

High-voltage motors

**21-MII** series

**21-MII series** : Combining over 100 years experience with innovative new technology makes the **21-MII series** the right choice for the demanding needs of today's industry.

## **Superior electrical performance benefits, unsurpassed reliability :**

The 21-MII series three-phase high-voltage motors are at the leading edge of motor technology.

- Designs up to 3,550 KW (4,750HP)
- Wide variety of enclosures
- Rugged, cast iron construction
- Frame sizes From 315 ~ 450mm
- Designed to meet worldwide standards

## **Features / Benefits :**

### **Excellent electrical performance**

- Higher efficiency
- Higher power factor
- Superior starting characteristics

### **Unique Modular Construction**

- Easy motor enclosure conversion  
ODP, WP1, WP2, CACA (TEAAC), CACW (TEWAC)

### **New compact design derived through**

- Extensive electrical magnetic field analysis
- Heat transfer analysis
- Improved ventilation

### **Lower noise & lower vibration**

- Advanced techniques in core/frame construction

### **Advanced VPI insulation system**

- Higher surge withstanding capability

### **Excellent Quality Control**

- Low operating and maintenance costs
- High reliability
- Extended re-greasing intervals

### **Design for all applications and industries**

### **Compatible on Variable Frequency Drive applications**

### **Highly reliable Aluminum Die Casting Rotor**

# Features of 21-MII Series Motors

Reliability & Easy Operation / Maintenance

## Main terminal Box

NEMA Type II terminal box is standard. Boxes arranged for surge protection and/or differential CT's are readily available. Standard main terminal box is rotatable every 90 degrees. There is enough space below main terminal box for cable connection.

## Air housing

Changes top-hood and available four kinds of enclosures such as NEMA WP-1, WP-II, CACA and CACW.

## Stator core

Made of high-grade electrical steel with low magnetic losses. Stator core with the winding is pressed centrally into the frame and locked against rotation and axial displacement.

## Stator coil

Utilizes highly reliable, vacuum pressurized impregnation (VPI) insulation system which provides firm fixing of coil ends and ability to withstand most environments.

## Frame

Increased rigidity of stator frame use cast iron and low vibration are achieved by a frequency analysis.

## Rotor

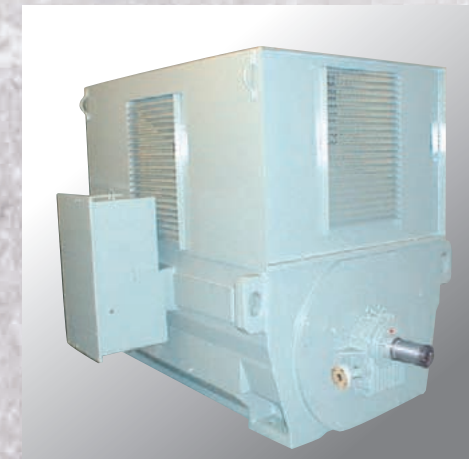
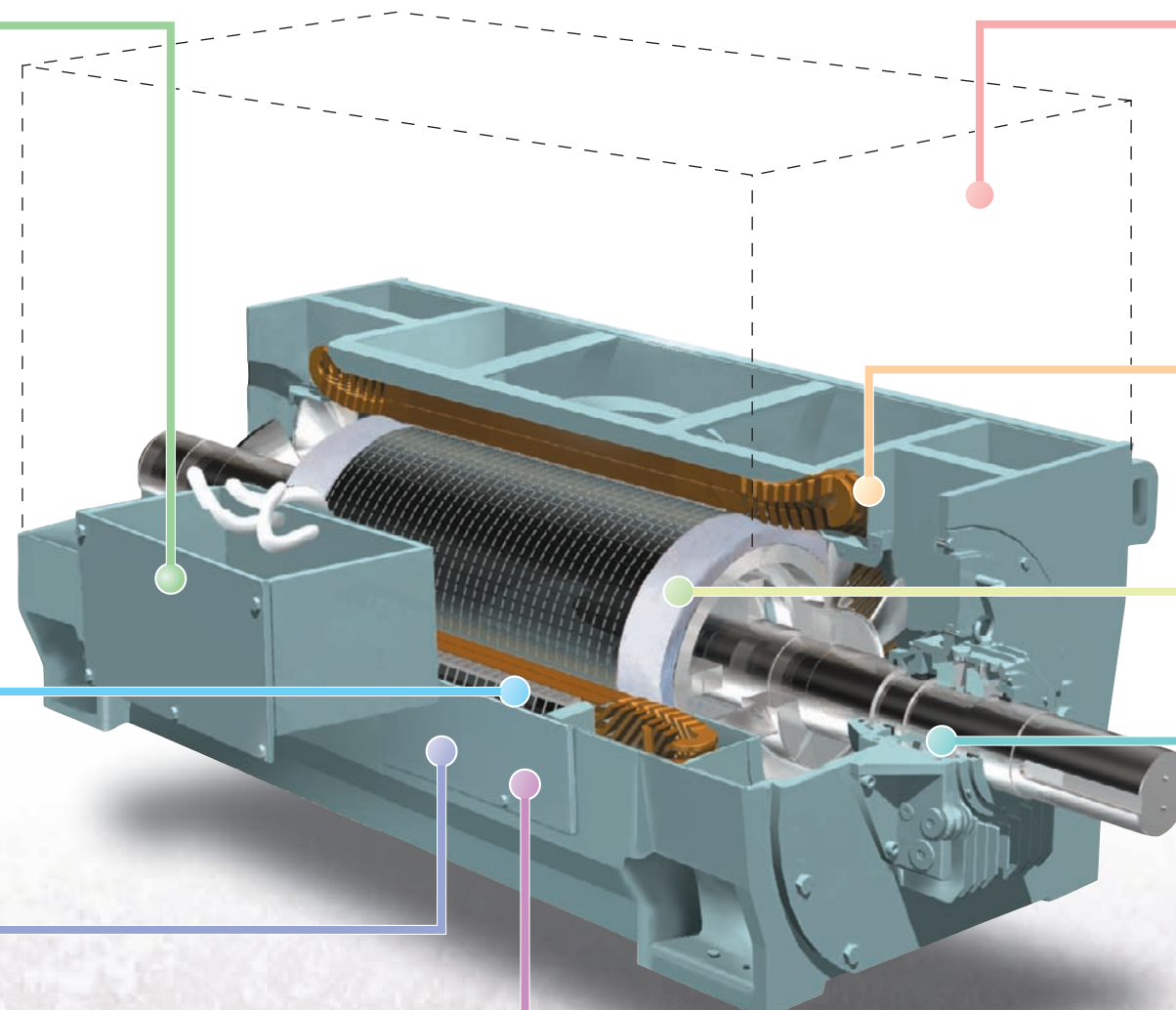
Highly reliable aluminum die casting rotor has increased range of utilization by established casting process. This rotor construction has realized capacity expansion, high reliability, high frequent starting duty and lower inertia. And also copper rotor bars are available.

## Auxiliary terminal box

Modular arrangement for accessory connections allows flexibility with standardized mechanical construction.

## Bearing

Antifriction & sleeve bearings have easily maintainable construction with excellent lubrication system.



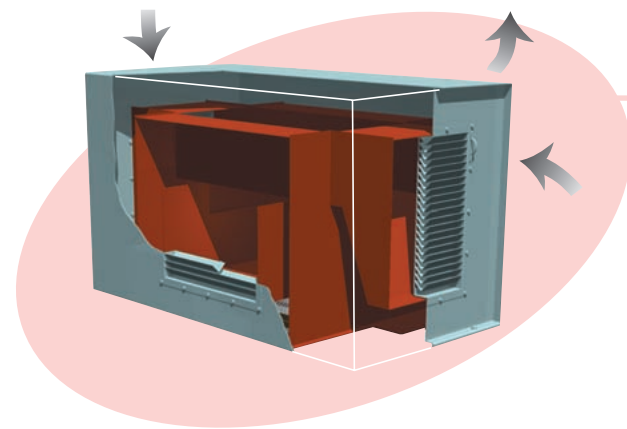
# Enclosures of 2I-MII Series Motors

## 2I-MII Series

**Output** : 50Hz 160 ~ 2,800KW (210~3,750HP)  
 60Hz 200 ~ 3,550KW (270~4,750HP)  
**Voltage** : 2,300V ~ 11,000V  
**Insulation Class** : F Class  
**Apply Standards** : IEC, NEMA, BS, AS ...

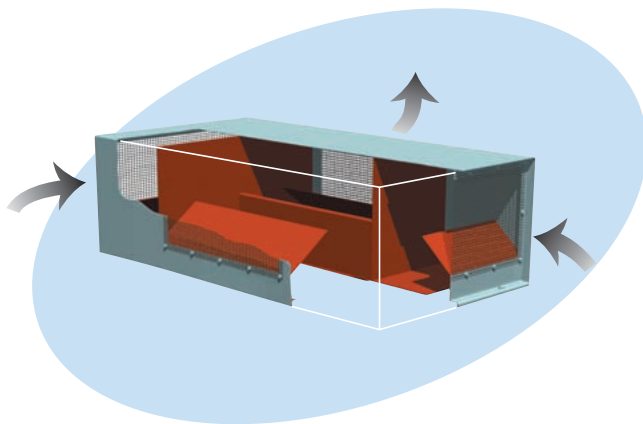
### NEMA Weather-protected Type-II

The open-outdoor type motor (IP24W, IC01) is a motor used for outdoor that incorporates an air housing in accordance with NEMA WP11. It includes three right angled turns for air inlet and inlet air duct has a section where wind velocity falls below 3 m/sec (600ft/min.), dripping water, dust, and foreign materials. A section is provided in which air may blow through without being forced into the motor.



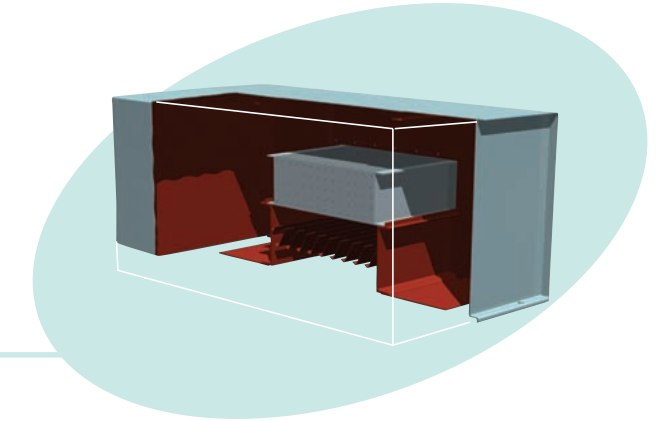
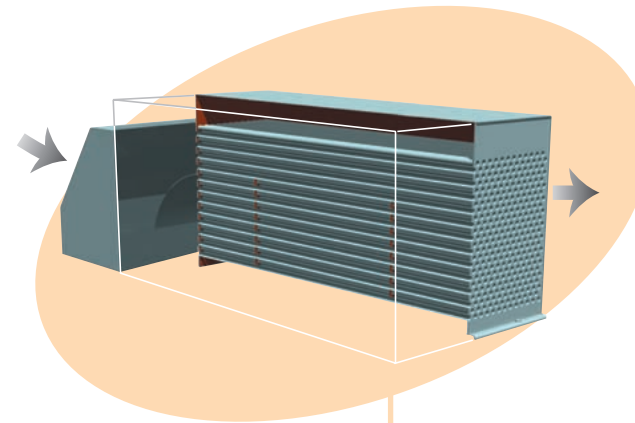
### Drip Proof Type

A drip proof type motor (IP22, IC01) is a common choice for a well ventilated room. Cooling air intake and hot air exhaust windows are located at top hood portion. The ducts are windows provide with separate braid at inside and screens at outside to prevent intrusion of water drips and other foreign materials into the motor inside (NEMA WP-I requirements).



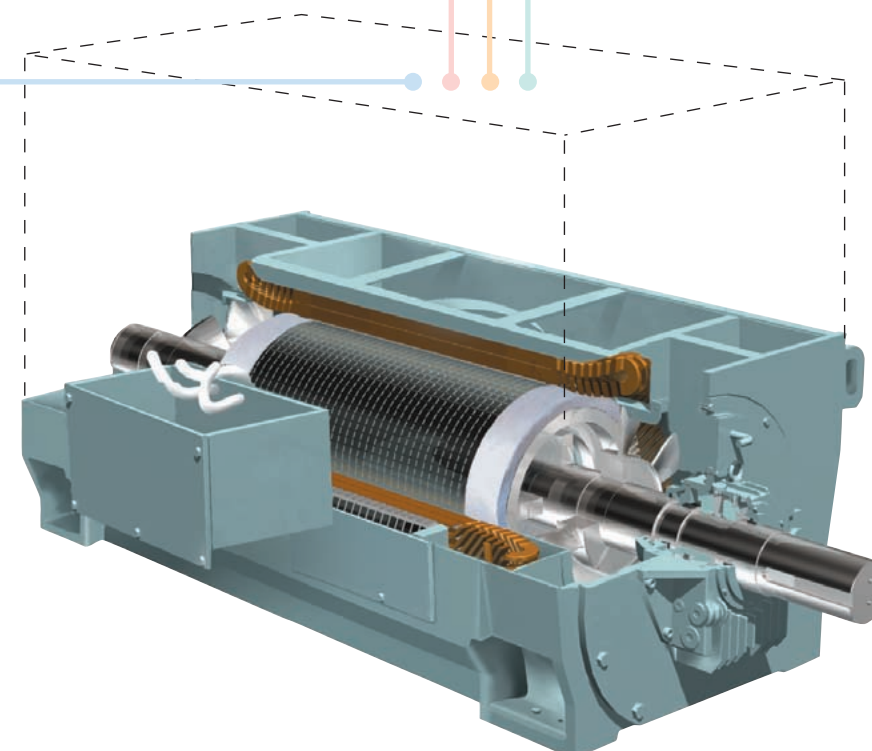
### Totally-enclosed Fan-cooled Type (CACA)

In an environment containing corrosive or harmful gas, a totally-enclosed fan-cooled motor (IP44 / IP55, IC611) is generally used. The external fan mounted on the opposite drive end directs fresh air into the pipes of the air housing located on the upper part of the motor. The pipes constitute a heat exchanger in which fresh air passing through the pipes cools motor inside hot air.



### Totally-enclosed Air-Water-cooled Type (CACW)

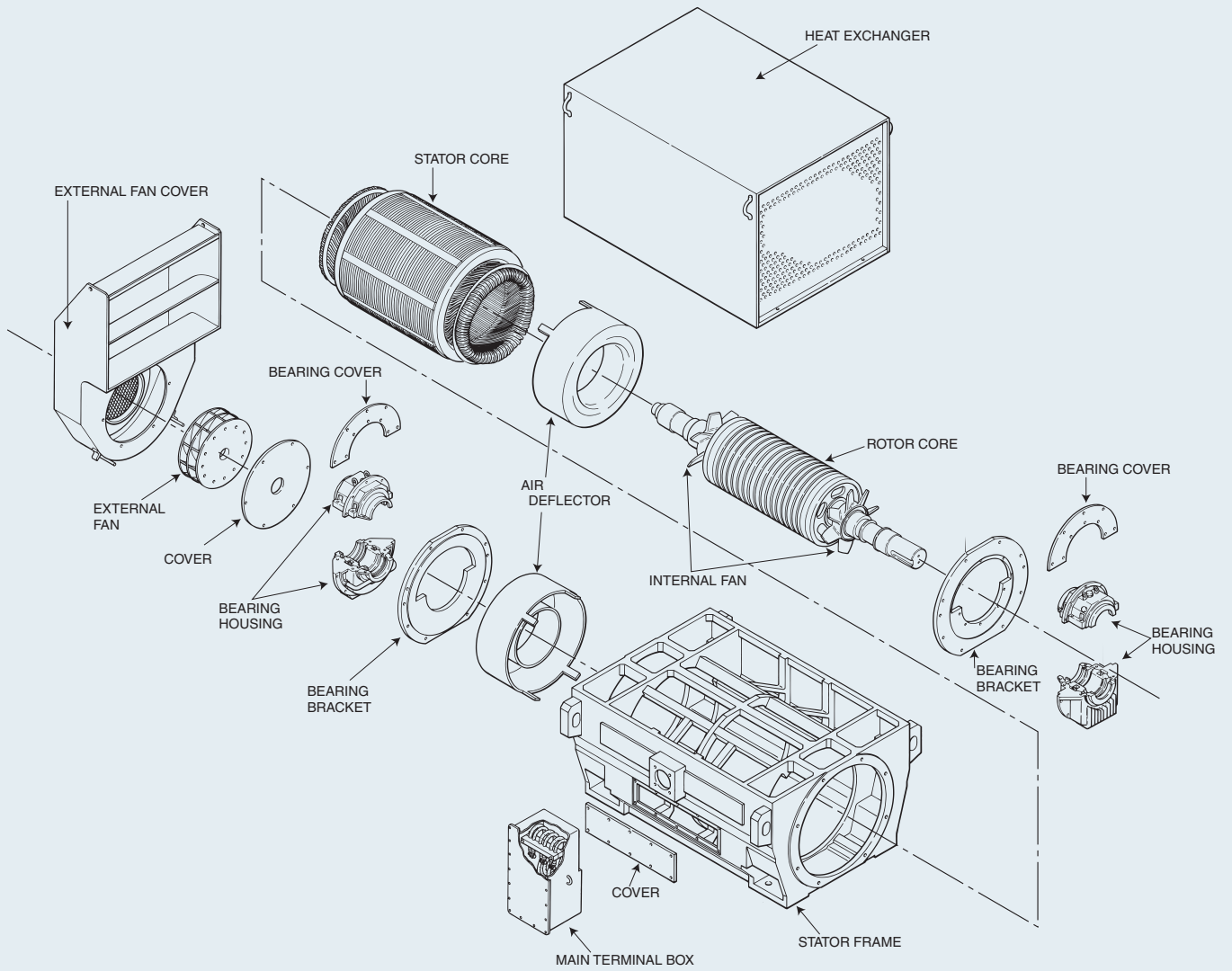
This type of motor (IP44 / IP55, IC81W) is especially useful in a location where low noise operation is required or where it is desired to remove heat from the motor ambient. The motor accommodates an air to water heat exchanger in the air housing in the upper part of the motor. A drain in the air housing protects the motor proper from damage caused by water leakage.



### Fundamental

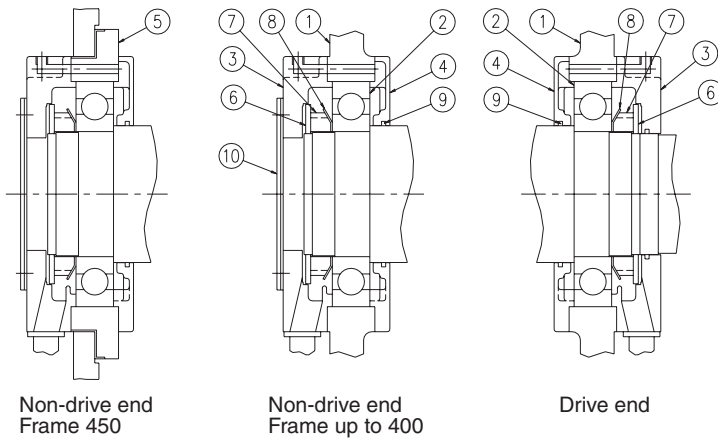
IC01, IC61 and IC81W per IEC Standard constructions are available by changing top hood construction, in addition to the four type where described here. Main terminal box can be changed every 90 degree angle. Main terminal box size is large enough to connect cable easily. And also provided shaft current protection insulator at none drive end bearing portion for 450 frame and sleeve bearings machine as standard.

# 21-MII series in detail



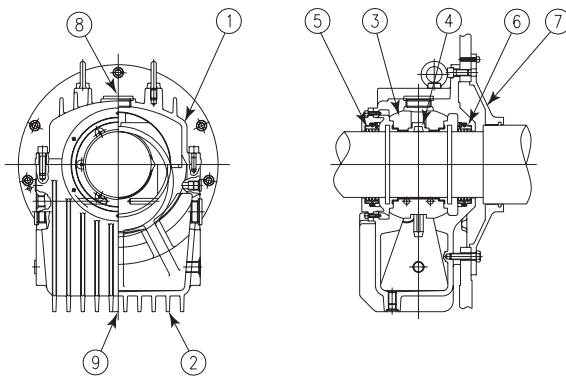
# Details of Bearing Arrangement

## Grease Lubricating Type Antifriction Bearings



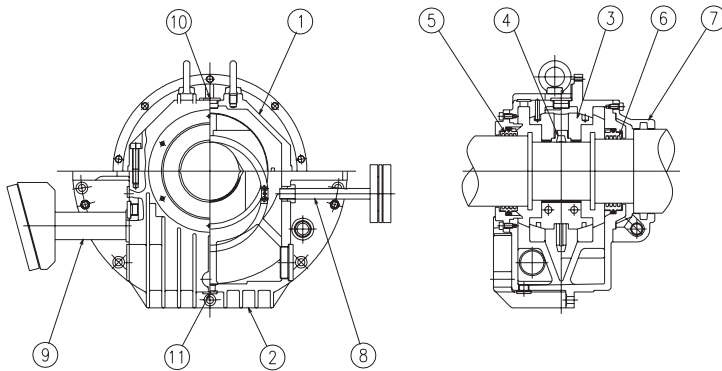
Part No.	Part Name
1	Bearing Bracket
2	Bearing
3	Outside Oil Seal
4	Inside Oil Seal
5	Insulated Bearing Seat
6	Grease Valve
7	Bearing Nut
8	Bearing Washer
9	Packing
10	Cover

## Self Cooled Sleeve Bearings



Part No.	Part Name
1	Bearing Housing
2	Bearing Bracket
3	Bearing Metal
4	Oil Ring
5	Outside Oil Seal
6	Inside Oil Seal
7	Machine Seat
8	Sight Glass
9	Drain Plug

## Forced Feed Lubricated Sleeve Bearings



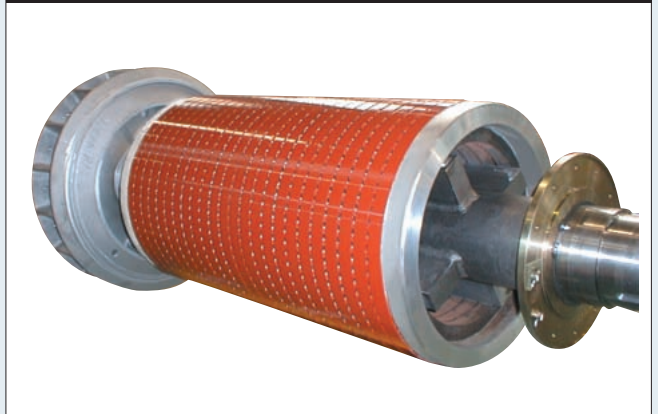
Part No.	Part Name
1	Bearing Housing
2	Bearing Bracket
3	Bearing Metal
4	Oil Ring
5	Outside Oil Seal
6	Inside Oil Seal
7	Machine Seal
8	Oil Inlet Pipe
9	Oil Outlet Pipe
10	Sight Glass
11	Drain Plug

# Features of 21-MII series equipments.

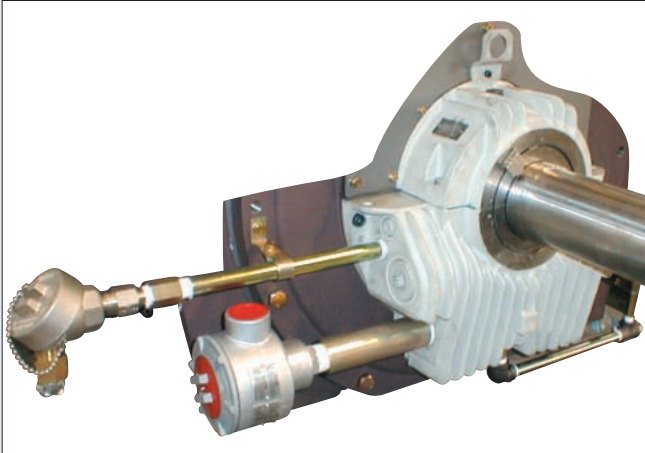
**High quality, rigid, Cast Iron frame provides lower vibration and noise.**



**Double cage rotors provide high starting torque. Unique radial air duct design provides increased cooling efficiency.**



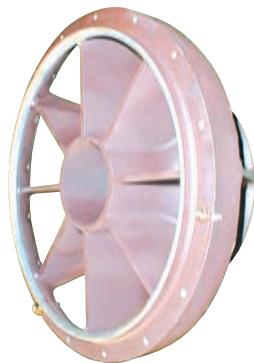
**Spherically seated split sleeve bearings provide easy alignment and long life.**



**Over sized main terminal boxes for easy cable termination and also available extra large sized for surge-pack mounting.**



**A variety of fan designs in cast iron or cast aluminum for increased cooling and lower noise.**



**Radial fan**



**Twin turbo fan**



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