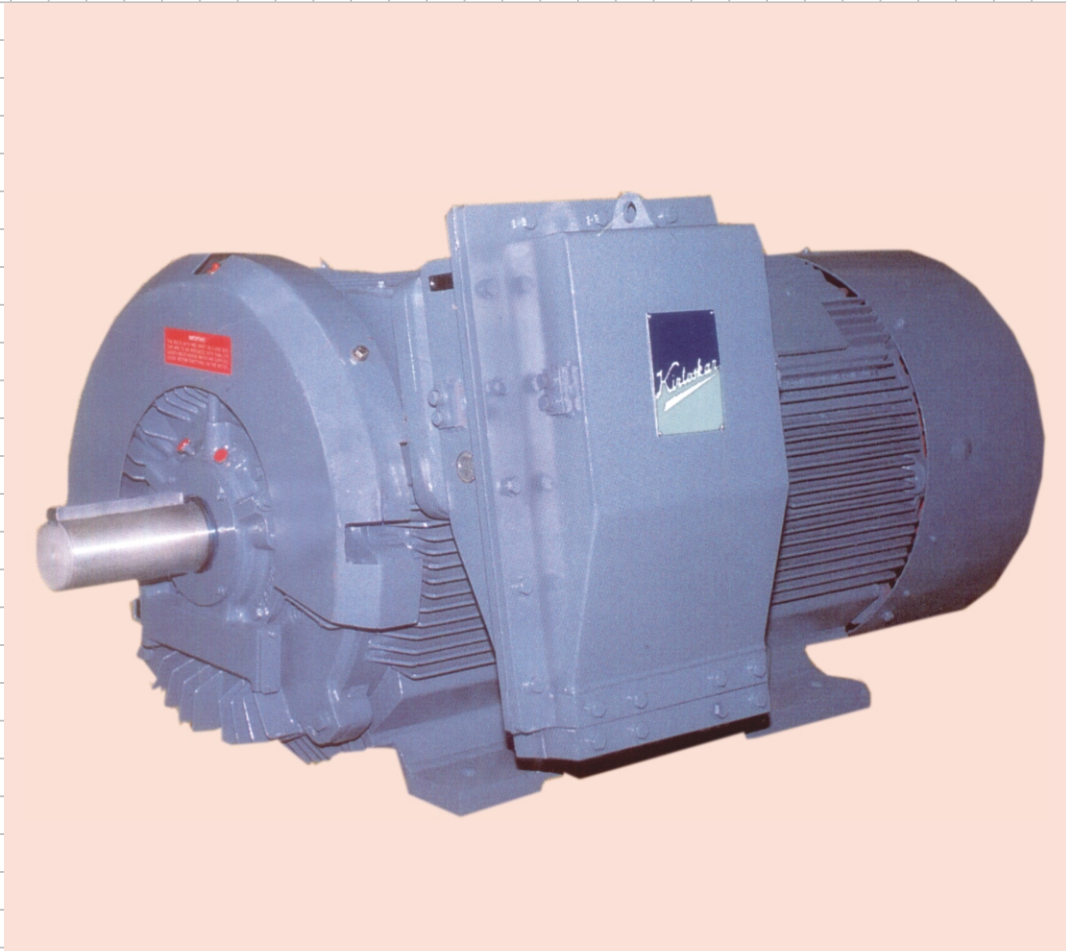


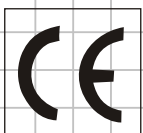


SPECTRUM X.F

THREE PHASE
LARGE AC INDUCTION MOTORS



KIRLOSKAR ELECTRIC



TEFV LOW VOLTAGE AND HIGH VOLTAGE MOTORS

SPECTRUM X.F is the new range of low and high voltage TEFV motors from Kirloskar Electric. This series is the result of advanced engineering and state of the art manufacturing technologies and meets the exacting requirements of industrial applications. The increasing significance of power saving, environmental requirements, the desire for smaller dimensions and stipulations made by national and international markets led to the development of spectrum X. F motors. These motors are compact, reliable robust and embody the unrivalled experience of Kirloskar Electric in the field of drive technology.

APPLICATION

Spectrum X.F motors are ideal for wide range of industrial applications like pumps, centrifugal and reciprocating compressors, blowers, fans, crushers, conveyors, mills etc., and caters to the requirements of modern industrial sectors like power, chemical, petrochemical, aluminium, pulp and paper, steel, refrigeration, steel, etc.,

SPECIFICATION

Motors conform to the following national and international standards.

STANDARDS	IS	IEC	BS
Specification	325	60034-1	EN 60034-1
Output & dimension	1231 2223	60072-1,2	4999-141
Degrees of Protection	4691	60034-5	EN 60034-5 4999-105
Method of cooling	6362	60034-6	EN 60034-6
Insulation	1271	60085	2757
Construction & Mounting	2253	60034-7	EN 60034-7
Noise level	12065	60034-9	EN 60034-9
Vibration level	12075	60034-14	4999-142
Terminal marking	4728	60034-8	4999-109

Motors also suitable for the special requirements of customer and consultant specifications.

FRAME DESIGNATION

MOUNTING	ROTOR TYPE	
	CAGE	WOUND
HORIZONTAL FOOT MOUNTING 1M 1001	SCX.....F	SOX.....F
VERTICAL FLANGE MOUNTING M 3011	VSCX....F

The IEC frames covered are 315, 355, 400, 450, 500.

FEATURES:

Energy saving

Spectrum X.F motors are energy efficient and are ideally suitable for power intensive process and other industries.

Low noise levels

Spectrum X.F motors are designed for low noise levels and the values are less than the values stipulated in IS: 12065.

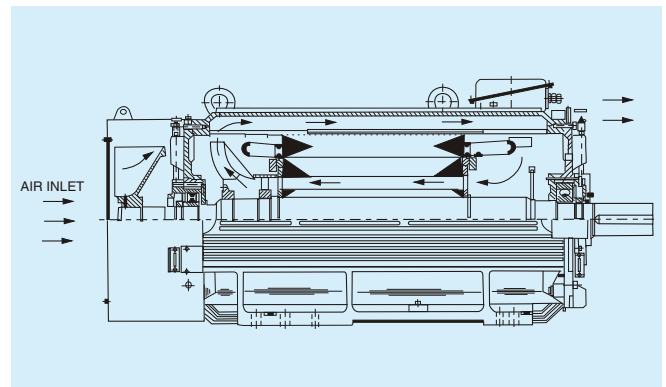
Low Vibration levels

Spectrum X. F motors vibration levels are less than the values stipulated in IS: 12075

Efficient cooling

Spectrum X.F motors have two separate cooling circuits-internal and external. The internal fan at non-drive end draws the air through specially designed trapezoidal ventilation slots in the rotor. The external air is blown over the cooling ribs by the external fan and the cooling air passes along the ribs from the non-drive end to drive -end by virtue of the waisting of the frame. The frame acts as a heat exchanger between external and internal cooling air. The internal cooled air returns to the drive-end, through four air ducts in the frame in the same direction as the external cooling air, while hot air travels from non-drive end to the drive-end, through the air ducts in the frame. This co-directional principle results in uniform

heat dissipation. Low quantity of air flow is adequate as very low heat need to be dissipated by virtue of high efficiency.



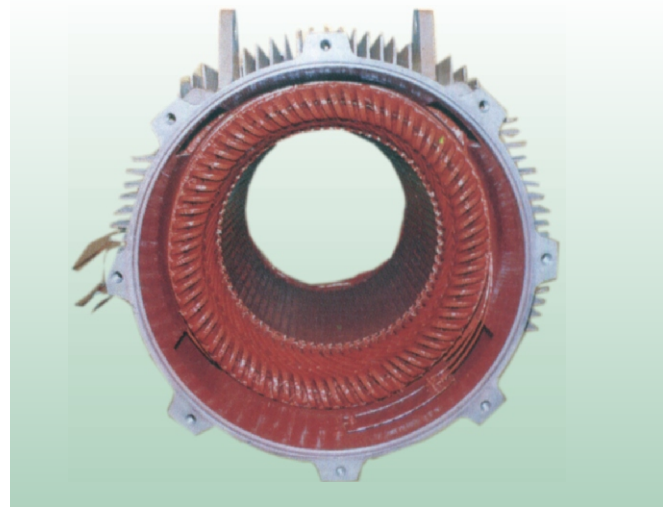
COOLING PRINCIPLE WITH EXTERNAL COOLING FLOW AND INTERNAL COOLING CIRCUIT

CORE

The stator & rotor core is made from low loss, high permeability, varnish insulated electrical cold rolled stamping steel. Stampings are hydraulically compressed and clamped to form a rigid structure.

STATOR FRAME AND END SHIELDS

Frame and end-shields are torsionally rigid, robust and are of cast iron/ fabricated steel. The ribs on frame and end shields provide larger cooling surface area for better heat dissipation.



WINDING AND IMPREGNATION

Low voltage stators are wound with dual enamelled copper wires or enamelled glass insulated rectangular copper strips conforming to class

'F' insulation. The complete wound stator core assembly is impregnated using polyester resin varnish having class 'F' thermal capability.

High voltage stators are wound with coils made from polyester film, double glass covered and modified polyesterimide varnish bonded copper rectangular copper strips, conforming to class 'F' insulation. Proven "MICABOND" insulation system with porous mica paper tapes as the main insulation is standard. Coils in slots are firmly wedged in position with epoxy glass or magnetic slot wedges. End windings are securely braced to prevent movement during transients.

Wound stator core assembly is impregnated with solventless epoxy- resin in vacuum pressure impregnation (VPI) plant. The impregnated stators are baked in an oven for thermo setting through polymerization process. VPI processed stators have void free insulation, high strength, high thermal conductivity and long service life. The coils have external corona protection and stress grading.

Optimum fit is achieved between stator frame and wound stator core assembly, by shrink fitting process, for better heat transfer and rigidity. The MICABOND insulation system is proven for use in damp or chemically aggressive atmospheres and is tropicalized. The VPI insulation system ensures long life to the motor even under arduous environmental working conditions.

ROTOR

Cage Rotor

Standard design is with copper bar and ring assembly. Aluminium high pressure die-cast double cage rotor designs also offered. Cage rotors are designed to withstand the severe forces encountered during starting and other transient conditions. The rotor core is keyed on to a steel-shaft and retained by means of rigid clamping end plates. The rotors are dynamically balanced to G2.5 grade as per ISO 1940 to achieve low vibration levels. Special care is taken in the design and manufacturing of high speed (3000 rpm) rotors with low vibration requirement for applications like high speed centrifugal compressor.

Wound Rotor

Rotor winding is of bar wave type using pre-formed coils of rectangular section copper conductors with build up of heat resistant varnished glass-tape conforming to class 'F' insulation. The end windings are secured with several layers of resin impregnated glass tape banding on to support collars to prevent any movement due to centrifugal magnetic rotational forces. The banding is cured and then the rotor is impregnated. The wound rotors are dynamically balanced to achieve low vibration levels.

SHAFT

Shafts are made from high carbon steel of larger dia cross section enough to provide optimal strength and rigidity to withstand torsional stresses developed during transient conditions.

TERMINAL BOX

The terminal boxes for housing cable terminations, are larger in size with sufficient electrical clearances. For HV machines, phase insulated terminal box is provided as a standard and is certified by PTB. Phase segregated terminal box can also be offered on request for HV machines and is certified by CPRI for a fault current of 43.7 kA for a duration of 0.25 secs.

BRUSH GEAR AND COLLECTOR RINGS.

The brush gear and collector rings, are designed for continuous duty operation. The collector rings are of phosphor-bronze type and the insulated collector ring assembly is shrink fitted on to the shaft. The brushes are of high quality carbon and are fitted with constant pressure brush holders for optimum contact between brushes and collector rings. The complete collector ring assembly is housed in a separate enclosure to prevent carbon dust entry into the motor.

ACCESSORIES

Anti condensation heaters, thermistors, platinum resistance type temperature detectors for winding & bearings, and dial type thermometers for bearings can be provided on request.

TESTS

Materials, components, and windings are subjected to strict quality checks during manufacturing stage. The completed machines are subjected to routine and type tests, in accordance with the specified standards / specifications before despatch.

Low Voltage Motors upto 500 Frame have passed the stipulated tests and are certified for 'CE Marking'

POWER (FOR CONTINUOUS OPERATION) IN RELATION TO FRAME SIZE AND SPEED

H.V. CAGE ROTOR INDUCTION MOTORS

FRAME SIZE	2 POLES 3000 MIN ⁻¹ (kW)		4 POLES 1500 MIN ⁻¹ (kW)		6 POLES 1000 MIN ⁻¹ (kW)		8 POLES 750 MIN ⁻¹ (kW)	
	3.3	6.6	3.3	6.6	3.3	6.6	3.3	6.6
SCX 315 F								
VSCX315F	180	150	236	160	180	132	132	90
SCX 355 F								
VSCX 355 F	280	212	335	250	250	200	180	160
SCX 400 F								
VSCX 400 F	450	355	560	475	375	280	300	212
SCX 450 F								
VSCX 450 F	670	500	800	670	600	425	475	335
SCX 500 F								
VSCX 500 F	900	710	1120	950	850	600	670	475

HV WOUND ROTOR INDUCTION MOTORS

FRAME SIZE	4 POLES 1500 MIN ⁻¹ (kW)		6 POLES 1000 MIN ⁻¹ (kW)		8 POLES 750 MIN ⁻¹ (kW)	
	3.3	6.6	3.3	6.6	3.3	6.6
SDX355F	265	200	200	160	140	132
SDX 400 F	450	375	300	224	236	170
SDX 450 F	630	530	475	335	375	265
SDX 500 F	900	750	670	475	530	375

LV CAGE ROTOR MOTORS

FRAME SIZE	2 POLES 3000 MIN ⁻¹ (kW)		4 POLES 1500 MIN ⁻¹ (kW)		6 POLES 1000 MIN ⁻¹ (kW)		8POLES 750 MIN ⁻¹ (kW)	
	3.3	6.6	3.3	6.6	3.3	6.6	3.3	6.6
SCX 400 F								
VSCX 400 F	475		475		375		280	
SCX 450 F								
VSCX 450 F	-		-		500		375	
SCX 500 F								
VSCX 500 F	-		-		-		500	

LV WOUND ROTOR MOTORS

FRAME SIZE	4 POLES 1500 MIN ⁻¹ (kW)		6 POLES 1000 MIN ⁻¹ (kW)		8 POLES 750 MIN ⁻¹ (kW)	
	3.3	6.6	3.3	6.6	3.3	6.6
SDX 400 F	375		300		224	
SDX 450 F	-		375		300	
SDX 500 F	-		-		375	

NOTE :

- Insulation: class 'F', and temperature rise limited to class 'B' (Temperature rise: 70°C over an ambient 50°C).
- Voltage variation: ± 10% ; Frequency variation: ± 5% ; Combined variation ± 10%.
- Altitude: upto 1000 m above sea level.

BEARING DETAILS

FRAME SIZE	NO. OF POLES	HORIZONTAL SCX-F MOTORS/ SDX-F MOTORS		VERTICAL VSCX-F MOTORS	
		DE	NDE	DE	NDE
315F	2	6216	NU216	*	*
	4 & UP	6322	NU322	NU322	63322
355F	2	6216	NU216	*	*
	4 & UP	6322	NU322	NU322	7320
400F	2	6219	NU219	*	*
	4 & UP	6324	NU322	NU324	7322
450F	2	6219	NU219	*	*
	4 & UP	6326	NU322	NU324	7322
500F	2	6219+	NU219	*	*
	4 & UP	6330	NU322	NU324	7322
500F	2	6219+	NU219	*	*
	4 & UP	6326	NU322	NU324	7322
500F	2	6219+	NU219	*	*
	4 & UP	6330	NU322	NU324	7322

*Note : Vertical 2 Pole Cage Motors can be supplied on request.

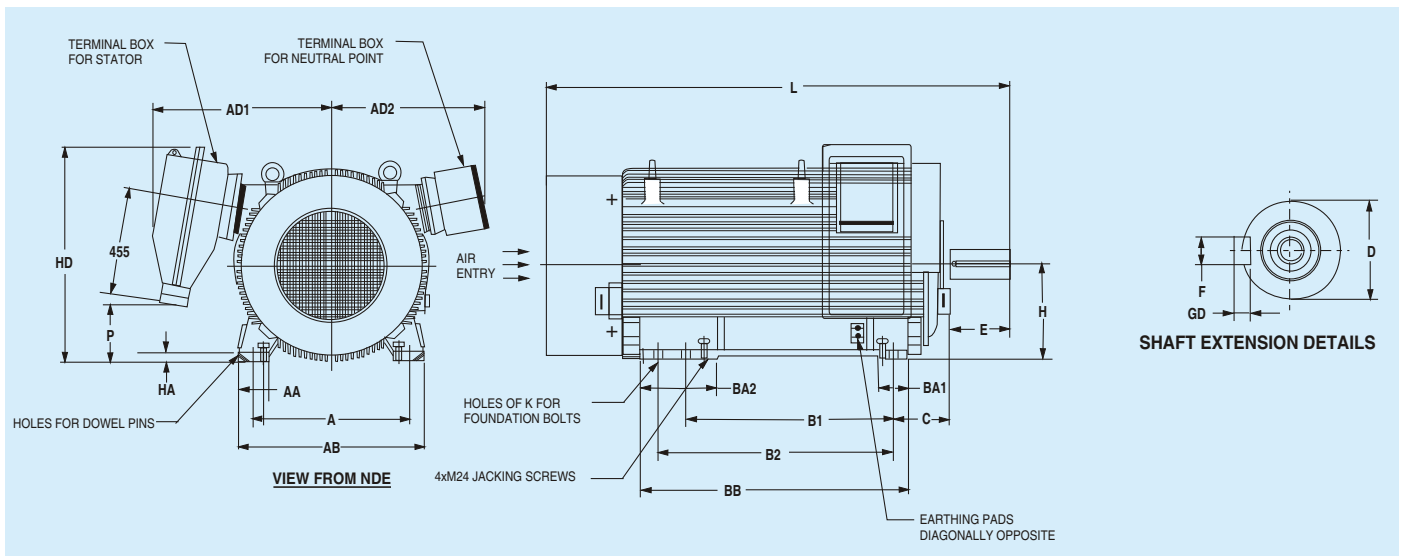
WEIGHT DETAILS

FRAME SIZE	CAGE ROTOR MOTORS				WOUND ROTOR MOTORS	
	HORIZONTAL		VERTICAL		LV	HV
	LV	HV	LV	HV		
315	---	1400	---	1500	---	---
355	---	2000	---	2250	---	2400
400	2800	2800	3000	3000	3200	3200
450	3700	3700	4000	4000	4200	4200
500	5400	5400	5500	5500	6000	6000

Note : All weights are in kgs.

DIMENSIONAL DETAILS

1. HIGH VOLTAGE HORIZONTAL FOOT MOUNTED CAGE ROTOR MOTORS : FRAMES 315-500



NOTE:-

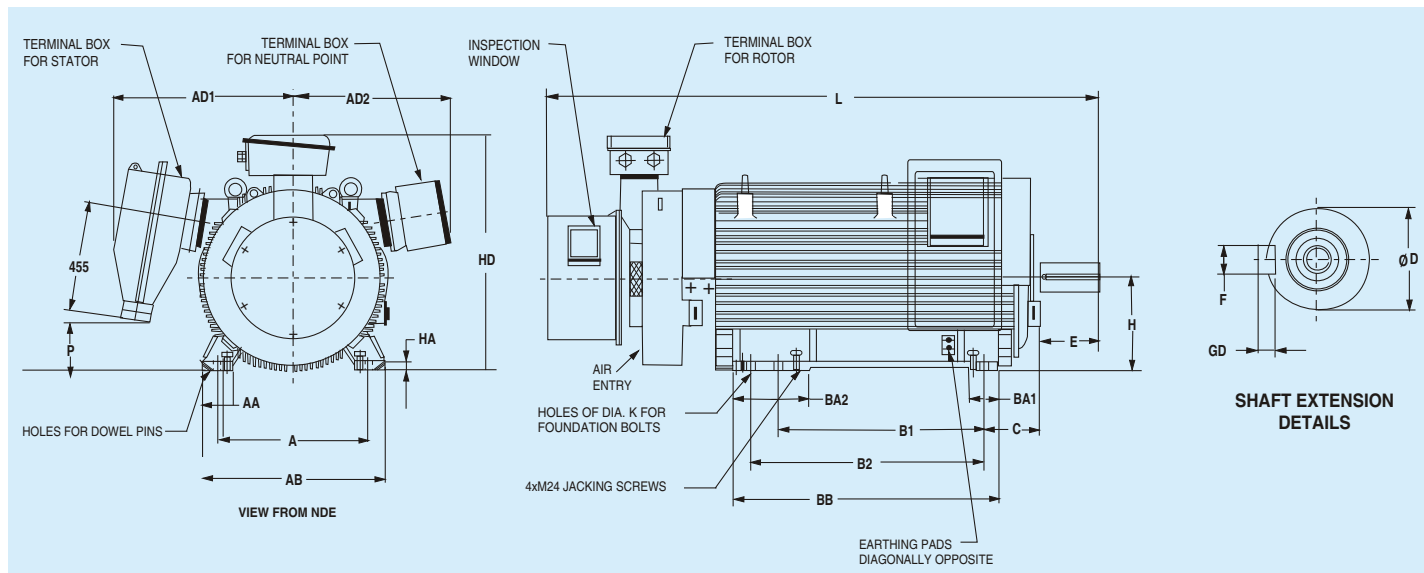
- MOTOR CONFORMS TO IS:325/IEC 60034 -1
- IP : 55.
- MAIN TERMINAL BOX IS SUITABLE FOR 360° ROTATION IN STEPS OF 90°
- ALL DIMENSIONS ARE IN mm.
- LIFTING HOOKS
 - 2 Nos. FOR 355
 - 4 Nos. FOR 400 & ABOVE.

5. ENCLOSURE TO DEGREE OF PROTECTION

COOLING IC: 411
6 TOLERANCE ON 'H' : 0 TO -1 UPTO 355 FRAME, &
0 TO -2 FOR 400 FRAME & ABOVE.

FRAME	POLE	A	AA	AB	AD1	AD2	B1	B2	BA1	BA2	BB	C	D	E	F	GD	H	HA	HD	K	P	L
SCX 315F	2P	508	120	628	685	635	457	508	145	200	628	216	65	140	18	11	315	42	780	28	100	148
	4P & UP												95	170	25	14						1
SCX 355F	2P	610	120	730	725	675	560	710	145	280	840	254	65	140	18	11	355	42	845	28	165	151
	4P & UP												100	210	28	16						1
SCX 400F	2P	686	140	826	760	710	800	900	170	400	1030	280	75	105	20	12	400	48	940	35	240	163
	4P												110	210	28	16						0
SCX 450F	2P	750	140	890	800	750	900	1000	170	230	1130	315	75	105	20	12	450	48	1025	35	345	181
	4P												110	210	28	16						0
SCX 500F	2P	850	160	1000	860	810	1000	1120	200	300	1380	355	85	130	22	14	500	55	1130	42	450	191
	4P												110	210	28	16						5
SCX 500F	2P	850	160	1000	860	810	1000	1120	200	300	1380	355	85	130	22	14	500	55	1130	42	450	191
	4P												110	210	28	16						5

2. HIGH VOLTAGE HORIZONTAL FOOT MOUNTED WOUND ROTOR MOTORS : FRAMES 355-500



NOTE:-

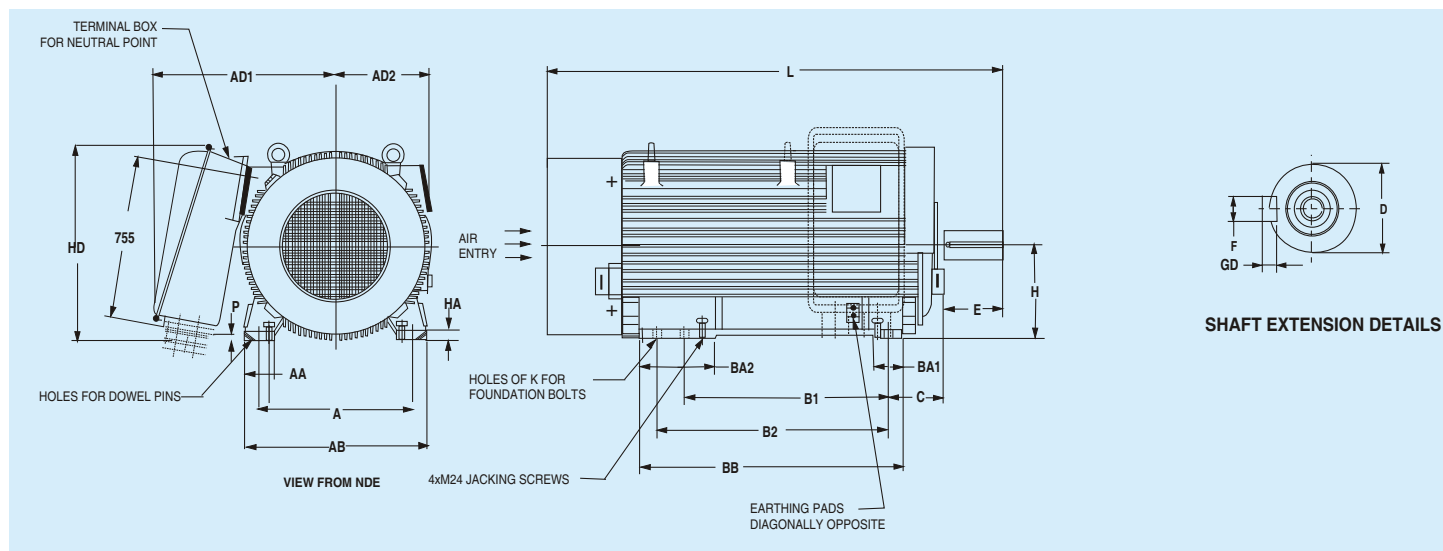
- 1 MOTOR CONFORMS TO IS:325/IEC 60034 -1
- IP : 55.
- 2 MAIN TERMINAL BOX IS SUITABLE FOR 360° ROTATION IN STEPS OF 90°
- 3 LIFTING HOOKS
 - a) 2 Nos. FOR 355

4. ENCLOSURE TO DEGREE OF PROTECTION

COOLING IC: 411
 5 TOLERANCE ON 'H' : 0 TO -1 UPTO 355 FRAME, &
 0 TO -2 FOR 400 FRAME & ABOVE.

FRAME	POLE	A	AA	AB	AD1	AD2	B1	B2	BA1	BA2	BB	C	D	E	F	GD	H	HA	HD	K	P	L
SDX 355F	4P & UP	610	120	730	725	675	560	710	145	280	840	254	100	210	28	16	355	42	1025	28	165	2115
SDX 400F	4P	686	140	826	760	710	800	900	170	400	1030	280	110	210	28	16	400	48	1110	35	240	2430
	6P & UP												125	210	32	18						
SDX 450F	4P	750	140	890	800	750	900	1000	170	230	1130	315	110	210	28	16	450	48	1200	35	345	2600
	6P & UP												140	250	36	20						
SDX 500F	4P	850	160	1000	860	810	1000	1120	200	300	1380	355	125	165	32	18	500	55	1300	42	450	2780
	6P & UP												145	200	36	20						

3. LOW VOLTAGE HORIZONTAL FOOT MOUNTED CAGE ROTOR MOTORS : FRAMES 400 - 500



NOTE:-

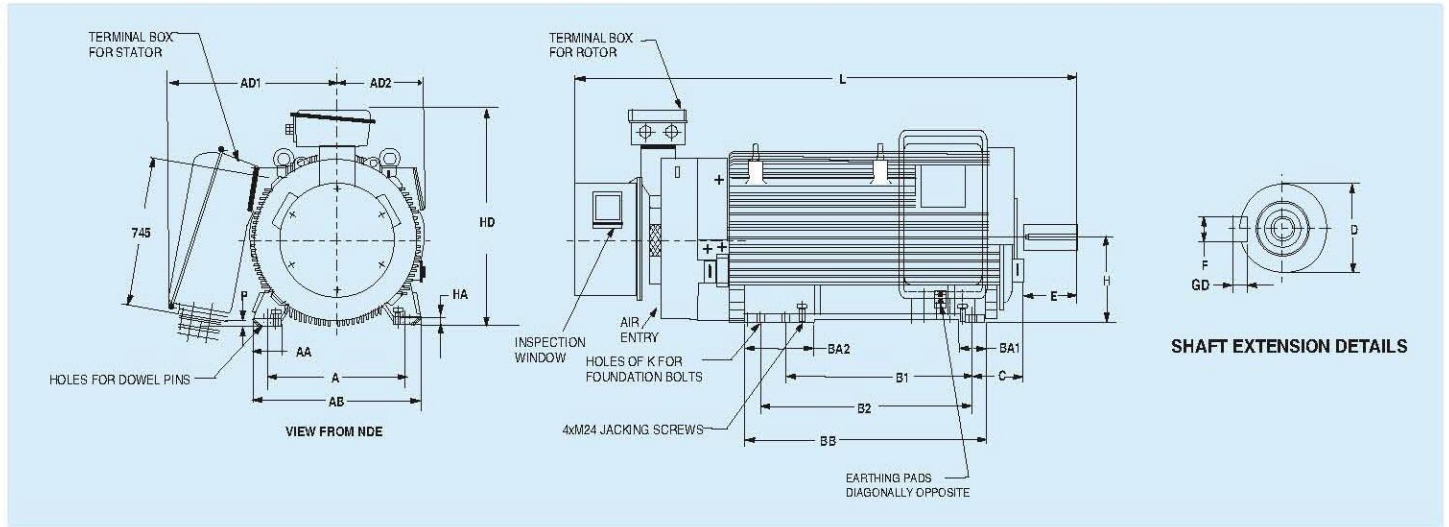
1. MOTOR CONFORMS TO IS:325/IEC : 60034 -1
2. MAIN TERMINAL BOX IS SUITABLE FOR 360° ROTATION IN STEPS OF 90°
3. ALL DIMENSIONS ARE IN mm.

4. ENCLOSURE TO DEGREE OF PROTECTION IP : 55.

COOLING IC: 411.
 5 TOLERANCE ON 'H' : 0 TO -2 FOR 400 FRAME & ABOVE.

FRAME	POLE	A	AA	AB	AD1	AD2	B1	B2	BA1	BA2	BB	C	D	E	F	GD	H	HA	HD	K	P	L
SCX 400F	2P	686	140	826	810	425	800	900	170	400	1030	280	75	105	20	12	400	48	915	35	25	1810
	4 P												110	210	28	16						1915
	6P & UP												125	210	32	18						1915
SCX 450F	2P	750	140	890	845	460	900	1000	170	230	1130	315	75	105	20	12	450	48	1000	35	110	1940
	4P												110	210	28	16						2045
SCX 500F	6P & UP	850	160	1000	900	515	1000	1120	200	300	1380	355	140	250	36	20	500	55	1100	42	215	2085
	4P												125	165	32	18						2265
	6P & UP												145	200	36	20						2300

4. LOW VOLTAGE HORIZONTAL FOOT MOUNTED WOUND ROTOR MOTORS : FRAMES 400-500



- NOTE:-**
- 1 MOTOR CONFORMS TO IS:325/IEC 60034 -1
 - 2 MAIN TERMINAL BOX IS SUITABLE FOR 360° ROTATION IN STEPS OF 90°
 - 3 ALL DIMENSION ARE IN mm.
4. ENCLOSURE TO DEGREE OF PROTECTION
- COOLING IC: 411
- 5 TOLERANCE ON 'H': 0 TO -2 FOR 400 FRAME & ABOVE.

FRAME	POLE	A	AA	AB	AD1	AD2	B1	B2	BA1	BA2	BB	C	D	E	F	GD	H	HA	HD	K	P	L
SDX 400F	4P	686	140	826	810	425	800	900	170	400	1030	280	110	210	28	16	400	48	1110	35	25	2430
	6P & UP												125	210	32	18						
SDX 450F	4P	750	140	890	845	460	900	1000	170	230	1130	315	110	210	28	16	450	48	1210	35	110	2560
	6P & UP												140	250	36	20						2780
SDX 500F	4P	850	160	1000	900	515	1000	1120	200	300	1380	355	125	165	32	18	500	55	1300	42	215	2815
	6P & UP												145	200	36	20						2815

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