

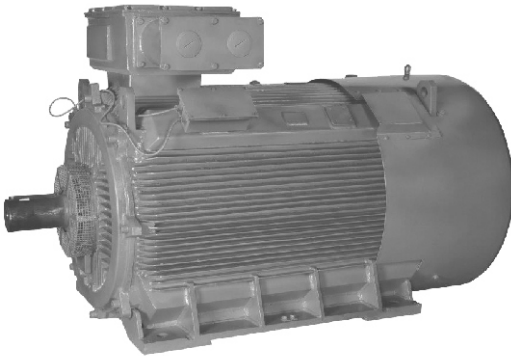
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INST - 1 Rev - d

# INDUCTION MOTORS

## Installation & Maintenance Instructions - General




### **BHARAT BIJLEE LIMITED**




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## **1.0 RECEIVING AND STORING OF MOTORS :-**


- 1.1 Make sure that right type of motors as ordered by you has arrived and it is not damaged in transit, In case of any such problem report immediately to our office. 
- 1.2 Store the motor in a clean dry place if it is not to be installed immediately. If period is more than 3 months, refer the catalogue available on our web site for storage instructions.

## **2.0 INSTALLATION AND MOUNTING OF MOTORS :-**

- 2.1. Before installation and mounting observe the following:-
  - 2.1.1 See that the motor rotates freely by turning the shaft by hand.
  - 2.1.2 Replace the grease in the bearings if the motor has been stored for more than 18 months. This is not applicable where sealed bearings (2Z) are used (63 to 200 frames) 
  - 2.1.3 Check the insulation resistance by applying a D.C. voltage of 500 V. If it is low due to moisture, dry out the stator winding till the insulation resistance increases up to five mega ohms by any of the accepted methods. (Ref. IS 900) 
  - 2.1.4 Remove anticorrosion coating on the shaft with petrol, white spirit or kerosene. Do not scrape the coating.
  - 2.1.5 See that the machined surface of motor feet (or flange face) and also the surface on which the motor is mounted is clean and perfectly level.
  - 2.1.6 The coupling parts to be fitted on the motor shaft are to be properly balanced. The bore and key way are to be machined accurately.
  - 2.1.7 The coupling parts or pulley must be carefully fitted by means of special tackle for which a tapped hole is provided at shaft end. Direct hammering must be avoided since it might damage bearings. The puller can also be used for removal of coupling (Ref Fig. 1) 
  - 2.1.8 While using Non-flexible coupling it shall be noted that shafts of the motor and the driven Machine must be in perfect alignment and axes should coincide. Inaccurate alignment can result in stresses on bearings and noisy running & can also result into premature

bearing failure.


2.1.9 See that screws for fixing the motor (or flange) to the foundation are secured properly.

2.1.10 Install the motor such that the cooling air has free access and can pass unobstructed over the motor. Refer catalogue for minimum distance to be kept for proper cooling. 


2.1.11 For vertical mounted motors, the user should ensure that water does not enter from the shaft. A rubber water flinger is recommended. For shaft pointing downwards, a canopy is recommended.

### **3.0 ELECTRICAL CONNECTIONS :-**

3.1.0 While doing electrical connection ensure following points:-

3.1.1 Use appropriate size of cables & cable lugs for connecting the motor. 


3.1.2 The supply voltage should be same as given in the rating plate.

3.1.3 Connect the motor in accordance with the connection (Star or Delta) given in the rated plate and connection diagram given inside the Terminal box cover. 

3.1.4 Connect earth terminal effectively for protection. This is very important to ensure safety. Local electrical code must be followed.

3.1.5 Normally 3 phase motors up to 2HP have their winding connected in star (Y) These Motors have three terminals and are meant for direct on line starting only.

3.1.6 Motors above 2HP have windings suitable for delta (D) connection. These motors can be started with a Y-D starter or Direct on Line starter using connecting links as shown in the connection diagram.

3.1.7 While connecting the cables to motor terminals please ensure that the cable is properly secured and clamped and it does not exert any tension on terminals. A heavy load or tension by the cable can break the terminals. 

3.1.8 Motors must be installed as per the local electrical code/regulations by an authorized person. Motors must be protected against overload and short circuit conditions.


## 4.0 **MAINTENANCE :-**

4.1.0 During maintenance please note the following points :-

4.1.1 Sealed bearings are pre lubricated and maintenance free. Unsealed bearings should be cleaned at intervals, of about 10,000 hours with trichloroethylene or white petrol. While lubricating, please see that the bearings are well lubricated and about one third of the space within bearing covers is filled with grease. Over filling of grease is not recommended. Wherever online greasing arrangement is provided & while re-greasing motors keep the grease outlet open and fill grease when the motor is running. Put specified grease quantity, at re-greasing frequency mentioned on the rating plate

4.1.2 LGMT3 grease of SKF make is recommended for use in motors. Alternatively Mobil UNIREX N3 grease can be used. In such cases existing grease shall be removed completely. Mixing of grease is not permitted.

4.1.3 When the motor is opened, protect bearings from foreign particles and dirt by wrapping them with clean paper or polythene sheet.

4.1.4 During reassembly of motor ensure that wavy washer is kept in its position and bearing covers are secured properly. These washers are specially designed to provide adequate preloading on the bearings. 


4.1.5 During reassembly of motor ensure that bolts / screws are tightened by applying following tightening torque in Nm (Ref. IS 1367 Part 3 (ISO 898-1))

Size	M4	M5	M6	M8	M10	M12	M16	M20	M24
Torque	1.3	2.6	4.5	10	20	34	83	160	280


4.1.6 Clean the entire path of the cooling air on the motor at regular intervals.

4.1.7 The temperature of the motor, judged by hand feeling, could be misleading. In the case of suspected overheating the actual temperature should be measured with duly calibrated thermometer or infrared gun and should be compared with the permissible temperature rise according to the temperature class of the motor.

4.1.8 Overheating of the motor may be due to over loading of motor, too low or too high supply voltages, frequency fluctuations, over greasing of bearings, foreign material in the air gap between stator and rotor. Necessary corrective action is to be taken accordingly.

4.1.9 When ordering spare parts, state the motor type, machine number, type of construction as shown in the rating plate, part description given in the part list and number of units required. (Ref.fig. 3) 


## **5.0 SPECIAL CARE FOR IP PROTECTION :-**

5.1 Cable entries are fitted with threaded plugs and are sealed. Open  the Plug and clean threads before fitting cable gland. Use double Compression gland and seal the threads of glands with sealing cement. This will ensure IP55/IP56 Protection of the cable entry.

5.2 After the cable connection, fix the T. Box and cover properly. Ensure that the rubber Gasket provided is not dislocated or distorted and fixing screws are fully tightened. Replace the gasket if damaged / distorted.

5.3 Whenever possible it is recommended to cover the motor from direct heating by the sun as well as direct rain fall. Provide canopy over the motor.

5.4 The motor shaft is provided with oil seals / 'V' rings on the both ends. Drain plugs are provided at driving & non driving ends, (Ref. fig 2). During periodic inspection, say once in 3 months open the drain plugs and drain out condensed water if any.

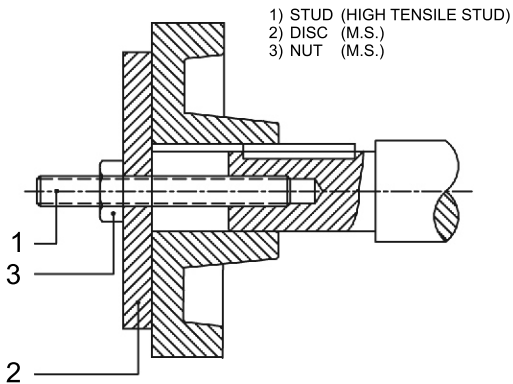
5.5 While replacing oil seals, make sure that oil seals are not distorted, the springs are in their position and the lip of the oil seals are free.  Apply small amount of grease to the lip. 'V' rings can be replaced by first removing the M.S. Cap. The new 'V' ring is to be fitted such that the lip just rests against the end shield face (Excessive pressure will lead to Premature failure of the 'V' ring.). Replace the M.S. Cap, ensuring that the slot in the M.S. Cap is at the bottom.

5.6 Whenever the motor is opened and reassembled ensure that all joints faces are properly cleaned and gasket cement is applied properly at all joints (Ref. fig 2).

5.7 Recommended gasket cements e.g. Anabond 681 of Anabond Ltd.

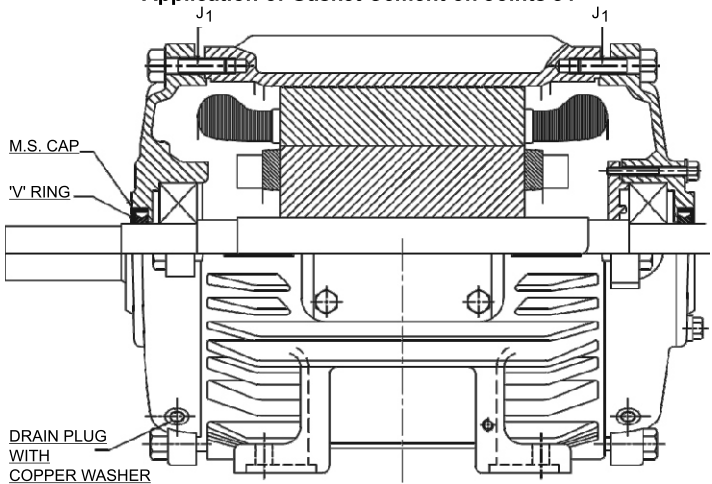
**Fig - 1**

**Method of Mounting Coupling / Pulley**



**Fig - 2**

**Application of Gasket Cement on Joints J1**

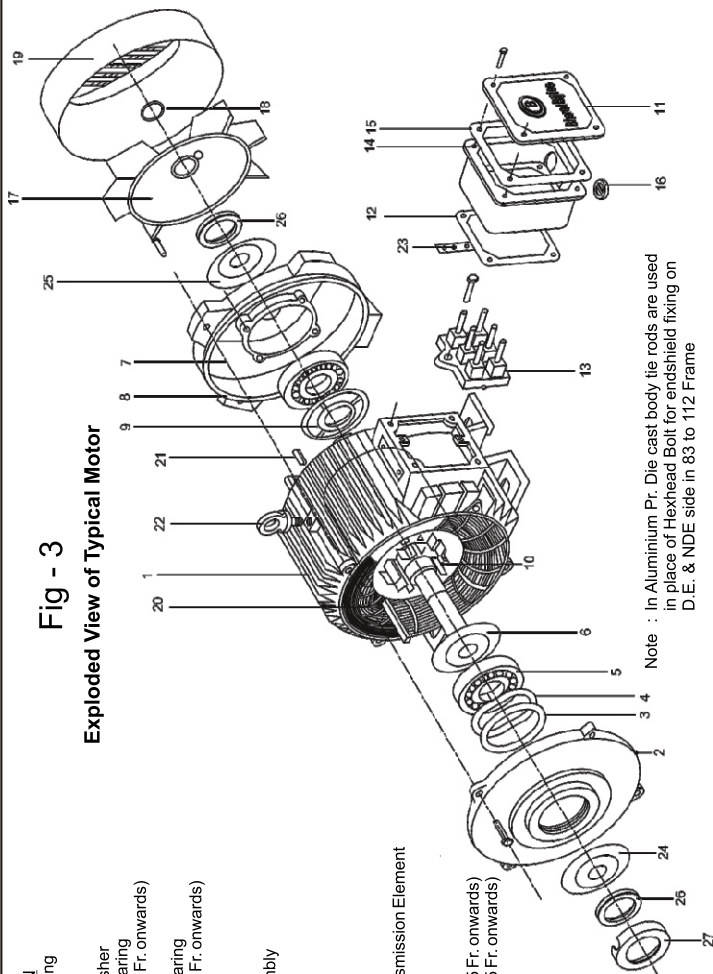


# Fig - 3

## Exploded View of Typical Motor

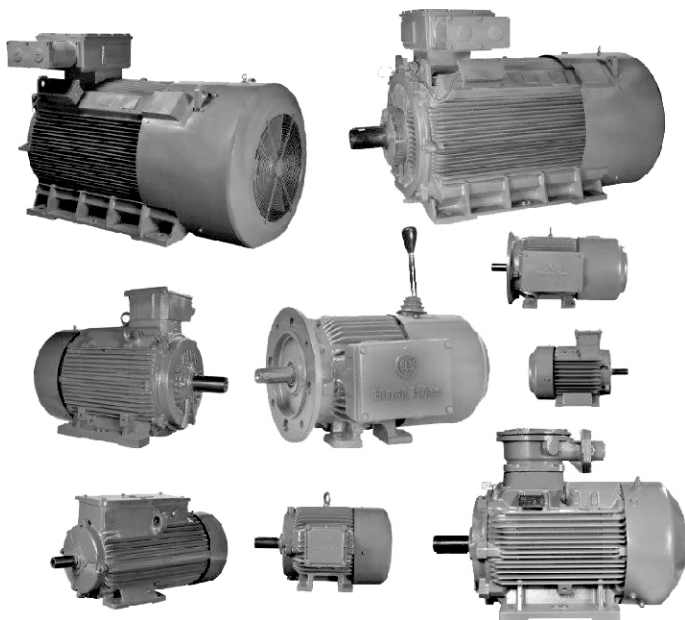
### PART DESCRIPTION

1. Body with stator winding
2. Endshield Drive End
3. Bearing Washer
4. Preloading Wavy Washer
5. Deep-Groove Ball Bearing
6. Inner Brg. Cover (225 Fr. onwards)
7. Endshield Non-Drive
8. Deep-Groove Ball Bearing
9. Inner Brg. Cover (132 Fr. onwards)
10. Rotor
11. Terminal Box Cover
12. Rubber Packing
13. Terminal Block Assembly
14. Terminal Box
15. Rubber Packing
16. Conduit Plug
17. Fan
18. Circlip
19. Fan Cowl
20. Feather Key For Transmission Element
21. Feather Key For Fan
22. Eye Bolt
23. Connecting Link
24. Outer Brg. Cover (315 Fr. onwards)
25. Outer Brg. Cover (315 Fr. onwards)
26. V-Seal
27. M. S. Cap



Note : In Aluminium Pr. Die cast body tie rods are used in place of Hexhead Bolt for endshield fixing on D.E. & NDE side in 83 to 112 Frame

## Motors for different applications



Product packaging materials shall be recycled to the extent possible.

During servicing of motor whatever scrap is getting generated shall be disposed/recycled to the extent possible.

After end of product life cycle please ensure the disposal/recycle of the same shall be in accordance to central, state & local regulations.

For details visit our Website-product life cycle guidelines.