Large and High Voltage Motors

Bespoke construction to your needs

ENGINEERING THE FUTURE
TECO MOTOR PRODUCTS
• Low voltage induction motors – IEC and NEMA
• High voltage induction motors
• Inverters
• Eddy current variable speed drives
• Drip proof motors – LV and HV
• DC motors
• Synchronous motors
• Vertical hollow shaft motors
• Hazardous area motors
• High efficiency motors
• Brake motors

TECO PUBLICATIONS AVAILABLE
• Product overview
• Advantage IEC/Advantage+ high and premium efficiency cast iron motors
• Advantage Lite Aluminium motors
• Advantage Lite Brake motors
• Open Advantage drip proof motors
• Low voltage motors
• High voltage motors (AEJK)
• Large and High Voltage motors
• Slip ring motors (AEEQ-AEJS)
• Advantage Guardian range – high temperature resistant motors
• Minicon palm drive
• Minicon+ IP65 drive
• Speeccon 7300PA variable speed drives
• Speeccon 7200MA variable speed drives
• Speeccon 7200GS variable speed drives
• Optim 2000 variable speed drives

LARGE AND HIGH VOLTAGE MOTOR RANGE FROM TECO
TECO’s position as a world leader in the design and manufacturing of large induction motors is secured by an unfailing commitment to engineering excellence and technological innovation. For a half a century TECO motors have been recognized as industry leaders in dependability and quality.

AVAILABLE IN BOTH IEC AND NEMA FRAMES AND SPECIFICATIONS
Voltage Options:
• Low voltage to 750kW (<690V)
• 3.3kV from 75kW
• 6.6kV from 110kW
• 11kV from 250kW
• 13.2kV from 500kW

Mounting Options:
• Vertical or Horizontal
• Foot and/or flange configurations

Enclosures:
• TEFC = Totally Enclosed Fan Cooled (IC411)
• TECACA = Totally Enclosed, Closed Air Circuit, Air Cooled (IC611)
• TECACW = Totally Enclosed, Closed Air Circuit, Water Cooled (IC81W)
• ODP = Open Dripproof (IC01)
• WPI = NEMA 1 Weatherprotected (IC01)
• WPII = NEMA 2 Weatherprotected (IC01)
High Voltage Motors

Introduction

CASE STUDY

TILCON QUARRY, SKIPTON, UK

The Tilcon Quarry produces up to two million tonnes of limestone a year. We supplied them with two induction motors, including the largest AC variable speed motor in the UK (1000kW 6 pole 690V, TECACA).

We also supplied two 12 pulse cubicalised inverters, rated at 450kW and 1000kW and a 2000kVA ONAN 11kV to 690V stepdown/phase shift transformer.

We have project capability experience in the following industry sectors, power generation, petro-chemical, mining, paper and quarrying.

APPLICATION

Crown Series motors are custom designed to each customer’s specific application. Because of their design versatility and high operating efficiencies, Crown Series motors are the logical choice for a multitude of industries including oil and gas, petro-chemical, pulp and paper, electric utility, water and waste water, marine, steel, mining and air separation.

Typical application of Crown Series motors include agitators, blowers, boring mills, pumps, conveyors, crushers, fans, and many more.
Construction

WINDING/INSULATION — FORM WOUND V.P.I. CLASS F SYSTEM
The insulation system determines the ‘life’ of a motor. Motor capacity is influenced by the quality of insulation.

TECO utilises mica tape as its base material, which is impregnated with a special epoxy resin. Impregnation is accomplished by immersion of the completely assembled stator in the special resin using a vacuum pressure cycle. This ensures outstanding resistance to heat, moisture, and chemicals, and guarantees safe operation even under most severe environmental conditions.

STATOR FRAME CONSTRUCTION
Crown Series motors use box frame construction to provide frames that have the mechanical strength and stability to assure years of dependable, economical performance. The fabricated steel frames are braced by heavy steel plate bulkheads and end plates to make the frames both laterally and torsionally stable. End brackets are reinforced to give the bearings rigid support and to minimize bearing stiffness.

STATOR WINDING BRACING
Bracing rings of insulated steel or epoxy glass yarn are used. Individual coils are lashed to the ring with glass cord. Impregnated felt packers are used between coil sides.

Support of the coil ends is designed to restrain shock and vibration of the coil ends under heavy overload conditions such as those which occur during full voltage starting.

ROTOR CONSTRUCTION
TECO induction motor rotors are recognised as the most reliable in the industry, and their high performance standards are a hallmark of the Crown Series motors. Standard construction utilises copper-copper/ alloy bars, a time-proven choice for rotor construction because it provides maximum performance and reliability, and high quality silicon steel laminations to minimise losses resulting in high efficiency values.

Connection between rotor bars and end rings are joined together using silver brazing and a “1 shot” brazing technique developed by TECO.

Rotors balanced to ‘N’ grade as per BSEN and Nema standards.
Bearings

ADVANCED BEARING SYSTEM FOR RELIABLE PERFORMANCE
The bearing system used in Crown Series Motors has been designed and engineered for continuous, reliable performance and ease of maintenance. Both anti-friction and split-sleeve bearings are offered. Bearing insulation can also be added when required.

ANTI-FRICTION BEARINGS
Grease lubricated roller bearings are mounted directly into the bores of the endshields. High quality vacuum degassed roller bearings are used for long life and quiet operation.

SPLIT-SLEEVE BEARINGS
Our split-sleeve bearings are spherically seated and self-aligning, thus providing ease of maintenance in all field conditions. Shaft mounted oil rings transfer the oil from the reservoir to the bearing with gravity feeding back into the reservoir. This bearing system employs a sophisticated sealing system that is designed to eliminate oil leakage along the shaft. The oil ring lubrication process can be easily modified for flood lubrication.

Testing

100% ROUTINE TEST
Quality is emphasised at each step as a motor proceeds through each stage of design, assembly and testing.

Each motor is given a routine test as required by BS4999, AS1359 or NEMA MG 1 to determine that it is free from electrical or mechanical defects.

Additional special tests beyond the routine test are available on request. Tests may be witnessed if required.
TOTALLY ENCLOSED AIR-TO-AIR COOLED TYPE. SQUIRREL CAGE ROTOR.

Figure 1.

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Dimensions in mm

Figure 2.

NOTES
1. Tolerance of shaft extension diameter D = m6
2. Tolerance of shaft centre height H = ± for F#630 & below ± for F#710 & up
3. Tolerance of key width F = h9
4. Usable Shaft Length: EE
5. Anti-friction bearings
TOTALLY ENCLOSED AIR-TO-AIR COOLED TYPE. SQUIRREL CAGE ROTOR.

Figure 3.

Dimensions in mm

1. Tolerance of shaft extension diameter D = m6
2. Tolerance of shaft centre height H = \( \pm \) for F#630 & below \( \% \) for F#710 & up
3. Tolerance of key width F = h9
4. Usable Shaft Length: EE
5. Sleeve bearings
6. Provision for noncontacting vibration probe, distance of “C” has to be changed: F#400-450:C=70, F#500-560: C=80
7. F#500B & Below, self lubrication bearing. All others must be force lubrication.
### Dimensions

**NEMA WEATHER PROTECTED TYPE I/OPEN DRIP-PROOF TYPE, SQUIRREL CAGE ROTOR.**

**Figure 5.**

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**Dimensions in mm**

**NOTES**

1. Tolerance of shaft extension diameter D = m6
2. Tolerance of shaft centre height H = ± for F#630 & below 1⁄3 for F#710 & up
3. Tolerance of key width F = h9
4. Usable Shaft Length: EE
5. Anti-friction bearings
# NEMA Weather Protected Type I (Open Drip-Proof Type, Squirrel Cage Rotor)

**Figure 6.**

## Dimensions

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**NOTES**

1. Tolerance of shaft extension diameter \( D = m6 \)
2. Tolerance of shaft centre height \( H = \) \( h \) for \#630 \& below \( h \) for \#710 & up
3. Tolerance of key width \( F = h9 \)
4. Usable Shaft Length: EE
5. Sleeve bearings
6. Provision for noncontacting vibration probe, distance of \( "C" \) has to be changed: \#400-450: C=+70, \#500-560: C=+80
7. \#500B \& Below: self lubrication bearing. All others must be force lubrication.
### Dimensions in mm

#### NOTES
1. Tolerance of shaft extension diameter D = m6
2. Tolerance of shaft centre height H = \( \pm \) for F#630 & below \( \pm \) for F#710 & up
3. Tolerance of key width F = h9
4. Usable Shaft Length: EE
5. Anti-friction bearings
NEMA WEATHER PROTECTED TYPE II. SQUIRREL CAGE ROTOR.

Figure 8.

Dimensions

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Dimensions in mm

1. Tolerance of shaft extension diameter D = m6
2. Tolerance of shaft centre height H = f for F#630 & below f/3 for F#710 & up
3. Tolerance of key width F = h9
4. Usable Shaft Length: EE
5. Sleeve bearings
6. Provision for noncontactive vibration probe, distance of “C” has to be changed: F#400-450: C+70, F#500-560: C+80
7. F#500B & Below, self lubrication bearing. All others must be force lubrication.

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