

Challenger Motors

ALSTOM

ALSTOM presents CHALLENGER Series TEFC Squirrel cage motors with excellent product features and outstanding performance parameters. The design of this range is based on advanced technical knowhow and the level of excellence associated with this international company manufacturing motors in India for more than half a century. Stringent quality control procedures are adopted at each stage of production as a part of the company policy to ensure that each motor is manufactured to the requisite quality standard ensuring customer satisfaction.

Rating

A.C. low voltage TEFC Sq. cage Induction motor.

Frame size-71-355M

(designated as 12D71 - 12D355M for Challenger Series)

Output-

- 2 Pole - 0.37 kW - 200 kW
- 4 Pole - 0.25 kW - 250 kW
- 6 Pole - 0.55 kW - 180 kW
- 8 Pole - 0.37 kW - 150 kW

Supply Voltage and Frequency

The Motors can be wound for any voltage from 200 volt to 690 volt and for either 50 Hz or 60 Hz frequency. Standard motors are wound for 3 phase, 415 volt, 50 Hz supply condition.

All standard 50 Hz motors may be operated with 60 Hz supply at same voltage for same output. However, if the supply voltage at 60 Hz is 10-20% higher than rated voltage of the motor, output can be increased by 10-15% depending on frame size/speed.

The Motors can also be supplied for dual voltage operation or for operation with variable voltage and variable frequency supply(VVVF), or for operation over a wide voltage range. Separate 'VD' series of motors suitable for VVVF drive are specially designed to withstand higher dielectric strength to combat voltage surges originated from high switching frequency with IGBT drives.

The supply voltage is assumed to be virtually sinusoidal and balanced as defined in IS 325.

Standards

Challenger Series conforms to the following national and international standards.

Standard	Indian IS	International	
		IEC	NEMA*
Dimensions	IS 1231 IS 2223	IEC 60072 - 1	MG1 Part 4
Performance	IS 325	IEC 60034 - 1	MG1 Part 12
Output	IS 1231	-	MG1 Part 10
Protection	IS 4691	IEC 60034 - 5	MG1 - 1.26B
Mounting	IS 2253	IEC 60034 - 7	MG1 Part 4

Motors Complying with IEC-60034-1 also comply with many national standards of European Countries. Motors suitable for NEMA standards duly approved by CSA/NRTL(C) are also manufactured. For full details of motors as per NEMA standard, refer to ALSTOM.

- Standard motor complies to
- Optional

Supply and Site Conditions

Standard motors are suitable for operation with variation in supply and site conditions as indicated in Table 1 :-

In the event of sustained operation at extreme limits of supply variation the temperature rise may exceed by 10°C.

For other site conditions motor output should be adjusted as per Tables 2 & 3.

When both ambient temperature and site altitude differ from standard, the approximate permissible output is obtained by multiplying the factors against each variable as indicated in Tables 2 & 3.

TABLE - 1

Ambient Temp.	Altitude	Voltage Variation	Frequency Variation	Combined Variation
45°C	≤1000 Mtrs.	± 10%	± 5%	± 10%
50°C	≤1000 Mtrs.	± 6%	± 3%	± 6%

TABLE - 2

Deration For High Ambient Temp.

Ambient Temp.	50°C	55°C	60°C	65°C	70°C
Class 'B' Temp. Limit	95%	90%	85%	80%	70%
Class 'F' Temp. Limit	100%	100%	95%	90%	80%

TABLE - 3

Deration For Attitude

Altitude	1500 m	2000 m	2500 m	3000 m	3500 m	4000 m
Class 'B' Temp. Limit	95%	91%	87%	83%	79%	74%
Class 'F' Temp. Limit	100%	100%	95%	90%	85%	81%

Insulation and Temperature Rise

Standard motors will operate satisfactorily in an ambient temperature range -20°C to $+45^{\circ}\text{C}$ with class **B** temperature rise and altitude up to 1000 meters above sea level.

The use of class **B** temperature rise (75°C) ensures an exceptional margin of safety and longer life even in abnormal operating conditions. Standard motors will withstand ambient temperatures up to 55°C OR 10% overload OR adverse supply systems.

Motors with Class 'H' insulation or higher may be supplied as an optional.

Duties

Standard motors are suitable for operation with continuous running duty (S1) suitable for maximum 3 cold starts or 2 hot starts in succession under rated load conditions provided that a period of 30 minutes elapses before another starting sequence is attempted. Motors to suit other duty conditions e.g. S2 – S6 may be offered on request.

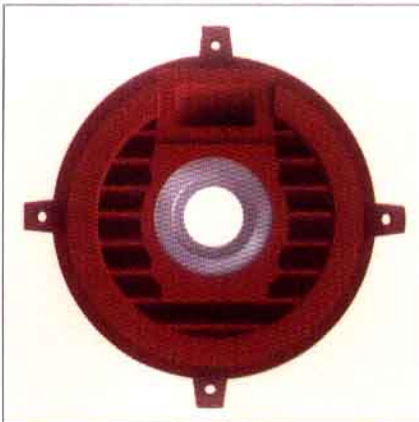
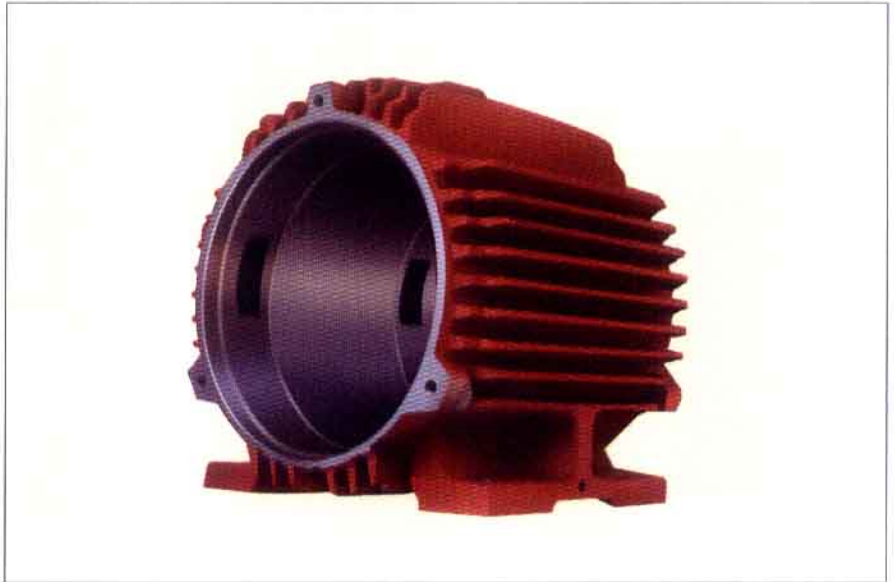
Performance

Challenger series offers outstanding performance parameters. The parameters are better than those recommended in IS 8789. Energy efficient motors complying to Eff2 (Improved efficiency)/Eff1 (High efficiency) parameters in accordance with IS 12615 and CEMEP (European Committee of Manufacturers of Electrical Machines & Power Electronics) are available on request.

Constructional Features

Frame

Stator frames are made of elegant looking, rugged cast iron enclosure. Foot mounted motors are provided with integrally cast feet. Maximum cooling surface is obtained by quadrangular disposition of cooling ribs.



Endbracket

Ribbed endbrackets are provided from frame sizes D160 upwards. For frame sizes upto D225S single piece endbracket is used eliminating outer bearing cap.

For frame sizes D200L and above, Challenger Series offers another unique feature of grease relief arrangement as standard. Grease nipple is provided as standard and located on rim of endbracket facilitating easy regreasing in service.

The terminal box location on the frames are as follows :

Frame Size (s)	Terminal box location	Remarks
D80-250 M	Side	Reversible frame housing offering terminal box position at RHS or LHS when viewed from DE side. Motors with Top T.Box frames are also available for frames D160 to D250M – can be offered if specified.
D280S/M	Side (Two openings)	Default RHS, can be converted to LHS if required, as there is another option on LHS. Motors with Top T. Box frames can be offered if specified.
D315 – D355M	Side/Top	Default RHS. LHS/Top can be provided as the frame has three optional terminal box position.

Cooling Fan

All fans are bidirectional. Optimum cooling air flow for efficient heat transfer is ensured by the design of fan and cowl. Motors in this series have been specially designed for



reduced noise level to satisfy present-day industry requirements.

For D71-D200L nylon fan is used as standard. For D225S-D280M either nylon or aluminium alloy (LM6) fan with C.I. insert is used. For all motor in frame size D315/D355 except 2 pole motors, aluminium alloy (LM6) fan with C.I. insert is used. For 2 pole motors in these frame sizes fabricated MS, fan is used. Optional unidirectional fan is also available for 2 pole application.

Shaft and Rotor

Standard shafts are machined from C45 grade of carbon steel. All shaft diameters are machined to fine limits. For ease of fitting, removing or securing fitments an axially tapped hole at drive end of shaft is provided as standard. Standard motors have a single cylindrical shaft extension with keyway. Double cylindrical/non-standard shaft extensions are available on request.

The rotor core is produced from high quality electrical grade insulated sheet steel lamination. Challenger Series offers Aluminium die-cast rotor for entire range of motors.

Windings

The integral system of wire insulation, slot and phase insulation and the overall varnish impregnation provides tracking protection together with a winding rigidity that is capable of withstanding the vibration limits imposed by industrial drives.

For highly corrosive atmosphere, special winding treatment is provided against specific order.

Terminal Box

Standard motors are provided with terminal box positioned at RHS looking from DE side. Terminal box in all motors are of generous size for ease of connection and maintenance. Terminal box may be rotated

in steps of 90° providing four alternative direction of cable entry in all frame sizes.

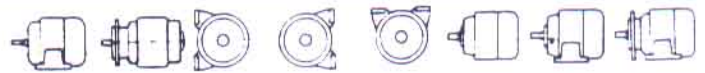
Cable sizes for standard terminal box arrangement are given in Table 4. Terminal box suitable for higher cable sizes is available on request.

Mounting Arrangement

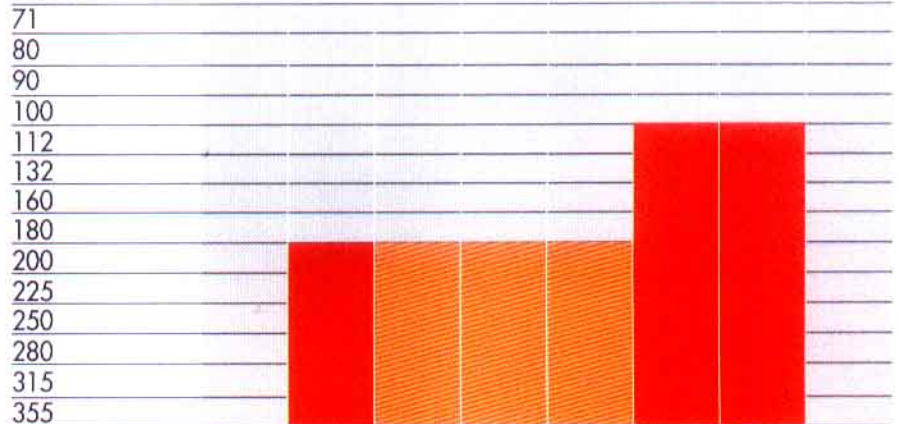
Standard motors are manufactured with horizontal foot mounted construction (IMB3) with single cylindrical shaft extension at D.E. side. Following Mounting options are available :-

Horizontal shaft Motors :-

Code I	IM B3	IM B5	IM B6	IM B7	IM B8	IM B14	IM B34	IM B35
Code II	IM 1001	IM 3001	IM 1051	IM 1061	IM 1071	IM 3601	IM 2101	IM 2001



TYPES



Vertical Shaft Motors :-

Code I	IM V1	IM V3	IM V5	IM V6	IM V15	IM V18	IM V19	IM V36
Code II	IM 3011	IM 3031	IM 1011	IM 1031	IM 2011	IM 3611	IM 3631	IM 2031



TYPES



Standard Construction

Consult us; specify the coupling method and any axial loads

Not covered

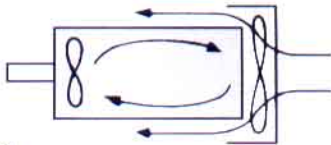
Table - 4

FRAME SIZE	STUD SIZE	MAX CABLE SIZE	DOWELL'S CAT. NO.
71 - 90	M5	1 NO. 3C X 4 mm ²	CUS/06
100 - 132	M6	1 NO. 3C X 6 mm ²	CUS/07
160 - 180	M6	1 NO. 3C X 35 mm ²	CUS/11
	M6	1 NO. 3C X 50 mm ²	CUS/13
200 - 225	M12	1 NO. 3C X 70 mm ²	CUS/18
250 - 280	M12	1 NO. 3C X 185 mm ²	CUS/25, 20
315	M12	2 NOS. 3C X 185 mm ²	CUS/29
	M12	1 NO. 3C X 300 mm ²	CUS/29
355	M12/M16	2 NOS. 3C X 300 mm ²	CUS/27

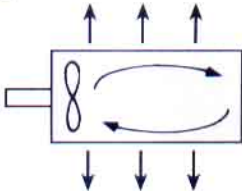
Cooling Forms

The standard cooling arrangement is IC 411 in accordance with IS 6362 defined as totally enclosed fan cooled over an externally ribbed surface with free movement of internal air by rotation of rotor blades. Alternative cooling forms e.g. airstream ventilated (IC 418) and totally enclosed surface cooled (IC 410) are also available.

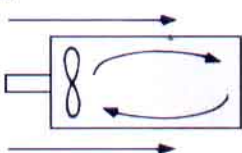
IC 411



IC 410



IC 418



Degree of Protection

Challenger series of motors are provided with IP55 degree of protection as standard. IP56 degree of protection may be provided on request.

Vibration limits

All rotors are dynamically balanced with half key to ensure normal class vibration level as per IS 12075.

Noise Level

Challenger Series have been designed to achieve low noise level over the whole range of speeds on outputs. Challenger Series conform to the noise level requirement as per IS 12065. Reduced noise levels may be offered on specific enquiry.

Noise level is normally specified as mean sound pressure level measured at one meter from the surface of the motor and is expressed as dB(A) referred to a base pressure of $2 \times 10^{-5} \text{N/m}^2$.

Overspeed

All standard motors will continuously withstand a mechanical overspeed of 120% rated speed.

Momentary overload

Standard motors will withstand a torque equivalent to 1.6 times rated load torque for a time not exceeding 15 seconds, provided the supply is maintained at the rated values.

Normally, the pull-out torque significantly exceeds this overload torque.

Termination/connection

Starting

For motors up to 2.2 kW rating, winding is connected internally in STAR and 3 terminals are brought out for termination for D.O.L starting.

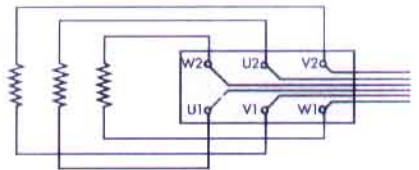
For motors of higher ratings, six terminals are brought out to suit either STAR/DELTA or D.O.L starting.

For motors upto frame size D132 shorting links are provided as standard. Shorting links are provided on request for other frames.

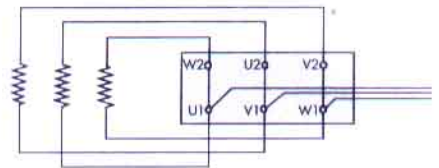
Terminal Marking

Motor terminals are identified as per IS 4728.

STAR/DELTA STARTING (6 TERMINALS)



DIRECT-ON-LINE STARTING-DELTA (6 TERMINALS)



Special Terminations

Loose flying leads without terminal board assemblies can be provided on request. Series/parallel connections can also be provided against specified enquiries.

Rotation

Standard rotation is clockwise when viewed from drive end of the motor. Standard rotation is obtained when the alphabetical sequence of the phase groups correspond to the time sequence of the supply connected to terminals.

Earthing

2 Nos. earthing points are provided one on each side of frame.

External Finish

Motors are provided with synthetic enamel finish paints. All cast-iron/ steel components are provided with a coat of epoxy zinc chromate primer over fettled and shot blasted components.

To ensure good corrosion resistance in highly corrosive atmosphere, motors may be provided with chlorinated rubber base paint or epoxy base paint on request.

Anti-condensation Heating

For motors remaining idle under severe cold climatic condition or under highly humid atmosphere use

of anti-condensation heating is recommended.

The heating serves to maintain the average temperature inside the enclosure at a level so as to avoid condensation. **THE HEATING MUST BE SWITCHED OFF WHILE MACHINE IS IN OPERATION.**

For motors up to 7.5 kW rating 2 terminals of either STAR or DELTA connected winding may be connected to 1 phase, 24 volts, A.C. supply for anti-condensation heating. For higher rating separate space heaters are provided, with termination in separate terminal box.

Bearings

Metric size ball/roller bearings are

used in horizontal foot mounted motors. For frame sizes up to D315L ball bearings are used at both ends. To cater to greater radial load, if necessary, roller bearing can be incorporated at the drive end by means of a simple conversion.

Ball bearings have C3 clearance. For frame size D355 roller/ball bearings are used at DE/NDE side respectively.

Grease relief arrangement is provided as standard for motors in frame size D200 and above. Bearing details are given in Table 6. For axial and radial load details works may be referred.

**TABLE - 6
BEARING DATA**

FRAME SIZE	POLES	HORIZONTAL MOUNTING		VERTICAL MOUNTING	
		DRIVE END	NON-DRIVE END	DRIVE END	NON-DRIVE END
71	ALL	6203ZZ C3	6203ZZ C3	6203ZZ C3	6203ZZ C3
80	ALL	6204ZZ C3	6204ZZ C3	6204ZZ C3	6204ZZ C3
90	ALL	6205ZZ C3	6204ZZ C3	6205ZZ C3	6204ZZ C3
100	ALL	6206ZZ C3	6205ZZ C3	6206ZZ C3	6205ZZ C3
112	ALL	6206ZZ C3	6205ZZ C3	6206ZZ C3	6205ZZ C3
132	ALL	6208ZZ C3	6207ZZ C3	6208ZZ C3	6207ZZ C3
160	ALL	6309ZZ C3	6209ZZ C3	6309ZZ C3	6209ZZ C3
180	ALL	6310ZZ C3	6210ZZ C3	6310ZZ C3	6210ZZ C3
200	ALL	6312 C3	6310ZZ C3	6312 C3	6310ZZ C3
225 S	ALL	6313 C3	6312 C3	6313 C3	6312 C3
225 M	ALL	6313 C3	6313 C3	6313 C3	6313 C3
250	ALL	6314 C3	6313 C3	6314 C3	6313 C3
280	ALL	6317 C3	6314 C3	6317 C3	6317 C3
315 S/M1	2	6317 C3	6316 C3	6317 C3	6316 C3
315 S/M1	4,6,8	6319 C3	6316 C3	6319 C3	6316 C3
315 M2/L	2	6317 C3	6217 C3	6317 C3	6317 C3
315 M2/L	4,6,8	6319 C3	6319 C3	6319 C3	6319 C3
355 S&M	4,6,8	N321	6321 C3	N321	6321 C3

Lubrication

Lubrication points are included as standard for entire range of motors. Regreasing intervals depend on bearing size and speed. General guideline for regreasing interval is given in Table 5.

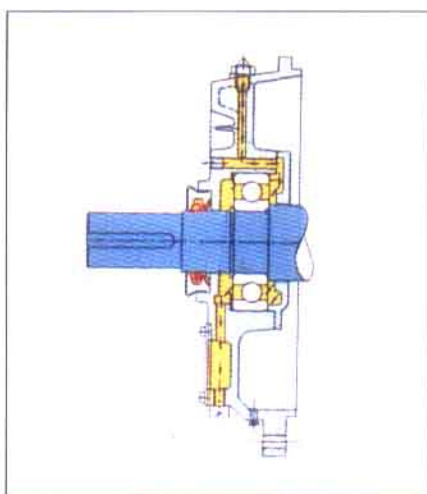
However for specific requirements our works may be referred.

TABLE - 5

Recommended Regreasing Interval

Frame size	Poles	Recommended regreasing interval (in hours)
200-225	2	3100
	4-8	7000
250-280	2	1200
	4-8	5000
315	2	1200
	4-8	4500
355	4-8	3000

Grease relief arrangement is provided as standard for frame sizes D200 and above.



Grease Entry & Relief Arrangement for Challenger Series Motor

The bearings are lubricated with premium grade lithium based MP3 grease (servogem No. 3 of IOC or equivalent) which contains oxidation and corrosion inhibitors. The grease is suitable for a temperature range of -20°C to 110°C . Suitable grease for extreme ambient temperature operation can be provided on request.

Electrical protection

Standard motors are suited for normal over load/stall protection offered by standard thermal or magnetic over load starters.

Additional thermal protection in the form of built-in thermistors is available at an extra cost. The small thermal mass of the thermistors and their intimate contact achieved by embedding in winding assures a quick response

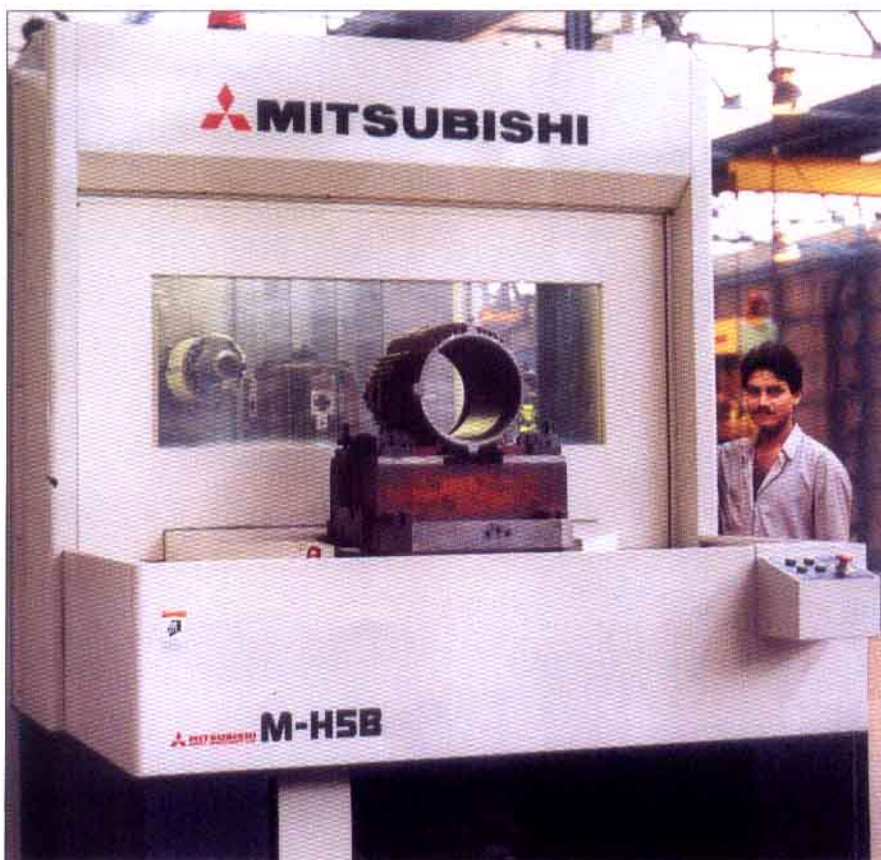
to changes in winding temperatures. Thermistors are semi conducting resistance devices with positive temperature coefficient. Recommended reference temperatures for thermistors are given in Table 7.

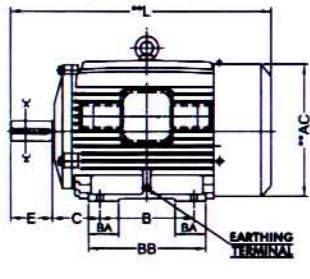
Thermistors are embedded in winding prior to impregnation and terminal leads brought out to a separate/main terminal box for connection to the control devices. RTD/BTD can be provided for 315/355 frame motors on request.

TABLE - 7

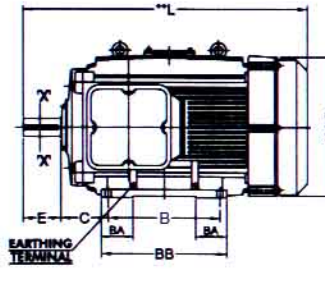
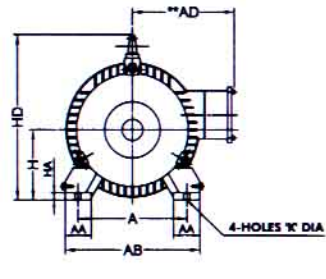
Recommended reference temperatures for Thermistors

Class of Insulation	Type of Thermistor	
	Warning	Tripping
B	P 120	P 140
F	P 140	P 160

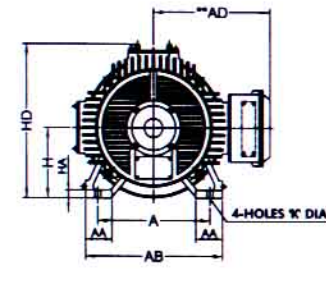




SECTION - "XX"



SECTION - "XX"



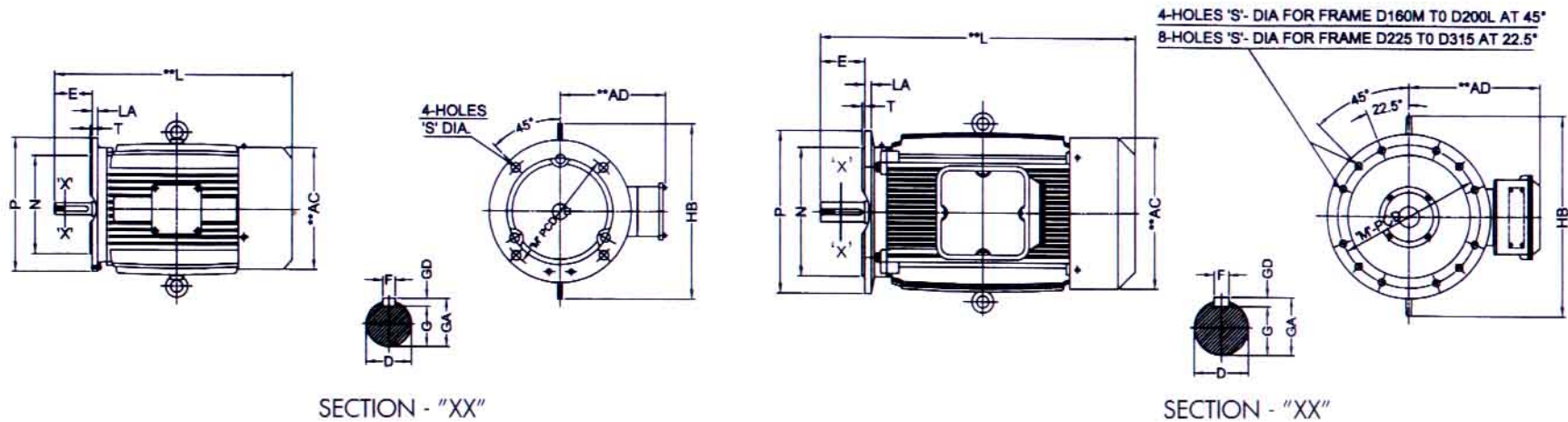
Foot Mounted

FRAME SIZE	FIXING							SHAFT						GENERAL						TAPPED CENTRE HOLE AT SHAFT END (AS PER IS:2540)	
	A	B	C	H	AB	BB	K	D	E	F	G	GA	GD	**L	AA	**AC	**AD	BA	HA		HD
D71 (TOP T. BOX)	112	90	45	71	134	112	7	14	30	5	11	16	5	250	27	135	125	26	8	—	—
D80	125	100	50	80	156	125	10	19	40	6	15.5	21.5	6	298	34	167	144	32.5	12	220	T8
D90S	140	100	56	90	170	130	10	24	50	8	20	27	7	310	35	187	152	40	12	236	T10
D90L	140	125	56	90	170	155	10	24	50	8	20	27	7	335	35	187	152	45	12	236	T10
D100L	160	140	63	100	192	170	12	28	60	8	24	31	7	374	38	220	175	50	12	263	T10
D112M	190	140	70	112	222	170	12	28	60	8	24	31	7	390	45	220	180	50	14	284	T10
D132S	216	140	89	132	256	184	12	38	80	10	33	41	8	458	50	260	205	57	14	317	T12
D132M	216	178	89	132	256	222	12	38	80	10	33	41	8	500	50	260	205	57	14	317	T12
D160M	254	210	108	160	300	300	15	42	110	12	37	45	8	670	60	316	300	100	20	381	T16
D160L	254	254	108	160	300	300	15	42	110	12	37	45	8	670	60	316	300	100	20	381	T16
D180M	279	241	121	180	344	330	15	48	110	14	42.5	51.5	9	750	65	345	315	90	25	422	T16
D180L	279	279	121	180	344	330	15	48	110	14	42.5	51.5	9	750	65	345	315	90	25	422	T16
D200L	318	305	133	200	390	356	19	55	110	16	49	59	10	795	80	390	395	88	35	460	T20
D225S	356	286	149	225	444	375	19	*55	110	16	49	59	10	*830	88	390	395	95	35	485	T20
D225M	356	286	149	225	444	375	19	60	140	18	53	64	11	860	88	390	395	95	35	485	T20
D225M	356	311	149	225	444	375	19	*55	110	16	49	59	10	*830	88	459	425	95	40	517	T20
D225M	356	311	149	225	444	375	19	60	140	18	53	64	11	860	88	459	425	95	40	517	T20
D250M	406	349	168	250	508	420	24	*60	140	18	53	64	11	*935	108	459	425	100	42	540	T20
D250M	406	349	168	250	508	420	24	65	140	18	58	69	11	935	108	459	425	100	42	540	T20
D280S	457	368	190	280	560	490	24	*65	140	18	58	69	11	*1110	112	544	460	120	42	620	T20
D280S	457	368	190	280	560	490	24	75	140	20	67.5	79.5	12	1110	112	544	460	120	42	620	T20
D280M	457	419	190	280	560	490	24	*65	140	18	58	69	11	*1110	112	544	460	120	42	620	T20
D280M	457	419	190	280	560	490	24	75	140	20	67.5	79.5	12	1110	112	544	460	120	42	620	T20
D315S	508	406	216	315	620	520	28	*65	140	18	58	69	11	*1190	120	598	605	143	50	710	T20
D315S	508	406	216	315	620	520	28	80	170	22	71	85	14	1220	120	598	605	143	50	710	T20
D315M	508	457	216	315	620	570	28	*65	140	18	58	69	11	*1280	120	664	630	143	50	742	T20
D315M	508	457	216	315	620	570	28	80	170	22	71	85	14	1310	120	664	630	143	50	742	T20
D315L	508	508	216	315	620	570	28	*65	140	18	58	69	11	*1280	120	664	630	143	50	742	T20
D315L	508	508	216	315	620	570	28	80	170	22	71	85	14	1310	120	664	630	143	50	742	T20
D355S	610	500	254	355	720	650	28	95	170	25	86	100	14	1430	140	740	675	160	45	790	T24
D355M	610	560	254	355	720	650	28	95	170	25	86	100	14	1430	140	740	675	160	45	790	T24

*2 POLE MOTORS ONLY

** DIMENSIONS ARE MAXIMUM VALUES

ALL DIMENSIONS ARE IN MM



Flange Mounted

FRAME SIZE	FIXING				SHAFT						GENERAL						TAPPED CENTRE HOLE AT SHAFT END (AS PER IS:2540)
	S	M	N	P	D	E	F	GA	GD	G	**AC	**AD	**HB	**L	LA	T	
D71	10	130	110	160	14	30	5	16	5	11	135	125	-	270	9	3.0	-
D80	12	165	130	200	19	40	6	21.5	6	15.5	167	144	266	298	10	3.5	T8
D90S	12	165	130	200	24	50	8	27	7	20	187	152	286	367	10	3.5	T10
D90L	12	165	130	200	24	50	8	27	7	20	187	152	286	367	10	3.5	T10
D100L	15	215	180	250	28	60	8	31	7	24	220	175	318	424	11	4	T10
D112M	15	215	180	250	28	60	8	31	7	24	220	180	318	424	11	4	T10
D132S	15	265	230	300	38	80	10	41	8	33	260	205	360	500	12	4	T12
D132M	15	265	230	300	38	80	10	41	8	33	260	205	360	500	12	4	T12
D160M/L	19	300	250	350	42	110	12	45	8	37	316	300	456	670	13	5	T16
D180M/L	19	300	250	350	48	110	14	51.5	9	42.5	345	315	544	750	13	5	T16
D200L	19	350	300	400	55	110	16	59	10	49	390	395	658	795	16	5	T20
D225S	19	400	350	450	*55	110	16	59	10	49	*390	395	658	830	16	5	T20
D225M	19	400	350	450	60	140	18	64	11	53	390	395	658	860	16	5	T20
D225M	19	400	350	450	*55	110	16	59	10	49	*459	425	658	830	16	5	T20
D225M	19	400	350	450	60	140	18	64	11	53	459	425	658	860	16	5	T20
D250M	19	500	450	550	*60	140	18	64	11	53	459	425	700	935	18	5	T20
D250M	19	500	450	550	65	140	18	69	11	58	459	425	700	935	18	5	T20
D280S/M	19	500	450	550	*65	140	18	69	11	58	*544	460	690	1110	18	5	T20
D280S/M	19	500	450	550	75	140	20	79.5	12	67.5	544	460	690	1110	18	5	T20
D315S/M	24	600	550	660	*65	140	18	69	11	58	*598	605	710	*1180	22	6	T20
D315S/M	24	600	550	660	80	170	22	85	14	71	598	605	710	1210	22	6	T20
D315M/L	24	600	550	660	*65	140	18	69	11	58	*664	630	860	*1280	22	6	T20
D315M/L	24	600	550	660	80	170	22	85	14	71	664	630	860	1310	22	6	T20
D355S/M	24	740	680	800	95	170	25	100	14	86	740	675	890	1430	25	6	T24

*2 POLE MOTORS ONLY

** DIMENSIONS ARE MAXIMUM VALUES

ALL DIMENSIONS ARE IN MM

Performance Chart

Ambient Temperature - 45°C
Degree of protection - IP55

Supply Condition :3 phase, 415V±10%,
50 HZ ± 5%

Class of Insulation - 'F'
Temperature rise limit - Class 'B' (75°C)

Frame Size IEC	Output kW	Full Load RPM	Rated Current (Amps)	Efficiency			Power Factor			STG. Current (x FLC)	STG. Torque (x FLT)	P.O.T. (x FLT)	GD ² Kg m ²	Weight (Kg)
				100%	75%	50%	100%	75%	50%					

2 Pole

D71	0.37	2800	0.92	68	65	55	0.82	0.65	0.5	4.9	2.2	2.3	0.0023	13.4
D71	0.55	2800	1.31	71	69	65	0.82	0.68	0.51	4.9	2.2	2.4	0.0023	13.4
D80	0.75	2750	1.66	73	73.5	73	0.86	0.85	0.79	5.0	2.1	2.4	0.0038	18
D80	1.1	2750	2.4	74	75	74.5	0.90	0.80	0.80	5.5	2.2	2.5	0.0063	23
D90S	1.5	2850	3.15	78	73	68	0.85	0.79	0.68	6.0	2.0	2.5	0.0083	25
D90L	2.2	2830	4.6	78	74	72	0.86	0.81	0.70	6.0	2.1	2.6	0.018	36
D100L	3.7	2850	7.2	81	78	74	0.88	0.86	0.83	6.0	2.0	2.6	0.027	42
D132S	5.5	2850	10.4	85.7	82	79	0.86	0.80	0.70	6.0	2.1	2.6	0.0534	64
D132S	7.5	2850	14.3	86	83	80	0.85	0.79	0.72	6.0	2.3	2.8	0.0725	69
D160M	11.0	2900	20.5	86	85	83	0.87	0.84	0.76	6.0	1.9	2.7	0.108	128
D160M	15.0	2880	27.6	87	86	84	0.87	0.86	0.80	6.0	1.9	2.7	0.135	136
D160L	18.5	2920	33.2	89	88	86	0.87	0.85	0.78	6.0	2.0	2.7	0.188	165
D180M	22.0	2930	38.6	90	89	87	0.88	0.86	0.74	6.0	1.8	2.7	0.225	172
D200L	30.0	2940	53.3	90	88	86	0.87	0.84	0.76	6.0	1.8	2.7	0.49	277
D200L	37.0	2950	65	91	89.5	86	0.87	0.83	0.74	6.0	1.8	2.7	0.61	320
D225M	45.0	2955	78.2	91	90	87	0.88	0.86	0.80	6.0	1.8	2.7	0.93	379
D250M	55	2955	94	92	91	88	0.885	0.875	0.81	6.0	1.8	2.7	1.11	439
D280S	75	2960	127	93	92	89	0.885	0.87	0.78	6.0	1.8	2.7	2.07	724
D280M	90	2965	152	93	92	89	0.885	0.86	0.78	6.0	1.8	2.7	2.35	754
D315S	110	2970	185	93	92	90	0.89	0.87	0.80	6.0	1.6	2.7	4.1	815
D315M1	132	2975	220	93.5	92.5	90	0.89	0.86	0.78	6.5	1.7	2.7	4.6	856
D315M2	160	2975	265	94	93	92	0.895	0.88	0.82	6.5	1.6	2.7	7.7	1190
D315LA	180	2975	299	94.2	93.1	92	0.89	0.87	0.81	6.5	1.6	2.8	8.9	1210
D315LB	200	2975	335	94.4	93.2	92	0.88	0.87	0.81	6.5	1.6	2.8	8.9	1210

Frame Size IEC	Output kW	Full Load RPM	Rated Current (Amps)	Eff. Class	Efficiency			Power Factor			STG. Current (x FLC)	STG. Torque (x FLT)	P.O.T. (x FLT)	GD ² Kg-m ²	Weight (Kg)
					100%	75%	50%	100%	75%	50%					

4 Pole

D71	0.25	1340	0.8	-	60	59	54	0.72	0.68	0.54	4.0	2	2.25	0.0023	13.3
D71	0.37	1380	1.08	2	68	66	62	0.7	0.65	0.52	4.5	2	2.3	0.0023	13.3
D80	0.55	1400	1.48	2	70	68	65	0.74	0.65	0.50	4.50	2	2.5	0.0064	16.4
D80	0.75	1400	1.93	2	73	70	67	0.74	0.65	0.53	5.0	2.2	2.5	0.0064	16.4
D90S	1.1	1410	2.6	2	76.2	70	67	0.78	0.70	0.61	5.0	2	2.5	0.0136	21.5
D90L	1.5	1410	3.4	2	78.5	72	67	0.79	0.76	0.60	5.5	2.1	2.5	0.0156	25
D100L	2.2	1430	4.6	2	81	78	76	0.82	0.75	0.62	6.0	1.9	2.5	0.0392	34
D112M	3.7	1430	7.5	2	84	81	80	0.82	0.77	0.70	6.0	2.1	2.6	0.0516	42
D132S	5.5	1440	10.7	2	85.8	85	82	0.83	0.75	0.62	6.0	2.2	2.7	0.124	64
D132M	7.5	1440	14.5	2	87	84	82	0.83	0.78	0.70	6.0	2.0	2.7	0.135	71
D160M	11	1450	20.1	2	88.5	88.5	87.5	0.86	0.84	0.76	6.0	2.2	2.7	0.177	126
D160LA	15	1455	27.3	-	88.8	89	88	0.86	0.84	0.76	6.0	2.2	2.7	0.238	136
D160LB	15	1460	27.1	2	89.5	89	88	0.86	0.84	0.76	6.0	2.2	2.7	0.26	140
D180M	18.5	1460	33.5	2	90.5	90	89	0.85	0.82	0.78	6.0	2.2	2.7	0.416	166
D180L	22	1460	39.0	2	91	90.5	89.5	0.87	0.85	0.79	6.0	2.2	2.7	0.504	174
D200L	30	1470	52.4	2	92.5	91	89.0	0.86	0.83	0.78	6.0	2.3	2.7	0.853	277
D225S	37	1470	65.0	2	92.5	92	90	0.86	0.82	0.72	6.0	2.3	2.7	1.001	315
D225M	45	1475	78.0	2	92.7	92	90.5	0.87	0.85	0.78	6.0	2.3	2.7	1.850	385
D250M	55	1470	96.0	2	93	92.3	90.5	0.86	0.85	0.78	6.0	2.4	2.7	2.252	450
D280S	75	1480	128	2	93.6	92.8	91	0.87	0.84	0.77	6.0	2.2	2.7	3.789	710
D280M	90	1485	153	2	93.9	93.3	91	0.87	0.84	0.76	6.0	2.2	2.7	4.601	758
D315S	110	1485	190.5	2	94.5	93.3	91.2	0.85	0.82	0.74	6.5	2.2	2.5	7.385	836
D315M1	132	1485	228	2	94.7	93.7	92	0.85	0.81	0.75	6.5	2.2	2.5	8.205	876
D315M2	160	1485	272	2	95	94	92	0.86	0.82	0.75	6.5	1.8	2.5	10.434	1225
D315L	180	1485	305	-	95	94.2	92.5	0.865	0.83	0.76	6.5	1.8	2.6	11.2	1260
D355S	200	1488	340	-	95.3	94.5	92.5	0.86	0.83	0.76	6.0	2.0	2.5	20.6	1500
D355M	220	1488	368	-	95.5	95.0	93.0	0.87	0.84	0.74	6.0	2.0	2.5	21.55	1600

Performance Chart

Ambient Temperature - 45°C
Degree of protection - IP55

Supply Condition :3 phase, 415V±10%,
50 HZ ± 5%

Class of Insulation - 'F'
Temperature rise limit - Class 'B' (75°C)

Frame Size IEC	Output kW	Full Load RPM	Rated Current (Amps)	Eff. Class	Efficiency			Power Factor			STG. Current (x FLC)	STG. Torque (x FLT)	P.O.T. (x FLT)	GD ² Kg m ²	Weight (Kg)
					100%	75%	50%	100%	75%	50%					
6 Pole															
D80	0.55	905	1.7	2	68	63	60	0.66	0.62	0.50	4.5	1.8	2.3	0.0069	18
D90S	0.75	910	1.9	2	72	70	67	0.75	0.69	0.53	5.0	1.7	2.2	0.0105	23
D90L	1.1	910	3	2	74	72.5	70	0.68	0.64	0.53	5.0	1.9	2.3	0.014	25
D100L	1.5	920	3.5	2	76	74	73	0.79	0.75	0.62	5.0	1.8	2.3	0.04	37
D112M	2.2	925	4.9	2	79	79	77	0.80	0.75	0.65	5.5	1.8	2.3	0.05	42
D132S	3.7	950	8	2	82.5	78	76	0.77	0.71	0.60	6.0	1.9	2.5	0.105	68
D132M	5.5	950	11.9	2	83	82	79	0.77	0.72	0.60	6.0	2.0	2.6	0.15	73
D160M	7.5	960	15.1	2	86	85	82	0.80	0.74	0.64	5.5	2.15	2.5	0.263	135
D160L	11.0	960	21.9	2	87.5	86	83.5	0.79	0.72	0.61	6.0	2.1	2.5	0.299	140
D180L	15.0	965	28.3	2	89	88	85	0.83	0.78	0.66	6.0	2.0	2.5	0.647	208
D200L	18.5	975	35.8	2	89.5	88.5	86	0.81	0.76	0.68	6.0	2.0	2.5	0.954	277
D200L	22.0	975	41.8	2	90	89	86	0.82	0.78	0.70	6.0	2.0	2.5	1.105	290
D225M	30.0	980	55.0	2	91	90.5	88	0.83	0.80	0.69	6.0	2.3	2.5	2.819	377
D250M	37.0	980	68.0	2	92	91	88.5	0.83	0.80	0.72	6.0	2.4	2.5	3.431	437
D280S	45.0	980	81	2	93	92.5	89	0.83	0.79	0.70	6.0	2.2	2.5	4.811	716
D280M	55.0	980	99.0	2	93.5	93	88.5	0.83	0.79	0.69	6.0	2.2	2.5	5.891	718
D315S	75.0	985	133.0	2	93.5	92.5	90.5	0.84	0.82	0.72	6.0	1.8	2.5	8.388	1100
D315MA	90.0	985	157.0	2	94	93	91	0.85	0.83	0.76	6.0	1.8	2.5	9.653	1197
D315MB	110	985	191.0	2	94.5	94	91.5	0.85	0.81	0.74	6.0	1.8	2.5	14.167	1230
D315LA	132	987	229.0	2	94.5	94	91.5	0.85	0.81	0.73	6.0	2	2.5	17.15	1280
D355S	160	990	274.0	-	94.5	94	92.0	0.86	0.82	0.74	6.0	1.8	2.5	30.00	1500
D355M	180	990	311.0	-	94.6	94.2	92.5	0.85	0.82	0.74	6.0	1.7	2.5	33.6	1600

8 Pole

D90S	0.37	680	1.4	2	62	59	55	0.61	0.53	0.42	3.5	1.8	2.2	0.015	23
D90L	0.55	680	1.95	2	67	61	57	0.60	0.54	0.40	3.5	1.9	2.4	0.018	25
D100LA	0.75	700	2.37	2	70	62	58	0.64	0.58	0.61	4.5	1.8	2.2	0.045	37
D100LB	1.1	700	3.3	-	70	67	61	0.67	0.60	0.45	4.5	1.7	2.2	0.045	37
D100LC	1.1	700	3.2	2	72	67	61	0.67	0.60	0.45	4.5	1.7	2.2	0.055	41
D112M	1.5	700	4.1	2	74	71	65	0.68	0.60	0.48	4.5	1.9	2.2	0.055	42
D132S	2.2	720	5.7	2	79	75	71	0.69	0.60	0.48	5.0	1.8	2.5	0.12	65
D160M	3.7	720	9.0	1	83	82	78	0.69	0.63	0.50	5.0	1.9	2.3	0.263	135
D160M	5.5	720	13.0	2	84	83	81	0.70	0.65	0.55	5.5	2.0	2.4	0.303	137
D160L	7.5	720	17.0	2	85	83	80	0.72	0.65	0.55	5.5	1.9	2.4	0.384	140
D180L	11.0	725	24.4	2	86	85	83	0.73	0.68	0.58	5.0	2.0	2.4	0.647	208
D200L	15.0	725	32.5	2	88	87	85	0.73	0.69	0.58	5.0	1.8	2.3	0.954	277
D225S	18.5	725	40.0	2	88	87	85	0.73	0.66	0.58	5.0	2.2	2.5	1.127	315
D225M	22.0	730	46.5	2	89	88	86	0.74	0.68	0.58	5.5	2.2	2.6	2.819	377
D250M	30.0	730	61.8	2	90	89.5	87	0.75	0.67	0.61	6.0	2.0	2.5	3.431	437
D280S	37.0	740	71.7	1	92	91.5	88	0.78	0.70	0.64	6.0	2.0	2.5	4.811	716
D280M	45.0	740	87.2	2	92	91	89	0.78	0.70	0.64	6.0	2.1	2.5	5.891	728
D315S	55.0	740	107.4	2	92.5	91.5	90	0.77	0.72	0.64	6.0	2.0	2.5	8.388	1050
D315M	75.0	740	146.5	2	92.5	91.3	90	0.77	0.72	0.63	6.0	2.0	2.4	9.653	1095
D315LA	90.0	740	167.6	2	93.5	93	91	0.80	0.75	0.65	6.0	2.0	2.4	18.90	1100
D315LB	110.0	740	204.2	2	94	93.5	92	0.81	0.78	0.65	6.0	2.0	2.4	22.80	1150
D355S	132	742	237	-	94.5	94.0	92	0.82	0.80	0.71	6.0	2.0	2.5	30.0	1500
D355M	150	742	276	-	94.5	94	92	0.80	0.75	0.65	6.0	2.0	2.5	34.2	1650

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