1.0” can be. This reflects on much lower vibration levels than specified in EN and IS standards.





STANDARD FEATURES

ELECTRICAL FEATURES :

Balancing of starting torque, Efficiency and slip are of major concern while designing "mototek" motors. The winding and insulating process and the material are also of prime concern. The design itself ensures the ease of winding as well as optimizing the performance.

Lamination : Laminations used are of high grade electrical steel and precisely stacked for better stacking factor to control losses and electrical losses.

Winding : Stators are wound with EC grade copper wires coated with Class "F" varnish for better insulation. Proper gauge for minimum losses ensures better efficiency.

Insulating Material : Insulating materials like sleeves and insulating papers of Class “F” are used which provide enough dielectric and mechanical strength. This allows to withstand higher temperature rise, wide range of voltage fluctuation and other electrical shocks.

Note:- Insulating varnish as per below can be provided(Fire conformity).
EN 45545-2:2020; Requirements for fire behavior of materials and components
ISO 5659-2:2017; Determination of optical density by a single-chamber test
T11.01 &T11.02 of EN 45545-2:2020; Determination of Conventional Index of Toxicity
ISO 4589-2: 2017: determination of oxygen index

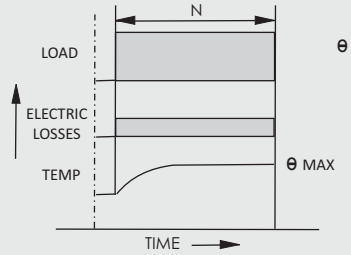
Terminal Plate : The terminal plates are of DNC material for better dielectric strength and having enough gaps to prevent inter phase shorting while energizing "mototek" motors.

Supply Voltage and Frequency : As per standard Indian supply condition normally "mototek" motors are designed to operate at 415V + 10%, 50 Hz + 5%, 3 Phase OR 230V +10%, 50 Hz + 5%, 1 Phase with a combined variation of voltage and frequency together at + 10%. As required for Frequency Inverter and for other parts of the world, "mototek" motors are available with various combinations of voltages from 24 V to 690V and frequency from 50Hz to 150Hz, for 3 phase supply and 110V and 50 or 60Hz for 1 Phase supply. High frequency motors are also available with jackated cooling.

Optional : "mototek" motors are available with thermister, thermal switch, space heaters, incremental or absolute encoder, resolver as required.

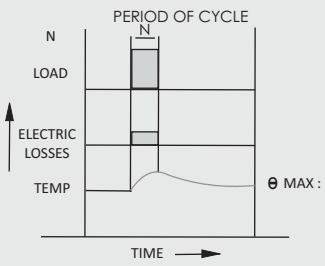
Duty : As a standard supply, all "mototek" motors are available with continuous duty cycle S1. However motors with duty cycle S2 to S6 are also manufactured against requirement. It is important to understand the duty cycle for which motor is to be operated. Derivative of duty cycle classification is mentioned as under.

DUTY S1 Continuous duty



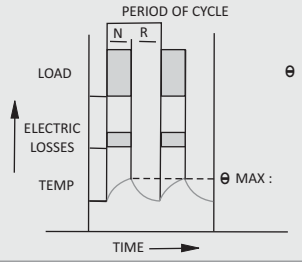
N : Operation at Constant Load
θ MAX : Maximum Temp. attained

DUTY S2 Temporary duty



N : Operation at Constant Load
θ MAX : Maximum Temp. attained during duty cycle in °C

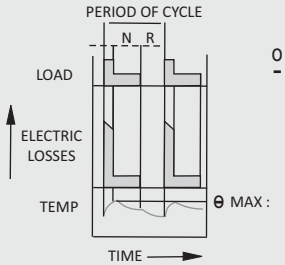
DUTY S3 Intermittent periodic duty-type without starting



N : Operation at Constant Load
R : Operation at rest & de-energized
MAX : Maximum Temp. attained during duty cycle in °C

Cyclic Duration factor $= \frac{N}{N+R} \times 100\%$

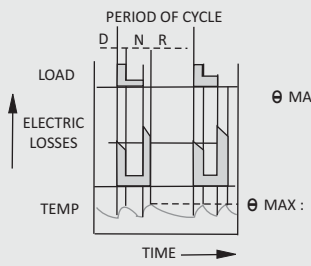
DUTY S4 Intermittent periodic duty with starting



D : Starting Period
N : Operation Under Rated condition
R : At rest & de-energized
θ MAX : Maximum Temp. attained during duty cycle in °C

Cyclic Duration factor $= \frac{D+N}{D+N+R} \times 100\%$

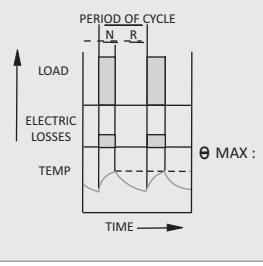
DUTY S5 Intermittent periodic duty with starting and electrical braking



D : Starting Time
N : Operation Under Rated condition
F : Braking period
R : At rest & de-energized
θ MAX : Maximum Temp. attained during duty cycle in °C

Cyclic Duration factor $= \frac{D+N}{D+N+F+R} \times 100\%$

DUTY S6 Continuous-operation duty type



N : Operation at Constant Load
V : Operation on no load
θ MAX : Maximum Temp. attained during duty cycle in °C

Cyclic Duration factor $= \frac{N}{N+V} \times 100\%$

STANDARD FEATURES

GENERAL FEATURES

Temperature Rise and Insulation Class :

With latest technological development in insulating material, “mototek” motors are available with Insulation class “F” with a temperature rise restricated to class “B” as default. This will allow motor to withstand more frequent overloads or voltage and frequency variations. For traction and such other requirement, motors with class “H” are also manufactured against requirement.

Note:- On request, motors with insulation to withstand up to 5kV High voltage test and Insulation resistance up to 5GOhm @1000VDC are manufactured which are suitable for converter fed motors.

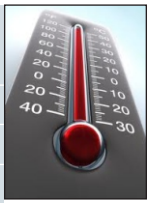
Temp. Ambient Permitted power as	40	45	50	55	60
% of rated power	100%	95%	90%	85%	80%

Derating Factor :

The value of performance and ratings of “mototek” motors are at 40°C ambient temperature and up to 1000 meter MSL altitude. However same motors can be used for higher ambient temperature and altitude but it has to be derated as specified in the tables. If specified, motors with higher ambient temperature and altitude can be manufactured.

Altitude above sea level In meters	% output of Motor
2000	95
3000	85
4000	77

Ambient temperature In °	% output of Motor
45	98
50	96
60	90



Paint :

All the casted components are shot/sand blasted and coated with epoxy primer to ensure better surface adhesion of paint and prevent rusting. MS components are also cleaned by phosphating and coated with epoxy primer. The finished "mototek" motors are painted with specific shade of Blue aluminum based paint which technically & practically ensures better heat dissipation and lifelong paint protection. The Machines lamination - mainly rotor and the shaft extension are coated with rust preventer to protect them from rusting.

Paint with following fire safety standard (fire conformity) can be provided.

EN 45545-2:2020; Requirements for fire behavior of materials and components

ISO 5659-2:2017; Determination of optical density by a single-chamber test

T11.01 &T11.02 of EN 45545-2:2020; Determination of Conventional Index of Toxicity

ISO 4589-2: 2017: determination of oxygen index

Paint suitable up to 1000Hrs. salt spray test can be provided.

BRAKE MOTOR

Brake motors are required when you want the motor to stop quickly even with heavy inertia/load like hoisting, positioning or material movement. "mototek" brake motors are becoming popular due to its practically maintenance free and noise less performance. "mototek" Brake motors are normally supplied with D.C. fail safe brakes, also known as normally ON brake. The motor is braked (Locked) when power is not applied i.e. de-energized to brake. This ensures real fail safe braking. The construction is robust and requires very limited maintenance. With wearing of liners of the rotor of brake, the air-gap can be easily adjusted. If necessary, the rotor can be easily replaced completely as well. The brake is mounted on end covers on non-driving end of the motor. It comes with a Manual release lever.

SELECTION CRITERIA

It is recommended to use proper size of brake. It should not be undersized or should not be over sized as well. Depending on the application, the service factor of the brake has to be selected for proper braking.

Service factors for selection of the brake are mentioned in the selection table. This is just a guideline as there are many other factors to be considered while selecting the brake size like mounting positions, type of transmission and type and ratio of reductions. We request you to consult "mototek" for proper brake motor selection.

OUTPUT		2-POLE 3000RPM			4-POLE 1500RPM			6-POLE 1000RPM			8-POLE 750RPM		
KW	HP	FRAME Size	Brake Torque in Nm	Safety Factor	FRAME Size	Brake Torque in Nm	Safety Factor	FRAME Size	Brake Torque in Nm	Safety Factor	FRAME Size	Brake Torque in Nm	Safety Factor
0.18	0.25	63	4.5	7.38	63	4.5	3.66	71	4.5	2.43	80	10	4.02
0.25	0.33	71	4.5	5.29	71	4.5	2.63	71	4.5	1.75	-	-	-
0.37	0.50	71	4.5	3.57	71	4.5	1.79	80	10	2.63	90S	10	1.95
0.55	0.75	71	4.5	2.39	71	4.5	1.20	-	-	-	-	-	-
	-	80	10	5.32	80	10	2.67	80	10	1.77	90L	20	2.63
0.75	1.00	80	10	3.91	80	10	1.95	90S	20	2.60	100L	20	1.93
1.10	1.50	80	10	2.67	90S	20	2.67	90L	20	1.77	100L	40	2.63
1.50	2.00	90S	20	3.91	90L	20	1.96	100L	40	2.60	112M	40	1.93
2.20	3.00	90L	20	2.67	100L	40	2.66	112M	55	2.43	132S	60	1.97
3.00	4.00	100L	20	1.96	100L	40	1.96	132S	60	1.95	132M	85	2.05
3.70	5.00	100L	20	1.58	112M	60	2.38	132S	85	2.24	132M	150	2.93
5.50	7.50	112M	40	2.13	132S	85	2.27	132M	140	2.48	160M	150	1.97
7.50	10.00	132S	60	2.35	132M	140	2.74	160M	150	1.95	160L	250	2.41
9.30	12.50	132M	60	1.89	132M	150	2.36	160L	250	2.62	-	-	-
		160M	85	2.68	160M	150	2.36	-	-	-	180M	250	1.94
11.00	15.00	160M	85	2.27	160M	150	2.00	160L	250	2.21	180L	250	1.64
15.00	20.00	160M	140	2.74	160L	250	2.44	180L	250	1.62	-	-	-
18.50	25.00	160L	150	2.38	180M	250	1.98	-	-	-	-	-	-
22.00	30.00	180M	150	2.00	180L	250	1.67	-	-	-	-	-	-

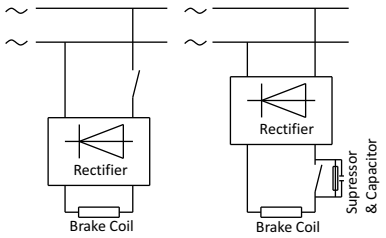
BRAKE MOTOR

SUPPLY

Unless otherwise specified, brake voltages are 190 V DC with a rectifier of 415V A.C. dual phase input and 190V DC output duly fitted on the motor and properly connected with the terminals. For faster brake releasing action, 96 V D.C. brakes can be used with the some rectifier.-but with an input supply of 230V AC. Brakes with 24V or 48 V DC can be supplied but without rectifier. For these supply voltages brake, inbuilt rectifier is not available. Hence the brake has to be energized and de-energized with external supply and controls.

SWITCHING

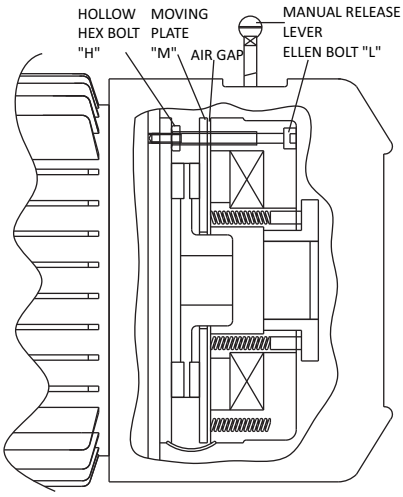
Motors are connected with AC switching as standard. For faster action i.e. reduction in the delay time in operation, DC switching can be used. Care must be taken while DC switching as it generates heavy sparking across make-brake contact. This may become a cause of accident in some cases. Hence suitable universal shock suppressors and capacitors can be used which are normally not included in the "mototek" motors. Special types of rectifires are available to suit the application. To name a few 230 VAC to 190 VDC fast acting, 415 VAC to 190 VDC quick release quick braking, 415 VAC to 190 VDC quick release soft braking & so on. Alternatively, 3 phase AC brakes can be used for extremely fast action.



A. C. Switching D. C. Switching

AIR-GAP ADJUSTMENT

The air gap between the armature and plate of the brake is important for the braking torque and engaging and disengaging time of the brake. It is recommended to verify and if required to adjust the air-gap periodically for consistent performance. It will not only improve the braking performance but will also increase the life of liner. The Brake is mounted on the rear end cover of the motor with three to six ellen bolts "L" near the outer periphery of the brake as indicated in the figure. These ellen bolts “L" pass through hollow hex bolts "H" which are in the opposite direction of the ellen bolts "L". Moving plate "M" is located between the armature and brake coil housing which moves axially during operation of engaging and disengaging. The air gap between this moving plate "M" and brake coil housing has to be maintained. It can be measured with a filler gauge or any other suitable measuring system. To set the air gap, loosen all the ellen bolts "L" and unscrew all the hollow hex bolts "H" slightly, to increasing the air gap and tighten them to reduce the air gap. Tighten the ellen bolts "L" and measure the air gap near the bolts if required adjust the air gap again to achieve specified air gap as mentioned in the table



Frame Size	63	71	80	90	100	112	132	160	180
Air gap in mm	0.3	0.3	0.3	0.3	0.35	0.35	0.4	0.4	0.4

OPTIONS

AC fail safe brakes are Normally off (energized to brake) brakes in different operating voltage can be supplied subject to confirmation. Motors with shaft extensions on rear side can be supplied if required for manual operation. A small handle can also be provided.

LENGTH OF BRAKE MOTORS

Mounting dimensions of brake motors are same as standard motors, except total length. As brake mechanism is mounted on NDE side of the motor, total length will increase depending upon the type and size of the brake. Please contact for detailed dimensions with specific requirements.

UNI-DIRECTION MOTORS (BACK STOP)

Certain applications such as Bucket elevator, Inclined screw conveyor require motors to rotate only in a particular direction. Upon de-energizing the motor it tends to rotate in other direction due to the inertia of the equipment which may lead to jamming of equipment. To prevent this “mototek” motors are available with Back stop assembly preventing motor to rotate in other direction. It is important to ensure that while energizing the motor, it should rotate in desired direction only otherwise it may damage the Back stop assembly. Best part of this smart design is that, If incase of any change at site or during installation, with just a little consultation from “mototek”, direction of rotation can be changed.

INVERTER RATED MOTOR (VFD or VVVF Motor)

Machine Tools and Process industries do need variable speed motors to either achieve desired machine function or for energy conservation. Application like fan and certrifugal pumps are an excellent example of energy saving through VFD. VFD or Frequency Inverter is not a new word for the industry now. "mototek" Inverted rated motors are suitable to operate with VFDs.

The motors are insulated to withstand the voltage spikes generated while working with VFDs.

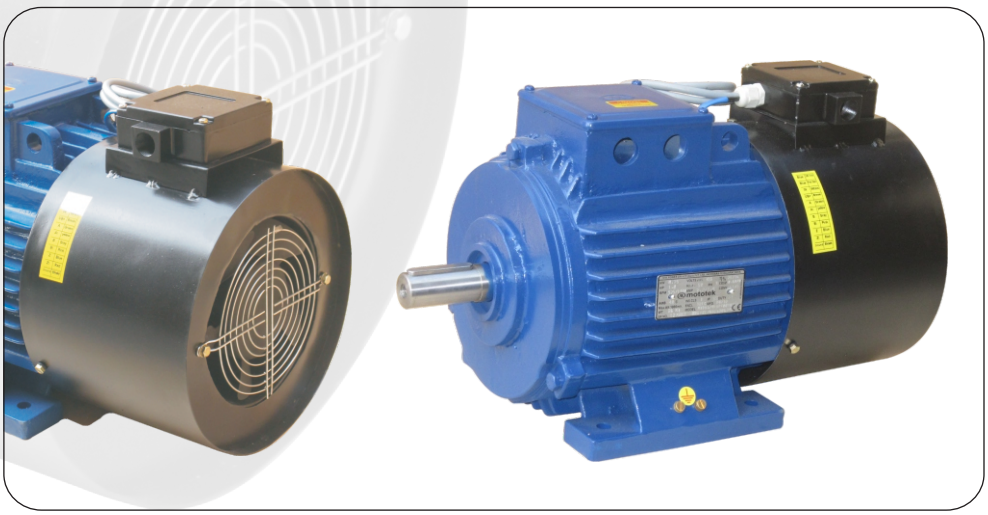
Depending upon the required operating speed range and close loop feed back for automation motors can be selected.

(A) Where speed of the motor is to be reduced approximately up to 50% of the rated speed, than the integral fan on the motor shaft is sufficient to provide enough cooling. It again depends on the type of load. If the load is of fan or centrifugal pump type, than motor with integral fan can go even further low speed at the same type heavy duty load with intermittent increasing load application may need extra cooling. This is just a guideline to understand the basic requirement of cooling.

(B) Where the speed of the motor is to be reduced further the integral fan mounted on the motor shaft becomes inactive OR when the speed of the motor is to be increased with a frequency above 60 Hz. The integral fan overloads the motor. In such situation, it becomes very important to provide extra cooling by separately energized fan i.e. servo ventilation (IC 46 cooling). Servo ventilation (IC 46 cooling) is available from the frame 71 to 280. For smaller frames, it is recommended to use higher frame, if B5 flange mounting than reduced flange can also be used.

(C) The automation requirements are increasing day by day and it is becoming important to control the speed of the motor or position of the motor shaft for positioning and synchronizing requirement of machine tools and process. "mototek" motors with servo ventilation as well as normal fan cooled are available with either incremental encoders, absolute encoders and resolvers of various supply and output. As a standard "mototek" can offer quick delivery with 1024 PPR - 10 to 30V DC Push-Pull incremental encoders.

Servo ventilated motors, motors with encoders or both are longer compared to standard motors. If the space is the criteria please confirm the length before ordering.



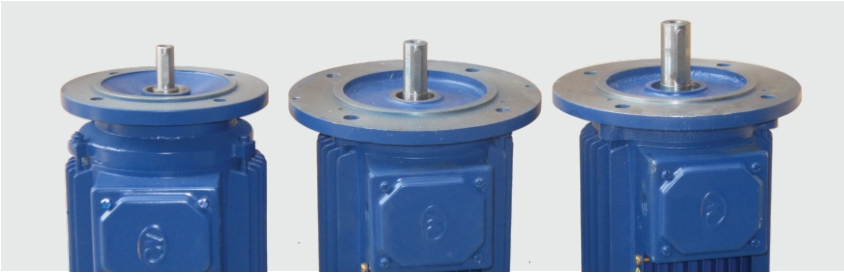
DUAL SPEED MOTOR

	Pole/Pole			
Frame	2/4	4/6	4/8	6/8
71	-	-	0.18/0.09	
90S	1.2/0.6	0.5/0.33	0.5/0.25	
90L	2.0/1.4	-	-	
90L	1.7/1.1	-	-	
90L	1.5/0.3	-	-	
90L	1.2/0.8	1.0/0.75	0.75/0.37	
100L	3.2/1.6	1.5/1.1	1.5/0.75	
112M	-	2.0/0.98	-	-
112M	5.0/2.5	3.0/2.13	2.6/1.3	
132S	7.0/3.5	5.0/3.33	4.0/2.0	
132M	-	-	-	-
132M	-	5.5/1.8	-	-
132M	-	7.0/2.2	5.5/2.2	-
132M	8.0/4.0	6.0/3.0	7.5/5.5	-
160M	15.0/10.0	10.0/7.5	10.0/5.0	7.5/5.0
160L	20.0/15.0	15.0/10.0	15.0/7.5	10.0/7.5
180M	25.0/15.0	17.5/12.5	17.5/8.4	12.5/8.4
180L	-	-	-	20.0/15.0
180L	25.0/22.0	20.0/15.0	20.0/10.0	15.0/10.0

Many application in industry needs dual speed motors. The motors work on either of the speed as selected. The speed change can be achieved by separate winding of the motor or dahlander connection by changing the pole connections. By and large the output torque of the motors remains same in both speed and hence the power of the motor changes with respect to speed. Application of dual speed motors are endless, to name a few “mototek” dual speed motors are being used for hoisting , positioning application for precise positioning and avoid jerking, centrifugal fan or pumps for energy saving, machine tools for better size control and special tooling operations.

REDUCED / ENLARGED FLANGE MOTOR

Many application such as special purpose gearboxes, non continuous operating machines or motors having radial & axial loads need flanges smaller or larger or larger than the standard frame. “mototek” motor are available with such flange.



HIGH RESISTANCE TORQUE GENERATOR

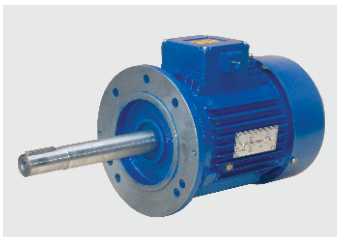
High resistance torque generators popularly known as torque generators are used mainly for winding application. Plastic blow film Extruders, redrawing and coating of copper and other wires, plastic and cotton strip and rope winders are few applications. "mototek" torque generators are designed to operate from quite a long strall time and with additional servo type cooling for reliable and long operation. "mototek" torque generators are available in different RPMs to suit the application. For bigger winder torque geared generators with servo type cooling are also manufactured.

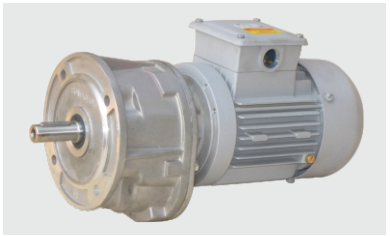
CUSTOM BUILT MOTORS

When overall optimum performance is targeted, customization is must for any process or machines, so “mototek” has developed and is further keen to develop customized motors. Customization for mechanical as well as electrical requirements can be developed and manufactured. It could be for vibratory applications, stirrer applications, positioning and many such applications, “mototek” custom built motors proves to be best value for money. Faster conceptualization to development and to production is the biggest strength of team “mototek”. It is a total team effort of electrical design, mechanical design and production team.

Motors with extended shaft, hollow shaft, special flanges, special foot mounting along with special power ratings, frequency, voltages, jacketed cooling and many such combinations are designed and developed by “mototek”.





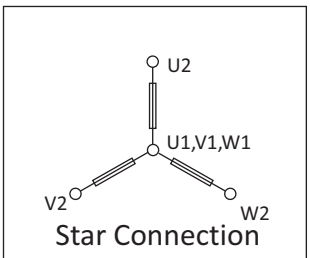

WIRING GUIDELINES

“mototek” motors up to 3kw are normally designed for star connection for 415V , 50Hz, 3 Phase supply, but with increasing usage of 230V inverter, these motors are supplied with six terminal to create star or delta connection as required. Motors above 4kw are normally supplied with six terminals for star-delta connections. Motors with six terminals have to be connected in accordance with supply conditions. Verify the connection instruction before putting the motor in operation. With different connections of the motor, it is possible to use the same motor of different voltage supplies (Dual voltage motor)

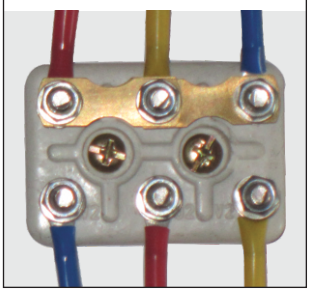
Star Connection - On a six termination plate, connect U1, V1 and W1 with the link supplied along with the motor and connect three phase supply wires to U2 , V2 and W2 to connect the motor in star connection.

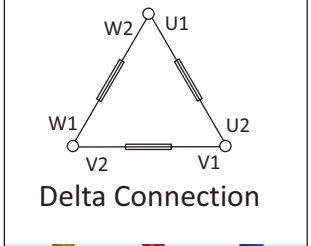
Delta Connection - On a Six termination plate, connect V1-U2, U1-W2 and W1-V2 with the link supplied along with the motor and connect three phase supply wires to U1, V1 and W1 to connect the motor in delta connection.

While changing the connections, ensure that the rated Voltage is maintained on the supply to brake, rectifier or any other type of accessories / equipment which are directly connected to the motor termination.

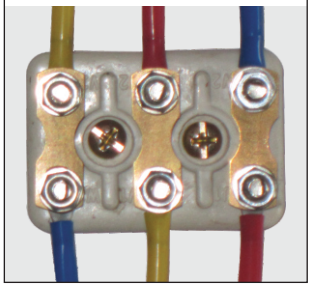


Star Connection

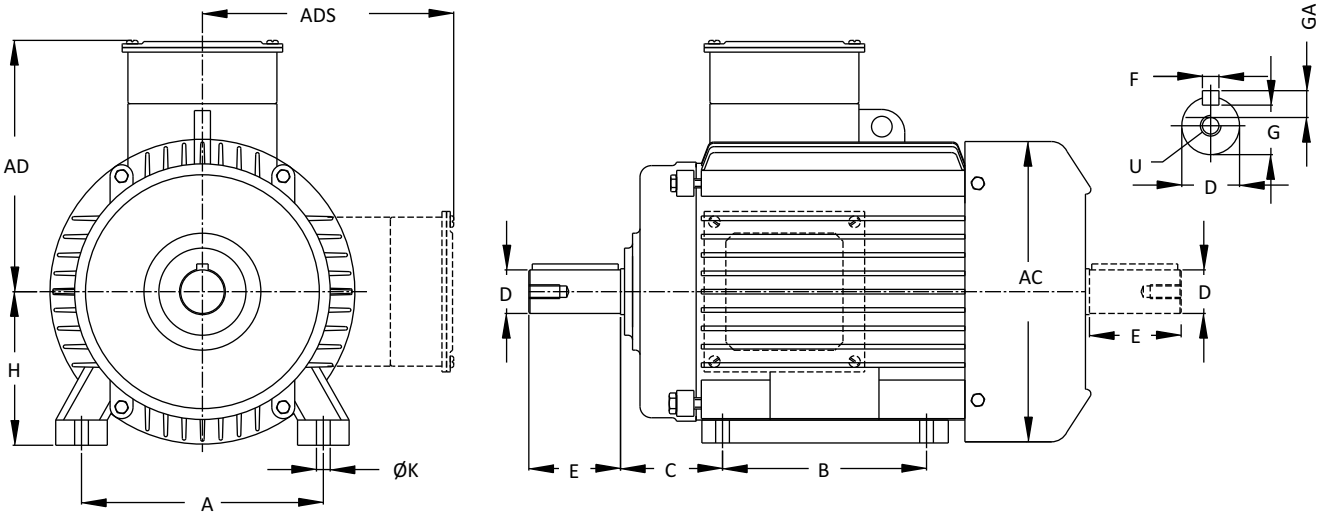




Delta Connection



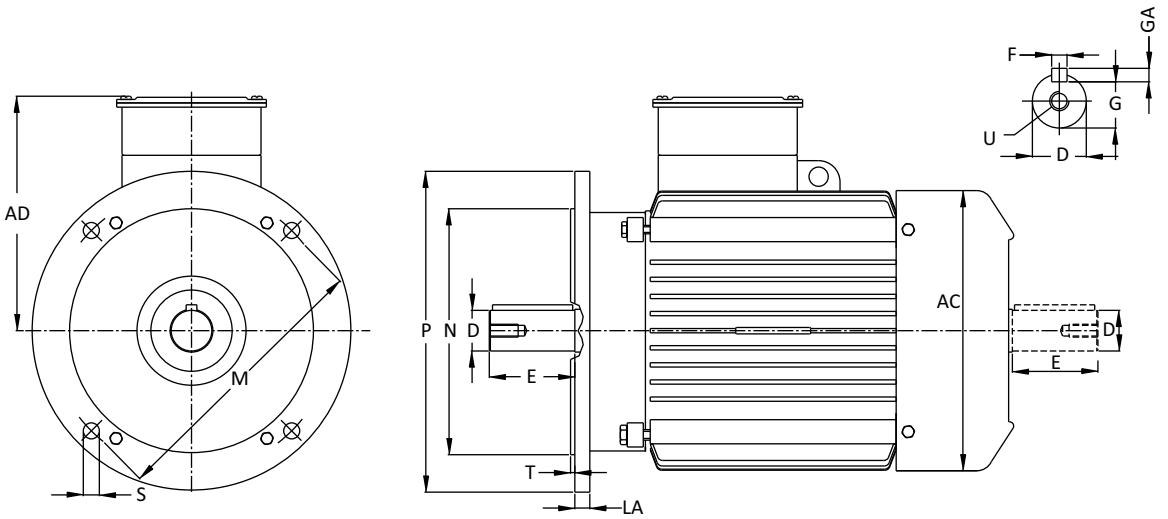
DIMENSION TABLE OF FOOT MOUNTED (B3) CONSTRUCTION



FRAME SIZE	A	B	C	H	K	U	AC	AD	ADS	D	E	F	GA	G	TOL ON D	TOL ON F	TOL ON H
63	100	80	40	63	7	M4	115	95	-	11	23	4	13	8.5	+0.008 0.003		
71	112	90	45	71	7	M5	140	105	-	14	30	5	16	11	(J6)	-0.03	
80	125	100	50	80	10	M6	162	128	-	19	40	6	22	16		(h9)	
90S	140	100	56	90	10	M8	173	135	128	24	50	8	27	20	+0.009		
90L	140	125	56	90	10	M8	173	135	142	24	50	8	27	20	-0.004		
100L	160	140	63	100	12	M10	195	165	155	28	60	8	31	24	(J6)	0	
112M	190	140	70	112	12	M10	226	178	160	28	60	8	31	24		-0.036	
132S	216	140	89	132	12	M12	260	198	185	38	80	10	41	33		(h9)	
132M	216	178	89	132	12	M12	260	198	185	38	80	10	41	33			0
160M	254	210	108	160	15	M16	310	240	210	42	110	12	45	37	+0.008		-0.5
160L	254	254	108	160	15	M16	310	240	210	42	110	12	45	37	-0.002		
180M	279	241	121	180	15	M16	360	260	227	48	110	14	52	43	(K6)	0	
180L	279	279	121	180	15	M16	360	260	227	48	110	14	52	43		-0.043	
200L	318	305	133	200	19	M20	390	295	-	55	110	16	59	49		(h9)	
225S *	356	286	149	225	19	M20	400	295	-	55	110	16	59	49	+0.03		
225S **	356	286	149	225	19	M20	400	295	-	60	140	18	64	53	-0.011		
225M *	356	311	149	225	19	M20	400	295	-	55	110	16	59	49	(m6)		
225M**	356	311	149	225	19	M20	400	295	-	60	140	18	64	53			
250M*	406	349	168	250	24	M20	490	335	-	60	140	18	64	53			
250MX*	406	311	168	250	24	M20	490	335	-	60	140	18	64	53			
250M**	406	349	168	250	24	M20	490	335	-	65	140	18	69	58			
250MX**	406	311	168	250	24	M20	490	335	-	65	140	18	69	58			

NOTE: * For 2Pole Motor ** For 4,6,8 Pole Motors

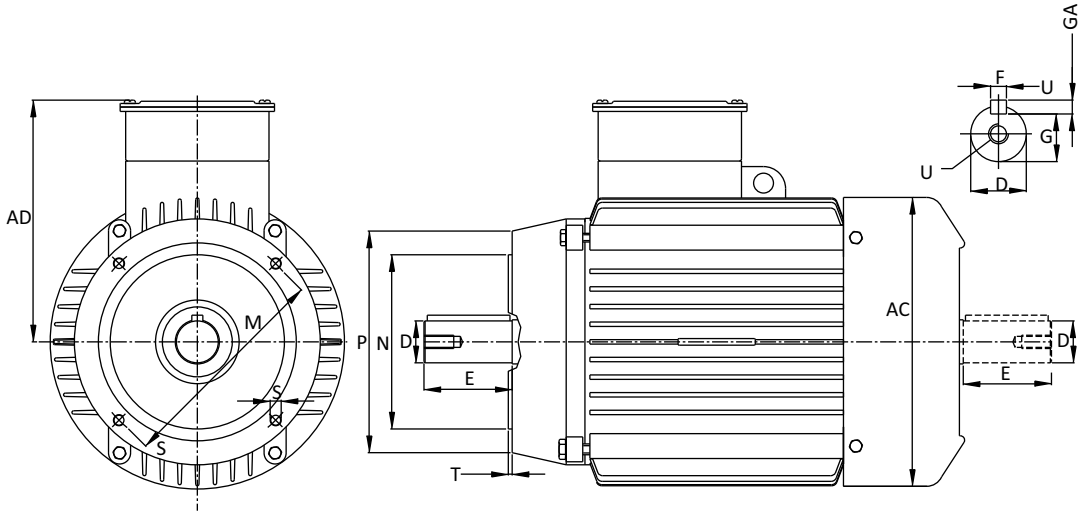
DIMENSION TABLE OF FLANGE MOUNTED (B5) CONSTRUCTION



FRAME SIZE	P MAX	M	N	S	Nos. of Holes	T MAX.	U	LA	AC	AD	D	E	F	GA	G	TOL ON D	TOL ON F	TOL ON H
63	140	115	95	10	4	3	M4	9	115	95	11	23	4	12.5	8.5	+0.008 -0.003		
71	160	130	110	10	4	3.5	M5	9	140	105	14	30	5	16	11	(J6)	-0.03	
80	200	165	130	12	4	3.5	M6	10	162	128	19	40	6	21.5	15.5		(h9)	
90S	200	165	130	12	4	3.5	M8	10	173	135	24	50	8	27	20	+0.009		
90L	200	165	130	12	4	3.5	M8	10	173	135	24	50	8	27	20	-0.004		0
100L	250	215	180	15	4	4	M10	11	195	165	28	60	8	31	24	(J6)	0	-0.5
112M	250	215	180	15	4	4	M10	11	226	178	28	60	8	31	24		-0.036	
132S	300	265	230	15	4	4	M12	12	260	198	38	80	10	41	33		(h9)	
132M	300	265	230	15	4	4	M12	12	260	198	38	80	10	41	33			
160M	350	300	250	19	4	5	M12	13	310	240	42	110	12	45	37	+0.008		
160L	350	300	250	19	4	5	M16	13	310	240	42	110	12	45	37	-0.002		
180M	350	300	250	19	4	5	M16	13	360	260	48	110	14	51.5	42.5	(K6)	0	
180L	.350	300	250	19	4	5	M16	13	360	260	48	110	14	51.5	42.5		-0.043	
200L	400	350	300	19	4	5	M16	15	390	295	55	110	16	59	49	0.03	(h9)	
225M/S*	450	400	350	19	8	5	M20	16	400	295	55	110	16	59	49	-0.011		
225M/S**	450	400	350	19	80	5	M20	16	400	295	60	140	18	64	53	(m6)		
250M/MX*	550	500	450	19	8	5	M20	18	490	335	60	140	18	64	53			
250M/MX**	550	500	450	19	8	5	M20	18	490	335	65	140	18	69	58			

NOTE: * For 2Pole Motor ** For 4,6,8 Pole Motors

DIMENSION TABLE OF FACE MOUNTED (B14) CONSTRUCTION



FRAME SIZE	P MAX.	M	N	S	T MAX.	U	AC	AD	D	E	F	GA	G	TOLE. ON D,DA	TOLE. ON F,FA	TOLE. ON H
63	90	75	60	M5	3	M4	115	95	11	23	4	12.5	8.5	+0.008 -0.003		
71	105	85	70	M6	3.5	M6	140	105	14	30	5	16	11	(J6)	+0.03	
80	120	100	80	M6	3.5	M6	162	128	19	40	6	21.5	15.5		(h9)	
90S	140	115	95	M8	3.5	M8	173	135	24	50	8	27	20	+0.009		
90L	140	115	95	M8	3.5	M8	173	135	24	50	8	27	20	-0.004		0
100L	160	130	110	M8	4	M10	195	165	28	60	8	31	24	(J6)	0	-0.5
112M	160	130	110	M8	4	M10	226	178	28	60	8	31	24		-0.036	
132S	200	165	130	M12	4	M12	260	198	38	80	10	41	33	+0.008	(h9)	
														-0.002		
132M	200	165	130	M12	4	M12	260	198	38	80	10	41	33	(K6)		


B3


B5


B14


B35


B34

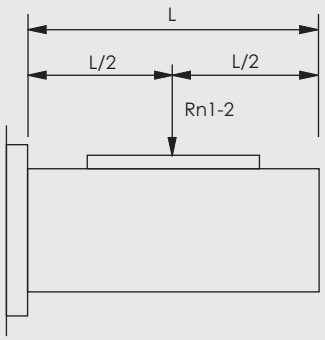
PERMISSIBLE RADIAL LOAD

Depending on type of the load, the output shaft of the motor is subjected to radial load. The permisible radial load on the motor shaft can be calculated with the following formula.

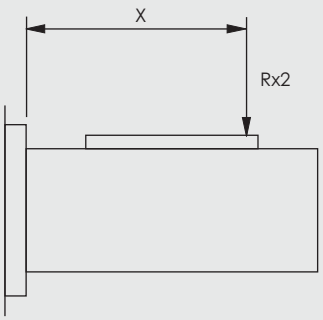
$$R = \frac{p \times 973 \times kW}{RPM \times D/2} + W$$

Where
- R = Radial Load
- p = 1, for chain
- p = 1.25 for gear
- p = 1.5-2.5 for v-belt
- kW = output of the motor in kW
- RPM = RPM of the motor
- D = diameter of the pulley / sprocket / gear in mm
- W = weight of the pulley / sprocket / gear.

Depending on the application there must be two cases for Radial Loads.



Load applied on shaft
at Mid- Point as shown above



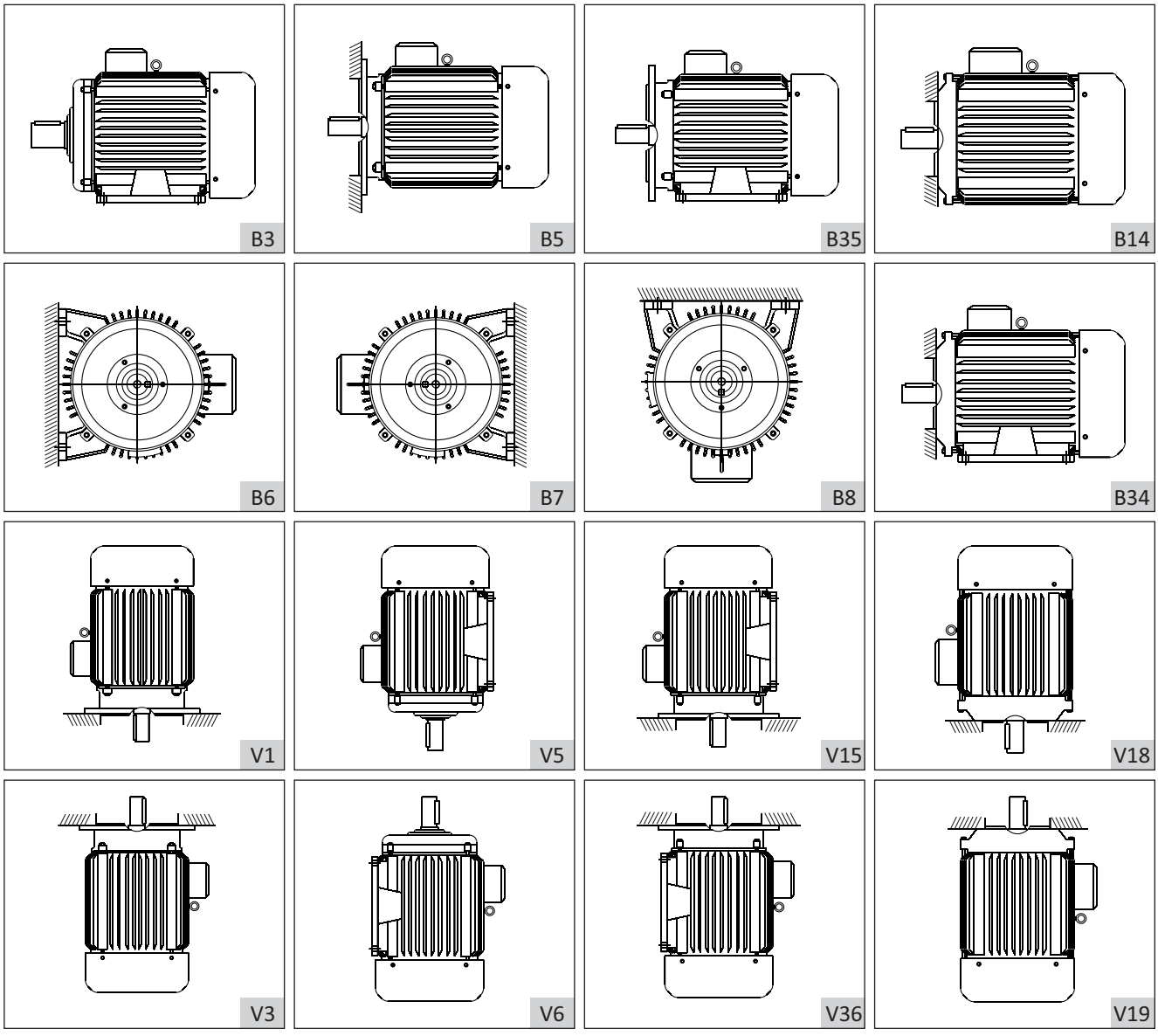
Load applied at x distance from shaft
shoulder as shown above

If in case, radial or axial load are more than those specified in the table below, please consult “mototek” for special design for such load.

FRAME SIZE	SYNCHRONOUS RPM & RADIAL LOAD IN KG.				PERMISSIBLE AXIAL LOAD IN kg	RECOMMENDED PULLY SIZE DIA X WIDTH (D X W) IN mm
	3000	1500	1000	750		
63	30	30	30	30	10	52 X 30
71	35	35	35	35	12	60 X 40
80	50	60	60	60	20	100 X 50
90	55	55	65	75	25	125 X 60
100	70	80	80	100	35	150 X 80
112	95	110	110	110	40	200 X 100
132	150	175	200	210	50	225 X 125
160	260	300	325	350	70	275 X 140
180	325	350	400	400	80	315 X 160
200	425	500	575	575	100	355 X 200
225	450	600	650	650	100	400 X 200

INSTALLATION POSITIONS

Variety of application of motors needs different ways of mounting positions. Depending upon the mounting positions, the loads on the bearings and the lubrication requirements changes to a great extent. However using double rubber sealed bearings with pre loading arrangement, motors are safe for any installation position. For batter and long life, it is advisable to confirm the installation position.



MOTOR EFFICIENCY-IE2 & IE3

Global warming has become a major point of concern around the globe. To counter that, energy efficient products have become a necessity. To observe this closely, Bureau of Indian Standards (BIS) has upgraded to IS 12615 aiming at energy efficient motors. It has become mandatoryto manufacture motors in accordance with IS:12615. “mototek” offers IE2 and IE3 motors with ISI mark (License no. CM/L-7200109193).

	Motor kW	0.18	0.25	0.37	0.55	0.75	1.1	1.5	2.2	3	3.7	4	5.5	7.5	11	15	18.5	22	30
Efficiency IE2	2 Pole	60.4	64.8	69.5	74.1	77.4	79.6	81.3	83.2	84.5	85.5	85.7	87.0	88.1	89.4	90.3	90.9	91.3	92.0
	4 Pole	64.7	68.5	72.7	77.1	79.6	81.4	82.8	84.3	85.5	86.3	86.5	87.7	88.7	89.8	90.6	91.2	91.6	92.3
	6 Pole	56.6	61.6	67.6	73.1	75.9	78.1	79.8	81.8	84.4	84.3	86.4	86.0	87.2	88.7	89.7	90.4	90.9	91.7
	8 Pole	42.3	48.8	55.7	61.9	66.2	70.8	74.1	77.5	79.9	81.4	81.9	83.8	85.3	86.9	88.0	88.6	89.1	89.8
Efficiency IE3	2 Pole	65.9	69.7	73.8	77.8	80.7	82.7	84.2	85.9	87.0	87.8	88.1	89.2	90.1	91.2	91.9	92.4	92.7	93.3
	4 Pole	69.9	73.5	77.3	80.8	82.5	84.1	85.3	86.7	87.7	88.4	88.6	89.6	90.4	91.4	92.1	92.6	93.0	93.6
	6 Pole	63.9	68.6	73.5	77.2	78.9	81.0	82.5	84.3	85.6	86.5	87.7	88.0	89.1	90.2	91.2	91.7	92.2	92.9
	8 Pole	58.7	64.1	69.3	73.0	75.0	77.7	79.7	81.9	83.4	84.5	84.8	86.2	87.3	88.6	89.6	90.1	90.6	91.3

MOTOR PROTECTION (IP)

Motor being electro-mechanical equipment, apart from electrical protection, it is important to protect the motor from accidental human contact, ingress of foreign material like dust, water is equally important. These protections are classified depending upon the location of the motor under use. "mototek" motors are normally available with IP55 protection as standard. Better protections are provided as required. The "mototek" motors are provided with IP protection as per EN 60034-5. IS 4691.

IP 5 5

0		Not protected
1	Ø50 mm	Protected against extraneous solid bodies having Ø = 50mm
2	Ø12 mm	Protected against extraneous solid bodies having Ø = 12mm
3	Ø2.5 mm	Protected against extraneous solid bodies having Ø = 2.5mm
4	Ø1 mm	Protected against extraneous solid bodies having Ø = 1mm
5		Protected against dust
6		No dust ingress

0		Not protected
1		Protected against vertical water drips
2	15°	Protected against vertical water drips inclined up to 15°
3	60°	Protected against rain
4		Protected against water splashes
5		Protected against jets of water
6		Protected against powerful jets of water
7		Protected against the effects of temporary immersion
8		Protected against the effects of continuous immersion

It is recommended to use a rain guard with clear air flow cover when the motor needs to be mounted in V1, V5, V15 or V18 mounting position. The canopy type construction on the rear, air suction side of the fan cover prevents the rain water to enter the fan area. Similar protection can be used in textile processing or such areas to counteract fiber or such waste from surroundings. The total length of the motor increases with such protection marginally but motor will be protected to a great extent.

MOTOR PROTECTION (ELECTRICAL)

It is a standard practice to protect motors against over current by overload relays, fuses or MCBs. For thermal protection, motors can be supplied with thermister or thermal switch. For condensing environments, motors with space heaters can be supplied as well. The table below gives general idea for selection of fuse ratings and over load relays.

DOL starting

kW/HP	0.37/0.5	0.55/0.75	0.75/1.0	1.1/1.5	1.5/2.0	2.2/3.0	3.7/5.0	5.5/7.5	7.5/10	9.3/12.5	11/15	15/20	18.5/25	22/30	30/40	37/50	45/60
Average Current	1.1	1.4	1.9	2.6	3.7	4.8	7.8	11.2	15	18	21	27	33	39	53	65	78
Fuse Rating	4	6	6	6	10	16	16	25	25	35	35	50	63	63	100	100	160
Relay Range	1-2	1-2	1-2	2-4	2-4	3-6	6-12	6-12	10-16	18-24	18-24	16-32	24-45	24-45	32-63	50-90	50 90

STAR-DELTA starting

kW/HP		3.7/5.0	5.5/7.5	7.5/10	9.3/12.5	11/15	15/20	18.5/25	22/30	30/40	37/50	45/60	55/75
Average	Line	7.8	11.2	15	18	21	27	33	39	53	65	78	92
Current	Phase	4.5	6.5	9	11	12.7	16.8	20.2	23.2	30.6	37.5	46.4	53.2
Fuse Rating		16	25	25	35	35	50	63	63	100	100	160	200
Relay Range		1.5-3	4-8	6-12	6-12	10-16	18-24	18-24	18-24	16-32	24-45	32-50	50-63

APPLICABLE STANDARD

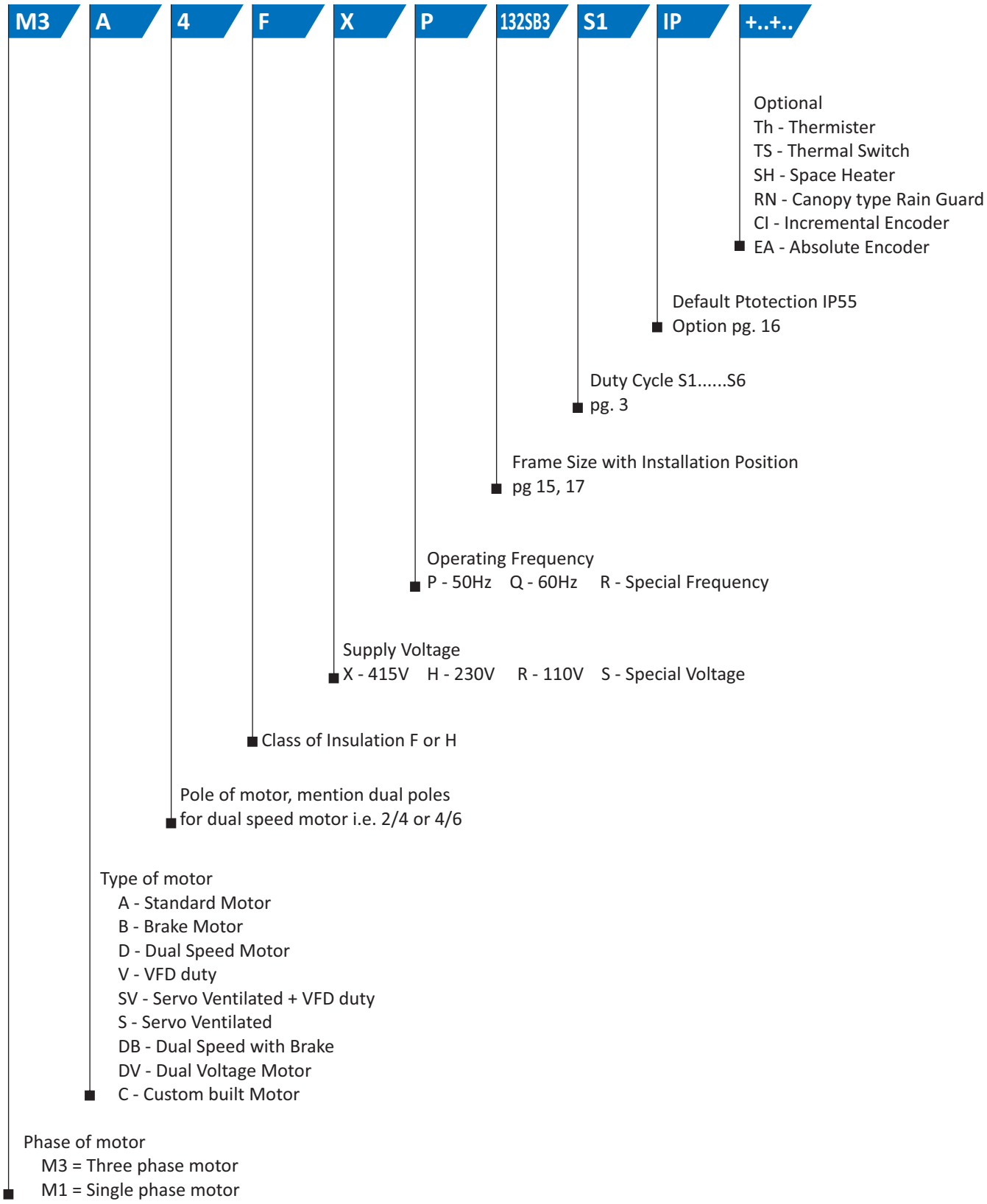
Title	ICE/EN standards	Indian Standard
Three phase induction motor – specifications	IEC60034.28	IS:12615
Type of duty & classes of rating assigned to rotating electrical machines	IEC 60034-1	IS 12824
Method of determination of efficiency of rotating electrical machines	IEC 60034-2	IS 4889/15999-2-1
Degree of protection provided by enclosure for rotating electrical machines	IEC 60034-5	IS 4691
Designation of methods of cooling of rotating electrical machines	IEC 60034-6	IS 6362
Terminal making & direction of rotation of rotating electrical machines	IEC 60034-8	IS 4728
Permissible limits of noise levels for rotating electrical machines	EN 60034-9	IS 12065
Mechanical vibration of rotating electrical machines with shaft height 56mm & higher	IEC 60034-14	IS 12075/15999(14)
Temperature rise measurements of rotating electrical machines	IEC 60034-1	IS 12802
Dimensions of foot mounted induction motors	IEC 60072-1	IS 1231
Dimensions of flange mounted induction motors	IEC 60072-1	IS 2223
Thermal evaluation and classification of electrical insulation	IEC 60034-18	IS 1271
Guide for testing Resistance	IEC 60034.27.4	IS 7816

FRAME V/S OUTPUT SUMMARY

"mototek" motors are available in standard frames as specified by international and Indian standards. This is to ensure interchangability with any other reputed make of the motor. Few "mototek" motors are also offered in different frame than the standard to match the lattest trends as well as interchangability with other standards and makes. The table indicates the power available in respective frames. The frames indicated in the bracket (**) are optional and are manufactured against order.

		Pole / Synchronous RPM at 50(60) Hz			
KW	HP	2/3000 (3600)	4/1500 (1800)	6/1000 (1200)	8/750 (900)
0.18	0.25	63	63	71	-
0.25	0.30	71	71	71	80
0.37	0.50	71	71	80	90S
0.55	0.75	71(80)	80(71)	80	90L
0.75	1.00	80	80	90S	100L
1.10	1.50	90S	90S(80)	90L	100L
1.50	2.00	90S	90L	100L	112M
2.20	3.00	90L	100L	112M	132S
3.00	4.00	100L	100L	132S	132M
3.70	5.00	100L	112M	132S	132M
4.00	5.50	100L	112M	132S	160M
5.50	7.50	132S	132S	132M	160M
7.50	10.00	132S	132M	160M	160L
9.30	12.50	132M	160M(132M)	160M	180M
11.00	15.00	160M	160M	160L	180L
15.00	20.00	160M	160L	180L	200L
18.50	25.00	160L	180M	200L	225S
22.00	30.00	180M	180L	200L	225M

MOTOR DESIGNATION FOR ENQUIRY / ORDERING



Note:

Enough care has been taken in verifying the information and data in the catalogue but we assume no responsibility of any inadvertent omission and errors. “mototek” being and innovative company, design improvement is a continuous process. We strongly recomend to confirm the dimensions and specifications prior to ordering.

Social Services :

The society has recognised ***"mototek"*** and we appreciate the same. As a team ***"mototek"***, we have some social objects

- To provide opportunity to physically challenged people to become economically independent. We have, there for employed and will be employing such people in our team ***"mototek"*** either for office work or in certain safe manufacturing areas like in process inspection of machined components, testing, winding.

- To provide on hand training to students of technical learning. We have tied up with ITI for in plant training to their students.

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