LONG TERM STORAGE -OIL LUBRICATED BEARINGS

NOTE: DO NOT WRAP OR COVER MOTOR WITH PLASTIC !

1. When To Put A Motor In Storage.

If a motor is not put into immediate service (one month or less), or if it is taken out of service for a prolonged period, special storage precautions should be taken to prevent environmental damage. The following schedule is recommended as a guide to determine storage needs.

A. Out of service or in storage less than one month -- no special precautions except that space heaters, if supplied, must be energized at any time the motor is not running.

B. Out of service or in storage for more than one month but less than six months -- store per items 2A, B, C, D, E, F, and G, items 3A, B, and C, and item 4.

C. Out of service or in storage for six months or more - all recommendations.

2. Storage Preparation.

A. Where possible, motors should be stored indoors in a clean, dry area.

B. When indoor storage is not possible, the motors must be covered with a tarpaulin. This cover should extend to the ground; however, it should not tightly wrap the motor. This will allow the captive air space to breathe, minimizing formation of condensation. Care must also be taken to protect the motor from flooding or from harmful chemical vapors.

C. Whether indoors or out, the area of storage should be free from ambient vibration. Excessive vibration can cause bearing damage. A unit which must be stored in areas with high ambient vibration, such as from heavy construction equipment or other sources, must have the shaft locked to prevent any movement.

D. Precautions should be taken to prevent rodents, snakes, birds, or other small animals from nesting inside the motors. In areas where they are prevalent, precautions must be taken to prevent insects, such as mud dauber wasps, from gaining access to the interior of the motor.

E. Inspect the rust preventative coating on all external machined surfaces, including shaft extensions. If necessary, recoat the surfaces with a rust preventative material, such as Rust Veto No. 342 (manufactured by E.F. Houghton Co.) or an equivalent. The condition of the coating should be checked periodically and surfaces recoated as needed.

F. Bearings:

Oil lubricated motors are shipped without oil and must be filled to the maximum capacity as indicated on the oil chamber sight gauge window immediately upon receipt. Fill reservoir to maximum level with a properly selected oil containing rust and corrosion inhibitors such as Texaco Regal Marine #77, Mobil Vaprotec Light, or an equivalent.

NOTE: Motor must not be moved with oil in reservoir. Drain oil before moving to prevent sloshing and possible damage, then refill when at new location.

G. To prevent moisture accumulation, some form of heating must be utilized to prevent condensation. This heating should maintain the winding temperature at a minimum of 5°C above ambient. If space heaters are supplied, they should be energized. If none are available, single phase or "trickle" heating may be utilized by energizing one phase of the motor's winding with a low voltage. Request the required voltage and transformer capacity from Nidec Motor Corporation. A third option is to use an auxiliary heat source and keep the winding warm by either convection or blowing warm air into the motor.

3. Periodic Maintenance.

A. Oil should be inspected monthly for evidence of moisture or oxidation. The oil must be replaced whenever contamination is noted or every twelve months; whichever occurs first.

B. All motors must have the shaft rotated once a month to insure the maintenance of a coating lubricant film on the bearing races and journals.

C. Insulation History:
The only accurate way to evaluate the condition of the winding insulation is to maintain a history of the insulation readings . Over a period of months or years these readings will tend to indicate a trend. If a downward trend develops, or if the resistance drops too low, thoroughly clean and dry the windings, retreating if necessary, by an authorized electrical apparatus service shop.

The recommended insulation resistance test is as follows:

(1) Using a megohm meter, with winding at ambient temperature, apply DC voltage (noted below) for sixty seconds and take reading.

Rated Motor Voltage	Recommended DC Test Voltage
600 and less	500 VDC
601 to 1000 (incl.)	500 to 1000 VDC
1001 and up	500 to 2500 VDC (2500 VDC optimum)

(2) For comparison, the reading should be corrected to a 40°C base temperature. This may be done by utilizing the following:

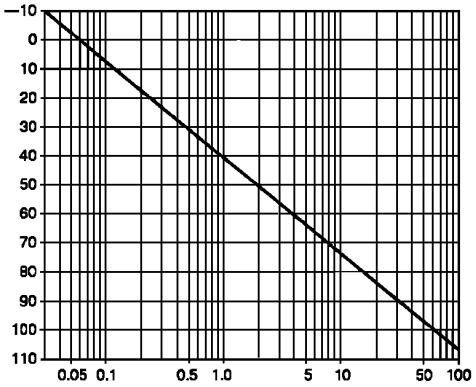
R40C = Kt X Rt

Where R40C = insulation resistance (in megohms) corrected to 40°C
Rt = measured insulation resistance (in megohms)
Kt = temperature coefficient (from Graph 1)

GRAPH 1

WINDING TEMPERATURE (°C

(Adapted from IEEE 43)



INSULATION RESISTANCE TEMPERATURE COEFFICIENT (kT)

(3) Insulation resistance readings must not drop below the value indicated by the following formula:

Rm = Kv + 1

Rm = minimum insulation (in megohms) at 40°C
Kv = rated motor voltage in kilovolts

(4) Dielectric absorption ratio:

In addition to the individual test reading, a dielectric absorption ratio may be required. The dielectric absorption ratio is obtained by taking megohm meter readings at a one minute and ten minute interval, or when hand powered megohm meters are used, at a thirty second and sixty second interval. The voltage should be the same as outlined in item 3D, part 1.

The ratio is obtained by dividing the second reading by the first reading and is based on a good insulation system increasing its resistance when subjected to a test voltage for a period of time. The ratios are as follows:

10 Minute: 1 Minute
Dangerous = Less than 1.0
Poor = 1.0 to 1.4
Questionable = 1.5 to 1.9
Fair = 2.0 to 2.9
Good = 3.0 to 4.0
Excellent = Over 4.0

60 Second: 30 Second
Poor = Less than 1.1
Questionable = 1.1 to 1.24
Fair = 1.25 to 1.3
Good = 1.4 to 1.6
Excellent = Over 1.6

If a lower insulation resistance reading is obtained in either the individual test or dielectric absorption ratio test, thoroughly clean and dry the windings. Recheck insulation resistance and dielectric absorption ratio.

NOTE: Slightly lower dielectric absorption ratios may be acceptable when high initial insulation resistance readings are obtained (1000 + megohms). Refer any questions to U.S.E.M. Service department.

For additional information on insulation testing, refer to IEEE Transaction No. 43.

4. Start-up Preparations After Storage.

A. Motor should be thoroughly inspected and cleaned to restore to an "As Shipped" condition.

B. Motors which have been subjected to vibration must be disassembled and each bearing inspected for damage.

C. Oil must be completely changed using lubricants and methods recommended on the motor's lubrication plate, or in the section titled "LUBRICATION" in the Installation/Maintenance manual.

D. The winding must be tested to obtain insulation resistance and dielectric absorption ratio as described in section III. item 3.

E. If storage has exceeded one year, the Quality Assurance Department must be contacted prior to equipment start-up.