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PRABAL SERIES

Crane Duty Motors



LTM / CRANE / 09 / APRIL-11



Crompton Greaves (CG) is part of the US\$ 4 bn Avantha Group, a conglomerate with an impressive global footprint.

Since its inception CG has been synonymous with electricity. CG's India operations were established in 1937, and since then the company has retained its leadership position in the management and application of electrical energy.

Today, Crompton Greaves India's largest private sector enterprise. It has diversified extensively and is engaged in designing, manufacturing and marketing technologically advanced electrical products and services related to power generation, transmission and distribution, besides executing turnkey projects. The company is customer-centric in its focus and is the single largest source for a wide variety of electrical equipments and products. With several international acquisitions, Crompton Greaves is fast emerging as a first choice global supplier for high quality equipment through its three business groups viz;

Power Systems :

- Transformer ● Switchgear ● Power Quality
- Engineering Projects

Industrial Systems :

- Motors ● Alternators ● Drives
- Railway Signalling ● Stampings

Consumer Products :

- Fans ● Appliances ● Lighting
- Integrated Security Solutions & Home Automation ● Pumps

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APPLICATION

Prabal series squirrel cage/slip ring Crane duty motors are specially designed for service on cranes and hoists. They can also be used for similar applications such as material handling equipments, and cranes of all types. These motors can serve as auxiliary motors in rolling mills or wherever intermittent duty drives are required.

These are duty type rated motors developing high starting torque with low starting current. The motors are suitable for frequent starts/ stops and reversals. Also rapid acceleration is achieved by high pull out torque/rotor inertia ratio.

TYPICAL APPLICATIONS :

Crane duty motors are used for following applications in majority:

- Cranes & hoists: long travel drive, cross travel drive, main hoist, auxiliary hoist.
- Material handling equipments: various conveyors
- Lifts
- Rolling mills

RANGE

Manufacturing range for cast iron slip ring crane duty motors is from 112 to 400 frame.

The same for squirrel cage motors in cast iron enclosure is from 80-400 & in aluminium enclosure is from 63-160.

CE marking : All motors are with CE marking.

MOUNTING

Squirrel cage crane duty motors are supplied with horizontal foot-mounting. However, motors suitable for foot / flange / face mounting or any combination of these with vertical or horizontal orientation can be offered when required. Slip ring motors are normally available with foot mounting Flange mounting can be supplied on specific request.

POWER SUPPLY

Crane duty motors are suitable for 3 phase supply and can be wound for any single voltage from 220 to 650 volts and frequencies from 50 Hz or 60 Hz. The rotor voltage is committed for stator supply of 415 V, 50 Hz. For other supply conditions, Rv to be confirmed from CG.

AMBIENT TEMPERATURE

The motors are rated at 45°C ambient temperature. For temperatures, other than 45°C, a deration factor has to be applied as indicated below.

DERATION FACTORS :

Ambient temperature :

Ambient Temperature	Deration factor
50°C	0.88
55°C	0.83
60°C	0.75

Table 1

Altitude :

The motors are suitable for altitude upto 1000 m above mean sea level. For altitudes more than this, deration factor shall be as per below :

Altitude in m above MSL	Deration factor
1000	1.00
1500	0.95
2000	0.90
2500	0.84
3000	0.78
3500	0.75
4000	0.70

Table 2

STANDARD OPERATING CONDITIONS

Power supply : 415 volts, 3 phase, 50 Hz
 Voltage variation : ± 10%
 Frequency variation : ± 5%
 Combined voltage and frequency Variation : ± 10% (absolute sum)
 Ambient temperature : 45°C
 Altitude : upto 1000m.

STANDARD SPECIFICATIONS

PERFORMANCE AND FIXING DIMENSIONS

The motors are manufactured with standard metric frame sizes, and they comply with the following standards (latest versions).

IS: 325 IS:4722
 IS:1231 IS:2223
 IS:3177 IEC:60034-1
 IS: 807

Motors with following steel plant specifications also can be supplied on request :

IPSS: 1-03-003 IPSS:1-03-004

For detail dimensions, please refer drawings on page 31-37 in this publication.

CONSTRUCTIONAL FEATURES : (MECHANICAL)

STATOR FRAME AND ENDSHIELDS

Made of high quality cast iron conforming to IS:210, ribbed externally to ensure maximum heat dissipation. All components are machined on CNC machines ensuring concentricity and correct alignment. The windings and working parts are completely enclosed and air is forced over the stator body by fan, mounted on the shaft and protected by a cowl. The feet are integrally cast with the body. This ensures sturdiness and resistance to vibrations.

STATOR AND ROTOR CORES

Both the stator and rotor cores consist of low loss and high permeability steel stampings which are assembled under pressure and rigidly secured by end plates.

ENCLOSURE AND COOLING

Standard crane duty motors have IP55 degree of protection as per IS:4691. IP 56 & 66 can be provided on request. The cooling code of motor is IC 411 as per IS:6362.

SHAFTS AND BEARINGS

The shaft is of high grade steel and of appropriate diameter to withstand the bending and torsional stresses. All shafts are ultrasonically tested for any minor flaw in the material. Shafts are machined to extreme fine limits to ensure fit and interchangeability of bearings. The motors are provided with single shaft extension. Special shaft extensions like :

- 1) change in diameter and length,
- 2) taper shaft, with threaded end, and with hexagonal nut and lock washer.
- 3) double shaft extensions, (cylindrical & taper) are available on request.

Motors are provided with deep groove ball bearings. They are mounted with extreme care in dust proof housing. (Refer bearing size table for details).

Sealed bearings are provided for motors upto frame 225M. Grease lubricated bearings are used on frames 250 and above. The correct amount of grease is filled in the bearings during manufacturing. On line greasing facility is provided for 250 frame & above to facilitate greasing of bearings without dismantling the motor.

For provision of insulated bearings, please refer to CG.

PRABAL 'E' SERIES MOTORS

FRAME	DE BRG	NDE BRG
ND90 S/L	6205ZZ	6205ZZ
ND100L	6206ZZ	6206ZZ
ND112M	6306ZZ	6206ZZ
ND132 S/M	6308ZZ	6208ZZ

Table 3

PRABAL SERIES MOTORS :

(Bearing references for single shaft extension)

FRAME	DE BRG	NDE BRG
GD63	6201ZZ	6201ZZ
GD71	6203ZZ	6203ZZ
ND80	6204ZZ	6204ZZ
ND90 S/L	6205ZZ	6205ZZ
ND100L	6206ZZ	6205ZZ
ND112M	6306ZZ	6205ZZ
ND132 S/M	6308ZZ	6208ZZ
ND160M/L	6309-2RS	6209-2RS
ND180M/L	6310-2RS	6210-2RS
ND200L	6312-2RS	6212-2RS
ND225S/M	6313-2RS	6213-2RS
ND250S/M/MX	6314	6314
ND280S/M	6318	6318
ND315S/M/L/LX	6319	6319
ND355S/M/L	6321	6321
ND355LX	6322	6322
ND400LX	6322	6322
NDW112M	6306ZZ	6305ZZ
DW132S/M	6208ZZ	6307ZZ
NDW160M/L	6309-2RS	6309-2RS
NDW180ML	6310-2RS	6310-2RS
NDW200L	6312-2RS	6312-2RS
NDW225S/M	6313-2RS	6313-2RS
NDW250S/M/MX	6314	6314
NDW280S/M	6318	6318
NDW315S/M/L/LX	6319	6319
NDW355S/M/L	6321	6321
NDW355LX	6322	6322
NDW400LX	NU322	6322

GD : Aluminium Series

ND : Cast Iron Squirrel Cage

DW / NDW : Cast Iron Slip Ring

Table 4

TERMINAL BOX

Terminal box is provided with IP55 degree of protection. The box can be turned through 360° in steps of 90° to give cable entry from any one of four positions. The terminal boxes are suitable for BS screwed conduit. However, fittings like double compression type cable glands are available on request.

Terminal box position can be provided as per table below :

FRAME SIZE	ROTOR TYPE	Standard TB POSITION	Other possible TB positions
112-315	Slip ring	Top	RHS or LHS
355-400	Slip ring	At 45°, Stator TB on RHS from DE Rotor TB on LHS from DE	--
63-71	Squirrel cage	TOP	--
80-315	Squirrel cage	RHS from DE	TOP
355-400	Squirrel cage	At 45°, TB on RHS from DE	At 45°, TB on LHS from DE
ND250MX	SCR	RHS	LHS
NDW250MX	SR	RHS	LHS

Table 5

SLIPRING AND BRUSH GEAR

All sliprings are made of cupro-nickel. The slipring unit is having high insulation resistance ensuring minimum wear and breakdown. The brush holders are assembled as a complete unit which can be easily replaced. The slipring enclosure is dustproof & has a cover with accessibility for inspection. The slip rings are epoxy moulded / fabricated type as per requirement.

MOTOR GD. SQ.

For large no. of starts, it is necessary that the accelerating time of the system should be as small as possible. For this purpose, total inertia of the system (motor GD sq. + Load GD sq.) should be minimum. Motor GD sq. value and permissible load GD sq. are indicated in the tables.

INTERCHANGEABILITY AND SPARES

All Prabal series crane duty motors are built to standardised designs and all spare parts are interchangeable.

CONSTRUCTIONAL FEATURES (ELECTRICAL)

Class of Insulation :

Stator : Class F insulation with temperature rise limited to class B

Rotor : Class H insulation with temperature rise limited to class F

Prabal series crane duty motors with higher class for stator insulation (class H) can also be offered on request.

WINDINGS

STATOR WINDINGS

Stator winding (and rotor winding in case of slipring motors) consists of enamelled copper wire impregnated with superior quality class F varnish which is rigid at all working temperatures.

Stators in motors with frame 280 & above are manufactured with vacuum pressure impregnation process as a standard. All rotors irrespective of frame size are processed with vacuum pressure impregnation. This gives added electrical & mechanical strength to the winding for high number of starts. The varnish has a high insulation resistance and excellent resistance to moisture, saline atmosphere, acidic/ alkaline fumes, and also to oil and grease. The insulation gives complete reliability under all atmospheric conditions, including humid tropical climates. Stator and rotor wound packs are subjected to surge test before impregnation.

ROTOR WINDINGS

1. Wound rotor

Rotors of slip ring motors are wound and impregnated similar to stator windings. In addition, rotor windings are braced with resiglass banding. This gives protection against centrifugal forces experienced by overhang during overspeed and frequent reversals. Gelcoat is provided on the winding overhang for better consolidation and protection from vibration. Strip wound rotors are provided on frames 355 and above.

2. Cage rotor

Rotors are of pressure diecast aluminium upto 355 frame. They are designed for high starting torque, suitable for high number of starts. Cooling fins cast integrally with the rotor cage, improve the cooling action within the motor. All rotors (cage and wound) are dynamically balanced to comply with the requirements of IS: 12075

TERMINAL ARRANGEMENT

The terminals are mounted on a moulded base and are enclosed in a box having an inspection cover. In case of slip ring motors, three terminals for stator and three terminals for rotor are terminated in terminal box with adequate creepage and clearance. The rotor terminals are in the same box as those of the stator. Separate terminal box for rotor terminals is provided for NDW355LX & NDW400LX frames. This simplifies wiring and maintenance.

EARTHING

One earthing terminal is provided in the terminal box and two terminals on mounting feet.

ACCESSORIES :

Crane duty motors can be provided with various accessories as per table below :

Accessory	Frame range (expressed as frame height)	
	available on request	standard feature
Space heater	132 to 250	280-400
Thermistor	80 to 355	No
Bearing temperature detector	225 to 355	400
Resistance temperature detector	160-355	400
On line greasing	160-225	250-400
Insulated bearings	250-400	No
MS Canopy	80-400	No
Compression glands	80-400	No

Table 6

Space heating for anti condensation :

Space heaters are used for avoiding accumulation of moisture/water in humid atmospheres. In motors upto 200 frame size, motor windings can be heated up to keep winding temperature above ambient by 5 to 10 degrees, by giving low supply voltage upto 10% of rated voltage. Supply voltage is to be adjusted by keeping 20-25% rated current.

Thermal protection: Stator windings can be provided with PTC thermistors for alarm/trip or PT 100 type resistance temperature detectors according to the accessories table provided. Bearings can be provided with PT100 type resistance temperature detectors as per enclosed table 6.

ROTOR VOLTAGE

The rotor voltage of the motor is kept such that the insulation of the rotor and of the associated switchgear is not unduly stressed during rapid plugging when rotor voltage can rise to 2 to 3 times the rated value. Rotor voltage for slip ring motors is as per performance tables enclosed. Special rotor voltage can be offered for wire wound rotors with confirmation from CG.

PULL OUT TORQUE

The pull out torque value at rated voltage is indicated in the respective tables. Since available torque varies as the square of the supply voltage at motor terminals, an allowance for voltage drop in long cables, live rails and collectors must be considered. These voltage drops are significant when motor is operated at pull out point, since current at this point is much higher than the rated current. Pull out torque is maximum for 300 starts/hour class. This high pull out torque ensures rapid acceleration irrespective of drop

in effective torque due to stepped rotor resistance. However, care to be taken that gears and other drive transmission equipments can withstand this peak torque.

OVERLOAD CAPACITY

The motors can withstand 1.5 times the rated current for 2 minutes without suffering damage. This feature makes the motor suitable for severe duties experienced on the crane or similar applications.

LIFE OF THE MOTOR

Crompton Greaves crane duty motors are designed and manufactured with carefully selected and tested insulating materials to ensure long services. The life of the motor mostly depends upon the life of the insulating materials since bearings, brush gears, slip rings etc. can be replaced easily during normal maintenance.

MAXIMUM PERMISSIBLE OPERATING SPEED

All 4, 6, 8, and 10 pole motors are designed for withstanding an over speed of 2.5 times rated synchronous speed or 2000 rpm whichever is less.

VFD CRANE DUTY MOTORS (Cast Iron)

Crane duty squirrel cage motors when used with inverter drives give better current control, speed control & improved operation. Current control is similar or better than slip ring motors & maintenance cost /efforts are less than equivalent slip ring motors. Current control of VFD driven motors is better than standard squirrel cage motors.

Prabal series Inverter duty motors are provided with special insulation system suitable to withstand voltage spikes when fed from inverters. The motors are provided with following features:

- Vacuum pressure impregnation of stator winding, this gives less voids & stronger winding.
- Strengthened insulation system for withstanding voltage stresses.

Standard features :

Base Voltage: 220 volts to 650 volts

Base frequency: 50 or 60 Hz

Insulation class: Class "F" or 'H' as required (temp rise limited to class B)

CG make motors are suitable for the following IGBT drive output

- High frequency in the range of 3kHz - 6 k HZ.
- Voltage rise time > 0.1 sec.
- Voltage spikes up to 1600V and rise time of 0.1 sec.
- THD < 3%

Mode of operation: Modes of operation of inverter driven motors are classified according to type of load & speed range. They are:

- Variable torque
- Constant torque
- Constant power.

In case of cranes/hoists, the mode of operation is constant torque. The typical speed range is from 10% to 100% of synchronous speed. The speed during lowering cranes in unloaded conditions may be more. The limiting speed should not exceed 2.5 times of rated synchronous speed or 2000 rpm whichever is less.

The selection of frame size for various duty type & starts shall be as per table enclosed.

For higher cable length from drive to motor, use suitable dv/dt filters & a lower switching frequency.

Use of insulated bearing at non driving is recommended for frame size above 315 to reduce bearing failure due to shaft currents.

Use of thermistors for frames upto 250 & resistance temperature detectors for frame 280 & above is recommended.

Additional losses & temperature rise :

Harmonics of voltage & current in a cage induction motor supplied from a converter cause additional iron & winding losses in the stator & the rotor.

There is no simple method to calculate the additional losses & no general statement can be made about their value.

When the motor is tested with converter supply at rated load, base voltage & base frequency, the permissible temperature rise will be within the limits of the insulation system used. For example when a motor having class F insulation system is tested with sinusoidal supply at rated voltage, rated frequency & rated load, may have temperature rise within class B limits. However, when the same motor is tested with converter supply under same test conditions, the temperature rise will be within class F limits. It is assumed that, while testing with converter supply, the HVF factor of converter output supply, is maximum 3%.

Hence the outputs of crane duty inverter driven motors are as listed in the table on page 28-30.

GENERAL REQUIREMENT :

All additional general requirements like accessories, paint shade, insulation class, degree of protection, voltage and frequency variation shall be available at extra cost. The cost structure of extra features is same as that for standard motors.

DEFINITIONS

The terms used frequently in intermittent duty drive and hoisting are as bellow :

1. Duty :

Operation of the motor at load including no load and de-energised period to which the motor is subjected, including the sequence and duration.

2. Cyclic duration factor (CDF) :

The ratio between the period of loading including starting and electric braking and the duration of the duty-cycle expressed as percentage.

3. Starting :

The process of energizing a motor to bring it upto rated speed from rest.

4. Jogging or inching :

This is an incomplete start during which the motor does not attain more than 25% of the rated speed.

5. Electric braking :

A system in which a braking action is applied to an electric motor by causing it to act as a generator.

6. D.C. Injection braking :

A form of braking of an induction motor in which a separate dc supply is used to magnetise the motor.

7. Plug braking :

A form of electric braking of an induction motor obtained by reversing the phase sequence of its any two lines.

8. Regenerative braking :

A system of electric braking in which energy is returned to the supply system.

INTERMITTENT DUTY TYPE RATINGS.

The basis of the ratings is that of thermal capability, taking into account,

- i) Frequency of starting (starting class).
- ii) Percentage of time during each operating cycle the motor is energized, (CDF)
- iii) The number and type of cycle per hour, (duty class)
- iv) and the inertia of the motor and the load.

CLASSIFICATION OF STARTING :

The starting classification for a motor indicates the maximum permissible number of starts per specified inertia, taking into account complete starting, jogging or inching and electric braking. Rating for the commonly used starting, i.e. 6,150 and 300 starts/hour class, are listed in this publication. However, following factors can be used to calculate output rating for different number of starts and CDFs.

Starts/hour	40%CDF	60%CDF
600	0.7	0.67
500	0.8	0.74
400	0.9	0.8
300	1	Listed
200	1.1	0.96
150	Listed	1
100	1.21	1.05
50	1.28	1.1

Table 7

EQUIVALENT STARTS PER HOUR :

When calculating for the duty, allowance should be made for inching and reverse current braking on the following basis :

Squirrel cage motors :

- 4 jogs or inchings or jerks = 1 start
- 1 plug braking = 3 starts
- 1 dc injection braking = 2 starts
- 1 plug reversal = 4 starts

Slip ring motors :

- 4 jogs or inchings or jerks = 1 start
- 1 plug braking = 0.8 starts
- 1 plug reversal = 1.8 starts

DUTY TYPE :

Crane duty applications can be classified into duty types S2 to S10. The duty types are as per table 4 below:

Duty type	Description
S2	Short-time duty
S3	Intermittent periodic duty
S4	Intermittent periodic duty with starting
S5	Intermittent periodic duty with electric braking
S6	Continuous operation periodic duty
S7	Continuous operation periodic duty with electric braking
S8	Continuous operation periodic duty with related load/speed changes
S9	Duty with non-periodic load and speed variations
S10	Duty with discrete constant loads and speeds

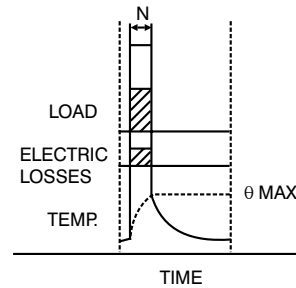
Table 8

The duty types S2 to S5 are explained in detail as per below:

Short time duty (duty type S2) :

Operation at constant load during a given time, less than that required to reach thermal equilibrium, followed by a rest and de-energised period of sufficient duration to re-establish machine temperatures within 2°C of the coolant. (See figure 1)

The recommended values for the short time duty are 10, 30 and 90 minutes.



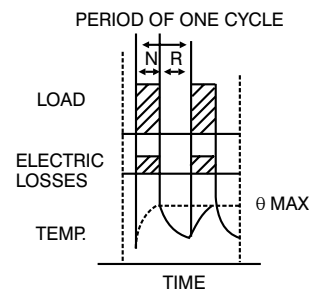
θ MAX = MAX. TEMP. ATTAINED DURING DUTY CYCLE
N = OPERATION AT CONSTANT LOAD

SHORT TIME DUTY, DUTY TYPE S2

Figure 1

Intermittent periodic duty (duty type S3) :

A sequence of identical duty cycle, each including a period of operation at constant load and a rest and de-energised period. These periods being too short to attain thermal equilibrium during one duty cycle. (See Fig. 2) In this duty type, the starting current dose not significantly affect the temperature rise. Unless otherwise specified, the duration of the duty cycle is 10 minutes. The recommended values for the CDF are 15, 25, 40 and 60 percent.



θ MAX = MAX. TEMP. ATTAINED DURING DUTY CYCLE

N = OPERATION AT CONSTANT LOAD
R = AT REST & DE - ENERGISED

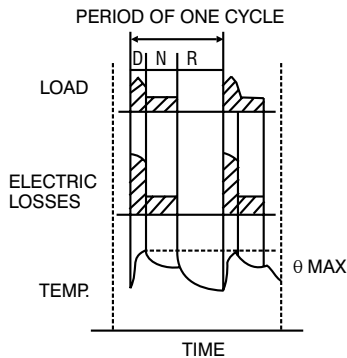
$$\text{CYCLIC DURATION FACTOR} = \frac{N}{N+R} \times 100\%$$

INTERMITTENT PERIODIC DUTY
DUTY TYPE S3

Figure 2

Intermittent periodic duty with starting (duty type S4) :

A sequence of identical duty cycles, each cycle including a significant period of starting, a period of operation at constant load and a rest and de-energised period. These periods being too short to attain thermal equilibrium during one duty cycle. (See Figure 3) In this duty, the stopping of the motor is obtained either by natural deceleration after disconnection of the supply or by means of braking such as mechanical brake which does not cause additional heating of the windings.



θ MAX = MAX. TEMP. ATTAINED DURING DUTY CYCLE
 N = OPERATION AT CONSTANT LOAD
 D = STARTING
 R = AT REST & DE - ENERGISED
 CYCLIC DURATION FACTOR = $\frac{D+N}{D+N+R} \times 100\%$

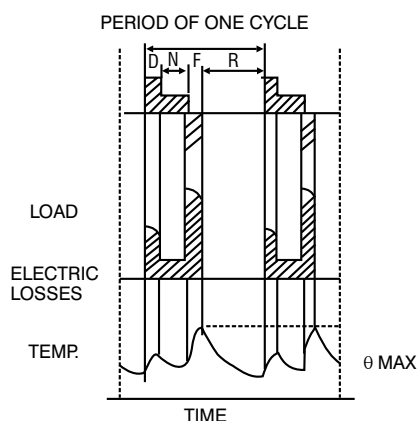
INTERMITTENT PERIODIC DUTY, DUTY TYPE S4

Figure 3

Intermittent periodic duty with starting and braking (duty type S5)

A sequence of identical duty cycles, each cycle consisting of a period of starting, a period of operation at constant load, a period of rapid electric braking and rest and de-energised period. The operating and rest and de-energised periods being too short, to attain thermal equilibrium during one duty cycle. (See Fig. 4)

Note : In all above types of duties, the loading period and rest period of the cycle are so short that the steady state temperature is not reached. While working on these identical cycles continuously, the motor temperature rise must not exceed the permissible values for a given class of insulation.



D = STARTING
 N = OPERATION AT CONSTANT LOAD
 F = ELECTRIC BRAKING
 θ MAX = MAX. TEMP. ATTAINED DURING DUTY CYCLE
 R = AT REST & DE - ENERGISED
 CYCLIC DURATION FACTOR = $\frac{D+N+F}{D+N+F+R} \times 100\%$

INTERMITTENT PERIODIC DUTY DUTY TYPE S5

Figure 4

Selection of motors for hoist motions :

For hoisting motor, the power required shall not be less than that computed from the following :

$$Kw = \frac{MVCvCdf}{6.12 E} \times \frac{1}{Camb}$$

Where, derating factor will be taken as 12%,

Kw = one hour power rating for dc motors & power rating at (S - 40%) cyclic duration factor for ac motors.

M = mass of rated load on hook plus weight of hook block & wire ropes in tones

V = specified hoisting speed in M/min

E = combined efficiency of gears & sheaves

$$= (0.93)^n \times (0.98)^m \text{ for sleeve bearings}$$

$$= (0.95)^n \times (0.99)^m \text{ for antifriction bearings}$$

$$= (0.985)^n \times (0.99)^m \text{ for hardened profile ground \& oil splashed lubricator, where}$$

n = number of pairs of gears

m = total number rotating sheaves passed over by each part of the moving rope attached to the drum

Cv = service factor for vertical motion depending on type of motors,

$$= 0.67 \text{ for ac motors,}$$

$$= 0.5 \text{ for dc motors}$$

Cdf = duty factor

Camb = Derating factor for ambient temperature as per table 1.

For an ac hoist motor, the specified full load hoist speed must be obtained at not more than rated torque, therefore, the calculated full load kw must be multiplied by :

$$\frac{(100 - \text{rated slip } \%)}{(100 - \text{total ohms at full speed } \%)}$$

Where sufficient information is not available values given in table 9 below for duty cycles, cyclic duration factor & starting class corresponding to mechanism class shall be used. The values given are based on the following formula :

Cyclic duration factor =

$$\frac{\text{operating time} \times 100}{\text{Operating time} + \text{idle time}}$$

Operating time + idle time

Recommended cyclic duration factor & starting class :

Mechanism Class	Duty cycle Number of cyclic class (c) Cycles/hour percent	Recommended cyclic duration factor percent	Starting class (c) Equivalent starts/hr
M1	Upto 5 cycles 25	25	90
M2	Upto 5 cycles 25	25	90
M3	10 to 15 cycles 40	40	150
M4	16 to 20 cycles 40	40	150
M5	21 to 30 cycles 60	60	300
M6	31 to 40 cycles 60	60	300
M7	41 to 50 cycles 100	100	600
M8	51 to 60 cycles 100	100	600

Table 9

Selection of motors for crane travel or trolley traverse :

It is assumed that the drive mechanism from the motor to the track wheels will use enclosed gearings mounted on anti-friction bearings. The actual efficiency of the drive will be adopted in making calculations. Where actual efficiency values are not available the efficiency of the drive shall be taken in the range of 0.85 to 0.9.

For the track wheel with anti-friction bearings the rolling friction at these bearing plus the Friction between the track wheels with an average drive efficiency of 0.875 will give an overall friction factor of 8.0 kgf per tonne of the mass moved for calculation of the motor horse power or torque. In the case of wheels with the plain bearings an overall friction factor of 13.0 kgf per tonne of the mass moved may be used.

Selection of motors for crane Travel or Trolley Traverse :

For bridge travel or trolley traverse the power of the motor required shall not be less than that computed from the following :

$$kW = \frac{MVSCdf}{6117T} \frac{(F + 1100a)}{981N}$$

For indoor cranes

$$kW = \frac{MVSCdf}{6117T} \frac{(F + 1100a)}{981N} + \frac{RwV}{6117T}$$

for outdoor cranes

Where

kW = one hour power rating for d.c motors and power rating at 40 percent cyclic duration factor for a.c motors.

M = mass of crane or trolley plus mass of max rated load in tones;

V = specified free running speed M/min;

N = mechanical efficiency of gearing. For spur and helical gears it can be taken as 0.95 per reduction.

T = Factor introduced by the permissible motor torque during acceleration exceeding the motor-rated torque. As a general guidance value of T may be taken as 1:7 for motors having pull out torque of 275 percent full load torque. Lower value of T should be taken for corresponding lower value of pull out torque.

= 1.3 of d.c motor pull out torque*100

= 1.6 for a.c motor 160*full load torque

F = overall friction factor

= 8kgf per tonne for wheel on anti friction bearing .

= 13 kgf per tonne for wheels on plane Bearings

Cdf = duty factor

Rwl = load due to service wind acting horizontally, which can be obtained by multiplying the horizontal exposed area by the service wind by taking drag co-efficient into consideration;

a = average linear acceleration of the crane or the trolley in cm/s² till the mechanism reaches 90 percent of free running speed.

For the value of average linear acceleration refer as given in table 10; and

S = service factor aimed at providing adequate motor heat dissipation capacity as given in table 10.

Acceleration Values

Speed to be Reached M/min	Acceleration in cm/s ² Low and Moderate speed with Long Travel	Acceleration in cm/s ² for Moderate and High Speed (Normal Application)	Acceleration in cm/s ² for High Speed with High Acceleration
240	-	50	67
190	-	44	58
150	-	39	52
120	22	35	47
100	19	32	43
60	15	25	33
40	12	19	-
25	10	16	-
15	8	-	-
10	7	-	-

Table 10

ENQUIRIES

When making an enquiry or when ordering a crane duty motor, please furnish the following information. This will enable to supply you Prabal series motors most suitable for your cranes and hoists

1.0 DETAILS OF CRANE

- 1.1 Class of cranes
- 1.2 Type of crane
- 1.3 Tonnage of crane
- 1.4 Operating speed
- 1.5 Type of motion : Hoisting, or traveling or traversing.

2.0 ELECTRICAL FEATURES

- 2.1 Motor output (kW) and polarity
- 2.2 Supply voltage and frequency with variations.
- 2.3 Type of rotor: squirrel cage or slipring
- 2.4 Class of insulation and ambient temperature.
- 2.5 Method of starting
- 2.6 Requirement of starting torque, pull out torque, starting current.
- 2.7 Load torque of the driven equipment.
- 2.8 In case of slipring motors, requirements of rotor voltage and rotor current.
- 2.9 Type of power supply: Sinusoidal or through inverter drive.

3.0 DETAILS OF DUTY CYCLE

- 3.1 Duty type : S2, S3, S4, or S5.
- 3.2 Duty cycle details preferably with a sketch if different from S2, S3, S4, or S5.
- 3.3 No. of starts per hour.

- 3.4 Method of braking : plugging, dc injection /mechanical brake.
- 3.5 No. of reversals per hour.
- 3.6 Cyclic duration factor (CDF).
- 3.7 Load inertia referred to motor speed. (GD sq.)

4.0 MECHANICAL FEATURES

- 4.1 Enclosure.
- 4.2 Degree of protection.
- 4.3 Mounting.
- 4.4 Fixing dimensions: If Crompton Greaves standard motor fixing dimensions are not acceptable, please let us have your specific requirements, preferably with a drawing with a drawing.
- 4.5 Shaft extension : Please let us have your requirements of special shaft extension, if any, with a drawing.
- 4.6 Any other relevant data.

4 POLE Duty : S4/S5, 150 Starts / Hour CDF 25% & 40%, Insulation : Stator cl. F / Rotor cl. F

Standard operating conditions :

Voltage : 415 V ± 10%,

Ambient / Temperature rise : 45°/75°C

Frequency : 50 Hz ± 5%

Altitude : upto 1000 m

FRAME	CDF 25%						CDF 40%						NET Wt kg			
	O/P kW	O/P HP	SPEED RPM	POT %FLT	FLA Amp	RA Amp	O/P kW	O/P HP	SPEED RPM	POT %FLT	FLA Amp	RA Amp		RV VOLT	GD ² MOTOR	GD ² LOAD
DW132S	4	5.5	1389	3.9	8.6	21	3.6	4.9	1400	4.3	6.92	23	140	0.17	0.163	88
DW132M	6.3	8.6	1405	3.3	14	20	5.3	7.2	1420	4	12	24	170	0.21	0.185	111
NDW160M	9.5	13	1450	3.2	19	18	8.5	11.5	1455	3.5	17	20	217	0.35	0.82	141
NDW160L	14	19	1455	3.5	28.5	25	12.5	17	1460	3.9	27	28	250	0.46	1.19	165
NDW180L	19	26	1461	3.6	37.5	35	17	23	1465	4	34.5	39	275	1.26	1.56	235
NDW200L	23	31	1467	3.5	44.5	32	21	28.5	1470	3.9	41	35	315	2.18	1.8	285
NDW200L	27	37	1468	3.6	52	33	25	34	1470	3.9	48	36	360	2.34	2.05	285
NDW225M	37	50	1470	3.4	64	42	33	45	1473	3.8	58	47	380	2.96	2.75	410
NDW250S	46	62.5	1471	3.6	83	49	41	56	1474	4.1	74	55	340	4.96	3.4	565
NDW250M	56	76	1479	3.8	102	60	50	68	1481	4.2	93	67	445	5.7	3.7	600

FRAME	CDF 60%						CDF 100%						NET Wt kg			
	O/P kW	O/P HP	SPEED RPM	POT %FLT	FLA Amp	RA Amp	O/P kW	O/P HP	SPEED RPM	POT %FLT	FLA Amp	RA Amp		RV VOLT	GD ² MOTOR	GD ² LOAD
DW132S	3.2	4.4	1411	4.9	7.4	20	-	-	-	-	-	-	140	0.17	0.163	88
DW132M	4.8	6.5	1428	4.4	11	22	-	-	-	-	-	-	170	0.21	0.185	111
NDW160M	7.5	10	1460	4	15.5	18	-	-	-	-	-	-	217	0.35	0.82	141
NDW160L	11	15	1465	4.4	23.5	25	-	-	-	-	-	-	250	0.46	1.19	165
NDW180L	15	20	1469	4.5	30	34	-	-	-	-	-	-	275	1.26	1.56	235
NDW200L	18.5	25	1474	4.4	37	31	-	-	-	-	-	-	315	2.18	1.8	285
NDW200L	22	30	1474	4.4	43	32	-	-	-	-	-	-	360	2.34	2.05	285
NDW225M	30	40	1475	4.2	53	43	-	-	-	-	-	-	380	2.96	2.75	410
NDW250S	37	50	1477	4.5	69	50	-	-	-	-	-	-	340	4.96	3.4	565
NDW250M	45	60	1483	4.8	86	60	-	-	-	-	-	-	445	5.7	3.7	600

Outputs in Frame NDW280M to NDW400LX are available on request.

4 POLE Duty : S4/S5, 300 Starts / Hour CDF 40% & 60%, Insulation : Stator cl. F / Rotor cl. F

Standard operating conditions :

Voltage : 415 V ± 10%,

Ambient / Temperature rise : 45°/75°C

Frequency : 50 Hz ± 5%

Altitude : upto 1000 m

FRAME	CDF 40%						CDF 60%						NET Wt kg			
	O/P kW	O/P HP	SPEED RPM	POT %FLT	FLA Amp	RA Amp	O/P kW	O/P HP	SPEED RPM	POT %FLT	FLA Amp	RA Amp		RV VOLT	GD ² MOTOR	GD ² LOAD
DW132S	3.2	4.4	1411	4.9	7.4	18	3	4	1417	5.2	7.1	19	140	0.17	0.163	88
DW132M	4.8	6.5	1428	4.4	11	19	4.5	6	1432	4.7	10.5	20	170	0.21	0.185	111
NDW160M	7.5	10	1460	4	15.5	13	6.5	8.8	1466	4.6	13.8	15	217	0.35	0.82	141
NDW160L	10.5	14	1466	4.6	23	19	9.5	13	1470	5.1	21	21	250	0.46	1.19	165
NDW180L	15	20	1469	4.6	29	26	13	17.5	1473	5.1	27	30	275	1.26	1.56	235
NDW200L	18	24	1474	4.5	36	24	16	22	1477	5	32	27	315	2.18	1.8	285
NDW200L	21	29	1475	4.6	42	25	19	26	1477	5.1	38	27	360	2.34	2.05	285
NDW225M	28	38	1477	4.5	50	32	25	34	1480	5	46	36	380	2.96	2.75	410
NDW250S	35	48	1478	4.7	66	37	31	42	1480	5.4	60	42	340	4.96	3.4	565
NDW250M	42	57	1483	5.1	82	46	38	51.5	1486	5.7	76	51	445	5.7	3.7	600

Outputs in Frame NDW280M to NDW400LX are available on request.

6 POLE Duty : S3, 6 Starts / Hour, Insulation : Stator cl. F / Rotor cl. F

Standard operating conditions :

Voltage : 415 V ± 10%, Frequency : 50 Hz ± 5%

Ambient / Temperature rise : 45°/75°C Altitude : upto 1000 m

FRAME	CDF 25%					CDF 40%					RV VOLT	GD ² MOTOR	GD ² LOAD	NET Wt kg	
	O/P kW	O/P HP	SPEED RPM	POT %FLT	FLA Amp	RA Amp	O/P kW	O/P HP	SPEED RPM	POT %FLT					FLA Amp
NDW112M	1.5	2	935	3.0	4.3	10	1.5	2	935	3	4.3	10	90	0.11	63
NDW112M	1.8	2.5	920	2.5	5.1	12	1.8	2.5	920	2.5	5.11	12	90	0.11	63
DW132S	4	5.5	885	2.0	9.0	22	3.7	5	893	2.1	8.35	20	110	0.33	88
DW132M	5.5	7.5	908	2.9	13.5	33	5.05	6.75	916	3.1	12.4	30	110	0.4	111
NDW160M	8	10.7	952	2.7	18	29	7	9.4	958	3.1	15.7	25	180	0.46	141
NDW160L	11.5	15.5	923	2.5	22	29	10	13.5	933	2.9	18.9	26	260	0.64	165
NDW180L	17	23	936	2.6	33	44	15	20	943	3.0	29.5	39	230	1.19	235
NDW200L	24.5	33	944	3.0	49	57	23	31	948	3.2	45.7	54	255	2.32	285
NDW225S	30	40	963	2.5	56	68	28.5	38.2	965	2.7	53.3	65	270	3.32	380
NDW225M	40	53.5	961	2.4	76	96	36	48	965	2.6	68.5	86	300	3.71	410
NDW250S	48	64	953	2.3	91	115	44	59	957	2.5	83.1	105	290	4.89	565
NDW250M	54	72.5	974	1.9	102	116	50.2	67.3	976	2.1	94.4	108	300	6.81	600
NDW280S	72	96.5	966	2.4	128	159	63	84.5	971	2.7	112	139	269	8.77	670
NDW280M	90	120	966	2.4	165	143	76	102	971	2.9	139	121	385	10.07	750
NDW315S	123	165	974	2.5	216	183	106	142	977	2.9	186	157	425	17.35	1050
NDW315M	150	200	973	2.8	261	184	134	179	976	3.1	233	164	495	19.46	1130

Outputs in Frame NDW315L to NDW400LX are available on request.

6 POLE Duty : S3, 6 Starts / Hour, Insulation : Stator cl. F / Rotor cl. F

Standard operating conditions :

Voltage : 415 V ± 10%,

Ambient / Temperature rise : 45°/75°C

Frequency : 50 Hz ± 5%

Altitude : upto 1000 m

FRAME	CDF 60%					CDF 100%					RV VOLT	GD ² MOTOR	GD ² LOAD	NET Wt kg	
	O/P kW	O/P HP	SPEED RPM	POT %FLT	FLA Amp	RA Amp	O/P kW	O/P HP	SPEED RPM	POT %FLT					FLA Amp
NDW112M	1.5	2	935	3.2	5	10	1.5	2	935	3.2	5	10	90	0.11	63
DW132S	3.4	4.5	900	3.4	7.8	16	2.6	3.5	925	4.5	6.6	13	120	0.33	88
DW132M	4.5	6	925	3.5	11.2	25	4	5.5	930	4.5	10	19	120	0.4	111
NDW160M	6	8	964	3.6	13	21.7	5.5	7.5	967	3.9	12	19.9	180	0.46	141
NDW160L	8.5	11.5	943	3.3	16	21.7	7.5	10	950	3.8	14	19.2	260	0.64	165
NDW180L	13	17.5	950	3.5	25	34	11	15	958	4	21	28.8	230	1.19	235
NDW200L	18	24	959	4.1	36	41.9	15.5	21	965	4.7	31	36.1	255	2.32	285
NDW225S	24.5	33	970	3.1	46	55.8	20	27	976	3.8	37	45.5	270	3.32	380
NDW225M	31.5	42.2	969	3.1	60	70.5	26	35	974	3.7	49	58.2	300	3.71	410
NDW250S	37	50	964	2.9	70	88.4	30	40	971	3.6	57	71.7	290	4.89	565
NDW250M	43.2	58	979	2.5	81	92.6	35	47	983	3	66	75	300	6.81	600
NDW280S	53.5	72	975	3.2	95	118	45	60	979	3.8	80	99.3	269	8.77	670
NDW280M	67	90	975	3.3	124	107.6	55	75	979	3.9	102	88.3	385	10.07	750
NDW315S	92	123.5	981	3.4	160	135	80	107	983	3.9	141	115	425	17.35	1050
NDW315M	116	156	979	3.6	202	142	100	135	982	4.1	178	122	495	19.46	1130

Outputs in Frame NDW315L to NDW400LX are available on request.

6 POLE Duty : S4 / S5, 150 Starts / Hour, Insulation : Stator cl. F / Rotor cl. F

Standard operating conditions :

Voltage : 415 V ± 10%,

Ambient / Temperature rise : 45°/75°C

Frequency : 50 Hz ± 5%

Altitude : upto 1000 m

FRAME	CDF 25%					CDF 40%					RV VOLT	GD ² MOTOR	GD ² LOAD	NET Wt kg	Cat Ref
	O/P kW	O/P HP	SPEED RPM	POT %FLT	FLA Amp	RA Amp	O/P kW	O/P HP	SPEED RPM	POT %FLT					
NDW112M	1.8	2.41	920	2.5	5	12	1.8	2.41	920	2.5	5.11	12	0.11	63	1.80KZ6SRTOP
DW132S	3	4	913	2.6	7	16	2.6	3.5	925	3	5.87	14	0.33	88	2.60KZ6SRTOP
DW132M	5.05	6.75	916	3.1	12	30	4.5	6.03	925	3.5	11.04	27	0.4	111	4.50KZ6SRTOP
NDW160M	7.5	10	955	2.9	17	27	6.7	9	960	3.2	15	24.2	0.46	141	6.7KZ6SR
NDW160L	10.5	14	930	2.7	20	27	9	12.07	940	3.2	17	23	0.64	165	9KZ6SR
NDW180L	14.5	19.5	945	3.1	29	37	13.2	17.5	950	3.4	26	34	1.19	235	13.2KZ6SR
NDW200L	22.5	29.8	949	3.3	45	52	17.6	23.6	960	4.2	35	41	2.32	285	17.6KZ6SR
NDW225S	28.5	38.2	965	2.7	53	65	24.6	32.99	970	3.1	46	56	3.32	380	24.6KZ6SR
NDW225M	34.5	46.5	966	2.7	66	83	30.5	40.9	970	3.1	58	73	3.71	410	30.5KZ6SR
NDW250S	40	53.5	961	2.7	76	96	36	48.28	965	3	68	86	4.89	565	36KZ6SR
NDW250M	46.5	62	978	2.3	87	100	42	56.32	980	2.5	79	90	6.81	600	42KZ6SR
NDW280S	61.5	82	971	2.8	109	136	53.5	71.74	975	3.2	95	118	8.77	670	53.5KZ6SR
NDW280M	76	102	971	2.9	139	121	66.5	89.18	975	3.3	122	106	10.07	750	66.5KZ6SR
NDW315S	107	144	977	2.9	188	159	93	126	980	3.3	163	138	17.35	1050	
NDW315M	134	179	976	3.1	233	164	116	156	979	3.6	202	142	19.46	1130	

Outputs in Frame NDW315L to NDW400LX are available on request.

6 POLE Duty : S4 / S5, 150 Starts / Hour, Insulation : Stator cl. F / Rotor cl. F

Standard operating conditions :
Voltage : 415 V ± 10%,
Ambient / Temperature rise : 45°/75°C

Frequency : 50 Hz ± 5%
Altitude : upto 1000 m

FRAME	CDF 60%						CDF 100%						RV VOLT	NET Wt kg	Cat Ref
	O/P kW	O/P HP	SPEED RPM	POT %FLT	FLA Amp	RA Amp	O/P kW	O/P HP	SPEED RPM	POT %FLT	FLA Amp	RA Amp			
NDW112M	1.5	2	933	3.0	4.2	10	1.5	2	933	3.0	5	10	90	63	1.80KZ6SRTOP
DW132S	2.2	3	937	3.5	6.2	12	2	2.7	942	3.9	6	11	110	88	2.60KZ6SRTOP
DW132M	4	5.5	933	3.9	10	24	3.5	4.7	942	4.5	9.5	21	110	111	4.50KZ6SRTOP
NDW160M	5.5	7.5	967	3.9	12	20	4.8	6.4	971	4.5	11	17	180	141	6.7KZ6SR
NDW160L	7.5	10	950	3.8	14	19	6.5	8.8	957	4.4	12	17	260	165	9KZ6SR
NDW180L	11	15	958	4.1	21	28	9.5	12.7	964	4.7	18	24	230	235	13.2KZ6SR
NDW200L	15.5	21	965	4.8	31	36	13	17.5	970	5.7	26	30	255	285	17.6KZ6SR
NDW225S	20	27	976	3.8	37	46	17.5	23.5	979	4.4	33	40	270	380	24.6KZ6SR
NDW225M	26	35	974	3.6	49	62	22.5	30	978	4.2	43	54	300	410	30.5KZ6SR
NDW250S	30	40	971	3.6	57	72	26	35	975	4.2	49	62	290	565	36KZ6SR
NDW250M	35	47	983	3.0	66	75	31	41.5	985	3.4	58	66	300	600	42KZ6SR
NDW280S	45	60	979	3.8	80	99	40	53.6	981	4.3	71	88	269	670	53.5KZ6SR
NDW280M	55	75	979	4.0	102	88	49	65.7	982	4.5	91	78	385	750	66.5KZ6SR
NDW315S	80	107	983	3.8	141	119	70	94	985	4.4	127	104	425	1050	
NDW315M	100	135	982	4.2	178	122	88	117.9	984	4.7	160	108	495	1130	

6 POLE Duty : S4 / S5, 300 Starts / Hour, Insulation : Stator cl. F / Rotor cl. F

FRAME	CDF 25%						CDF 40%						RV VOLT	NET Wt kg	Cat Ref
	O/P kW	O/P HP	SPEED RPM	POT %FLT	FLA Amp	RA Amp	O/P kW	O/P HP	SPEED RPM	POT %FLT	FLA Amp	RA Amp			
NDW112M	1.8	2.41	920	2.5	5.11	12	1.5	2	933	3.0	5.0	10	90	63	1.80KZ6SRTOP
DW132S	2.6	3.5	925	3	5.87	14	2.2	3	937	3.5	5.5	12	110	88	2.60KZ6SRTOP
DW132M	4.5	6.03	925	3.5	11.04	27	4	5.5	933	3.9	10.0	24	110	111	4.50KZ6SRTOP
NDW160M	6.7	9	960	3.2	15	24.2	5.5	7.5	967	3.9	13.0	20	180	141	6.7KZ6SR
NDW160L	9	12.07	940	3.2	17	23	7.5	10	950	3.8	15.0	19	260	165	9KZ6SR
NDW180L	13.2	17.5	950	3.4	26	34	11	15	958	4.1	22.0	28	230	235	13.2KZ6SR
NDW200L	17.6	23.6	960	4.2	35	41	15	20	966	4.9	30.0	35	255	285	17.6KZ6SR

6 POLE Duty : S4 / S5, 300 Starts / Hour, Insulation : Stator cl. F / Rotor cl. F

Standard operating conditions :

Voltage : 415 V \pm 10%,

Ambient / Temperature rise : 45°/75°C

Frequency : 50 Hz \pm 5%

Altitude : upto 1000 m

FRAME	CDF 25%					CDF 40%					CDF 60%						
	O/P kW	O/P HP	SPEED RPM	POT %FLT	FLA Amp	RA Amp	O/P kW	O/P HP	SPEED RPM	POT %FLT	FLA Amp	RA Amp	RV VOLT	GD ² MOTOR	GD ² LOAD	NET Wt kg	Cat Ref
NDW225S	24.6	32.99	970	3.1	46	56	20	27	976	3.8	38.0	46	270	3.32	4.8	380	24.6KZ6SR
NDW225M	30.5	40.9	970	3.1	58	73	26	35	974	3.6	50.0	62	300	3.71	5.3	410	30.5KZ6SR
NDW250S	36	48.28	965	3	68	86	30	40	971	3.6	57	72	290	4.89	6.4	565	36KZ6SR
NDW250M	42	56.32	980	2.5	79	90	35	47	983	3.0	66	75	300	6.81	7.5	600	42KZ6SR
NDW280S	53.5	71.74	975	3.2	95	118	45	60	979	3.8	80	99	269	8.77	9	670	53.5KZ6SR
NDW280M	66.5	89.18	975	3.3	122	106	55	75	979	4.0	101	88	385	10.07	10.3	750	66.5KZ6SR
NDW315S	93	126	980	3.3	163	138	80	107	983	3.8	140	119	425	17.35	12.6	1050	
NDW315M	116	156	979	3.6	202	142	100	135	982	4.2	174	122	495	19.46	14.5	1130	

FRAME	CDF 60%					CDF 100%					CDF 100%						
	O/P kW	O/P HP	SPEED RPM	POT %FLT	FLA Amp	RA Amp	O/P kW	O/P HP	SPEED RPM	POT %FLT	FLA Amp	RA Amp	RV VOLT	GD ² MOTOR	GD ² LOAD	NET Wt kg	Cat Ref
NDW112M	1.5	2	933	3.0	5.0	10	-	-	-	-	-	-	90	0.11	0.11	63	1.80KZ6SRTOP
DW132S	2	2.7	942	3.9	5.0	11	-	-	-	-	-	-	110	0.33	0.33	88	2.60KZ6SRTOP
DW132M	3.5	4.7	942	4.5	9.0	21	-	-	-	-	-	-	110	0.4	0.4	111	4.50KZ6SRTOP
NDW160M	5	6.7	970	4.3	12.0	18	-	-	-	-	-	-	180	0.46	1.6	141	6.7KZ6SR
NDW160L	6.5	8.8	957	4.4	13.0	17	-	-	-	-	-	-	260	0.64	2.2	165	9KZ6SR
NDW180L	9.5	12.7	964	4.7	19.0	24	-	-	-	-	-	-	230	1.19	3.1	235	13.2KZ6SR
NDW200L	13	17.5	970	5.7	26.0	30	-	-	-	-	-	-	255	2.32	4	285	17.6KZ6SR
NDW225S	18	24	978	4.2	34.0	41	-	-	-	-	-	-	270	3.32	4.8	380	24.6KZ6SR
NDW225M	22.5	30	978	4.2	43.0	54	-	-	-	-	-	-	300	3.71	5.3	410	30.5KZ6SR
NDW250S	26	35	975	4.2	50.0	62	-	-	-	-	-	-	290	4.89	6.4	565	36KZ6SR
NDW250M	31	41.5	985	3.4	59.0	66	-	-	-	-	-	-	300	6.81	7.5	600	42KZ6SR
NDW280S	41	55	981	4.2	73.0	90	-	-	-	-	-	-	269	8.77	9	670	53.5KZ6SR
NDW280M	51	68	981	4.3	94.0	81	-	-	-	-	-	-	385	10.07	10.3	750	66.5KZ6SR
NDW315S	72	96.5	985	4.3	127.0	107	-	-	-	-	-	-	425	17.35	12.6	1050	
NDW315M	90	120	984	4.6	157.0	110	-	-	-	-	-	-	495	19.46	14.5	1130	

8 POLE Duty : S3, 6 Starts / Hour, Insulation : Stator cl. F / Rotor cl. F

Standard operating conditions :

Voltage : 415 V ± 10%,

Ambient / Temperature rise : 45°/75°C

Frequency : 50 Hz ± 5%

Altitude : upto 1000 m

FRAME	CDF 25%					CDF 40%					CDF 60%					CDF 100%					
	O/P kW	O/P HP	SPEED RPM	POT %FLT	FLA Amp	RA Amp	O/P kW	O/P HP	SPEED RPM	POT %FLT	FLA Amp	RA Amp	O/P kW	O/P HP	SPEED RPM	POT %FLT	FLA Amp	RA Amp	RV VOLT	GD ² MOTOR	GD ² LOAD
DW132S	2.2	3	705	2	6.7	12	1.85	2.5	712	2.8	6	9.8	120	0.33	0.4	88					
DW132M	3.2	4.4	705	2	9.7	18	2.7	3.8	712	2.8	8	15	120	0.4	0.5	111					
NDW160M	5.5	7.5	695	3	16	24	5.2	7	698	2.8	15	23	135	0.46	1.9	141					
NDW160L	8.2	11	692	2	21	29	7.5	10	697	2.7	20	27	170	0.64	2.2	165					
NDW180L	12	16	707	3	28	34	11.5	15.5	709	2.8	27	32	210	1.19	4.5	235					
NDW200L	17.5	23.5	705	3	39	41	15.5	21	710	2.9	34	37	240	2.32	7.11	285					
NDW225S	27	36	727	2	68	74	23	31	731	2.6	58	63	225	3.32	9.7	380					
NDW225M	33	44	726	2	80	74	29	38.8	729	2.3	70	65	270	3.71	11.5	410					
NDW250S	41	55	725	2	95	86	37	50	728	2.0	86	78	290	4.89	13	565					
NDW250M	49.5	66	721	2	108	95	43.2	58	724	2.0	95	83	325	5.43	15.6	600					
NDW280S	62	83	731	2	125	191	56	76	733	2.2	113	173	200	8.77	19.5	670					
NDW280M	79	105	730	2	166	198	70	94	732	2.3	147	176	235	10.07	25.4	750					
NDW315S	93	125	731	3	186	189	87	116.7	732	2.7	174	176	285	17.35	30	1050					
NDW315M	115	155	730	2	239	183	106	142	732	2.6	221	169	360	19.46	36	1130					
NDW315L	150	200	725	3	300	230	125	170	729	3.0	250	192	390	25	43.8	1220					
NDW355LX	185	250	720	2	369	228	160	215	724	2.5	319	197	475*	35	52.5	2260					

FRAME	CDF 60%					CDF 100%					CDF 100%					
	O/P kW	O/P HP	SPEED RPM	POT %FLT	FLA Amp	RA Amp	O/P kW	O/P HP	SPEED RPM	POT %FLT	FLA Amp	RA Amp	RV VOLT	GD ² MOTOR	GD ² LOAD	NET Wt kg
DW132S	1.7	2.3	715	3	5.2	9	1.5	2	719	3.4	5	7.9	120	0.33	0.4	88
DW132M	2.5	3.4	715	3	7.6	14	2.2	3	719	3.4	7	12	120	0.4	0.5	111
NDW160M	4.5	6	705	3	13	20	4.1	5.5	709	3.5	12	18	135	0.46	1.9	141
NDW160L	6.7	9	703	3	18	24	5.5	7.5	711	3.7	14	20	170	0.64	2.2	165
NDW180L	9.3	12.5	717	4	22	26	7.5	10	723	4.3	18	21	210	1.19	4.5	235

* Note : Rotor Voltage (RV) value mentioned above is for wire wound rotors only. For strip wound rotors, RV value will be different. Please refer to works.

8 POLE Duty : S3, 6 Starts / Hour, Insulation : Stator cl. F / Rotor cl. F

Standard operating conditions :
Voltage : 415 V ± 10%,
Ambient / Temperature rise : 45°/75°C

Frequency : 50 Hz ± 5%
Altitude : upto 1000 m

FRAME	CDF 60%					CDF 100%					NET Wt kg					
	O/P kW	O/P HP	SPEED RPM	POT %FLT	FLA Amp	RA Amp	O/P kW	O/P HP	SPEED RPM	POT %FLT		FLA Amp	RA Amp	RV VOLT	GD ² MOTOR	GD ² LOAD
NDW200L	13.5	18	715	3	30	32	11.5	15.5	720	3.9	26	27	240	2.32	7.11	285
NDW225S	20.2	27.2	733	3	51	55	16.7	22.4	736	3.6	42	45	225	3.32	9.7	380
NDW225M	24.5	33	732	3	59	55	20	27	735	3.4	48	45	270	3.71	11.5	410
NDW250S	31	41.5	731	2	72	65	26	35	734	2.9	60	54	290	4.89	13	565
NDW250M	37	50	728	2	81	71	30	40	732	2.8	66	58	325	5.43	15.6	600
NDW280S	47	62.4	735	3	95	145	40	53.5	738	3.1	81	123	200	8.77	19.5	670
NDW280M	59	79	735	3	124	148	50	67	737	3.2	105	125	235	10.07	25.4	750
NDW315S	70	94	735	3	140	142	60	80	738	4.0	120	122	285	17.35	30	1050
NDW315M	88	118	735	3	183	140	75	100	737	3.7	156	119	360	19.46	36	1130
NDW315L	110	150	732	3	220	169	95	127	734	3.9	190	146	390	25	43.8	1220
NDW355LX	140	188	727	3	279	172	120	161	731	3.3	239	148	475*	35	52.5	2260

8 POLE Duty : S4 / S5, 150 Starts / Hour, Insulation : Stator cl. F / Rotor cl. F

FRAME	CDF 25%					CDF 40%					NET Wt kg					
	O/P kW	O/P HP	SPEED RPM	POT %FLT	FLA Amp	RA Amp	O/P kW	O/P HP	SPEED RPM	POT %FLT		FLA Amp	RA Amp	RV VOLT	GD ² MOTOR	GD ² LOAD
DW132S	1.85	2.5	712	2.8	5.7	10	1.7	2.3	715	3	5.2	9	120	0.33	0.4	88
DW132M	2.7	3.8	712	2.8	8.2	15	2.5	3.4	715	3	7.6	14	120	0.4	0.5	111
NDW160M	5.2	7	698	2.8	15	23	4.8	6.4	702	3	14	21	135	0.46	1.9	141
NDW160L	7.5	10	697	2.7	20	27	6.7	9	703	3	17.5	24	170	0.64	2.2	165
NDW180L	11.5	15.5	709	2.8	27	32	9.3	12.5	717	3.5	22	26	210	1.19	4.5	235
NDW200L	15.5	21	710	2.9	34	37	13.5	18	715	3.3	30	32	240	2.32	7.11	285
NDW225S	23	31	731	2.6	58	63	20.2	27.2	733	3	50.5	55	225	3.32	9.7	380
NDW225M	29	38.8	729	2.3	70	65	26	35	731	2.6	63	58	270	3.71	11.5	410
NDW250S	37	50	728	2.0	86	78	31.5	42.2	731	2.4	73	66	290	4.89	13	565

* Note : Rotor Voltage (RV) value mentioned above is for wire wound rotors only. For strip wound rotors, RV value will be different. Please refer to works.

8 POLE Duty : S4 / S5, 150 Starts / Hour, Insulation : Stator cl. F / Rotor cl. F

Standard operating conditions :

Voltage : 415 V ± 10%, Frequency : 50 Hz ± 5%

Ambient / Temperature rise : 45°/75°C

Altitude : upto 1000 m

FRAME	CDF 25%					CDF 40%					CDF 60%			NET Wt kg		
	O/P kW	O/P HP	SPEED RPM	POT %FLT	FLA Amp	RA Amp	O/P kW	O/P HP	SPEED RPM	POT %FLT	FLA Amp	RA Amp	RV VOLT		GD ² MOTOR	GD ² LOAD
NDW250MX	43.2	58	724	2.0	95	83	37	50	728	2.3	81	71	325	5.43	15.6	600
NDW280S	56	76	733	2.2	113	173	48	64	735	2.6	97	148	200	8.77	19.5	670
NDW280M	70	94	732	2.3	147	176	59	79	735	2.7	124	148	235	10.07	25.4	750
NDW315S	87	116.7	732	2.7	174	176	72	26.5	735	3.3	144	146	285	17.35	30	1050
NDW315M	106	142	732	2.6	221	169	86	115.3	735	3.2	179	137	360	19.46	36	1130
NDW315L	120	161	729	3.1	240	184	105	141	732	3.5	210	161	390	25	43.8	1220
NDW355LX	150	200	725	2.7	315	197	132	177	728	3.1	277	173	475*	35	52.5	2260

FRAME	CDF 60%					CDF 100%					CDF 150%			NET Wt kg		
	O/P kW	O/P HP	SPEED RPM	POT %FLT	FLA Amp	RA Amp	O/P kW	O/P HP	SPEED RPM	POT %FLT	FLA Amp	RA Amp	RV VOLT		GD ² MOTOR	GD ² LOAD
DW132S	1.5	2	719	3.4	4.59	8	1.3	1.8	706	3.8	4.5	7	120	0.33	0.4	88
DW132M	2.2	3	719	3.4	6.69	12	2.0	2.7	707	3.7	6.5	11	120	0.4	0.5	111
NDW160M	4.1	5.5	709	3.5	12	18	3.7	5	688	3.9	11	16	135	0.46	1.9	141
NDW160L	5.3	7.3	713	3.8	14	19	4.8	6.4	684	4.2	12	17	170	0.64	2.2	165
NDW180L	7.5	10	723	4.3	18	21	6.7	9	704	4.8	16	19	210	1.19	4.5	235
NDW200L	11.5	15.5	720	3.9	26	27	10.1	13.5	703	4.4	22	24	240	2.32	7.11	285
NDW225S	16.7	22.4	736	3.6	42	45	14.5	19.5	726	4.2	36	40	225	3.32	9.7	380
NDW225M	20	27	735	3.4	48	45	17.8	23.9	722	3.8	43	40	270	3.71	11.5	410
NDW250S	26	35	734	2.9	60	54	22.0	29.5	723	3.4	51	46	290	4.89	13	565
NDW250M	30	40	732	2.8	66	58	26.1	35	719	3.3	57	50	325	5.43	15.6	600
NDW280S	40	53.5	738	3.1	81	123	34.3	46	729	3.6	69	106	200*	8.77	19.5	670
NDW280M	50	67	737	3.2	105	125	41.8	56	729	3.8	88	105	235	10.07	25.4	750
NDW315S	60	80	738	4.0	120	122	52.2	70	729	4.5	104	106	285	17.35	30	1050
NDW315M	75	100	737	3.7	156	119	64.2	86	730	4.3	134	102	360	19.46	36	1130
NDW315LX	95	127	734	3.9	190	146	-	-	-	-	-	-	390	25	43.8	1220
NDW355LX	120	161	730	3.4	252	157	-	-	-	-	-	-	475*	35	52.5	2260

* Note : Rotor Voltage (RV) value mentioned above is for wire wound rotors only. For strip wound rotors, RV value will be different. Please refer to works.

8 POLE Duty : S4 / S5, 300 Starts / Hour, Insulation : Stator cl. F / Rotor cl. F

Standard operating conditions :

Voltage : 415 V ± 10%,

Ambient / Temperature rise : 45°/75°C

Frequency : 50 Hz ± 5%

Altitude : upto 1000 m

FRAME	CDF 25%					CDF 40%					RV VOLT	GD ² MOTOR	GD ² LOAD	NET Wt kg		
	O/P kW	O/P HP	SPEED RPM	POT %FLT	FLA Amp	RA Amp	O/P kW	O/P HP	SPEED RPM	POT %FLT					FLA Amp	RA Amp
DW132S	1.7	2.3	715	3	5.2	9	1.5	2	719	3.4	5	8	120	0.33	0.4	88
DW132M	2.5	3.4	715	3	7.6	14	2.2	3	719	3.4	7	12	120	0.4	0.5	111
NDW160M	4.8	6.4	702	3	14	21	4.1	5.5	709	3.5	12	18	135	0.46	1.9	141
NDW160L	6.7	9	703	3	17.5	24	5.3	7.3	713	3.8	14	19	170	0.64	2.2	165
NDW180L	9.3	12.5	717	3.5	22	26	7.5	10	723	4.3	18	21	210	1.19	4.5	235
NDW200L	13.5	18	715	3.3	30	32	11.5	15.5	720	3.9	26	27	240	2.32	7.11	285
NDW225S	20.2	27.2	733	3	50.5	55	16.7	22.4	736	3.6	42	45	225	3.32	9.7	380
NDW225M	26	35	731	2.6	63	58	20	27	735	3.38	48	45	270	3.71	11.5	410
NDW250S	31.5	42.2	731	2.4	73	66	26	35	734	2.9	60	54	290	4.89	13	565
NDW250M	37	50	728	2.3	81	71	30	40	732	2.8	66	58	325	5.43	15.6	600
NDW280S	48	64	735	2.6	97	148	40	53.5	738	3.1	81	123	200	8.77	19.5	670
NDW280M	59	79	735	2.7	124	148	50	67	737	3.2	105	125	235	10.07	25.4	750
NDW315S	72	26.5	735	3.3	144	146	60	80	738	3.9	120	122	285	17.35	30	1050
NDW315M	86	115.3	735	3.2	179	137	75	100	737	3.7	156	119	360	19.46	36	1130
NDW315LX	105	141	732	3.5	210	161	95	127	734	3.9	190	146	390	25	43.8	1220
NDW355LX	132	177	728	3.1	277	173	115	154	731	3.5	253	155	475*	35	52.5	2260

* Note : Rotor Voltage (RV) value mentioned above is for wire wound rotors only. For strip wound rotors, RV value will be different. Please refer to works.

8 POLE Duty : S4 / S5, 300 Starts / Hour, Insulation : Stator cl. F / Rotor cl. F

Standard operating conditions :

Voltage : 415 V ± 10%,

Ambient / Temperature rise : 45°/75°C

Frequency : 50 Hz ± 5%

Altitude : upto 1000 m

FRAME	CDF 60%					CDF 100%					RA Amp	FLA Amp	GD ² MOTOR	GD ² LOAD	NET Wt kg
	O/P kW	O/P HP	SPEED RPM	POT %FLT	RA Amp	O/P kW	O/P HP	SPEED RPM	POT %FLT	FLA Amp					
DW132S	1.3	1.8	723	3.9	4.3	7	-	-	-	-	-	120	0.33	0.4	88
DW132M	2	2.7	722	3.7	6.6	11	-	-	-	-	-	120	0.4	0.5	111
NDW160M	3.7	5	713	3.9	12	17	-	-	-	-	-	135	0.46	1.9	141
NDW160L	4.8	6.4	716	4.1	14	17	-	-	-	-	-	170	0.64	2.2	165
NDW180L	6.7	9	726	4.9	18.5	18	-	-	-	-	-	210	1.19	4.5	235
NDW200L	10	13.5	724	4.4	25	26	-	-	-	-	-	240	2.32	7.11	285
NDW225S	15	20	737	4	46.5	41	-	-	-	-	-	225	3.32	9.7	380
NDW225M	19	25.5	736	3.8	54	42	-	-	-	-	-	270	3.71	11.5	410
NDW250S	22	29.5	737	3.4	58	46	-	-	-	-	-	290	4.89	13	565
NDW250M	26	35	735	3.3	61	48	-	-	-	-	-	325	5.43	15.6	600
NDW280S	35	47	739	3.6	78	108	-	-	-	-	-	200	8.77	19.5	670
NDW280M	43	57.6	739	3.8	100	107	-	-	-	-	-	235	10.07	25.4	750
NDW315S	53	71	739	4.5	117	102	-	-	-	-	-	285	17.35	30	1050
NDW315M	64	86	739	4.3	151	101	-	-	-	-	-	360	19.46	36	1130
NDW315LX	82	110	736	4.5	164	126	-	-	-	-	-	390	25	43.8	1220
NDW355LX	105	141	733	3.9	239	147	-	-	-	-	-	475*	35	52.5	2260

* Note : Rotor Voltage (RV) value mentioned above is for wire wound rotors only. For strip wound rotors, RV value will be different. Please refer to works.

10 POLE Duty : S3, 6 Starts / Hour CDF 25% & 40%, Insulation : Stator cl. F / Rotor cl. F

Standard operating conditions :

Voltage : 415 V ± 10%,

Ambient / Temperature rise : 45°/75°C

Frequency : 50 Hz ± 5%

Altitude : upto 1000 m

FRAME	CDF 25%					CDF 40%					GD ²		NET Wt			
	O/P kW	O/P HP	Speed RPM	POT %FLT	FLC Amp	RA Amp	O/P kW	O/P HP	Speed RPM	POT %FLT	FLC Amp	RA Amp	RV Volt	Motor kg.m.sq.	GD ² Load kg.m.sq.	Kg.
NDW225S	18	24	584	2.1	52	45	16.7	22.4	585	2.3	48	41	230	3.32	9.9	380
NDW225M	23.5	31.5	581	1.9	66	46	22	29.5	582	2	62	43	285	3.71	11.1	410
NDW250M	29	38	582	2.7	77	67	25	33.5	584	3	66	59	260	5.43	17.9	600
NDW280S	55	75	579	1.6	141	211	46	61.5	584	2	118	165	165	8.77	23.3	670
NDW280M	65	87	578	1.8	165	183	57	76.4	582	2	145	155	215	10.07	31	750
NDW315S	78	104.5	580	2	186	220	67	90	583	2.3	160	185	210	17.35	37.4	1050
NDW315M	87	116.7	583	2.1	204	152	75	100	584	2.5	176	144	295	19.46	46	1130
NDW315L	120	161	590	2.3	287	234	100	134	591	2.8	239	195	325	25	57	1220
NDW355LX	150	200	588	2.4	353	256	125	168	590	2.8	294	210	385*	35	71	2260

10 POLE Duty : S3, 6 Starts / Hour CDF 60% & 100%, Insulation : Stator cl. F / Rotor cl. F

FRAME	CDF 60%					CDF 100%					GD ²		NET Wt			
	O/P kW	O/P HP	Speed RPM	POT %FLT	FLC Amp	RA Amp	O/P kW	O/P HP	Speed RPM	POT %FLT	FLC Amp	RA Amp	RV Volt	Motor kg.m.sq.	GD ² Load kg.m.sq.	Kg.
NDW225S	15	20	587	2.5	43	37	11.5	15.5	590	3.3	36	29	230	3.32	9.9	380
NDW225M	19.5	26	584	2.5	55	36	15	20	588	3.0	47	28	285	3.71	11.1	410
NDW250M	21.5	29	586	3.4	57	49	18	24	588	4.3	52	41	260	5.43	17.9	600
NDW280S	38	51	587	2.4	98	133	32	43	589	2.9	90	112	165	8.77	23.3	670
NDW280M	46.5	62	585	2.5	118	122	40	53.5	587	2.9	112	105	215	10.07	31	750
NDW315S	56	76	586	2.3	133	157	50	67	587	3.0	131	138	210	17.35	37.4	1050
NDW315M	65	87	586	2.8	152	124	55	75	588	3.4	142	107	295	19.46	46	1130
NDW315L	86	115	592	3.2	205	166	73	98	593	3.6	192	141	325	25	57	1220
NDW355LX	108	145	591	3.5	254	178	92	123	593	4.0	238	151	385*	35	71	2260

* Note : Rotor Voltage (RV) value mentioned above is for wire wound rotors only. For strip wound rotors, RV value will be different. Please refer to works.

10 POLE Duty : S4 / S5, 150 Starts / Hour CDF 25% & 40%, Insulation : Stator cl. F / Rotor cl. F

Standard operating conditions :

Voltage : 415 V ± 10%,

Ambient / Temperature rise : 45°/75°C

Frequency : 50 Hz ± 5%

Altitude : upto 1000 m

FRAME	CDF 25%					CDF 40%					RV Volt	GD ² Motor kg.m.sq.	GD ² Load kg.m.sq.	NET Wt Kg.		
	O/P kW	O/P HP	Speed RPM	POT %FLT	FLC Amp	RA Amp	O/P kW	O/P HP	Speed RPM	POT %FLT					FLC Amp	RA Amp
NDW225S	16.5	22	573	2.3	47	41	15	20	575	2.5	43	37	230	3.32	9.9	380
NDW225M	22	30	570	2.0	62	42	18.5	25	575	2.4	52	35	285	3.71	11.1	410
NDW250MX	26	35	570	3.0	69	60	22	30	575	3.5	58	51	260	5.43	17.9	600
NDW280S	46	61.5	576	2.0	118	161	38	51	580	2.4	98	133	215	8.77	23.3	670
NDW280M	57	76.4	575	2.0	145	150	46.5	62	580	2.5	118	122	215	10.07	31	750
NDW315S	70	94	583	2.1	167	193	60	80	585	2.5	143	165	210	17.35	37.4	1050
NDW315M	77	103	584	2.4	180	146	66	88	586	2.8	155	125	295	19.46	46	1130
NDW315L	93	126	589	2.9	222	183	83	113	590	3.2	198	163	325	25	57	1220
NDW355LX	117	159	583	3.1	275	196	105	143	585	3.5	247	176	385*	35	71	2260

10 POLE Duty : S4 / S5, 150 Starts / Hour CDF 60% & 100%, Insulation : Stator cl. F / Rotor cl. F

FRAME	CDF 60%					CDF 100%					RV Volt	GD ² Motor kg.m.sq.	GD ² Load kg.m.sq.	NET Wt Kg.		
	O/P kW	O/P HP	Speed RPM	POT %FLT	FLC Amp	RA Amp	O/P kW	O/P HP	Speed RPM	POT %FLT					FLC Amp	RA Amp
NDW225S	11.5	15.5	581	3	36	28	10	13.5	583	4	31	25	230	3.32	9.9	380
NDW225M	15	20	580	3	47	28	13.2	17.7	582	3	41	25	285	3.71	11.1	410
NDW250M	18	24	580	4	52	42	15.5	21	582	5	45	36	260	5.43	17.9	600
NDW280S	32	43	583	3	90	112	28	37.5	585	3	79	98	215	8.77	23.3	670
NDW280M	40	53.5	583	3	112	105	34	46	585	3	95	89	215	10.07	31	750
NDW315S	50	67	588	3	131	138	42	56	590	4	110	116	210	17.35	37.4	1050
NDW315M	55	75	588	3	142	104	47	62.5	590	4	121	89	295	19.46	46	1130
NDW315L	73	99	591	4	192	143	62	84	593	4	163	122	325	25	57	1220
NDW355LX	92	125	587	4	238	154	78	106	589	5	202	131	385*	35	71	2260

* Note : Rotor Voltage (RV) value mentioned above is for wire wound rotors only. For strip wound rotors, RV value will be different. Please refer to works.

10 POLE Duty : S4 / S5, 300 starts/Hour CDF 25% & 40%, Insulation : Stator cl. F / Rotor cl. F

Standard operating conditions :

Voltage : 415 V ± 10%,

Ambient / Temperature rise : 45°/75°C

Frequency : 50 Hz ± 5%

Altitude : upto 1000 m

FRAME	CDF 25%					CDF 40%					GD ²		NET Wt			
	O/P kW	O/P HP	Speed RPM	POT %FLT	FLC Amp	RA Amp	O/P kW	O/P HP	Speed RPM	POT %FLT	FLC Amp	RA Amp	RV Volt	Motor kg.m.sq.	GD ² Load kg.m.sq.	Kg.
NDW225S	15	20	575	3	43	37	11.5	15.5	581	3	36	28	230	3.32	9.9	380
NDW225M	20	27	573	3	57	38	15	20	580	3	47	28	285	3.71	11.1	410
NDW250M	23	31	574	4	61	53	18	24	580	4	52	42	260	5.43	17.9	600
NDW280S	42	56	578	3	108	147	32	43	583	3	90	112	165	8.77	23.3	670
NDW280M	50	67	578	3	127	131	40	53.5	583	3	112	105	215	10.07	31	750
NDW315S	62	83	585	3	148	171	50	67	588	3	131	138	210	17.35	37.4	1050
NDW315M	70	94	585	3	164	133	55	75	588	3	142	104	295	19.46	46	1130
NDW315L	83	113	590	3	198	163	70	95	592	4	184	137	325	25	57	1220
NDW355LX	105	143	585	4	247	176	88	119	587	4	228	148	385*	35	71	2260

10 POLE Duty : S4 / S5, 300 Starts / Hour CDF 60% & 100%, Insulation : Stator cl. F / Rotor cl. F

FRAME	CDF 60%					CDF 100%					GD ²		NET Wt			
	O/P kW	O/P HP	Speed RPM	POT %FLT	FLC Amp	RA Amp	O/P kW	O/P HP	Speed RPM	POT %FLT	FLC Amp	RA Amp	RV Volt	Motor kg.m.sq.	GD ² Load kg.m.sq.	Kg.
NDW225S	10	13.5	591	4	31	25	-	-	-	-	-	-	230	3.32	9.9	380
NDW225M	13.5	18	590	3	42	26	-	-	-	-	-	-	285	3.71	11.1	410
NDW250M	16	21.5	588	5	47	37	-	-	-	-	-	-	260	5.43	17.9	600
NDW280S	28	37.5	591	3	79	98	-	-	-	-	-	-	165	8.77	23.3	670
NDW280M	34	46	591	3	95	89	-	-	-	-	-	-	215	10.07	31	750
NDW315S	44	59	590	3	115	121	-	-	-	-	-	-	210	17.35	37.4	1050
NDW315M	50.5	67.7	590	4	130	96	-	-	-	-	-	-	295	19.46	46	1130
NDW315L	62	84	596	4	163	122	-	-	-	-	-	-	325	25	57	1220
NDW355LX	78	106	596	5	202	131	-	-	-	-	-	-	385*	35	71	2260

* Note : Rotor Voltage (RV) value mentioned above is for wire wound rotors only. For strip wound rotors, RV value will be different. Please refer to works.

4 POLE PERFORMANCE DATA FOR TEFC SQUIRREL CAGE CRANE DUTY INDUCTION MOTORS (DOL)

Standard operating conditions :

Voltage : 415 V ± 10%,

Ambient / Temperature rise : 45°/75°C

Frequency : 50 Hz ± 5%

Altitude : upto 1000 m

4 POLE FRAME	Speed RPM	S4 & S5 DUTY 90 STARTS / HR						S4 & S5 DUTY 150 STARTS / HR						S4 & S5 DUTY 300 STARTS/HR						Starting Current Ratio	Rotor GD ² kg-m ²	Net Weight kg	Catalogue Reference	
		25% or 40% CDF		60% CDF		100% CDF		25% or 40% CDF		60% CDF		100% CDF		40% CDF		60% CDF		100% CDF						
		KW	FLC	KW	FLC	KW	FLC	KW	FLC	KW	FLC	KW	FLC	KW	FLC	KW	FLC	KW	FLC					
GD63	1330	0.25	1.12	0.25	1.12	0.25	1.12	0.25	1.12	0.25	1.12	0.25	1.12	0.25	1.12	0.25	1.12	0.25	1.12	5	2.75	0.003	5.6	0.25KG4 E
GD71	1350	0.55	1.84	0.55	1.84	0.55	1.84	0.55	1.84	0.55	1.84	0.55	1.84	0.55	1.84	0.55	1.84	0.55	1.84	5	2.5	0.004	7	0.55KG4 E
ND80	1410	0.75	2.1	0.75	2.1	0.75	2.1	0.75	2.1	0.75	2.1	0.75	2.1	0.75	2.1	0.75	2.1	0.75	2.1	5	2.75	0.007	17	
ND80S	1395	1.1	3.2	1.1	3.2	1.1	3.2	1.1	3.2	1.1	3.2	1.1	3.2	1.1	3.2	1.1	3.2	0.9	2.6	5	2.75	0.007	17	
ND90S	1390	1.5	3.8	1.5	3.8	1.5	3.8	1.5	3.8	1.5	3.8	1.5	3.8	1.5	3.8	1.5	3.8	1.5	3.8	5	2.75	0.014	22	1.50KZ4 ER
ND90L	1400	2.2	5.3	2.2	5.3	2.2	5.3	2.2	5.3	2.2	5.3	2.2	5.3	2.2	5.3	2.2	5.3	2.2	5.3	5.5	2.75	0.019	25	2.20KZ4 E
ND100L	1425	3.75	8	3.75	8	3.75	8	3.75	8	3.75	8	3.75	8	3.75	8	3.75	8	3.2	6.85	6	2.75	0.03	32	3.75KZ4 ERR1
ND112M	1430	5.5	11.5	5.5	11.5	5.5	11.5	5.5	11.5	5.5	11.5	5.5	11.5	5.5	11.5	5.5	11.5	5.3	11.1	6	2.75	0.052	45	5.50KZ4 E
ND132S	1410	7.5	15	7.5	15	7.5	15	7.5	15	7.5	15	7.5	15	7.5	15	7.5	15	6.5	13	6	2.75	0.131	68	7.50KZ4 ER
ND132M	1440	9.3	18.5	9.3	18.5	9.3	18.5	9.3	18.5	9.3	18.5	9.3	18.5	9.3	18.5	9.3	18.5	8.5	17	6	2.75	0.161	79	9.30KZ4 ER
ND160M	1460	11	21	11	21	11	21	11	21	11	21	11	21	11	21	11	21	9.3	17.7	5	2.25	0.31	125	11KZ4 E
ND160M	1460	15	30	15	30	15	30	15	30	15	30	15	30	15	30	15	30	11	21	5	2.25	0.31	125	
ND160L	1460	18.5	34.5	18.5	34.5	18.5	34.5	18.5	34.5	18.5	34.5	18.5	34.5	18.5	34.5	18.5	34.5	15	28	5	2.5	0.47	146	
ND180M	1475	22.5	42	22.5	42	22.5	42	22.5	42	22.5	42	22.5	42	22.5	42	22.5	42	-	-	5	2.5	0.81	170	
ND180L	1475	27	51	27	51	27	51	27	51	27	51	27	51	27	51	27	51	-	-	5	2.5	0.95	205	
ND200L	1475	37	65	37	65	37	65	37	65	37	65	37	65	37	65	37	65	-	-	6	2.75	1.62	270	

6 POLE : PERFORMANCE DATA FOR TEFC SQUIRREL CAGE CRANE DUTY INDUCTION MOTORS (DOL)

Standard operating conditions :

Voltage : 415 V ± 10%,

Ambient / Temperature rise : 45°/75°C

Frequency : 50 Hz ± 5%

Altitude : upto 1000 m

6 POLE	Speed RPM	S4 & S5 DUTY						S4 & S5 DUTY						S4 & S5 DUTY						Starting Current Ratio	Rotor GD ² kg-m ²	Net Weight kg	Catalogue Reference			
		25% or 40% CDF		60% CDF		100% CDF		25% or 40% CDF		60% CDF		100% CDF		40% CDF		60% CDF		100% CDF								
		KW	FLC	KW	FLC	KW	FLC	KW	FLC	KW	FLC	KW	FLC	KW	FLC	KW	FLC	KW	FLC					KW	FLC	
GD63	865	0.17	0.55	0.17	0.55	0.17	0.55	0.17	0.55	0.17	0.55	0.17	0.55	0.17	0.55	0.17	0.55	0.17	0.55	0.17	0.55	4	2.25	0.004	7	0.37KS6_ER
GD71	880	0.37	1.9	0.37	1.9	0.37	1.9	0.37	1.9	0.37	1.9	0.37	1.9	0.37	1.9	0.37	1.9	0.37	1.9	0.37	1.9	4	2.5	0.011	17	
ND80	890	0.55	1.7	0.55	1.7	0.55	1.7	0.55	1.7	0.55	1.7	0.55	1.7	0.55	1.7	0.55	1.7	0.55	1.7	0.55	1.7	4	2.5	0.011	17	
ND80	890	0.75	2.6	0.75	2.6	0.75	2.6	0.75	2.6	0.75	2.6	0.75	2.6	0.75	2.6	0.75	2.6	0.75	2.6	0.75	2.6	4	2.5	0.011	17	
ND90S	935	1.1	3.8	1.1	3.8	1.1	3.8	1.1	3.8	1.1	3.8	1.1	3.8	1.1	3.8	1.1	3.8	1.1	3.8	1.1	3.8	5	2.5	0.015	22	1.10KZ6_ER
ND90L	880	1.5	5	1.5	5	1.5	5	1.5	5	1.5	5	1.5	5	1.5	5	1.5	5	1.5	5	1.5	5	5	2.5	0.021	25	1.50KZ6_ER
ND100L	900	2.2	6.5	2.2	6.5	2.2	6.5	2.2	6.5	2.2	6.5	2.2	6.5	2.2	6.5	2.2	6.5	2.2	6.5	2.2	6.5	5	2.5	0.03	32	2.20KZ6_ER
ND112M	910	3.7	10.5	3.7	10.5	3.7	10.5	3.7	10.5	3.7	10.5	3.7	10.5	3.7	10.5	3.7	10.5	3.7	10.5	3.7	10.5	5	2.5	0.048	45	3.70KZ6_ER
ND132S	925	5.5	12	5.5	12	5.5	12	5.5	12	5.5	12	5.5	12	5.5	12	5.5	12	5.5	12	5.5	12	5	2.5	0.174	68	5.50KZ6_ER
ND132M	920	7.5	17	7.5	17	7.5	17	7	16	5.5	12	7.5	17	7	16	5.5	12	7.5	17	7.5	17	5.5	2.5	0.214	79	7.50KZ6_ER
ND160M	970	9.3	19	9.3	19	9.3	19	9.3	19	9.3	19	9.3	19	9.3	19	9.3	19	9.3	19	9.3	19	5.5	2.5	0.46	120	9.3KZ6_E
ND160L	970	11	22	11	22	11	22	11	22	11	22	11	22	11	22	11	22	11	22	11	22	5.5	2.5	0.59	148	11KZ6_E
ND160L	970	15	27	15	27	15	27	15	27	15	27	15	27	15	27	15	27	15	27	15	27	5.5	2.5	0.59	148	
ND180L	975	18.5	33	18.5	33	18.5	33	18.5	33	18.5	33	18.5	33	18.5	33	18.5	33	18.5	33	18.5	33	6	3	1.16	205	

8 POLE : PERFORMANCE DATA FOR TEFC SQUIRREL CAGE CRANE DUTY INDUCTION MOTORS (DOL)

Standard operating conditions :

Voltage : 415 V ± 10%,

Ambient / Temperature rise : 45°/75°C

Frequency : 50 Hz ± 5%

Altitude : upto 1000 m

8 POLE FRAME	Speed RPM	S4 & S5 DUTY 90 STARTS / HR						S4 & S5 DUTY 150 STARTS / HR						S4 & S5 DUTY 300 STARTS/HR						Starting Current Ratio	Pull out Torque Ratio	Rotor GD ² kg-m ²	Net Weight kg			
		25% or 40% CDF		FLC	100% CDF		FLC	25% or 40% CDF		FLC	60% CDF		FLC	40% CDF		FLC	60% CDF		FLC					100% CDF		FLC
		KW	FLC		KW	FLC		KW	FLC		KW	FLC		KW	FLC		KW	FLC						KW	FLC	
ND90S	680	0.55	2.1	0.47	1.8	0.35	1.3	0.55	2.1	0.47	1.8	0.35	1.3	0.55	2.1	0.47	1.8	0.35	1.3	0.35	1.3	4	2.25	0.015	22	
ND90L	680	0.75	2.6	0.64	2.2	0.48	1.65	0.75	2.6	0.64	2.2	0.48	1.65	0.75	2.6	0.63	2.2	0.47	1.65	0.47	1.65	4	2.25	0.021	22	
ND100L	700	1.1	3.3	1.1	3.3	0.92	2.75	1.1	3.3	1.1	3.3	0.92	2.75	1.1	3.3	1.1	3.3	0.91	2.75	0.91	2.75	4	2.25	0.03	32	
ND100L	700	1.5	5	1.5	5	1.3	4.3	1.5	5	1.5	5	1.3	4.3	1.5	5	1.5	5	1.3	4.3	1.3	4.3	4	2.25	0.03	32	
ND112M	700	2.2	6	2.2	6	2.2	6	2.2	6	2.2	6	2.2	6	2.2	6	2.2	6	2.2	6	2.2	6	4	2.25	0.057	45	
ND132S	710	3.7	9	3.2	7.8	2.4	5.8	3.7	9	3.2	7.8	2.4	5.8	3.7	9	3.1	7.5	2.3	5.7	2.3	5.7	4.5	2.25	0.174	68	
ND160M	710	5.5	12	4.45	9.7	3.35	7.3	5.5	12	4.4	9.7	3.3	7.3	5.5	12	4.25	9.3	3.25	7.1	3.25	7.1	5	2.25	0.46	120	
ND160M	710	7.5	17	6.6	15	5	11.3	7.5	17	6.5	14.9	4.9	11.3	7.5	17	6.3	14.3	4.75	10.8	4.75	10.8	5	2.25	0.46	120	
ND160L	710	9.3	21	9.3	21	8.5	19.2	9.3	21	9.3	21	8.35	19	9.3	21	9.3	21	8.15	19	8.15	19	5	2.25	0.64	146	
ND180M	710	12	26	9.5	21	8.5	18.4	10	21.6	8.2	17.7	-	-	8.5	18.4	7.1	15.4	-	-	-	-	5	2.25	0.99	174	
ND180L	710	14	31	11.5	25	10	22	12	28	9.5	22	-	-	10	22	8.5	22	-	-	-	-	5	2.25	1.16	205	

4 POLE : PERFORMANCE DATA FOR TEFC SQUIRREL CAGE CRANE DUTY INVERTER DRIVEN INDUCTION MOTORS

Standard operating conditions :

Voltage : 415 V ± 10%

Frequency : 50 Hz ± 5%

Ambient : 45°C

Altitude : upto 1000 m

Switching frequency : 3-6 khz

Voltage rise time : > 0.1 micro sec

THD : < 2.5%

S4 DUTY (4 POLE)

FRAME SIZE	90starts			150starts			300starts			Starting Current Ratio	Pull out Torque Ratio	Rotor GD ² kg-m ²	Net Wt kg				
	25 & 40% CDF KW	FLA	60% CDF KW	25 & 40% CDF KW	FLA	60% CDF KW	25 & 40% CDF KW	FLA	60% CDF KW					FLA			
ND80	1.1	2.9	1.1	2.8	2.5	0.9	2.4	2.4	0.9	2.4	2.4	0.8	2.3	5.5	2.75	0.007	17
ND90S	1.5	3.8	1.4	3.7	3.3	1.2	3.1	3.1	1.2	3.1	3.1	1.2	3.0	5.5	2.75	0.014	22
ND90L	2.2	5.3	2.1	5.1	4.6	1.8	4.4	4.4	1.8	4.3	4.3	1.7	4.1	6	2.75	0.019	25
ND100L	3.6	8.3	3.4	7.9	7.1	2.9	6.8	6.8	2.9	6.7	6.7	2.8	6.4	6.5	2.75	0.03	32
ND112M	5.5	12.0	5.2	11.5	10.3	4.5	9.8	9.8	4.4	9.7	9.7	4.2	9.2	6.5	2.75	0.052	45
ND132S	7.4	15.4	7.1	14.7	13.2	6.1	12.6	12.6	6.0	12.5	12.5	5.7	11.8	6.5	2.75	0.131	68
ND132M	9.2	18.5	8.8	17.7	16.0	7.5	15.2	15.2	7.4	15.0	15.0	7.1	14.3	6.5	2.75	0.161	79
ND160M	15	31	14	30	27	12	26	26	12	25	25	11	24	6.5	2.25	0.31	125
ND160L	18	36	17	35	31	15	30	30	15	29	29	14	28	6.5	2.5	0.47	146
ND180M	22	43	21	41	37	18	35	35	18	34	34	17	33	6.5	2.5	0.81	170
ND180L	26	51	24	49	44	21	42	42	21	41	41	20	39	6.5	2.5	0.95	205
ND200L	34	67	33	64	58	28	55	55	28	54	54	27	52	6.5	2.75	1.62	270
ND225S	43	80	41	77	69	35	66	66	35	65	65	33	62	6.5	2.5	2.64	345
ND225M	52	97	50	93	84	43	79	79	42	79	79	40	75	6.5	2.5	3.13	375
ND250M	63	116	60	111	100	52	95	95	51	94	94	49	90	6.5	2.5	3.45	465
ND280S	87	157	83	150	135	71	129	129	71	127	127	67	121	6.5	2.5	7.21	600
ND280M	108	195	104	186	168	89	160	160	88	158	158	83	150	6.5	2.75	8.26	630
ND315S	130	229	124	219	197	106	187	187	105	185	185	100	176	6.5	2.75	11.6	900
ND315M	158	296	151	283	255	129	242	242	128	240	240	121	228	6.5	2.75	14	950
ND315LX	226	403	216	386	347	185	330	330	183	327	327	174	310	6.5	2.25	19	1160
ND355LX	394	691	377	662	596	323	566	566	320	560	560	304	532	6.5	2.25	29.6	2150

6 POLE : PERFORMANCE DATA FOR TEFC SQUIRREL CAGE CRANE DUTY INVERTER DRIVEN INDUCTION MOTORS

Standard operating conditions :

Voltage : 415 V ± 10%

Frequency : 50 Hz ± 5%

Ambient : 45°C

Altitude : upto 1000 m

Switching frequency : 3-6 khz

Voltage rise time : > 0.1 micro sec

THD : < 2.5%

S4 DUTY (6 POLE)

FRAME SIZE	90starts			150starts			300starts			Starting Current Ratio	Pull out Torque Ratio	Rotor GD ² kg-m ²	Net Wt kg	
	25 &40% GDF KW	FLA	60% CDF KW	FLA	25 &40% CDF KW	60% CDF KW	FLA	25 &40% CDF KW	60% CDF KW					FLA
ND80	0.8	2.4	0.7	2.3	0.65	2.0	0.6	1.9	0.6	1.8	4.5	2.5	0.011	17
ND90L	1.1	3.2	1.1	3.1	0.95	2.8	0.9	2.6	0.8	2.5	5.5	2.5	0.015	22
ND90L	1.5	4.2	1.4	4.0	1.30	3.6	1.2	3.4	1.2	3.3	5.5	2.5	0.021	25
ND100L	2.2	6.0	2.1	5.8	1.90	5.2	1.8	4.9	1.7	4.6	5.5	2.5	0.03	32
ND112M	3.6	9.2	3.4	8.8	3.10	7.9	2.9	7.5	2.8	7.1	5.5	2.5	0.048	45
ND132S	5.3	12.5	5.1	12.0	4.60	10.8	4.4	10.3	4.3	9.6	6	2.5	0.174	68
ND132M	7.3	16.6	7.0	15.9	6.30	14.4	6.0	13.6	5.9	12.8	6	2.5	0.214	79
ND160M	9	20.2	9	19.3	7.90	17.4	8	16.5	7	15.5	6	2.5	0.46	120
ND160L	13	28.1	12	26.9	11	24.2	10	23.0	10	21.6	6	2.5	0.59	148
ND180L	21	45.6	21	43.7	18.5	39.3	18	37.4	17	35.1	6.5	3	1.16	205
ND200L	26	51.0	24	48.8	22	44.0	21	41.8	21	39.3	6	2.5	1.69	270
ND225M	38	74.4	37	71.2	33	64.1	31	60.9	31	57.3	6	2.5	3.61	375
ND250M	45	88.8	43	84.9	39	76.5	37	72.7	37	68.3	6.5	2.75	4.82	465
ND280S	54	104.8	52	100.3	47	90.4	44	85.9	44	80.7	6.8	2.75	8.01	600
ND280M	64	121.2	61	116.0	55	104.5	52	99.3	52	93.3	6.5	2.5	9.89	630
ND315S	89	175.5	85	168.0	77	151.3	73	143.8	72	142.3	6.5	2.5	14.1	900
ND315M	123	234.4	118	224.3	106	202.1	101	192.0	100	190.0	6.5	2.5	17	950
ND315LX	177	331.9	170	317.6	153	286.1	145	271.8	144	268.9	6.5	2.25	29.9	1160
ND355LX	321	596.9	307	571.2	277	514.6	263	488.9	260	483.7	6.5	2.25	29.7	2150

8 POLE : PERFORMANCE DATA FOR TEFC SQUIRREL CAGE CRANE DUTY INVERTER DRIVEN INDUCTION MOTORS

Standard operating conditions :

Voltage : 415 V ± 10%

Frequency : 50 Hz ± 5%

Ambient : 45°C

Altitude : upto 1000 m

Switching frequency : 3-6 khz

Voltage rise time : > 0.1 micro sec

THD : < 2.5%

S4 DUTY (8 POLE)

FRAME SIZE	90starts			150starts			300starts			Starting Current Ratio	Pull out Torque Ratio	Rotor GD ² kg-m ²	Net Wt kg	
	25 &40% GDF KW	FLA	60% CDF KW	FLA	25 &40% GDF KW	FLA	60% CDF KW	FLA	60% CDF KW					FLA
ND80	0.2		0.2			0.2			0.2					
ND90S	0.3	1.5	0.3	1.4	1.3	0.3	1.2	1.2	0.3	1.1	4.5	2.25	0.015	22
ND90L	0.7	2.7	0.7	2.5	2.3	0.6	2.2	2.2	0.6	2.0	4.5	2.25	0.021	22
ND100L	1.5	5.3	1.4	5.1	4.6	1.2	4.4	4.4	1.2	4.1	4.5	2.25	0.03	32
ND112M	2.2	6.5	2.1	6.2	5.6	1.8	5.3	5.3	1.8	5.0	4.5	2.25	0.057	45
ND132M	3.7	9.5	3.6	9.1	8.2	3.0	7.8	7.8	3.0	7.7	5	2.25	0.214	79
ND160M	7	17	7	16	14	6	14	14	6	13	5.5	2.25	0.46	120
ND160L	8	19	8	18	16	7	16	16	7	15	5.5	2.25	0.64	146
ND180M	10	25	10	24	21	9	20	20	8	19	5.5	2.25	0.99	174
ND180L	12	30	12	28	25	10	24	24	10	24	5.5	2.25	1.16	205
ND200L	17	41	16	39	35	14	33	33	14	33	5.5	2.75	2.14	270
ND225S	20	47	19	45	40	17	38	38	16	36	5.5	2.25	3.24	345
ND225M	24	55	23	53	48	20	45	45	20	45	5.5	2.25	3.61	375
ND250M	34	75	32	72	65	28	62	62	27	61	6	2.25	4.82	465
ND280S	42	93	40	89	80	34	76	76	34	75	5.5	2.5	8.01	600
ND280M	51	114	49	109	98	42	93	93	41	92	6	2.25	9.89	630
ND315S	61	138	59	132	119	50	113	113	50	112	6	2.5	14.1	900
ND315M	99	221	94	212	191	81	181	181	80	179	5.5	2.5	19	950
ND315L	121	265	115	254	229	99	217	217	98	215	5.5	2.25	25.3	1160
ND315LX	144	315	138	302	272	118	258	258	117	255	5.5	2.25	29.9	1160
ND355LX	249	517	239	495	446	204	424	424	202	419	5.5	2.25	36.8	2140

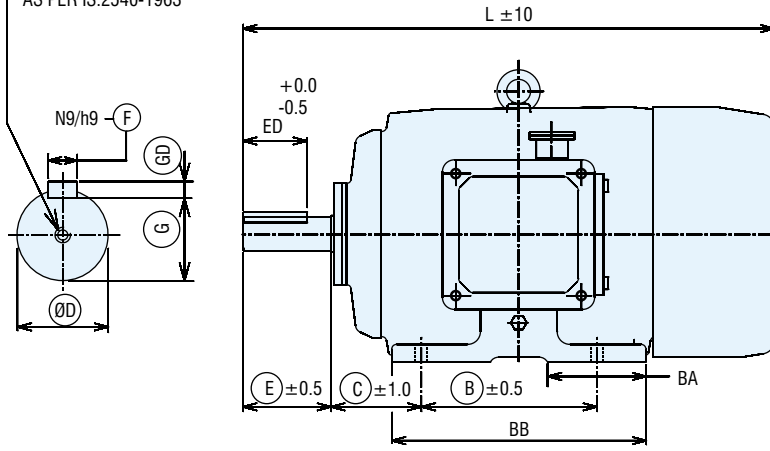
GENERAL PURPOSE CRANE DUTY MOTORS & CG PRABAL 'E' SERIES CRANE DUTY MOTORS OUTLINE DIMENSION DRAWING

CG PRABAL 'E' series motors are especially designed for cranes suiting special shaft dimensions and arduous electrical conditions having high number of starts. The motors are having compact designs giving high electrical outputs. The general arrangement drawings are as per page 36 & 37 and performance as per page 25 & 26.

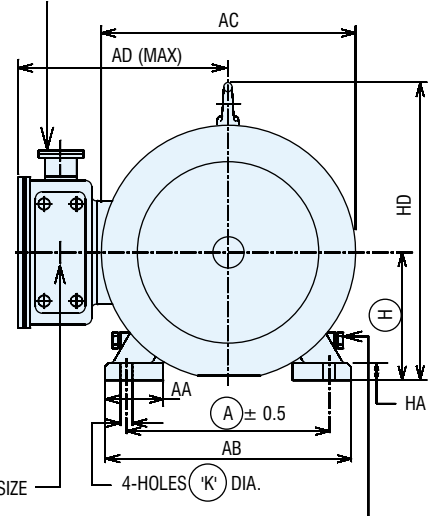
3 PHASE SQUIRREL CAGE TEFC FOOT MOUNTED INDUCTION MOTORS

OUTLINE DIMENSION DRAWING (4 POLE & UP)

Y^TTHREADED CENTRE HOLES AS PER IS:2540-1963



AUX. TERM BOX FOR SPACE HEATER ABOVE 225 FRAME ONLY WHEN REQD.



CABLE ENTRY PROVIDED AS PER CUSTOMER CABLE SIZE

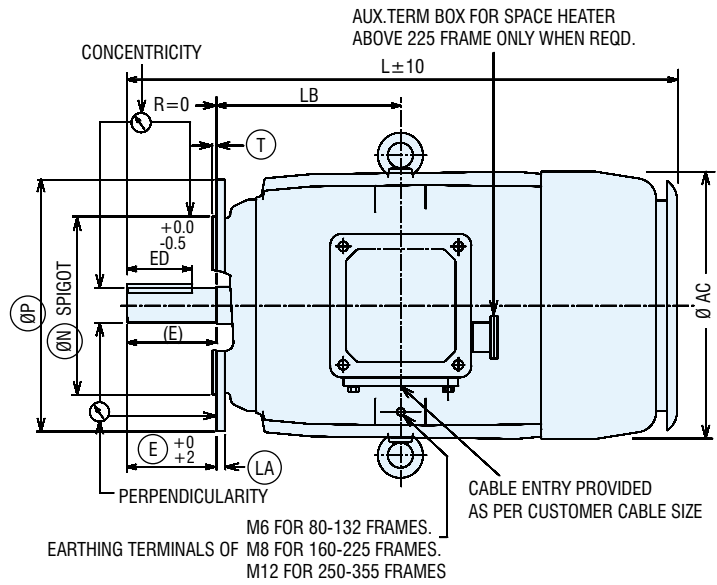
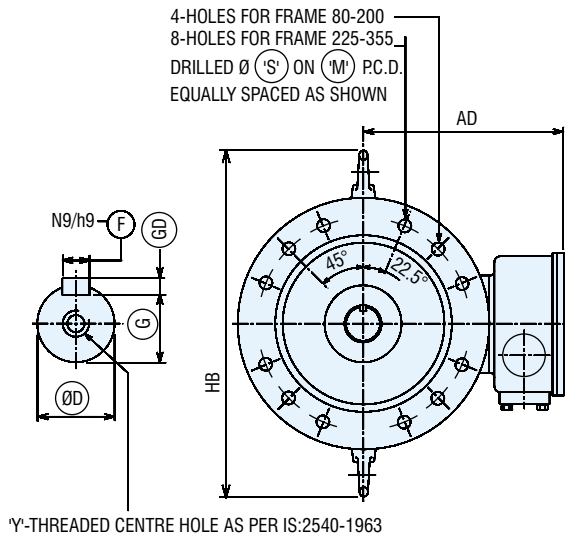
EARTHING TERMINALS OF M6 FOR 80-132 FRAMES.
M8 FOR 160-225 FRAMES.
M12 FOR 250-355 FRAMES

RINGED DIMENSIONS ARE AS PER IS:1231
ALL DIMENSIONS ARE IN mm

Frame	A	B	C	H	AA	AB	BA	BB	K	D	E	ED	F	GD	G	Y	AD	AC	L	HD	HA
ND80	125	100	50	80.0 / 79.7	35	152	45	124	10.0 / 10.5	19.009 / 18.996	40	27	6.00 / 5.97	6.00 / 5.91	15.5 / 15.3	M6X16	134	170	285	165	11
ND90S	140	100	56	90.0 / 89.7	35	168	40	127	10.0 / 10.5	24.009 / 23.996	50	36	8.00 / 7.964	7.00 / 6.91	20.0 / 19.8	M8X19	150	195	310	185	13
ND90L	140	125	56	90.0 / 89.7	35	168	52	152	10.0 / 10.5	24.009 / 23.996	50	36	8.00 / 7.964	7.00 / 6.91	20.0 / 19.8	M8X19	150	195	335	185	13
ND100L	160	140	63	100.0 / 99.7	36	192	45	170	12.0 / 12.5	28.009 / 27.996	60	44	8.00 / 7.957	7.0 / 6.91	24.0 / 23.8	M10X22	160	215	380	250	13
ND112M	190	140	70	112.0 / 111.7	36	222	60	170	12.0 / 12.5	28.009 / 27.996	60	44	8.00 / 7.957	7.0 / 6.91	24.0 / 23.8	M10X22	170	235	405	275	13
ND132S	216	140	89	132.0 / 131.7	48	254	54	178	12.0 / 12.5	38.018 / 38.002	80	60	10.0 / 9.957	8.0 / 7.91	33.0 / 32.8	M12X28	190	275	470	320	16
ND132M	216	178	89	132.0 / 131.7	48	254	54	216	12.0 / 12.5	38.018 / 38.002	80	60	10.0 / 9.957	8.0 / 7.91	33.0 / 32.8	M12X28	190	275	510	320	16
ND160M	254	210	108	160.0 / 159.5	73	308	76	254	15.5 / 15.0	42.018 / 42.002	110	80	12.00 / 11.957	8.00 / 7.91	37.0 / 36.8	M16X32	325	318	605	376	22
ND160L	254	254	108	160.0 / 159.5	73	308	101	298	15.5 / 15.0	42.018 / 42.002	110	80	12.00 / 11.957	8.00 / 7.91	37.0 / 36.8	M16X32	325	318	650	376	22
ND180M	279	241	121	180.0 / 179.5	84	348	85	286	15.5 / 15.0	48.018 / 48.002	110	80	14.00 / 13.957	9.00 / 8.91	42.5 / 42.3	M16X32	345	352	677	418	22
ND180L	279	279	121	180.0 / 179.5	84	348	106	323	15.5 / 15.0	48.018 / 48.002	110	80	14.00 / 13.957	9.00 / 8.91	42.5 / 42.3	M16X32	345	352	715	418	22
ND200L	318	305	133	200.0 / 199.5	66	381	115	356	19.5 / 19.0	55.030 / 55.011	110	80	16.00 / 15.957	10.00 / 9.91	49.0 / 48.8	M20X40	430	428	790	480	25
ND225S	356	286	149	225.0 / 224.5	70	425	102	340	19.5 / 19.0	60.030 / 60.011	140	110	18.00 / 17.957	11.00 / 10.91	53.0 / 52.8	M20X40	455	470	840	534	25
ND225M	356	311	149	225.0 / 224.5	70	425	102	375	19.5 / 19.0	60.030 / 60.011	140	110	18.00 / 17.957	11.00 / 10.91	53.0 / 52.8	M20X40	455	470	865	534	25
ND250S	406	311	168	250.0 / 249.5	80	483	140	419	24.5 / 24.0	65.030 / 65.011	140	110	18.00 / 17.957	11.00 / 10.91	58.0 / 57.8	M20X40	485	500	940	598	32
ND250M	406	349	168	250.0 / 249.5	80	483	140	419	24.5 / 24.0	65.030 / 65.011	140	110	18.00 / 17.957	11.00 / 10.91	58.0 / 57.8	M20X40	485	500	940	598	32
ND280S	457	368	190	280.0 / 279.0	100	538	137	440	24.5 / 24.0	75.030 / 75.011	140	110	20.00 / 19.948	12.00 / 11.91	67.5 / 67.3	M20X40	530	536	1035	642	35
ND280M	457	419	190	280.0 / 279.0	100	538	162	487	24.5 / 24.0	75.030 / 75.011	140	110	20.00 / 19.948	12.00 / 11.91	67.5 / 67.3	M20X40	530	536	1085	642	35
ND315S	508	406	216	315.0 / 314.0	110	597	138	485	28.5 / 28.0	80.030 / 80.011	170	140	22.00 / 21.948	14.00 / 13.91	71.0 / 70.8	M20X40	530	590	1180	725	35
ND315M	508	457	216	315.0 / 314.0	110	597	164	533	28.5 / 28.0	80.030 / 80.011	170	140	22.00 / 21.948	14.00 / 13.91	71.0 / 70.8	M20X40	530	590	1230	725	35
ND315L	508	508	216	315.0 / 314.0	110	610	204	655	28.5 / 28.0	90.035 / 90.013	170	140	25.00 / 24.948	14.00 / 13.91	81.0 / 80.8	M24X50	570	655	1295	755	38
ND315LX	508	508	216	315.0 / 314.0	110	610	235	740	28.5 / 28.0	90.035 / 90.013	170	140	25.00 / 24.948	14.00 / 13.91	81.0 / 80.8	M24X50	570	655	1390	755	38
ND355S	610	510	254	355.0 / 354.0	110	710	253	745	28.5 / 28.0	100.035 / 100.013	210	160	28.00 / 27.948	16.00 / 15.89	90.0 / 89.8	M24X50	560	672	1513	780	40
ND355M	610	560	254	355.0 / 354.0	110	710	253	745	28.5 / 28.0	100.035 / 100.013	210	160	28.00 / 27.948	16.00 / 15.89	90.0 / 89.8	M24X50	560	672	1513	780	40
ND355L	610	630	254	355.0 / 354.0	110	710	253	745	28.5 / 28.0	100.035 / 100.013	210	160	28.00 / 27.948	16.00 / 15.89	90.0 / 89.8	M24X50	560	672	1513	780	40

3 PHASE SQUIRREL CAGE TEFC FLANGE MOUNTED INDUCTION MOTORS

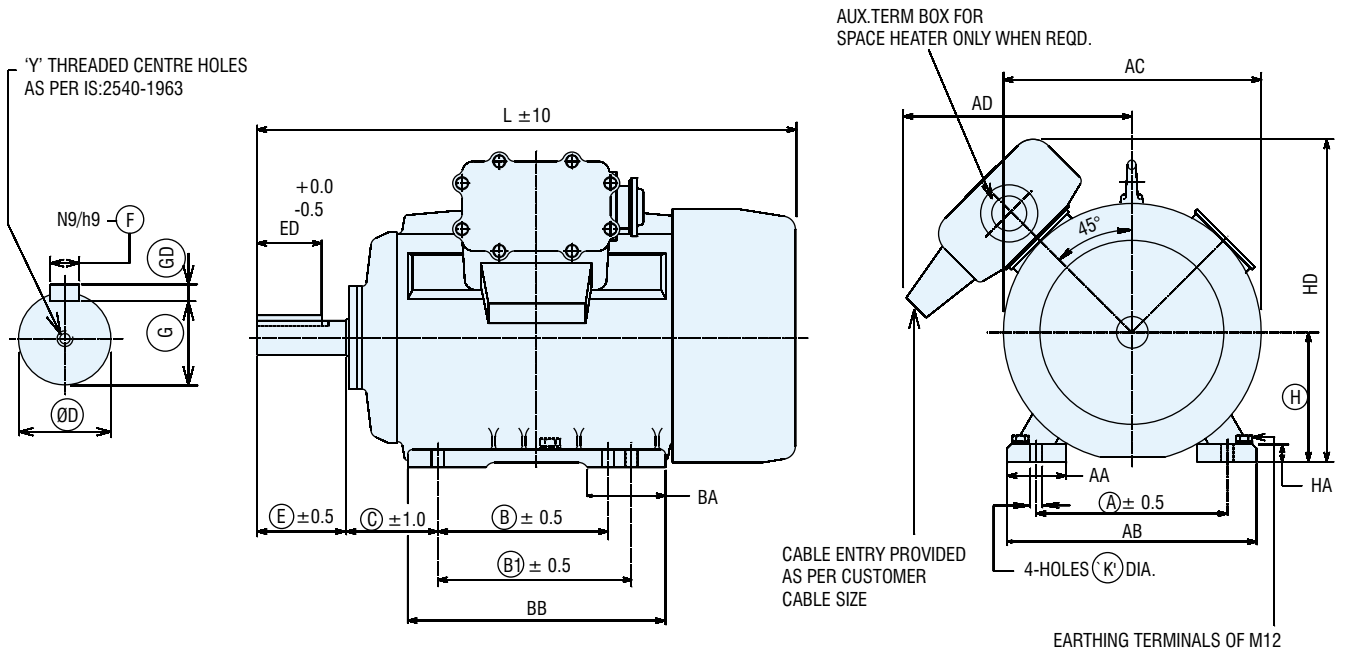
OUTLINE DIMENSION DRAWING (4 POLE & UP)



RINGED DIMENSIONS ARE AS PER IS:2223
ALL DIMENSIONS ARE IN mm

Frame	D	E	ED	F	GD	G	Y	AD	AC	L	MTol	NTol	P	S	T	LA	LB	HB
ND80	19.009 / 18.996	40	27	6.00 / 5.97	6.00 / 5.91	15.5 / 15.3	M6X16	134	170	325	165.3 / 164.7	130.014 / 129.989	200	12	3.5	10	100	260
ND90S	24.009 / 23.996	50	36	8.00 / 7.964	7.00 / 6.91	20.0 / 19.8	M8X19	150	195	375	165.3 / 164.7	130.014 / 129.989	200	12	3.5	10	122	280
ND90L	24.009 / 23.996	50	36	8.00 / 7.964	7.00 / 6.91	20.0 / 19.8	M8X19	150	195	400	165.3 / 164.7	130.014 / 129.989	200	12	3.5	10	137	280
ND100L	28.009 / 27.996	60	44	8.00 / 7.957	7.0 / 6.91	24.0 / 23.8	M10X22	160	215	440	215.3 / 214.7	180.016 / 179.987	250	15	4	11	137	300
ND112M	28.009 / 27.996	60	44	8.00 / 7.957	7.0 / 6.91	24.0 / 23.8	M10X22	170	235	465	215.3 / 214.7	180.016 / 179.987	250	15	4	11	140	320
ND132S	38.018 / 38.002	80	60	10.0 / 9.957	8.0 / 7.91	33.0 / 32.8	M12X28	190	275	542	265.3 / 264.7	230.016 / 229.987	300	15	4	14	158	380
ND132M	38.018 / 38.002	80	60	10.0 / 9.957	8.0 / 7.91	33.0 / 32.8	M12X28	190	275	580	265.3 / 264.7	230.016 / 229.987	300	15	4	14	177	380
ND160M	42.018 / 42.002	110	80	12.00 / 11.957	8.00 / 7.91	37.0 / 36.8	M16X32	325	318	660	300.5 / 299.5	250.016 / 249.987	350	19	5	18	213	421
ND160L	42.018 / 42.002	110	80	12.00 / 11.957	8.00 / 7.91	37.0 / 36.8	M16X32	325	318	705	300.5 / 299.5	250.016 / 249.987	350	19	5	18	235	421
ND180M	48.018 / 48.002	110	80	14.00 / 13.957	9.00 / 8.91	42.5 / 42.3	M16X32	345	352	750	300.5 / 299.5	250.016 / 249.987	350	19	5	18	242	478
ND180L	48.018 / 48.002	110	80	14.00 / 13.957	9.00 / 8.91	42.5 / 42.3	M16X32	345	352	790	300.5 / 299.5	250.016 / 249.987	350	19	5	18	260	478
ND200L	55.030 / 55.011	110	80	16.00 / 15.957	10.00 / 9.91	49.0 / 48.8	M20X40	430	428	830	350.5 / 349.5	300.018 / 299.982	400	19	5	18	285	557
ND225S	60.030 / 60.011	140	110	18.00 / 17.957	11.00 / 10.91	53.0 / 52.8	M20X40	455	470	895	400.5 / 399.5	350.018 / 349.982	450	19	5	19	305	618
ND225M	60.030 / 60.011	140	110	18.00 / 17.957	11.00 / 10.91	53.0 / 52.8	M20X40	455	470	895	400.5 / 399.5	350.018 / 349.982	450	19	5	19	305	618
ND250S	65.030 / 65.011	140	110	18.00 / 17.957	11.00 / 10.91	58.0 / 57.8	M20X40	485	500	1020	500.5 / 499.5	450.020 / 449.980	550	19	5	22	342	688
ND250M	60.030 / 60.011	140	110	18.00 / 17.957	11.00 / 10.91	58.0 / 57.8	M20X40	485	500	1020	500.5 / 499.5	450.020 / 449.980	550	19	5	22	342	688
ND280S	75.030 / 75.011	140	110	20.00 / 19.948	12.00 / 11.91	67.5 / 67.3	M20X40	530	536	1170	500.5 / 499.5	450.020 / 449.980	550	19	5	22	400	722
ND280M	75.030 / 75.011	140	110	20.00 / 19.948	12.00 / 11.91	67.5 / 67.3	M20X40	530	536	1170	500.5 / 499.5	450.020 / 449.980	550	19	5	22	400	722
ND315S	80.030 / 80.011	170	140	22.00 / 21.948	14.00 / 13.91	71.0 / 70.8	M20X40	530	590	1325	601.0 / 599.0	550.022 / 549.978	660	24	6	25	445	812
ND315M	80.030 / 80.011	170	140	22.00 / 21.948	14.00 / 13.91	71.0 / 70.8	M20X40	530	590	1325	601.0 / 599.0	550.022 / 549.978	660	24	6	25	445	812
ND315L	90.035 / 90.013	170	140	25.00 / 24.948	14.00 / 13.91	81.0 / 80.8	M24X50	570	655	1495	601.0 / 599.0	550.022 / 549.978	660	24	6	25	531	880
ND315LX	90.035 / 90.013	170	140	25.00 / 24.948	14.00 / 13.91	81.0 / 80.8	M24X50	570	655	1495	601.0 / 599.0	550.022 / 549.978	660	24	6	25	531	880
ND355S	100.035 / 100.013	210	160	28.00 / 27.948	16.00 / 15.89	90.0 / 89.8	M24X50	570	672	1650	741.0 / 739.0	680.025 / 679.975	800	24	6	28	570	900
ND355M	100.035 / 100.013	210	160	28.00 / 27.948	16.00 / 15.89	90.0 / 89.8	M24X50	570	672	1650	741.0 / 739.0	680.025 / 679.975	800	24	6	28	570	900
ND355L	100.035 / 100.013	210	160	28.00 / 27.948	16.00 / 15.89	90.0 / 89.8	M24X50	570	672	1650	741.0 / 739.0	680.025 / 679.975	800	24	6	28	570	900

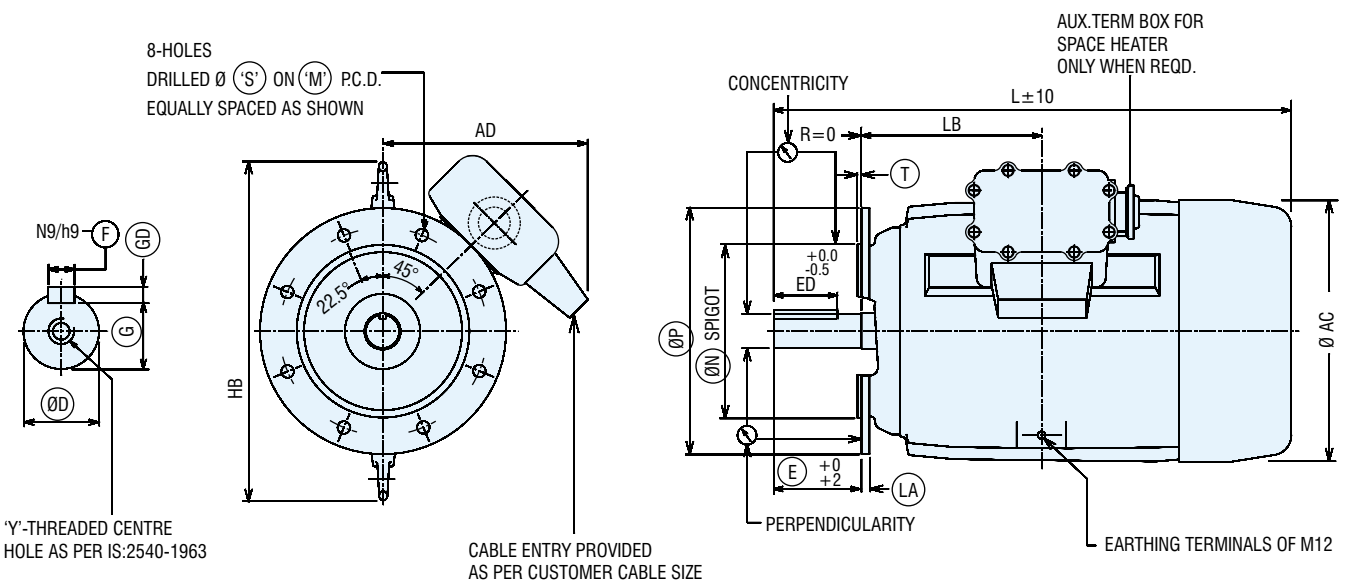
FOOT MOUNTED TB ON RHS



RINGED DIMENSIONS ARE AS PER IS:1231
ALL DIMENSIONS ARE IN mm

Frame	A	B	C	H	AA	AB	BA	BB	K	D	E	ED	F	GD	G	Y	AD	AC	L	HD	HA
4 POLE & UP																					
ND355LX	610	630	254	355.0 / 354.0	110	710	250	850	28.5 / 28.0	100.035 / 100.013	210	160	28.00 / 27.948	16.00 / 15.89	90.0 / 89.8	M24x50	720	720	1580	950	40

FLANGE MOUNTED (FRAME ND355LX)

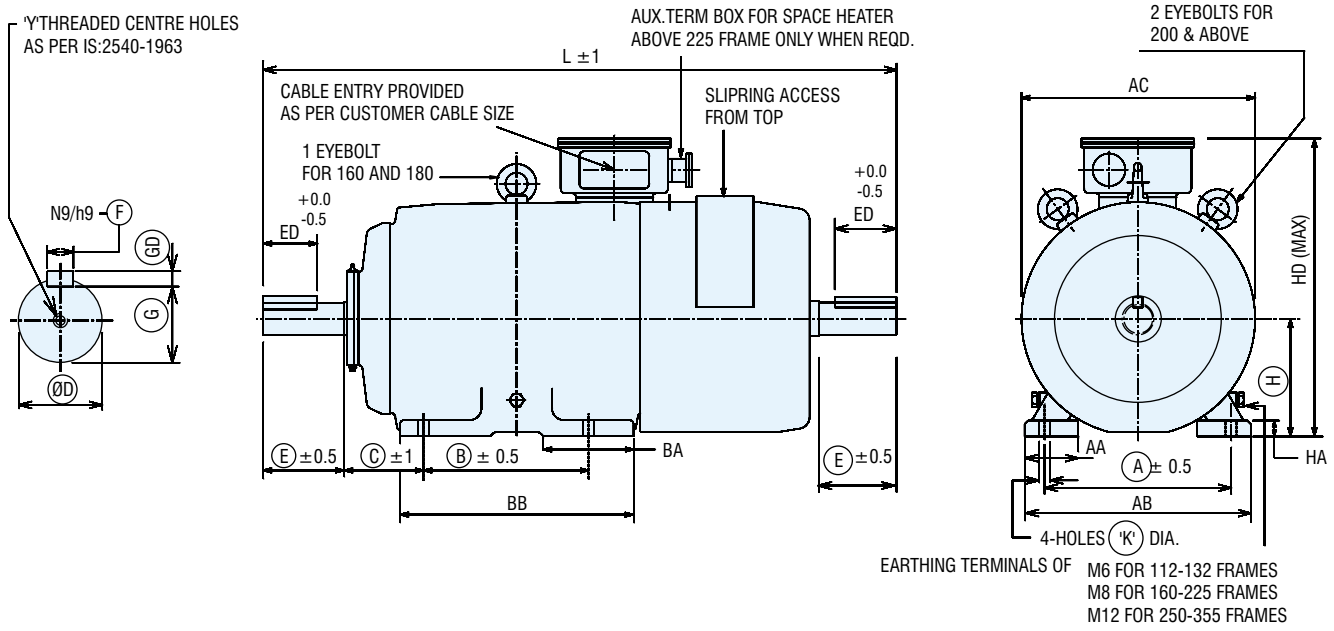


RINGED DIMENSIONS ARE AS PER IS:2223
ALL DIMENSIONS ARE IN mm

Frame	D	E	ED	F	GD	G	Y	AD	AC	L	MTol	NTol	P	S	T	LA	LB	HB
4 POLE & UP																		
ND355LX	100.035 / 100.013	210	160	28.00 / 27.948	16.00 / 15.89	90.0 / 89.8	M24X50	720	720	1580	741.0 / 739.0	680.025 / 679.975	800	24	6	28	570	900

3 PHASE SLIP RING TEFC FOOT MOUNTED INDUCTION MOTORS

OUTLINE DIMENSION DRAWING TB ON TOP SINGLE/DOUBLE SHAFT

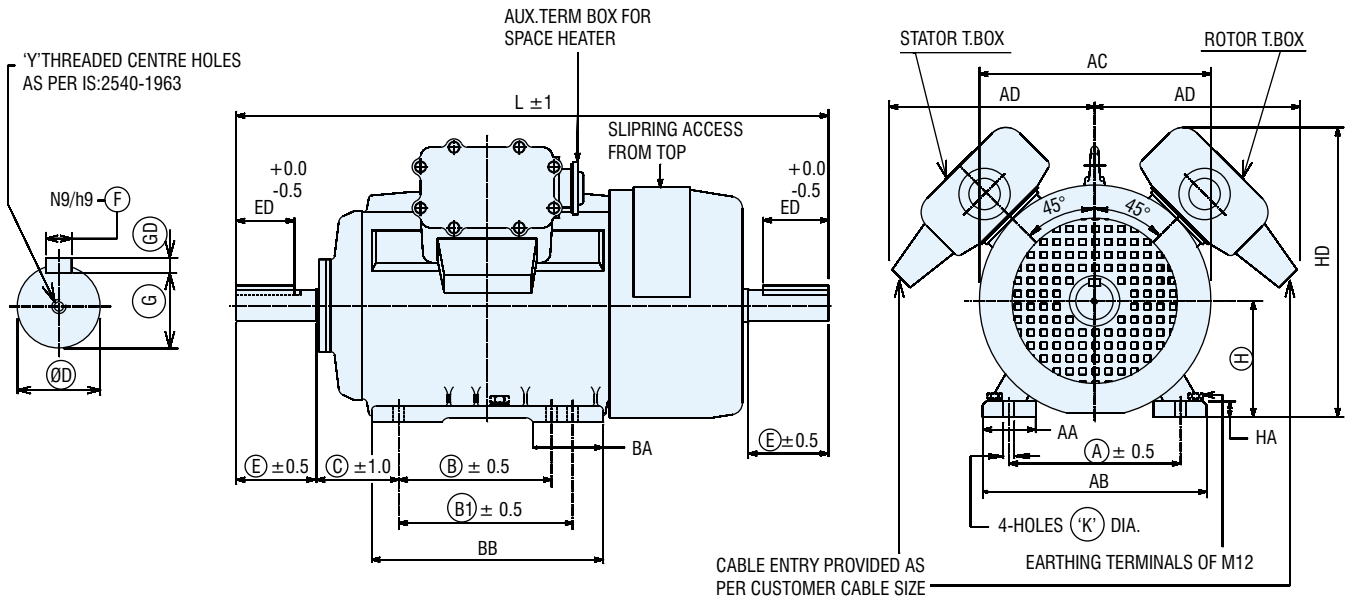


RINGED DIMENSIONS ARE AS PER IS:1231
ALL DIMENSIONS ARE IN mm

Frame	A	B	C	H	AA	AB	BA	BB	K	D	E	ED	F	GD	G	Y	AC	L	HD	HA
4 POLE & UP																				
NDW112M	190	140	70	112.0 / 111.5	36	222	50	170	12.5 / 12.0	28.018 / 28.002	60	44	8.00 / 7.964	7.00 / 6.91	24.0 / 23.8	M10X22	235	608	322	13
DW132S	216	140	89	132.0 / 131.5	48	254	54	178	12.5 / 12.0	38.018 / 38.002	80	60	10.00 / 9.964	8.00 / 7.91	33.0 / 32.8	M12x28	320	680	385	16
DW132M	216	178	89	132.0 / 131.5	48	254	54	216	12.5 / 12.0	38.018 / 38.002	80	60	10.00 / 9.964	8.00 / 7.91	33.0 / 32.8	M12x28	320	720	385	16
NDW160M	254	210	108	160.0 / 159.5	73	308	76	254	15.5 / 15.0	42.018 / 42.002	110	80	12.00 / 11.97	8.00 / 7.91	37.0 / 36.8	M16x32	318	904	435	22
NDW160L	254	254	108	160.0 / 159.5	73	308	99	298	15.5 / 15.0	42.018 / 42.002	110	80	12.00 / 11.957	8.00 / 7.91	37.0 / 36.8	M16x32	318	948	435	22
NDW180L	279	279	121	180.0 / 179.5	84	348	114	323	15.5 / 15.0	48.018 / 48.002	110	80	14.00 / 13.957	9.00 / 8.91	42.5 / 42.3	M16x32	370	1030	475	22
NDW200L	318	305	133	200.0 / 199.5	66	381	115	356	19.5 / 19.0	55.030 / 55.011	110	80	16.00 / 15.957	10.00 / 9.91	49.0 / 48.8	M20x40	428	1072	545	25
NDW225S	356	286	149	225.0 / 224.5	70	425	102	375	19.5 / 19.0	60.030 / 60.011	140	110	18.00 / 17.957	11.00 / 10.91	53.0 / 52.8	M20x40	470	1227	600	25
NDW225M	356	311	149	225.0 / 224.5	70	425	102	375	19.5 / 19.0	60.030 / 60.011	140	110	18.00 / 17.957	11.00 / 10.91	53.0 / 52.8	M20x40	470	1227	600	25
NDW250S	406	311	168	250.0 / 249.5	80	483	135	419	24.5 / 24.0	65.030 / 65.011	140	110	18.00 / 17.957	11.00 / 10.91	58.0 / 57.8	M20x40	500	1298	730	32
NDW250M	406	349	168	250.0 / 249.5	80	483	135	419	24.5 / 24.0	65.030 / 65.011	140	110	18.00 / 17.957	11.00 / 10.91	58.0 / 57.8	M20x40	500	1298	730	32
NDW280S	457	368	190	280.0 / 279.0	100	538	167	487	24.5 / 24.0	75.030 / 75.011	140	110	20.00 / 19.948	12.00 / 11.91	67.5 / 67.3	M20x40	540	1431	810	35
NDW280M	457	419	190	280.0 / 279.0	100	538	167	487	24.5 / 24.0	75.030 / 75.011	140	110	20.00 / 19.948	12.00 / 11.91	67.5 / 67.3	M20x40	536	1431	810	35
NDW315S	508	406	216	315.0 / 314.0	110	597	164	533	28.5 / 28.0	80.030 / 80.011	170	140	22.00 / 21.948	14.00 / 13.91	71.0 / 70.8	M20x40	590	1595	845	38
NDW315M	508	457	216	315.0 / 314.0	110	597	164	533	28.5 / 28.0	80.030 / 80.011	170	140	22.00 / 21.948	14.00 / 13.91	71.0 / 70.8	M20x40	590	1595	845	38
NDW315LX	508	508	216	315.0 / 314.0	110	610	235	740	28.5 / 28.0	90.035 / 90.013	170	140	25.00 / 24.948	14.00 / 13.91	81.0 / 80.8	M24x50	655	1750	885	40
NDW355S	610	500	254	355.0 / 354.0	110	710	253	745	28.5 / 28.0	100.035 / 100.013	210	160	28.00 / 27.948	16.00 / 15.89	90.0 / 89.8	M24x50	672	1960	950	40
NDW355M	610	560	254	355.0 / 354.0	110	710	253	745	28.5 / 28.0	100.035 / 100.013	210	160	28.00 / 27.948	16.00 / 15.89	90.0 / 89.8	M24x50	672	1960	950	40
NDW355L	610	630	254	355.0 / 354.0	110	710	253	745	28.5 / 28.0	100.035 / 100.013	210	160	28.00 / 27.948	16.00 / 15.89	90.0 / 89.8	M24x50	672	1960	950	40

3 PHASE SLIP RING TEFC FOOT MOUNTED INDUCTION MOTORS

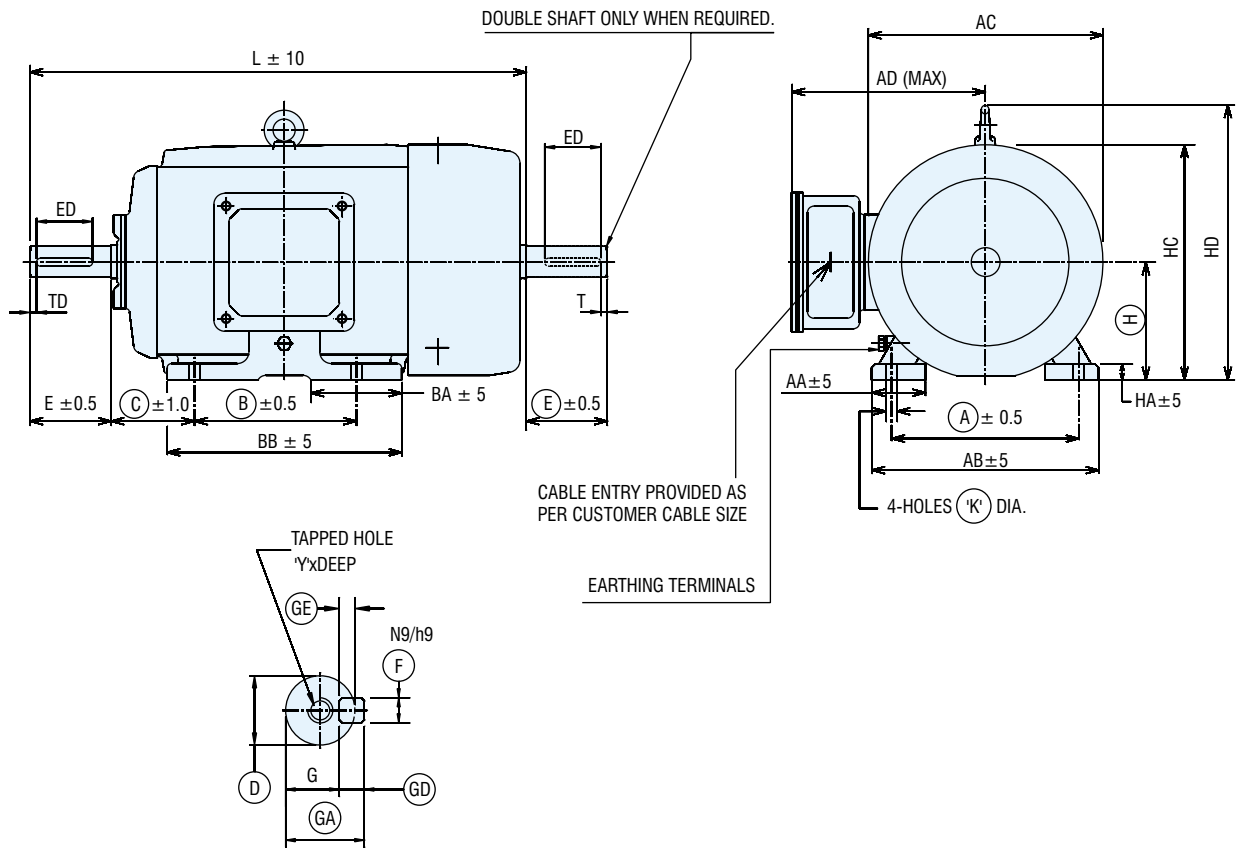
OUTLINE DIMENSION DRAWING : TB ON TOP SINGLE/DOUBLE SHAFT (FRAME:NDW355LX)



RINGED DIMENSIONS ARE AS PER IS:1231
ALL DIMENSIONS ARE IN mm

Frame	A	B	C	H	AA	AB	BA	BB	K	D	E	ED	F	GD	G	Y	AD	AC	L	HD	HA
4 POLE & UP																					
NDW 355LX	610	630	254	355.0 / 354.0	110	710	250	850	28.5 / 28.0	100.035 / 100.013	210	160	28.00 / 27.948	16.00 / 15.89	90.0 / 89.8	M24x50	720	720	2045	950	40

PRABAL EXCLUSIVE 'E' SERIES



NOTE :- BOTH END ROUND KEYWAY.

ALL DIMENSIONS ARE IN mm.

FRAME SIZE	FOOT FIXING									SHAFT AND KEYWAY								OVERALL(MAX)							
	A	B	C	H	AA	AB	BA	BB	K	D	E	ED	F	G	GA	GD	GE	Y xDEEP	AD	AC	L	HC	HD	HA	TD
ND90S	140	100	56	90	35	168	40	127	10	24	75	70	8	20	27	7	4	M8 x19	150	195	353	185	-	13	2.5
ND90L		125						152													378				
ND100L	160	140	63	100	36	192	45	170	12	28	90	85	8	24	31	7	4	M10 x22	160	215	434	205	250	13	2.5
ND112M	190	140	70	112	36	222	60	170	12	28	90	85	8	24	31	7	4	M10 x22	170	235	461	230	275	13	2.5
ND132S	216	140	89	132	48	254	54	178	12	38	120	110	10	33	41	8	5	M12 x28	190	275	526	270	320	16	5
ND132M		178						216													564				

Foot Mounted (B3) Single shaft extension motors

IP : 55 Duty S4
Voltage : 415 +/- 10% CDF 40 % 150 Starts/hour
Frequency : 50 Hz +/- 5% Amb 45 degree

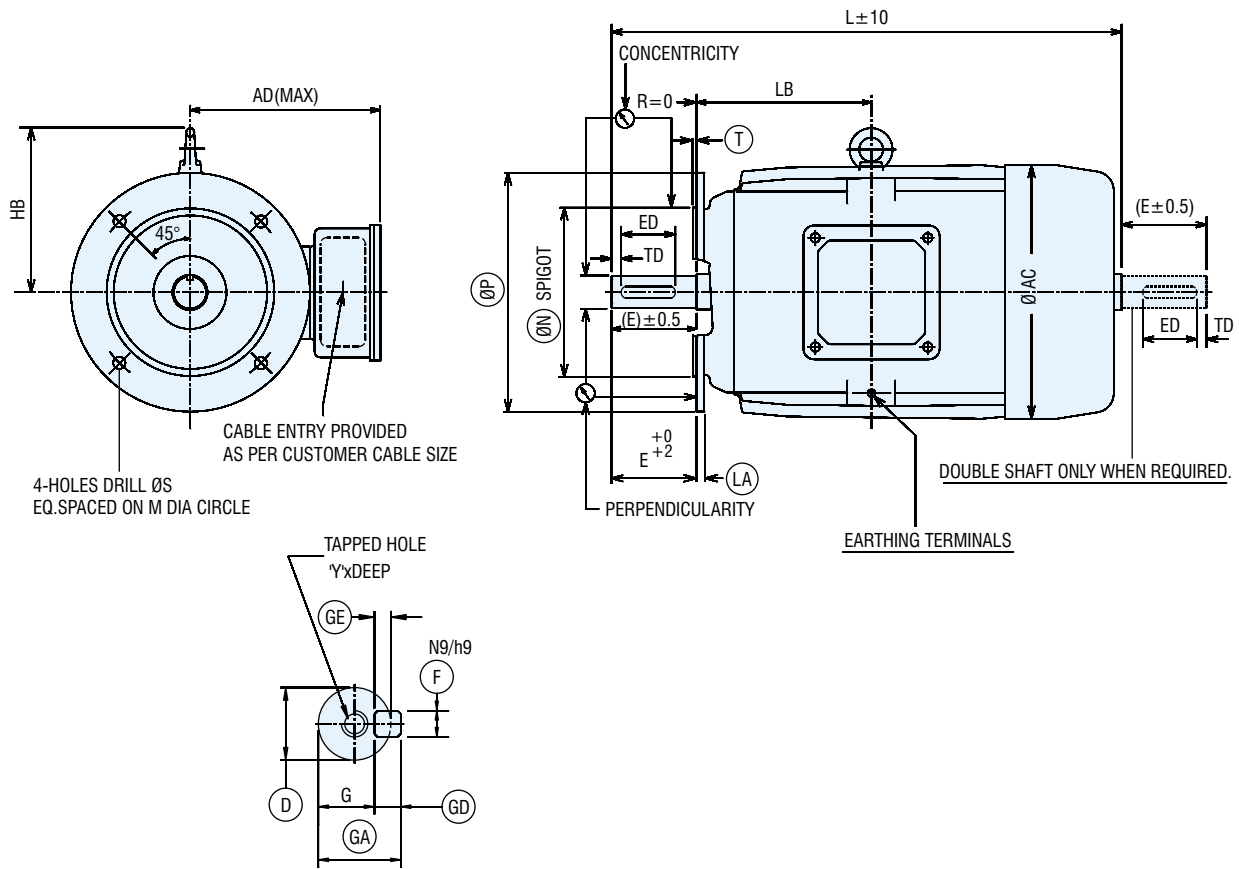
CG PRODUCT CODE	kW	POLE	FRAME
2.20KZ4_E	2.20	4	ND90L
1.50KZ4_ER	1.50	4	ND90S
3.75KZ4_ERR1	3.75	4	ND100L
5.50KZ4_E	5.50	4	ND112M
9.30KZ4_ER	9.30	4	ND132M
7.50KZ4_ER	7.50	4	ND132S
1.50KZ6_ER	1.50	6	ND90L
1.10KZ6_ER	1.10	6	ND90S
2.20KZ6_ER	2.20	6	ND100L
3.70KZ6_ER	3.70	6	ND112M
7.50KZ6_ER	7.50	6	ND132M
5.50KZ6_ER	5.50	6	ND132S

Foot Mounted (B3) double shaft extension motors

IP : 55 Duty S4
Voltage : 415 +/- 10% CDF 40 % 150 Starts/hour
Frequency : 50 Hz +/- 5% Amb 45 degree

CG PRODUCT CODE	kW	POLE	FRAME
1.50KZ4B_ER	1.50	4	ND90S
2.20KZ4B_E	2.20	4	ND90L
3.75KZ4B_E	3.75	4	ND100L
3.75KZ4B_ER	3.75	4	ND100L
5.50KZ4B_E	5.50	4	ND112M
7.50KZ4B_ER	7.50	4	ND132S
9.30KZ4B_ER	9.30	4	ND132M
1.10KZ6B_ER	1.10	6	ND90S
1.50KZ6B_ER	1.50	6	ND90L
2.20KZ6B_ER	2.20	6	ND100L
3.70KZ6B_ER	3.70	6	ND112M
5.50KZ6B_ER	5.50	6	ND132S
7.50KZ6B_ER	7.50	6	ND132M

PRABAL EXCLUSIVE 'E' SERIES



NOTE :- BOTH END ROUND KEYWAY.

ALL DIMENSIONS ARE IN mm.

FRAME SIZE	FACE FIXING								SHAFT AND KEYWAY								OVERALL(MAX)					
	M	N	P	R	S	T	LA	D	E	ED	F	G	GA	GD	GE	YxDEEP	AD	AC	L	LB	HB	TD
ND90SD	165	130	200	0	12	3.5	10	24	75	70	8	20	27	7	4	M8x19	150	190	372	285	-	2.5
ND90LD																			405	310		
ND100LD	215	180	250	0	15	4	11	28	90	85	8	24	31	7	4	M10x22	160	210	434	310	150	2.5
ND112MD	215	180	250	0	15	4	11	28	90	85	8	24	31	7	4	M10x22	170	230	461	330	160	2.5
ND132SD	265	230	300	0	15	4	14	38	120	110	10	33	41	8	5	M12x28	190	270	526	390	190	5
ND132MD																			564	430		

Flange Mounted (B5) Single shaft extension motors

IP : 55
Voltage : 415 +/- 10%
Frequency : 50 Hz +/- 5%

Duty S4
CDF 40 % 150 Starts/hour
Amb 45 degree

CG PRODUCT CODE	kW	POLE	FRAME
2.20KZ4FLG_E	2.20	4	ND90L
1.50KZ4FLG_ER	1.50	4	ND90S
3.75KZ4FLG_E1	3.75	4	ND100L
5.50KZ4FLG_E	5.50	4	ND112M
9.30KZ4FLG_ER	9.30	4	ND132M
7.50KZ4FLG_ER	7.50	4	ND132S
1.50KZ6FLG_ER	1.50	6	ND90L
2.20KZ6FLG_ER	2.20	6	ND100L
3.70KZ6FLG_ER	3.70	6	ND112M
7.50KZ6FLG_ER	7.50	6	ND132M
5.50KZ6FLG_ER	5.50	6	ND132S

Flange Mounted (B5) double shaft extension motors

IP : 55
Voltage : 415 +/- 10%
Frequency : 50 Hz +/- 5%

Duty S4
CDF 40 % 150 Starts/hour
Amb 45 degree

CG PRODUCT CODE	kW	POLE	FRAME
1.50KZ4FLGB_ER	1.50	4	ND90S
2.20KZ4FLGB_E	2.20	4	ND90L
3.75KZ4FLGB_E	3.75	4	ND100L
5.50KZ4FLGB_E	5.50	4	ND112M
7.50KZ4FLGB_ER	7.50	4	ND132S
9.30KZ4FLGB_ER	9.30	4	ND132M
1.10KZ6FLGB_ER	1.10	6	ND90S
1.50KZ6FLGB_ER	1.50	6	ND90L
2.20KZ6FLGB_ER	2.20	6	ND100L
5.50KZ6FLGB_ER	5.50	6	ND132S
7.50KZ6FLGB_ER	7.50	6	ND132M

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New Delhi :

Vandana, 11, Tolstoy Marg, New Delhi - 110 001
Phones : (011) 30416300

Jalandhar :

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GT Road, Jalandhar - 144 001
Phones : (0181) 3240990

Lucknow :

Saran Chambers II, 3rd Floor, 5 Park Road,
Lucknow - 226 001
Phones : (0522) 3018850

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Church Road, P. O. Box. No. 173, Jaipur-302 001
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Jangali Maharaj Road, Pune 5.
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Mumbai-Agra Road, Indore - 452 001.
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Dharampeth, Nagpur - 440 010
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5, New Tilak Nagar, Near Sai Care Hospital,
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Phones : (0771) 4022215

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Bannerghetta Road, Bilekahalli, Bangalore 560 076.
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Cochin :

Cherupushpam Building, 5th Floor, 300-6
Shanmugham Road, Ernakulam, Cochin - 682 031.
Phones : (0484) 2370860

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Secunderabad - 500 003.
Phones : (040) 40002300

Regional Service Centres :

North : Vandana, 11, Tolstoy Marg, New Delhi-110 001. Phones: (011) 30416308.

East : 21, R.N.Mukherjee Road, Kolkata-700 001. Phones: (033) 22489160.

West : Kanjur Marg (E), Mumbai 400 042. Phones : (022) 67558590.

South : 3A, MGR Salai, Kodambakkam High Road, Nungambakkam, Chennai-600 034.
Phones : (044) 23651369.



NOTE : As the design and manufacture of Crompton Greaves electrical equipment are subject to constant improvement, the product supplied may differ in some details from the specifications and illustrations given in this booklet. For more details, contact nearest Branch Office.

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LT Motors Division

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