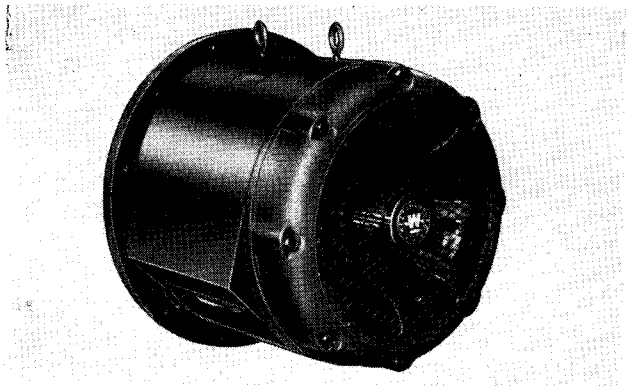
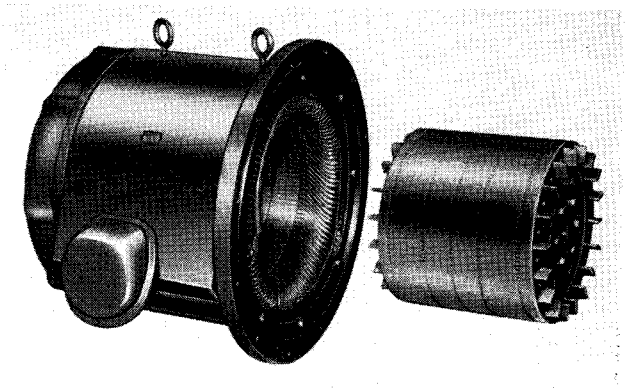
SECTION II—OPERATION • MAINTENANCE

INSTRUCTIONS

OVERHUNG FRAME MOUNTED Life-Line MOTORS DRIP-PROOF, TYPE CSP SQUIRREL CAGE AND GP SYNCHRONOUS (Frames 580 Through 683)



Front View Drip-Proof CSP Squirrel Cage



Rear View Drip Proof CSP Squirrel Cage

The photographs above are typical of the CSP design of the squirrel cage motors for overhung application. The synchronous design is similar except the brush holder assembly and inlet hole for field leads is contained in front bracket.

Section II: This part of the instruction book covers notes on the operation and maintenance of the motors by the final user.

Location. Locate the motor in a place that is clean, dry, 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.

Conduit Box. The conduit box may be rotated 90° or 180° for use with horizontal conduit or conduit from above. The motors can be furnished with three different sizes of conduit box with holes to take any standard conduit size.

OPERATION

To start and stop motor refer to instructions furnished with starter. Before starting motor check air gap with ½" wide feeler gauges. Check gap at four places 90° apart. The minimum gap should not be less than 70% of the average taken at the four places. Check voltage, frequency and number of phases of line against that of motor nameplate stamping. If voltage, frequency and phases check, run the motor without load to check connection and direction of rotation. The motor will operate satisfactorily with a 10% variation in voltage, a 5% variation of frequency, or a combined variation of frequency and voltage of 10%, but not necessarily in accordance with the standards of performance established for operation at normal rating. Connect leads to the power supply through a suitable starter and overload relay. Install all wiring and fusing in accordance with the National Electric Code and local requirements.

MOTOR MAINTENANCE

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) mositure, (3) friction and (4) vibration.

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. Suction is recommended over blowing out because it eliminates the danger of blowing metal chips and

etc. into the insulation and also because of the danger of moisture in the compressed air. Dust may be blown from inaccessible parts with clean, dry air of moderate pressure.

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.

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 ordor of carbon tetrachloride, a chemical cartridge respirator or gas mask must be used.

2. Guard Against Moisture. Drip-proof motors should always be guarded against the accidental intrusion of water from splatter or splashing.

Motors should be run at least once a week to guard against moisture condensation.

Before starting motors which have been subjected to moisture, megger with 500 volt megger. If resistance is below 2 megohms dry the winding in oven or circulate a safe current. Continue drying until resistance rises to 2 megohms or preferably higher. Drying time will depend on size of machine and degree of moisture absorbed.

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

a. Poor alignment causing excessive vibration or binding.

b. Bent shaft.

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

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

Check the motor mounting bolts and bracket bolts to be sure thay 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.

OUTBOARD BALL BEARINGS

Prelubricated. For any of the motors which are equipped with an outboard bearing it will in most cases be a prelubricated ball bearing. These bearings are packed at the factory with the proper amount of lubricant, and no further lubrication is needed for the normal life of the bearing. For this reason there is no grease fitting equipped on motor.

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

Bearings from several suppliers are used, but 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.

NOTE: These bearings require no greasing.

Grease Lubricated: For those motors equipped with grease lubricated ball bearings the life and quietness of the bearing depends largely on cleanliness and proper lubrication. One may know if the motor is equipped with a grease lubricated ball bearing by its grease fitting on the outboard bracket hub.

As a guide, it is suggested that grease should be added every 2000 hours of operation.

Cleanliness. Since ball bearings are sensitive to small amounts of dirt, they must be protected at all times. If it is necessary to disassemble the bearing housing, first thoroughly remove all dirt from adjacent parts, so that no dirt will fall upon the bearing or interior of the housing. Cover the bearing and interior of the housing with clean wrapping material if they are to be left dismantled and exposed.

If dirt or deteriorated grease is found all parts should be thoroughly cleaned with carbon tetrachloride (Avoid allowing this liquid to remain on adjacent motor windings). In some cases, it may be necessary to entirely remove the bearing from the shaft in order to clean it properly.

Special seals are used to prevent dirt from entering housing. Be sure that these are carefully replaced when housing is reassembled.

Never open the bearing housing under conditions which would permit entrance of dirt.

SPECIAL NOTES FOR SYNCHRONOUS MOTORS

Collector Rings and Brushes Sparking. If sparking between the brushes and collector rings occur the following points should be checked:

1. Brush pressure. Springs of the brush holders may be adjusted so that the pressure on all brushes is the same. In general, the tension should be as

light as possible and still maintain constant contact with the rings. A fair value for the average motor should be about 2 to 3 lbs per square inch of brush surface.

2. **Brush sticking.** Brushes may be sticking in the holders. This would prevent the brushes from following the collector ring surface. To correct this, take the brush from the holder and clean brush and holder as grease and grit may have worked in to prevent free movement. Movement of brushes in holders must be as small as possible and still avoid binding.

3. **Rough or dirty rings.** A rough or dirty collector ring will produce sparking because of the momentary separation between the brush and ring. Ordinarily a little rubbing with a fine sandpaper will smooth the ring if rough. Never use emery cloth or paper for this purpose because of the continued abrasive action of the emery particles which become embedded in the copper rings and brushes. Even when sandpaper is used the brushes should be raised and wiped clean as well as the rings with a piece of canvas.

4. **Extremely rough and untrue rings.** If through neglect or accident the rings become too rough or out of round the rotor will have to be removed and the rings turned down in a lathe. Regular inspection should be made to see that the collector rings are clean, perfectly round and running true. If rings have to be turned down make sure the collector assembly is tight.

CARE OF THE RINGS

Cleanliness: The rings should always be kept clean of any dirt, grease, or oil. If necessary use a silken rag dipped in kerosene then wrung. Dry and polish with a piece of canvas or dense felt.

Smoothness: Under normal conditions the rings will become highly polished after a few weeks of operation and may remain so for years. If however black spots appear on the surface of the collector they should be removed by rubbing lightly with fine sandpaper. It is very important that this is done, for while these spots are not serious in themselves, they will lead to pitting of the rings and the necessity of a machining job.

The smoothness of the ring can also be damaged by vibration. Any vibration which causes the brushes to jump produces an arc which in time will pit rings. Check brush holder to make sure it is tight. Check apparatus and eliminate source of vibration.

For any motors which are shut down over long periods of time. Example: (Air conditioning units not used during winter.) In these cases fumes or rust attacks that portion of the collector rings which are exposed, while the portion under the brushes are protected. This causes high spots under the portion protected by brushes, and when motor is again operated, the brush jumps slightly as the high spots pass beneath the brushes and the resulting arc burns the imprint of the brush behind each high spot. The application of paraffin to the rings will protect the rings during an extended shutdown. Also the brushes should be kept in the raised position. Remove paraffin before putting motor back in service.

Occasionally rings may wear unevenly because they are not of uniform hardness. Such a ring should be replaced.

RENEWAL PARTS

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

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