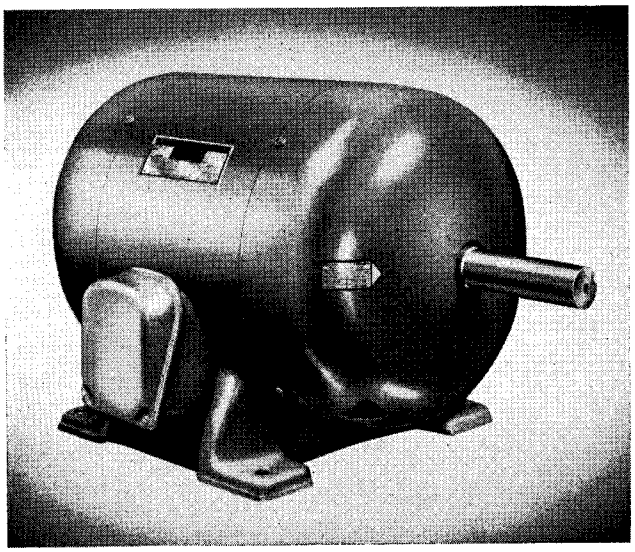
INSTALLATION • OPERATION • MAINTENANCE

INSTRUCTIONS

SQUIRREL-CAGE *Life-Line* MOTORS

SPLASH-PROOF, TYPE CSP, 1 TO 20 HP

(Frames 203 through 326 with Prelubricated Ball Bearings)



LIFE-LINE SPLASH-PROOF Type CSP Motors in NEMA frame sizes 203 through 326 are squirrel-cage induction motors designed for a wide variety of constant speed applications. The stator core is completely encased in a rolled steel frame. Steel end brackets and hoods protect the windings from falling chips and offer full protection against dripping and splashing liquids. The brackets also offer special support to the prelubricated ball bearings.

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 wiping with any petroleum solvent, such as benzine, gasoline, turpentine, Stoddard solvent, etc. See precautions under "Maintenance" for use of these solvents.

INSTALLATION

Mounting. Locate the motor in a place that is clean and 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.

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

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

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

Mount the motor pulley so that the inner face of the pulley is in line with the shoulder on the shaft extension.

Use a belt wide enough to carry the load without excessive tension. Wide, single ply belts are preferable to double ply belts due to the lower bearing pressures that result.

The smallest pulley should not be less in diameter than that recommended by the belt manufacturer for the belt used, and in no case less in diameter than indicated on Table 1.

Align the pulleys so that the belt runs true, and tighten the belt just enough to prevent slippage. Where the pulleys are not of approximately the same diameter, the distance between shaft centers should be greater than twice the diameter of the larger pulley. For short center distances, an idler pulley or a V-belt drive should be employed.

2. **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, and in no case less in diameter than indicated on Table 2.

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

3. **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.

4. **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.

5. **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.

Table No. 1

PULLEY SIZE FOR FLAT BELT DRIVES

MOTOR FRAME	PULLEY DIMENSIONS	
	MIN. DIAM. (inches)	MAX. WIDTH (inches)
203-204	2½	3
224	2½	3½
225	3	3½
254	3½	4½
284	4	5½
324	5	6¾
326 (above 2000 RPM)	5	6¾
326 (2000 RPM and below)	6	7¾

Table No. 2

SHEAVE SIZE FOR V-BELT DRIVES

MOTOR FRAME	SHEAVE DIMENSIONS	
	MIN. PITCH DIAM. (inches)	MAX. WIDTH (inches)
203-204	2¼	3
224	2¼	3½
225	2½	3½
254	2¾	4½
284	3	5½
324	3¾	6¾
326	4½	7¾

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 switch 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 on the side of the motor is designed with three conduit knock-outs to suit various mounting conditions. Where it is desired to extend conduit from above, remove the two mounting screws, and turn the conduit box 180° so that the knock-out will be at the top. Recommended method of connecting conduit for overhead entry is shown in Fig. 1. When conditions warrant it, the same method may be applied to the side knock-outs.

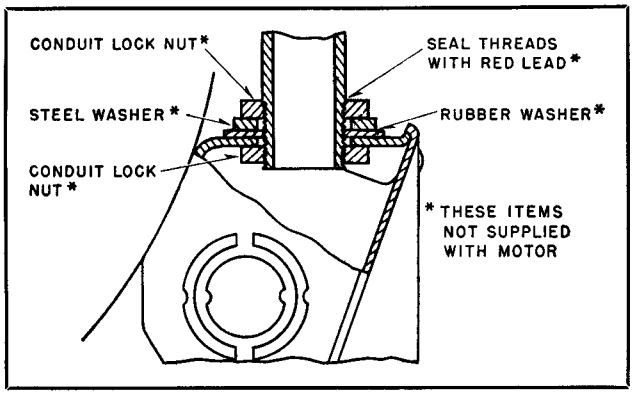


FIG. 1. Method of Connecting Conduit to Keep Out Liquids When Leads Enter Top of Conduit Box

When the motor is mounted on a bedplate, or on slide rails for belt adjustment, flexible metallic conduit should be used to protect the leads to the motor. In making this connection a squeeze connector should be used for attaching the flexible conduit to the conduit box. Squeeze connectors may be straight, 45° or 90°.

OPERATION

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

The motor will operate satisfactorily with a 10% variation in voltage, a 5% variation in frequency, or a combined voltage and frequency variation of 10%, 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 guard against excessive (1) dirt, (2) moisture, (3) friction and (4) vibration, which account for 90% 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

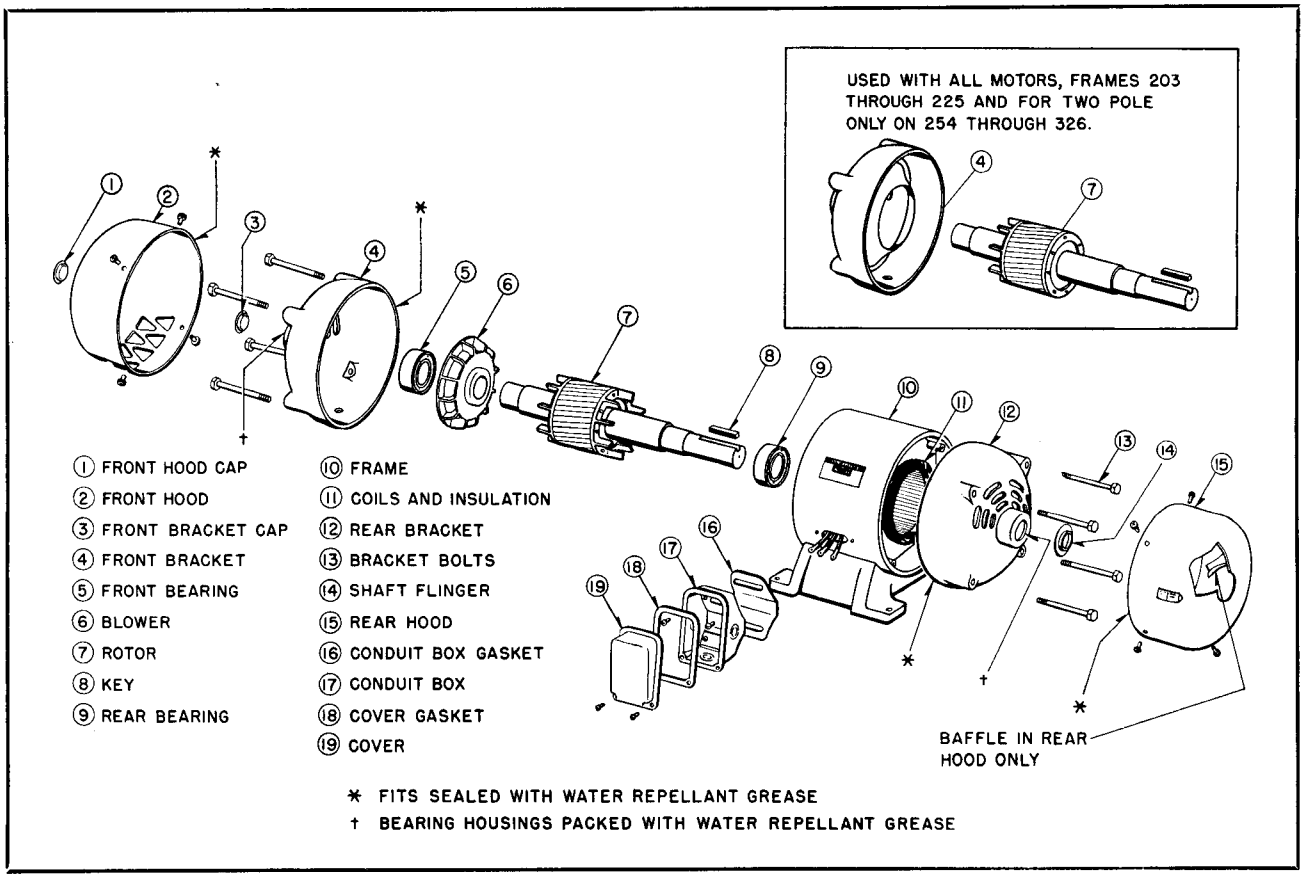


FIG. 2. Arrangement of Parts—Splash-Proof Type CSP Motor (Frames 203-326)

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 the air hose; use goggles to avoid eye 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. When a material is difficult to remove, carbon tetrachloride is more effective than petroleum solvents. Wear neoprene gloves to prevent skin irritation when using either petroleum solvents or carbon tetrachloride.

Petroleum solvents are flammable and comparatively nontoxic.

Carbon tetrachloride is nonflammable, but is highly toxic. Suitable ventilation should be provided to avoid breathing vapors. When ventilation is not sufficient to prevent a distinct odor of carbon tetrachloride, a chemical cartridge respirator or gas mask must be used.

2. Guard Against Moisture. Stand-by motors should be run at least once a week to guard against moisture condensation.

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 bolts and bracket bolts to be sure they are tight.

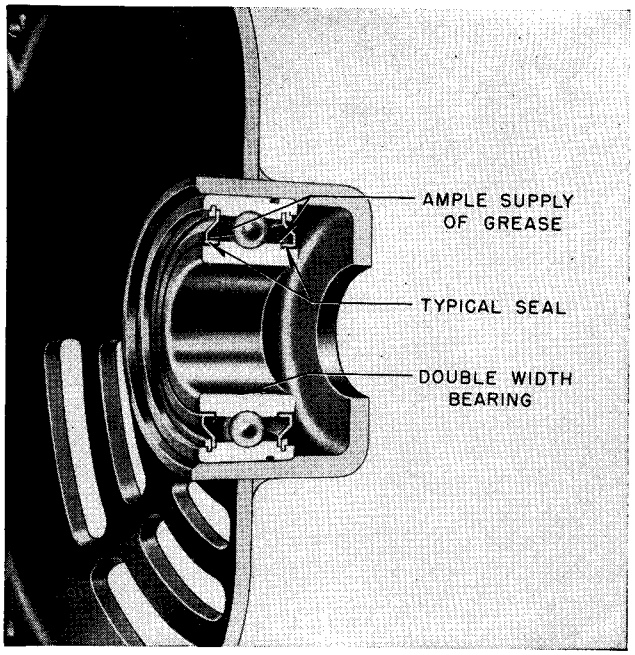


FIG. 3. Sectional View—Prelubricated Ball Bearing

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 Fig. 3.) 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 grease having a high degree of stability is permanently sealed in the bearings. This grease has been proven by tests both in the laboratory and 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 Fig. 3.

RENEWAL PARTS

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

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