INSTRUCTIONS

SQUIRREL-CAGE Life-Line® MOTORS
TYPE CSP, FOR NAVY SERVICE
(Frames 364 through 505 with Prelubricated Ball Bearings)

1. DETAILED DESCRIPTION

1.1 Typical Life-Line Motors. Life-Line Type CSP Motors are squirrel-cage induction motors designed for a wide variety of constant speed applications. The stator core is completely encased in a fabricated or cast steel frame. A few special applications require aluminum frames. Cast steel or aluminum end brackets protect the windings and offer special support to the ball bearings. See the master plan for construction details.

1.2 Drip-Proof Motors. A drip-proof motor is one in which the ventilating openings are so constructed that drops of liquid or solid particles falling on the motor from any angle up to 45 degrees from the vertical cannot enter the motor either directly or by striking and running along a horizontal or inwardly inclined surface.

1.3 Drip-Proof Protected Motors. Drip-proof protected motors have screens or expanded metal over the air inlet and outlet openings.

1.4 Spray-Tight Motors. Spray-tight motors are either totally enclosed or totally enclosed fan-cooled. They are built to withstand a hose test and are suitable for deck service or other locations subject to splashing. The motors cannot be submerged continuously.

1.5 Totally Enclosed Motors. A totally enclosed motor is one so enclosed as to prevent exchange of air between the inside and the outside of the enclosure, but not sufficiently to be termed air-tight.

1.6 Totally Enclosed Fan-Cooled Motors. A totally enclosed fan-cooled motor is a totally enclosed motor equipped for exterior cooling by means of a fan or fans integral with the motor but external to the enclosed parts.

1.7 Explosion-Proof Motors. Explosion-proof motors are built for safe operation in a specified explosive atmosphere.

2. INSTALLATION

2.1 Inspection. 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.

2.2 Mounting. 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.

The external air temperature should not exceed the maximum permissible ambient temperature specified in the master plan for the given motor.

For bulkhead or overhead mounting, the motor end brackets of drip-proof motors should be rotated 90 degrees or 180 degrees to offer greater protection from falling objects or dripping liquids.

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

2.3.1 Direct Drive. Motor shaft coupled with flexible or rigid coupling to the driven shaft. The motor shaft and driven shaft must be carefully aligned.

Dowel the motor to the base.

Note: Pulleys, pinions or couplings which are to be mounted on shaft extensions should be keyed and have bores that provide a bumping fit on the shaft. Back up the shaft opposite the extension when driving on the part to prevent damage to the motor bearings. A bearing puller or a similar device should be used for removing tight pulleys, pinions or couplings. as motor bearings can be damaged at removal as well as at assembly of these parts.

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2.3.2 Close-Coupled Pumps and Axial Flow Fans. The impeller or fan is mounted on the motor shaft. See driven auxiliary instructions for assembly.

2.3.3 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.

Sheaves should be carefully aligned. Belt tension should be just sufficient to eliminate excessive sag in the slack of the belt.

2.4 Electrical Connections. Connect single-speed motors to give the desired rotation. Any two leads may be interchanged to reverse rotation.

Multi-speed motors should be connected in accordance with the diagram on the controller master plan.

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

The terminal box may be rotated 90 degrees or 180 degrees for use with horizontal conduit or conduit from above.

3. OPERATING INSTRUCTIONS

Run the motor without load, if possible, 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.

3.1 Insulation. The motor on being shipped from the factory will have insulation resistance values in accordance with the requirements of Navy Spec. MIL-M-17060. However, should the motor stand idle in storage or on the vessel for any great length of time and be subject to unusual atmospheric changes, it will be advisable to measure the insulation resistance of the stator windings with an insulation resistance meter. The insulation resistance taken cold should not be less than one (1) megohm.

Should the insulation resistance be less than one megohm, means of drying out the motor should be undertaken. This may be accomplished by drying in an oven at a temperature not to exceed 105 degrees Centigrade, enclosing the unit and heating by means of lamps, resistance units, etc., or by circulating current through the stator windings at low voltages (with rotor locked) until the insulation resistance readings reach a constant value.

4. MAINTENANCE

4.1 Inspection. Motors should be inspected at regular intervals to guard against excessive (1) dirt, (2) moisture and (3) vibration.

4.1.1 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 blown with clean, dry air, using not more than 30 pounds pressure.

When removing grease or oil, wipe with a cloth moistened (but not dripping) with an organic solvent.

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

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

4.1.3 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 deck 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 tension.

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

4.2 Coils. Revarnishing the windings when motors are overhauled will lengthen their life. Refer to the master plan for suitable varnish to be used for a given motor.

4.3 Bearings. Most of 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.

The details of the seal construction vary somewhat depending upon the bearing manufacturer,

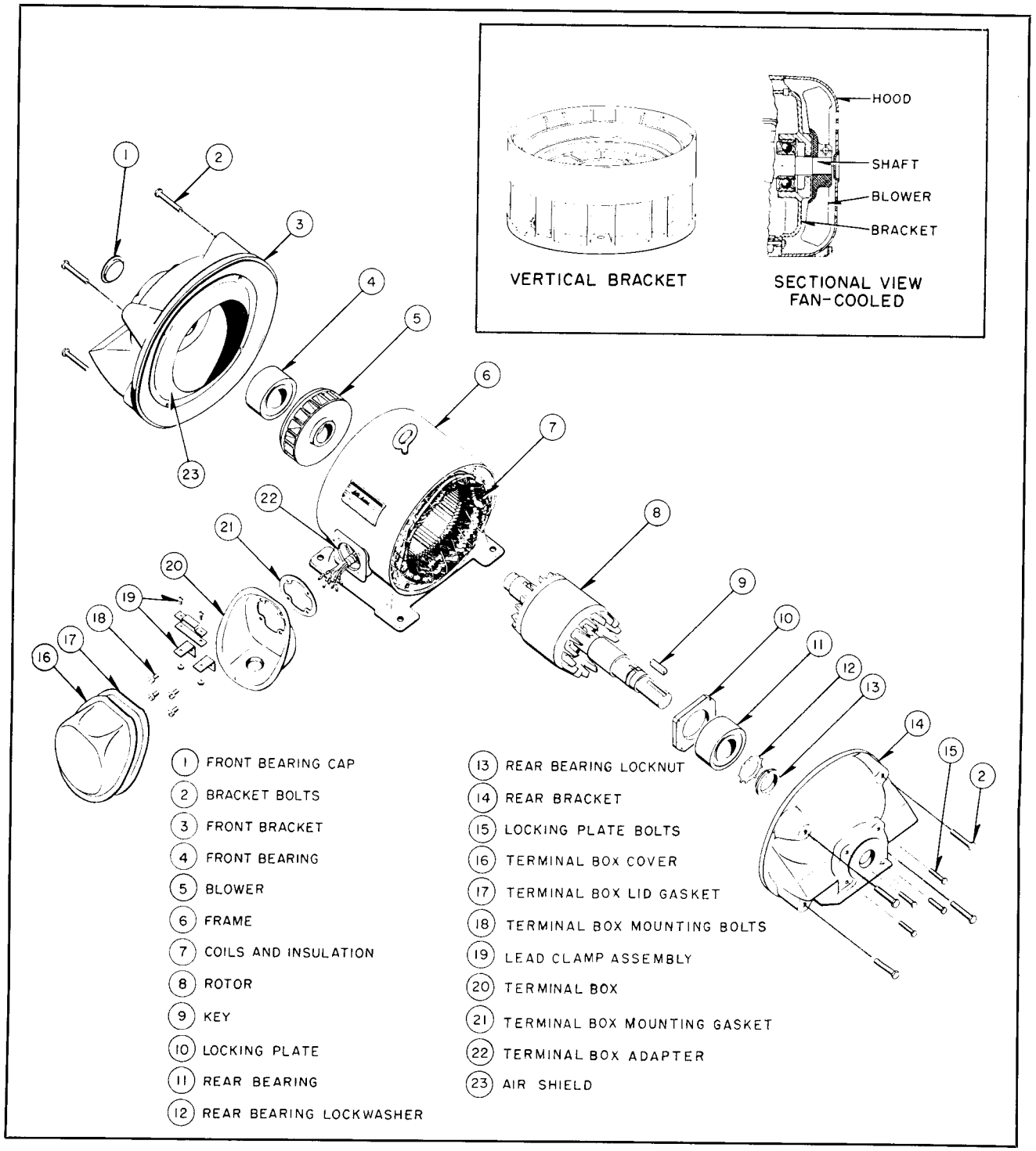

FIG. 1. Arrangement of Parts—Type CSP Motors for Navy Service

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. 2. The master plan identifies replacement bearings of several manufacturers.

Motors having non-sealed bearings are provided with grease plugs, fittings or grease cups. Additional grease should be added every four (4) to six (6) months of a type and grade shown on the master plan. Avoid overgreasing and entrance of any dirt. The grease drain should always be open when adding grease. An estimate of the maximum amount of grease that should be added is given in Table No. 1.

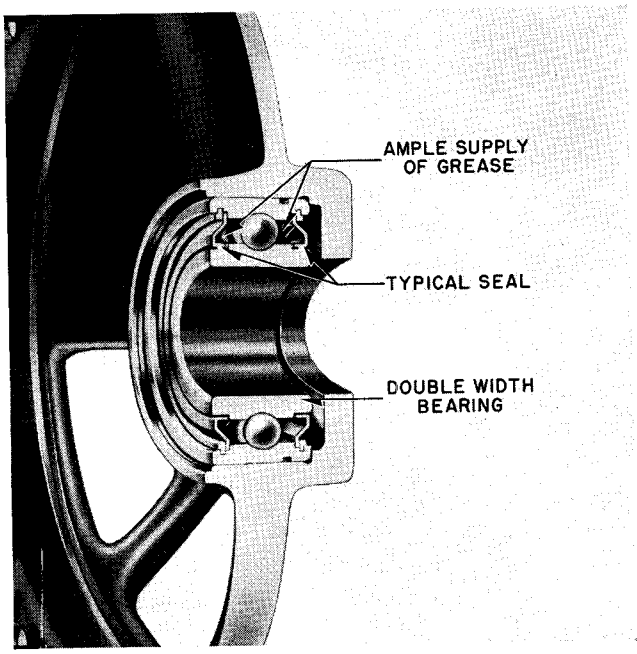

FIG. 2. Sectional View—Prelubricated Ball Bearing

4.4 Replacing a Bearing. When replacing a bearing, every effort should be made to determine the reason for the trouble and then make sure this reason is eliminated when installing the new bearing. After the motor has been reassembled, the bolts that hold the inner bearing cap for the bearing on the drive end should be loosened two or three turns and a check for axial end play made. The rotor should move one way or the other if forced by tapping on the shaft. This total movement should not be less than .010 of an inch. The bolts that hold the inner bearing cap should then be evenly tightened and the shaft turned by hand to be sure it turns freely.

TABLE NO. 1

SHAFT EXTENSION DIAMETER (Inches)	AMOUNT OF GREASE TO BE ADDED (Cubic Inches)
¾ to 1¼	1 cu. in.
Above 1¼ to 1⅞	1¼ cu. in.
" 1⅞ to 2⅜	2½ cu. in.
" 2⅛ to 3	4 cu. in.
1 oz — 1¼ cu. in.	

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