SIEMENS

Installation • Operation • Maintenance

Instructions

Storage
Recommendations
Induction Motors
Integral Horsepower

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The information contained within is intended to assist operating personnel by providing information on the general characteristics of the purchased equipment It does not relieve the user of the responsibility of using accepted engineering practices in the installation. operation and maintenance of this equipment.

Should a conflict arise between the general information in this manual and the contents of the drawings and supplementary material, the latter shall take precedence.

The illustrations in this book show typical motors. Special features will deviate from those pictured.

INTRODUCTION

The purpose of this booklet is to offer some short, easy- to-follow recommendations to our customers, users, and distributors for the proper care of electric motors in storage.

For practical purposes, such equipment is considered to be in storage not only when it is in the storeroom but also when:

It has been delivered to the jobsite and is awaiting installation;

or, it has been installed but regular operation is delayed pending completion of plant construction;

or, there are long, idle periods between operating cycles;

or, the plant or department is shut down.

Distributors of products listed are:

Tectyl 502-C and 506:
Valvoline Oil Co.
Div. of Ashland Oil and Refining Co.
150 Fourth Avenue
Freedom, Pennsylvania 1 5042

PD. George 11137:
Insulation Manufacturers Corp.
123 Superior Avenue, N.E.
Cleveland, Ohio 44114

The recommendations given here apply to conditions commonly found in indoor storage. Personnel responsible for care of the equipment should use good discretion in adapting these recommendations to the particular situation. Common sense and sound safety rules need to be followed.

NOTE

Recommended brand products have shown good performance. Siemens, however, cannot assume responsibility or be liable for products other than those it warrants.

SAFETY PROCEDURE

WARNING

Dangerous voltages are present in the motor components which can cause serious injury, electrocution and equipment damage. To avoid serious injury and/or equipment damage — before any adjustments, servicing, wiring, parts replacement or any other act requiring physical contact with the electrical or mechanical working components of this equipment is performed, all equipment must be de-energized, disconnected and isolated to prevent accidental contact with live or rotating parts.

The success and safe operation of motors is dependent upon proper handling, installation, operation and maintenance, as well as upon proper design and manufacture. Failure to follow certain fundamental installation and maintenance requirements may lead to personal injury and the failure and loss of the motor as well as damage to other property.

Only qualified personnel should be involved in the inspection, maintenance and repair procedure and all plant safety procedures must be observed.

A qualified person is one who is familiar with the installation, construction and operation of the equipment, and the hazards involved. In addition, he has the following qualifications:

a. Is trained and authorized to energize, de-energize, clear, ground, and tag circuits and equipment in accordance with established safety practices.
b. Is trained in the proper care and use of protective equipment such as rubber gloves, hard hat, safety glasses or face shields, flash clothing, etc., in accordance with established safety practices.
c. Is trained in rendering first aid.

Motor should be installed and grounded per local and national codes.

STORAGE

INDOOR STORAGE (Up to 5 Years)

WHOLLY CONTROLLED ATMOSPHERE

Conditions Required
Uniform temperature (between 40°F and 140°F) throughout the room maintained at least 10°F above the dew point. Relative humidity of 50% or less. Dust accumulation to be little, no harmful fumes and little or no ambient vibration

PREPARATION

Sleeve Bearings
Units with these types of bearings are shipped without lubricating oil. A film of rust-inhibiting oil protects the bearings and shaft journals during shipment, but this protection does not last for extended periods of storage; therefore, before placing the unit in storage longer than one (1) month, fill the oil wells to running level, using a good grade of rust-inhibiting lubricating turbine oil.

Oil Lubricated Antifriction Bearings
Vertical Machines having these types of bearings, and operating at 1800 RPM or slower, are designed so that the oil completely covers the bearings when properly lubricated. Vertical machines for faster operation (3600 RPM) use an oil-mist lubrication system requiring the bearings to be located above the normal oil level. NO LUBRICATING OIL IS SHIPPED WITH ANY OF THESE UNITS; only a film of rust-inhibiting oil is applied at the factory. To protect the bearings for storage, fill the oil wells to running level with a good grade of rust-inhibiting lubricating turbine oil; units with oil-mist lubrication and Kingsbury type bearings need to be run at operating speed for two minutes every three (3) months so that the bearings receive a new film of protective oil; otherwise, the motors must be partially disassembled to reach the bearings and coat them with oil every three (3) months.

Grease Lubricated Antifriction Bearings
Ball or roller bearing units are shipped from the factory with the bearings properly packed with grease and require no further preparation.

Shaft Extensions and Exposed Machined Surfaces
Surfaces should be coated with an easily removable rust-preventative, such as "Tectyl No. 502-C".

NOTE

Rodents and other animals, like to house inside motors in search of warm surroundings or food. Some of them attack the insulating materials. Their access to the motor should be restricted.

MAINTENANCE

Sleeve Bearings
Once a month the shaft should be rotated by hand at 30 revolutions per minute for 15 seconds or, if power is available, the motor can be bumped for 5 seconds.

Oil Lubricated Antifriction Bearings
Every three (3) months the 3600 RPM Vertical, and all Kingsbury type machines should be run for two minutes to recoat the oil-mist lubricated bearings. If the unit cannot be run it must be partially disassembled to reach the bearings and coat them with oil, by hand. The oil itself need not be renewed. Vertical machines operating at 1800 RPM or slower, are designed so that the oil completely covers the bearings when properly lubricated. Every two (2) months the shaft should be rotated by hand at 30 revolutions per minute for 15 seconds or, if power is available, the motor can be bumped for 5 seconds.

Grease Lubricated Antifriction Bearings
Every two (2) months the shaft should be rotated by hand at 30 revolutions per minute for 15 seconds or, if power is available, the motor can be bumped for 5 seconds. Bearings should be relubricated at two year intervals when in storage. Use the polyurea base grease of No. 2 or No. 3 consistency. (See instruction book for unit.)

PARTIALLY CONTROLLED ATMOSPHERE

Conditions Desirable
The room selected should be as clean and dry as possible, with little or no ambient vibration.

CAUTION

Motors stored in ambients below 40°F and above 140°F should be stored in an enclosed ventilated structure. Space heaters must be energized. The enclosing structure should be designed to protect the motor from flying debris or other damage from high winds.

PREPARATION

Disassemble main parts of motor and clean them thoroughly. Keep the lubricant where it belongs; do not remove or contaminate it. In open motors, coat the exposed machined surfaces of the rotor with a non- hardening protective film, such as 'Tectyl No. 502-C", which is easily removed with petroleum solvents during service preparation. Coat the rotor air-gap surfaces lightly.

STORAGE

CAUTION Do not put Tectyl Film on the bearings.

When storage may last over one year, repaint all surfaces previously painted before reassembling.

Remove the condensation drain plugs from those units equipped with them, and insert silica-gel plugs into the openings. Insert one-half pound bags of silica-gel, or other desiccant material, into air inlets and outlets of drip-proof or splash-proof open motors.

NOTE The bags must remain visible so that they will be noticed and removed when the unit is prepared for service.

Cover the unit completely to exclude dirt, dust, moisture, and other foreign materials. At a bare minimum, a heavy water-proofed cover should be slipped over it. If the unit cannot be moved from its base, and more elaborate protection is desired, all the openings can be covered with an adhesive plastic cloth and the entire unit sprayed with a peelable plastic. Specifications for this material can be secured from the U.S. Government.

If the motor can be moved, it is suggested that the entire motor be encased in a strong, transparent plastic bag. Before sealing this bag, a moisture indicator should be attached to the side of the motor, and several bags of silica-gel desiccant put inside the bag, around the motor. When the moisture indicator shows that the desiccant has lost its effectiveness, as by a change in color, the bag should be opened and the desiccants replaced with fresh ones.

CAUTION Whenever a motor cannot be sealed and the relative humidity is greater than 50%, long storage calls for space heaters to be installed in the unit, to maintain equipment temperatures at least 10°F above the ambient air, to prevent the harmful effects of moisture condensation. If motors are not equipped with space heaters at time of manufacture, consult factory for proper size.

Sleeve Bearings
Units with these types of bearings are shipped without lubricating oil. A film of rust-inhibiting oil protects the bearing and shaft journals during shipment, but this protection does not last for extended periods of storage; therefore, before placing the unit in storage longer than one month, fill the oil wells to running level. Use a good grade of rust-inhibiting lubricating turbine oil.

Oil Lubricated Antifriction Bearings
Vertical machines operating at 1800 RPM or slower, are designed so that the oil completely covers the bearings when properly lubricated. Vertical machines for faster operation (3600 RPM) use an oil-mist lubrication system requiring the bearings to be located above the normal oil level. NO LUBRICATING OIL IS SHIPPED WITH ANY OF THESE UNITS; only a film of rust-inhibiting oil is applied at the factory to protect the bearings during shipment. To prepare the bearings for storage, fill the oil wells to running level with a good grade of rust-inhibiting lubricating turbine oil.

Grease Lubricated Antifriction Bearings
Ball or roller bearing units are shipped from the factory with the bearings properly packed with grease and require no further preparation.

Shaft Extensions and Exposed Machined Surfaces or Flanges
Coat these surfaces with an easily removable rust-preventative, such as "Tectyl No. 502-C".

NOTE Rodents and other animals like to house inside motors in search of warm surroundings or food. Some of them attack the insulating materials. Their access to the motors should be restricted.

MAINTENANCE

Sleeve Bearings
Once a month the shaft should be rotated by hand at 30 revolutions per minute for 15 seconds or, if power is available, the motor can be bumped for 5 seconds.

Oil Lubricated Antifriction Bearings
Every three months the 3600 RPM machines and all Kingsbury type, should be run for two minutes to recoat the oil-mist lubricated bearings. If it cannot be run it must be partially disassembled and the bearings coated with oil, by hand. The oil itself need not be renewed.

Vertical machines operating at 1800 RPM or slower, are designed so that the oil completely covers the bearings when properly lubricated and do not need to be disassembled. Every three (3) months the shaft should be rotated by hand at 30 revolutions per minute for 15 seconds or, if power is available, the motor can be bumped for 5 seconds.

STORAGE

Grease Lubricated Antifriction Bearings
Every three months the shaft should be rotated by hand at 30 revolutions per minute for 15 seconds or, if power is available, the motor can be bumped for 5 seconds. Bearings should be relubricated at two year intervals when in storage. Use a polyurea base grease of No.2 or No.3 consistency. (Consult instruction book for your unit.)

Shaft Extensions and Exposed Machined Surfaces, or Flanges
For very long storage, check the protective life of the rust inhibitor used, and recoat as recommended by the manufacturer. "Tectyl No. 502-C", for example, heavily applied may last about 2 years.

Desiccant plugs and bags must be checked periodically, even weekly, if the moisture is high (above 50%) and the temperature drops often.

CAUTION When no desiccant is being used, the correct setting of the space heaters becomes important. Make certain they function properly. Space heaters should be sized to keep the motor 10°F above the ambient temperature.

OUTDOOR STORAGE (Up to 5 Years)

INLAND DRY CLIMATE

Conditions Usually Encountered
Dust, sand, heat from the sun, and occasional rain or snow.

CAUTION Motors stored in ambients below 40°F and above 140°F should be stored in an enclosed ventilated structure. Space heaters must be energized. The enclosing structure should be designed to protect the motor from flying debris or other damage from high winds.

PREPARATION

Sleeve Bearings
Sleeve bearing units are shipped WITHOUT lubricating oil in the bearings. A film of rust-inhibiting oil protects the bearings and shaft journals during shipment. This film does not offer sufficient protection for outdoor storage; therefore, before placing in storage, fill the oil wells to operating level with a good grade of rust-inhibiting turbine oil.

Oil Lubricated Antifriction Bearings
Vertical machines of 3600 RPM and all Kingsbury type oil-lubricating bearings are shipped from the factory WITHOUT lubricating oil in the bearings. A film of rust- inhibiting oil protects the bearing during shipment. This film does not offer sufficient protection for outdoor storage; therefore, before placing in storage, fill the oil wells to running level and run the machine at operating speed for two minutes. If the motor cannot be run, disassemble to reach the bearings and coat them with the rust-inhibiting oil. *Otherwise, this motor must not be stored outdoors.*

Slower vertical machines will have the bearings completely covered by the corrosion inhibiting lubricant when it is added to running level.

Grease Lubricated Antifriction Bearings
Ball or roller bearing units are shipped from the factory with the bearings properly packed with grease and require no further preparation.

Shaft Extensions and Exposed Machined Surfaces, or Flanges
Coat these surfaces with a removable rust-preventative, such as Tectyl No. 506'.

For storing *longer than six months,* notice should be given to Siemens Factory so that an extra protective coating can be specified for the internal parts of the unit. Otherwise, it is necessary to take the following precautions.

Disassemble motor and clean thoroughly. Do not contaminate the lubricant.

In open motors, coat all the exposed machined surfaces of the rotor with a non-hardening protective film, such as 'Tectyl No. 506'. This material can be removed with petroleum solvents. Coat the rotor air-gap surfaces lightly.

CAUTION Do not Apply Tectyl Film to the bearings.

Repaint all surfaces previously painted, before reassembling.

For all periods of storage over one month use silica-gel plugs and half-pound bags.

Remove the condensation drain plugs from those units equipped with them, and insert silica-gel plugs into the openings. Insert one-half pound bags of silica-gel, or other desiccant material, into air inlets and outlets of drip proof or splash-proof type motors.

STORAGE

NOTE The bags must remain visible so that they will be noticed and removed when the unit is prepared for service.

Cover the unit completely to exclude dirt, dust, moisture and other foreign materials. At a bare minimum, a heavy water-proofed cover should be slipped over the motor, If the unit cannot be moved from its base, and more elaborate protection is desired, all the openings can be covered with an adhesive plastic cloth and the entire unit sprayed with a peelable plastic. Specifications for this material can be secured from the U.S. Government.

After the unit is covered as explained in the above paragraph, a shed of some sort should be erected to protect it from direct rain, snow, and excessive direct sun heat. Proper wrapping will protect the unit from sandstorms. If the motor can be moved it is suggested that the entire motor be encased in a strong, transparent plastic bag. Before sealing the bag, a moisture indicator should be attached to the side of the motor, and several bags of silica-gel desiccant distributed inside the bag and around the motor. When the moisture indicator shows that the desiccant has lost its effectiveness, as by a change in color, the bag should be opened and the desiccant replaced by fresh ones.

CAUTION If the motor cannot be sealed, either install space heaters to keep it at least 10°F above the ambient temperature to prevent moisture condensation; or install silica-gel (bags or plugs) in all openings and replace them at least every six months. If motors are not equipped with space heaters at time of manufacture, consult factory for proper size. It must be remembered, that dust and sand will remain hazardous as long as proper cover is not supplied.

NOTE Rodents and other animals like to house inside motors in search of warm surroundings or food. Some of them attack the insulating materials. Their access to the motor should be restricted.

MAINTENANCE

Sleeve Bearings
Once a week the shaft should be rotated by hand at 30 revolutions per minute for 15 seconds or, if power is available, the motor can be bumped for 5 seconds.

Oil Lubricated, Antifriction Bearings
Except for Kingsbury type, vertical machines of 1800 RPM or slower need no oil maintenance after initial care except that once a month the shaft should be rotated by hand at 30 revolutions per minute for 15 seconds or, if power is available, the motor can be bumped for 5 seconds. Vertical machines of 3600 RPM and all Kingsbury oil-lubricated bearings should be run at operating speed every month; if these motors cannot be run, disassemble to reach the bearings and coat them with the rust-inhibiting oil. *Otherwise, these motors must not be stored outdoors.*

Grease-Lubricated, Antifriction Bearings
The shaft should be rotated by hand at 30 revolutions per minute for 15 seconds or, if power is available, the motor can be bumped for 5 seconds.

Bearings should be relubricated at two (2) year intervals. Use a polyurea base grease of No. 3 consistency. (Consult instruction book for your unit.)

Shaft Extensions — Machined Surfaces, or Flanges
For very long storage, check the protective life of the rust inhibitor used, and recoat as recommended by the manufacturer. Outdoor life of "Tectyl 506" for example, is about two years.

Check the condition of the desiccant plugs and bags, preferably weekly.

CAUTION When no desiccant is being used, the correct setting of the space heaters becomes imperative. Make certain they function properly. Space heaters should be sized to keep the motor 10°F above the ambient temperature.

Whenever a motor cannot be sealed in a bag and the relative humidity is greater than 50%, long storage calls for space heaters to be installed in the unit, to maintain equipment temperatures at least 10°F above the ambient air, and thus prevent the harmful effects of moisture condensation. If motors are not equipped with space heaters at time of manufacture, consult factory for proper size.

INLAND HUMID CLIMATE; (NOT INDUSTRIAL AREA)

Conditions Usually Encountered
Dust, rain and snow, organic (fungus) growth.

CAUTION Motors stored in ambients below 40°F and above 140°F should be stored in an enclosed ventilated structure. Space heaters must be energized. The enclosing structure should be designed to protect the motor from flying debris or other damage from high winds.

STORAGE

PREPARATION

Sleeve Bearings
Sleeve bearing units are shipped WITHOUT lubricating oil in the sleeve bearings. A film of rust-inhibiting oil protects the bearings and shaft journals during shipment. This film does not offer sufficient protection for outdoor storage; therefore, before placing in storage, fill the oil wells to operating level with a good grade of rust- inhibiting turbine oil.

Oil Lubricated, Antifriction Bearings
Vertical machines of 3600 RPM and all Kingsbury oil- lubricated bearings are shipped from the factory WITHOUT lubricating oil in the bearings. A film of rust- inhibiting oil protects the bearing during shipment. This film does not offer sufficient protection for outdoor storage, therefore, before placing in storage, fill the oil wells to running level. Run the machine at operating speed if there are facilities to connect the motor. If the motor cannot be run, facilities must exist to disassemble the motor and the bearings must be coated with rust- inhibiting oil, OTHERWISE THIS MOTOR MUST NOT BE STORED OUTDOORS.

Slower vertical machines 1800 RPM and less will have the bearings completely covered by the rust-inhibiting lubricant after oil is added to running level.

Grease Lubricated Antifriction Bearings
Ball or roller bearing units are shipped from the factory with the bearings properly packed with grease and require no further preparation.

Shaft Extensions and Exposed Machined Surfaces, or Flanges
Coat these surfaces with an easily removable rust- preventative, such as Tectyl No. 506'.

FOR STORAGE OVER ONE MONTH, notice should be given to factory so that an extra protective coating can be specified for the internal parts of the motor. Otherwise, it is necessary to take the following precautions:

Disassemble and thoroughly clean units. (For periods over six months storage, repaint all previously painted surfaces, internal as well as external.) Do not contaminate lubricant.

In open motors, coat all the exposed machined surfaces of the rotor with a non-hardening protective film, such as "Tectyl No. 506".

CAUTION Do not apply Tectyl to the bearings.

Before reassembly, spray all internal surfaces of the stator (winding and iron) with one coat of an anti-fungus varnish, such as "PD. George No. 11137' protective sealer.

Reassemble Unit.

Remove the condensation drain plugs from those units equipped with them, and insert silica-gel plugs into the openings. Insert one-half pound bags of silica-gel (or other desiccant material) into air inlets and outlets of drip- proof or splash-proof type motors.

NOTE The bags must remain visible so that they will be noticed and removed when the unit is prepared for service.

Cover the unit completely to exclude dirt, dust, moisture, and other foreign materials. At a bare minimum slip a heavy water-proof cover over the motor. If the unit cannot be moved from its base, and more elaborate protection is desired, all the openings can be covered with an adhesive plastic cloth and the entire unit sprayed with a peelable plastic. Specifications for this material can be secured from the U.S. Government.

After the unit is covered as explained above, a shed of some sort should be erected to protect it from direct rain, snow, and excessive direct sun heat. Proper wrapping will protect the unit from sandstorms.

If the motor can be moved, it is suggested that the entire motor be encased in a strong, transparent plastic bag. Before sealing this bag, a moisture indicator should be attached to the side of the motor and several bags of silica-gel desiccant put inside the bag, around the motor. When the moisture indicator shows that the desiccant has lost its effectiveness, as by a change in color, the bag should be opened and the desiccants replaced with fresh ones.

Whenever motors cannot be sealed, either space heaters must be installed to keep them at least 100F above the ambient temperature, or a roof and plenty of desiccant material must be provided; *otherwise, the unit must be stored indoors.* If motors are not equipped with space heaters at time of manufacture, consult factory for proper size.

NOTE Rodents and other animals like to house inside motors in search of warm surroundings or food. Some of them attack the insulating materials. Their access to the motor should be restricted.

STORAGE

MAINTENANCE

Sleeve Bearings
Once a week the shaft should be rotated by hand at 30 revolutions per minute for 15 seconds or, if power is available, the motor can be bumped for 5 seconds.

Oil Lubricated, Antifriction Bearings
Vertical machines of 1800 RPM or slower need no oil maintenance after initial care except that once a month the shaft should be rotated by hand at 30 revolutions per minute for 15 seconds or, if power is available, the motor can be bumped for 5 seconds.

Vertical machines of 3600 RPM and all Kingsbury oil lubricated bearings should be run at operating speed every month. If motor cannot be run, disassemble unit to reach the bearings and coat them with the rust-inhibiting oil. OTHERWISE, THIS MOTOR MUST NOT BE STORED OUTDOORS.

Grease Lubricated, Antifriction Bearings
Once a month the shaft should be rotated by hand at 30 revolutions per minute for 15 seconds or, if power is available, the motor can be bumped for 5 seconds. Bearings should be relubricated at two year intervals.

Most Siemens motor bearings use a polyurea base grease of No. 2 consistency; some large horizontal motors and many vertical ones use a No. 3 grease. (Consult your motor instruction book)

Shaft Extensions — Exposed Machined Surfaces, and Flanges
For very long storage check the protective life of the rust inhibitor used and recoat as recommended by the manufacturer. Outdoor life of heavily applied "Tectyl 506" for example, is about 2 years.

Each week check the condition of the desiccant plugs and bags. Replace them when needed.

CAUTION

When no desiccant is being used the correct setting of the space heaters becomes imperative. Make sure they are always functioning properly. Space heaters should be sized to keep the motor 10°F above the ambient temperature.

Whenever a motor cannot be sealed and the relative humidity is greater than 5O%, long storage calls for space heaters to be installed in the unit, to maintain equipment temperatures at least 10°F above the ambient air, and thus prevent the harmful effects of moisture condensation. If motors are not equipped with space heaters at time of manufacture, consult factory for proper size.

SALTY AND INDUSTRIAL ATMOSPHERES

Conditions Usually Encountered
Moisture impregnated with salts or other chemicals, salty dust, sand, rain or snow, fungus growth, fumes, coal and chemical dust soot.

CAUTION

Motors stored in ambients below 40°F and above 140°F should be stored in an enclosed ventilated structure. Space heaters must be energized. The enclosing structure should be designed to protect the motor from flying debris or other damage from high winds.

PREPARATION

Sleeve Bearing
Sleeve bearing units are shipped WITHOUT lubricating oil in the bearings. A film of rust-inhibiting oil protects the bearings and shaft journals during shipment. This film does not offer sufficient protection for outdoor storage; therefore, before placing in storage, fill the oil wells to operating level with a good grade of rust inhibiting turbine oil.

Oil Lubricated Antifriction Bearings
Vertical machines of 3600 RPM and all Kingsbury oil- lubricated bearings are shipped from the factory WITHOUT lubricating oil in the bearings. A film of rust- inhibiting oil protects the bearing during shipment. This film does not offer sufficient protection for outdoor storage; therefore, before placing in storage, fill the oil wells to running level. Run the machine at operating speed for two minutes. If the motor cannot be run, facilities must exist to disassemble the motor and the bearings must be coated with rust-inhibiting oil. OTHERWISE, THIS MOTOR MUST NOT BE STORED OUT DOORS.

Slower vertical machines (1800 RPM and less) will have the bearings completely covered by the rust-inhibiting oil after it is added to running level.

Grease Lubricated Antifriction Bearings
Ball or roller bearing units are shipped from the factory with the bearings properly packed with grease and require no further preparation.

Shaft Extensions; Exposed Machined Surfaces or Flanges
Coat these surfaces with a removable rust-preventative, such as "Tectyl No 506"

FOR STORAGE OVER ONE MONTH, notice should be given to motor plant where manufactured so that an extra protective coating can be specified for the internal parts of the motor. Otherwise, it is necessary to take the following precautions:

STORAGE

Disassemble and thoroughly clean unit. (For periods of over six months storage, repaint all previously painted surfaces, internal as well as external.) In open motors, coat all the exposed machined surfaces of the rotor with a nonhardening protective film, such as "Tectyl No. 506". This material can be removed with petroleum solvents. Coat the rotor air-gap surfaces lightly.

CAUTION Do not apply Tectyl film to the bearings.

Before reassembly, spray all internal surfaces of the stator (winding and iron) with one coat of an anti-fungus varnish, such as 'PD. George No. 11137" protective sealer.

Reassemble Unit.

Remove the condensation drain plugs from those units equipped with them, and insert bags of silica-gel (or other desiccant material) into air inlets and outlets of drip- proof or splash-proof type motors.

NOTE The bags must remain visible so that they will be noticed and removed when the unit is prepared for service.

Cover the unit completely to exclude dirt, dust, moisture and other foreign materials. At a bare minimum, place heavy water-proof cover over the motor.

If the unit cannot be moved from its base, and more elaborate protection is desired, all the openings can be covered with an adhesive plastic cloth and the entire unit sprayed with a peelable plastic. Specifications for this material can be secured from the U.S. Government.

After the unit is covered as explained above, a shed of some sort should be erected to protect it from direct rain, snow, and excessive direct sun heat. Proper wrapping will protect equipment from sandstorms.

If the motor can be moved, it is suggested that the entire motor be encased in a strong, transparent plastic bag. Before sealing the bag, a moisture indicator should be attached to the side of the motor, and several bags of silica-gel desiccant put inside the bag, around the motor. When the moisture indicator shows that the desiccant has lost its effectiveness, as by a change in color, the bag should be opened and the desiccants replaced with fresh ones.

Whenever the motor cannot be sealed, either space heaters must be installed to keep them at least 100F above the ambient temperature, or a roof and plenty of desiccant material must be provided; *otherwise, the units must be stored indoors.* If the motors are not equipped with space heaters at time of manufacture, consult factory for proper size.

NOTE Rodents and other animals like to house inside motors in search of warm surroundings or food. Some of them attack the insulating materials. Their access to the motor should be restricted.

MAINTENANCE

NOTE In applying the following procedures, remember that life of rust preventatives decreases under salty and/or alkaline conditions.

Sleeve Bearings
Once a week the shaft should be rotated by hand at 30 revolutions per minute for 15 seconds or, if power is available, the motor can be bumped for 5 seconds.

Oil Lubricated Antifriction Bearings
Vertical machines of 1800 RPM or slower need no oil maintenance after initial care, except that once a month, the shaft should be rotated by hand at 30 revolutions per minute for 15 seconds or if power is available the motor can be bumped for five (5) seconds. Vertical machines of 3600 RPM having oil-lubricated bearings and all Kingsbury type, should be run at operating speed every month. If motor cannot be run, disassemble the unit to reach the bearings and coat them with rust-inhibiting oil. OTHERWISE, THIS MOTOR MUST NOT BE STORED OUTDOORS.

Grease Lubricated, Antifriction Bearings
Once a month the shaft should be rotated by hand at 30 revolutions per minute for 1 5 seconds or, if power is available, the motor can be bumped for 5 seconds. Bearings should be relubricated at two year intervals.

Most Siemens motor bearings use a polyurea base grease of No. 2 consistency; some large horizontal motors and many vertical ones use a No.3 grease. (Consult your motor instruction book.)

Shaft Extensions — Exposed Machined Surfaces and Flanges
For very long storage check the protective life of the rust inhibitor used and recoat as recommended by the manufacturer. Outdoor life of Tectyl 506" for example, is about two years.

Each week check the condition of the desiccant plugs and bags. Replace them when needed.

STORAGE

PREPARATION FOR SERVICE

Cleaning
Both the interior and exterior of the motor should be free of spilled oil, water, dust and dirt. The exterior should be wiped and the interior blown out with compressed air at reduced pressure or with a small hand bellows. Wipe off removable rust preventatives with a clean cloth soaked in petroleum solvent. Make sure that the bearings and lubricant cavities are free of dust and dirt, and that the (oil) plugs are tight. Scratches, bruises, or rust on the shaft journals must be carefully removed.

Relubricate Bearings (Refer to instruction book.)

Replace Packing (Refer to instruction book.)

Remove Desiccant

Meggering
Regardless of the method of storage, the windings of every motor should be meggered prior to placing in service. Standards of the American Institute of Electrical Engineers recommend the insulation resistance of stator windings at 75°C, measured at 500 Volts dc, after one minute should not be less than that given by the following formula:

$$\text{Insulation in Megohms} = \frac{\text{Rated Voltage of Machine} + 1000}{1000}$$

If the insulation resistance is less than that recommended, the stator may be dried out by operating at reduced voltage, provided the insulation resistance does not drop below 1000 Ohms per nameplate volts during the drying- out period. Should the value of resistance fall below this figure, the stator should be baked in a forced hot air oven— rather than in a radiant type oven.

INSULATION DRYING TEMPERATURES*

CLASS "A"	CLASS "B"	CLASS "F"	CLASS "H"
167°F 75°C	200°F 94°C	245°F 118°C	275°F 135°C

* Class "F" & "H" insulated units should be baked at 70% specified temperature (to avoid steam inside winding) for about 6 hours, before temperature is raised to drying temperature.

SIEMENS

MOTOR SERVICE RECORD

Serial No. _____ Horsepower _____ Type_____

Speed _____ Volts _____ Amperes _____ Phase _____ Cycles _____

Insulation Class _____ Temperature Rise _____°C Frame Size_____

Connection Diagram - Rotor _____ Stator _____

Owner Order No. _____ Item No. _____ Date Purchased _____

MACHINE TYPE

❑ Horizontal
❑ Vertical
❑ Open Drip-Proof
❑ Totally-Enclosed
❑ Explosion-Proof

❑ Weather-Protected

BEARINGS

❑ Ball ❑ Roller ❑ Sleeve

Size:

Front_____

Rear _____

Lubrication_____

SHAFT EXTENSION

Length _____

Diameter _____

Internal Thread_____

External Thread _____

Date Installed	Location	Application

Date Repaired or Replaced	Repairs or Parts Replaced [1]	Fault	Repaired by	Total Cost

[1] Name of Part	No. Per Machine	Manufacturer's No.	Date	Quan. Repl.	Cost	Date	Quan. Repl.	Cost	Date	Quan. Repl.	Cost
Rotor											
Stator Coils											
Bearing, Front											
Rear.....											
Other.....											
.....											

INSPECTION

Date Checked													
Bearings													
Lubrication													
Excess Heat													
Excess Noise													
Speed													
Voltage													
Amps													
Insulation													
Clean													
Alignment													
Vibration													
Temperature													

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