INSTALLATION • OPERATION • MAINTENANCE

INSTRUCTIONS

WOUND ROTOR Life-Line MOTORS

TYPE CSP SQUIRREL-CAGE and TYPE CWP or CIP

FAN-COOLED AND EXPLOSION-PROOF
Frames 364 through 445 with Prelubricated Ball Bearings

FAN-COOLED LIFE-LINE TYPE CSP SQUIRREL-CAGE AND CWP OR CIP WOUND ROTOR INDUCTION MOTORS in NEMA frames 364 through 445 are designed for a wide variety of applications. Sturdy cast iron construction is employed throughout, with the stator core completely encased in a solid frame.

Brackets are cast solid and register directly in accurately machine rabbet fits in the frame. The fan is securely clamped on the shaft and propels a stream of cooling air through the frame vents. In all enclosed motors, none of the internal parts are exposed to the external air.

ON EXPLOSION-PROOF MOTORS, the presence of the Underwriters' label on the motor is certification that it has been built to rigidly controlled standards to assure utmost safety of operation in hazardous locations. If necessary to dismantle a labeled motor for servicing in the field, upon reassembly it is imperative that the factory assembly be duplicated in all respects. Underwriters' label can only be mounted at point of manufacture.

Warranty. The Corporation in connection with apparatus sold agrees to correct any defect or defects in workmanship or material which may develop under proper or normal use during the period of one year from the date of shipment, by repair or by replacement f.o.b. factory of the defective part or parts, and such correction shall constitute a fulfillment of all the Corporation's liabilities in respect to said apparatus, unless otherwise stated in the quotation.

Any defects that may develop should be referred to the nearest Westinghouse Sales Office for complete servicing information.

RECEIVING

Unpack the motor and make certain that it was not damaged during shipment. Turn the shaft by hand to see that it turns freely.

Check to see that the nameplate data agrees with the voltage and frequency of the power supply provided for the motor.

Shaft extension is coated with a slushing compound to prevent rusting during shipment and storage. This slushing compound may be removed by such as benzine, gasoline, Stoddard solvent, etc. See Precautions under "Maintenance" for use of these solvents.

INSTALLATION

Mounting. Locate the motor in a place that is well-ventilated. If protecting shields or guards are used, they must not obstruct the free flow of air around the motor. The external air temperature should not exceed 40°C or 104°F, unless the motor has been specially designed or otherwise cleared for use in higher ambient.

Fasten to a rigid foundation using bolts or screws of the largest size permitted by the drilling in the mounting feet or flange. The motor must rest evenly on all 4 foot-pads or flange mounting.

Because these motors have sealed prelubricated ball bearings, they may be mounted at any desired odd angle, without decrease in drip proof protection or reduced drain effectiveness.

Method of Drive. Any of the following drive methods may be used depending on the particular motor application.

1. **V-Belt Drive.** Mount the motor on the slide rails or bedplate, which allows for adjusting the belt tension.

Mount the motor sheave close to the bearing housing allowing sufficient clearance for rotor end play.

The smallest sheave should not be less in diameter than that recommended by the belt manufacturer for the belt used.

Sheaves should be carefully aligned. Belt tension should be just sufficient to eliminate excessive sag in the slack side of the belt. V-belts do not require as much tension as flat belts.

2. **Chain Drive.** Mount the motor on the slide rails or bedplate, which allows for adjusting the chain tension.

Mount the motor sprocket close to the bearing housing, allowing sufficient clearance for rotor end play, and align the sprockets accurately.

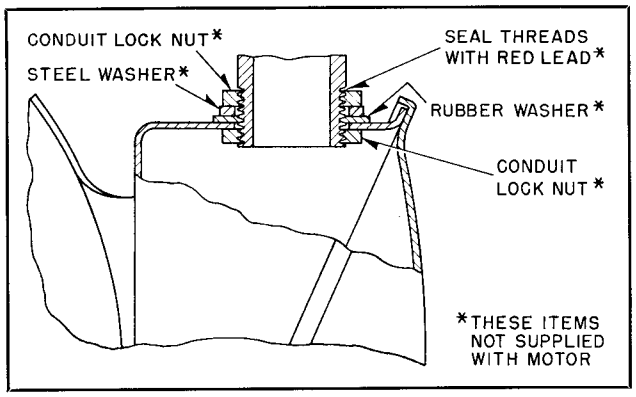


FIG. 1. Method of Connecting Conduit to Keep Out Liquids When Leads Enter Top of Conduit Box

3. **Gear Drive.** Mount the motor and driven unit so as to maintain accurate alignment. The gears must mesh accurately to prevent vibration.

Mount the motor gear close to the bearing housing to minimize the overhang, allowing sufficient clearance for rotor end play.

Dowel the motor to the base.

4. **Direct Drive.** The motor shaft and driven shaft must be carefully aligned.

Dowel the motor to the base.

Note: Pulleys, pinions or coupling halves should have a close sliding fit on the shaft extension and must be securely locked to avoid hammering out in operation. If it is necessary to drive the part into position, it is important, on ball bearing motors, that the end of the shaft opposite the extension be backed up so that the force of the blow is not taken in the bearing. Use a pinion puller for removing tight pulleys.

Electrical Connections. Be sure the motor is connected as shown on the nameplate diagram, and that the power supply (Voltage, Frequency and Number of Phases) corresponds with the nameplate data.

Connect to the power supply through a suitable witch and overload protection.

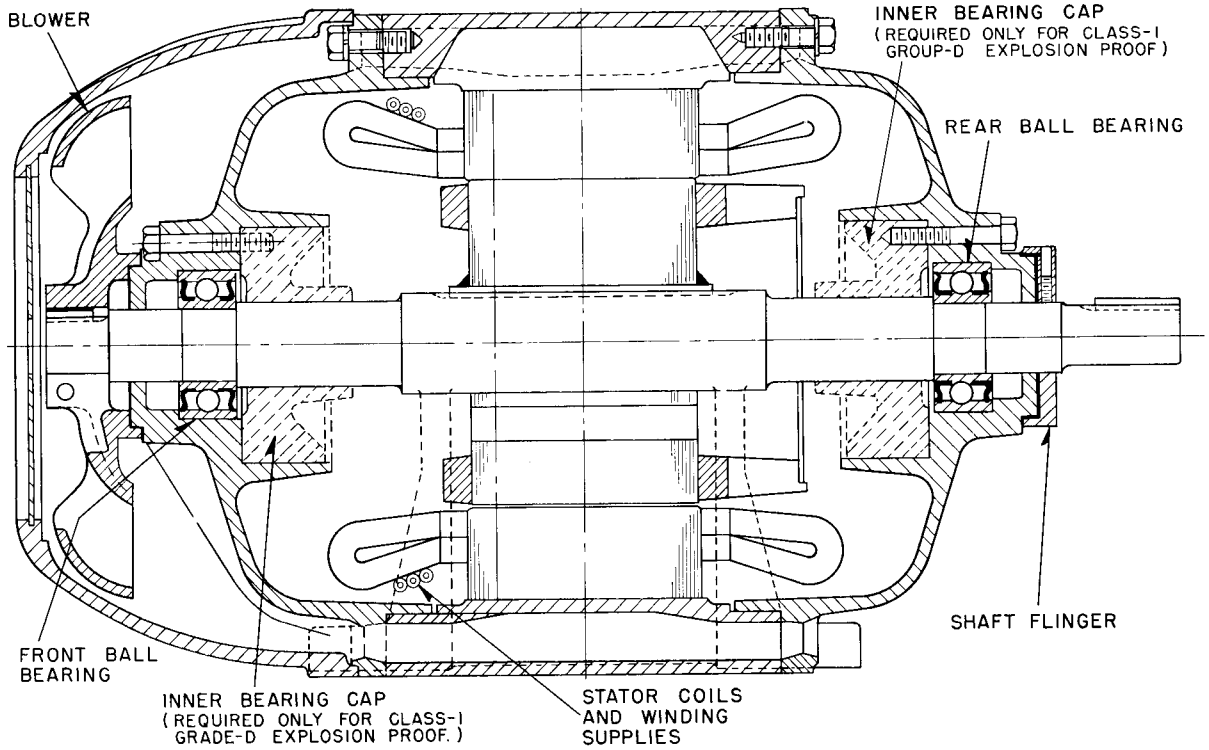
Install all wiring and fusing in accordance with the National Electric Code and local requirements.

To change the direction of rotation on three-phase motors, interchange any two line leads.

To change the direction of rotation on two-phase motors, interchange the line leads of either phase.

Conduit Box. If the conduit box is desired on the opposite side of the motor, remove the brackets and rotor, reverse the frame, and reassemble.

The conduit box is mounted on the horizontal



Note: Fits between brackets and frame sealed with water repellent grease; some totally enclosed non-ventilated motors use same parts as fan cooled except without fan and hood.

FIG. 2. Arrangement of Parts—Fan Cooled and Explosion Proof Assemblies

centerline, and may be rotated in steps of 90° to receive conduit from any of four directions.

Standard Fan-Cooled motors use a gasketed sheet steel box with knock-out for conduit entrance. When conduit entry is from above, the recommended method of connecting conduit is as shown in Figure 1. Where conditions warrant it, the same method may be applied to conduit entry from the sides.

Explosion-Proof and Chemical motors have a cast iron box tapped for receiving rigid conduit. Pipe-size conforms to accepted standards for the particular motor frame size, and a reducer should be used when connecting to smaller conduit.

OPERATION

Run the motor without load to check the connections and direction of rotation.

The motor will operate satisfactorily with a 10 percent variation in voltage, a 5 percent variation in frequency, or a combined voltage and frequency variation of 10 percent, but not necessarily in accordance with the standards of performance established for operation at normal rating.

MAINTENANCE

Inspection. Although Life-Line motors require a minimum of attention in service, they should be inspected at regular intervals to check for excessive (1) dirt, (2) moisture, (3) friction and (4) vibration, which account for 90 percent of all motor failures.

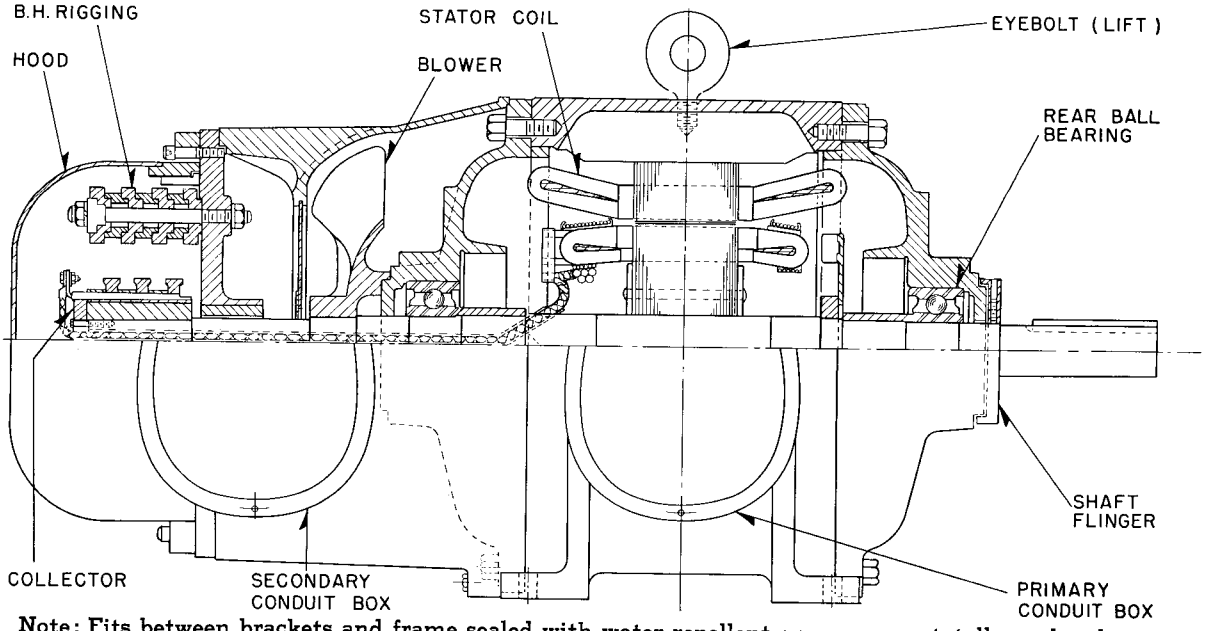
1. **Guard Against Dirt.** Keep the insulation and mechanical parts of the motor clean. Dust that is free from oil or grease may be removed by wiping with a clean, dry cloth, or preferably, by suction. Dust may be blown from inaccessible parts with clean, dry air, using not more than 30 to 50 pounds pressure. Use care to prevent personal injury from flying particles.

When grease or oil is present, wipe with a cloth moistened (but not dripping) with a petroleum solvent of a "safety type" such as Stoddard solvent or similar materials available under various trade names. Wear suitable gloves to prevent skin irritation when using these petroleum solvents.

Petroleum solvents are flammable but relatively non-toxic.

2. **Guard Against Moisture.** Care should be taken to protect dripproof motors from accidental hosing.

The insulation resistance of stand-by motors should be checked with a "megger" at regular intervals to detect the presence of moisture in the windings. If the insulation resistance shows an appreciable decrease, the windings should be dried out by any suitable means before applying power to the motor. This is particularly important in installations where the ambient temperature is subject to frequent, sharp fluctuations, or where the atmosphere is unusually damp. For less severe locations, running stand-by motors, at least once a week should protect the windings from moisture absorption or condensation.



Note: Fits between brackets and frame sealed with water repellent grease; some totally enclosed non-ventilated motors use same parts as fan cooled except without fan and hood.

FIG. 3. Arrangement of Parts—CWP or CIP Fan-Cooled Assemblies

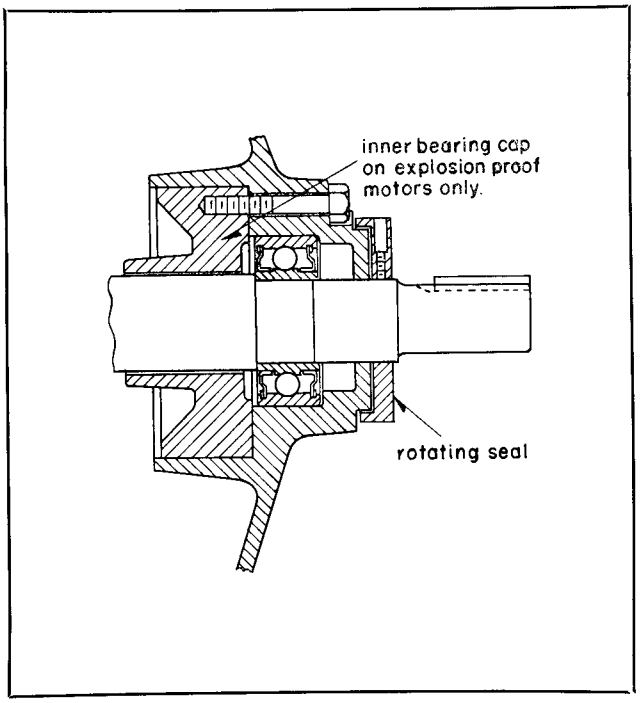


FIG. 4. Sectional View—Prelubricated Ball Bearing Assembly

Before motor windings are blown out with air, make sure that water has not condensed in the air line.

3. **Guard Against Friction.** Excessive friction or overheating of bearings is usually traced to one of the following causes:

a. Excessive belt tension.

b. Poor alignment causing excessive vibration or binding.

c. Bent shaft.

d. Excessive end or side thrust due to gearing, flexible couplings, etc.

4. **Guard Against Vibration.** To avoid failures due to vibration, a few simple checks should be made regularly.

Check for misalignment such as may be caused by foundation settling or heavy floor loading. These may be causing vibration through misalignment.

Check to see if vibration from the driven machine is being transmitted to the motor.

Check for excessive belt or chain tension or the push-apart effect inherent in spur gears.

Check the motor mounting belts and bracket bolts to be sure they are tight.

Coils. Revarnishing the windings when motors are overhauled will lengthen their life. Suitable varnish may be obtained from the nearest Westinghouse Sales Office.

Bearings. (See Figure 4) The bearings used in Life-Line motors are packed at the factory with the proper amount of lubricant; no further lubrication is needed for the normal life of the bearings.

A specially selected grease having a high degree of stability is permanently sealed in the bearings. The grease has been proven by tests both in the laboratory and the field for long service.

Bearings from several suppliers are used in Life-Line motors; for a given size motor, the bearings of all suppliers are interchangeable. The details of the seal construction vary somewhat depending upon the bearing manufacturer, but each type of seal is equally effective in keeping out foreign material and retaining the lubricant. A typical seal construction is shown in Figure 4.

SECONDARY CONNECTIONS, BRUSHES AND SLIP RINGS FOR TYPES CWP AND CIP WOUND ROTOR MOTORS

Brushes. The brushes should make good contact with the slip rings along the whole face of the brush. If necessary, grind new brushes in with fine sandpaper. Maintain a free sliding fit between the brushes and the brushholder by cleaning both thoroughly when necessary.

Maintain the brush spring tension at the correct value, determined by the grade of brushes and the local service conditions. Make the pressure as low as consistent with good brush slip ring contact. A correct pressure per square inch is between two and three pounds for carbon or graphite brushes, and between three and five pounds for metallic brushes. Each brush should bear equal pressure. Do not use lubricants. Use the correct grade of brushes which may be obtained from the nearest Westinghouse dealer.

Slip Rings. The slip rings should be maintained smooth and true. Grind or turn them if necessary to restore a smooth and true surface.

Secondary Connections. A conduit box is supplied to accommodate the secondary leads; no leads are furnished. Customer should extend leads from the conduit box to the terminals on the brushes.

RENEWAL PARTS

Renewal Parts information may be obtained from the nearest Westinghouse Sales Office. Be sure to name the part or parts required (see Figures 2 and 3) and give the complete nameplate reading on the motor for positive identification.

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