

Instructions for

Long-Term Storage Manual for Induction LV Motor



Maintenance Work during Relatively Long Storage Periods before First Operation or while Shutdown for Servicing

Induction Motors / Generators

Maintenance

If a machine has been out of service for more than three months, the following procedures should be followed. The intervals depend on the operating and site conditions. The following works are recommended under normal conditions.

Package conditions. Table 1

Package condition	Machine with export packing.	Without packing or machine with domestic packing.
	Machine should be stored in a correct mounting position. Machine should be covered with suitable water-proof canvases.	
Storage location	1. Machine with packing should preferably not be stored in outdoors. where possible, machines should be stored indoors in a clean, dry area. 2. If indoor storage is impossible for machine with packing, it is recommended that the storing it under a weather-proof roof. or alternatively cover it with canvases.	1. Machine should not be stored in outdoors. where possible, machines should be stored indoors in a clean, dry area. 2. If indoor storage is impossible for totally-enclosed, outdoor application machine, it is recommended that covering it with canvases.
Works for packing	1. In the case of condition before installation. (1) Stacking of heavy machine stop one another should be avoided. Machine should be stored in such a way that no base frame will suffer distortion. (2) Attention should be paid to the loading capacity of floor. Care should be taken, so that the floor, on which machine is stored, is not subjected to vibration and free from moisture. (3) Storing of machine for longer than one year is not recommended. If the storing is continued, following procedures described in Table 2 should be done in year : 1) Seal the silica-gel within packing and replace at regular intervals. 2) Fully seal the packing.	
		(3) The store room should be well ventilated and selected for possible protection against moisture and dirt. 2. Cover the air intake and discharge openings of open-enclosure machine by canvases to prevent the dust deposits inside the machine. 3. If the other works are still in progress even after completed installation of machine, machine should be protected from ingress of foreign matters by a temporary protection covering.

Maintenance work preparatory on machine parts. Table 2

	During long storage	Prior to operation
External, unpainted metal surfaces.	Apply the following rust-preventive materials or equal : RUST VETO 244. 342.(E.F.Houghton). P101(Nippon Sekiyu). TECTYL 506(Valvoline Oil).	Remove the rust-preventives with suitable solvents.
Bearings.	Rotate the shaft slowly at least 10 revolutions by hand (*) or for several minutes by temporarily operate (**) the machine once every three months. Exception : In machine with export packing.	1. Check to see that shaft locking-provisions and temporary-covers have been removed, when provided. 2. Check for irregular noise by shaft rotation by hand. 3. If possible, check that bearings are free from rust.
Regreasable anti-friction bearings.	Supply the following amount of grease to the bearing while rotating the shaft by hand. Regreasing amount is indicated on the rating plate. Supply the grease once a year. Prior to grease supply, Open the grease outlet. Remove the original grease to avoid excessive filling the bearing cavity and to avoid grease leaks from shaft seals.	1. Remove the old grease from the grease outlet opening before beginning operation. 2. Supply new lubricant of the amount indicated on rating plate while rotating the shaft by hand or while the machine is running. 3. Remove old grease by running the machine for a few hours with the grease outlet open.

Oil lubricated bearings	1. Check the reservoir filled with lubricant up to the proper line on the oil level gauge. 2. If a machine is out of service for more than one month, the following procedures should preferably be followed monthly : (1) Lubricate a machine with combined angular-contact ball (72 or 73 series) bearings by operating it for about 10 minutes. Lubricate a bearing of large output machine, provided with oil inlet plug on the top of oil reservoir, by pouring oil through the oil inlet. Then immediately rotate its shaft at least 10 revolutions by hand. After that, drain off excess oil. (2) For a machine with a spherical-roller thrust (293 or 294 series) bearings. A machine should be run for about 10 minutes or the shaft rotated at least 10 revolutions by hand. (3) In a machine with sleeve bearings, a machine should be run for about 10 minutes or the shaft rotated at least 10 revolutions by hand. When rotate the shaft, supply about 50 to 100cm³ of the lubricating oil through the screw plug (or sight-glass) of bearing housing. 3. Replace with new oil once per year.	1. Open the drain plug and remove the original oil. Fill the reservoir with the new lubricant up to the proper line on the oil level gauge. 2. In the forced-feed, oil-lubricated bearing. (1) Clean the inside of the oil pipings and refresh them, when required. (2) Fill the bearings connected to a feed-oil system with specified oil, check the system for satisfactory operation.
Insulated windings	Insulation resistance between winding and earth be measured every six months (Every one year in machine with export packing) and before the machine is started. If the lower insulation resistance value is measured, open the terminal-box cover and, if the value does not increase, winding should be dried before being energized.	
Anti-condensation heater, when provided.	Heater should be energized, in machine without packing, when power-supply cables and heater leads are connected. 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℃ above ambient.	Heater should be disconnected before machine is started up.
Water drain	Drain water by opening the drain plug in the enclosure.	

plug, when provided.	At regular intervals of not longer than six months. One year in machine with export packing.	-
Slip rings	Check the surface for signs of corrosion every six months and prior to operation (one year in machine with export packing.)	
Openings	Any unused cable entry into terminal box(s) should be closed.	Remove the temporary protection covers, when provided
Painted external surfaces	Repaint at regular intervals, when necessary.	

Notes (*) : When possible. (**) : When the machine is installed ready for operation.

Check and inspection items prior the operation, addition to items described above

Enclosure :

- (1) Check that cooling air can flow unobstructed to and from the machine.
- (2) Check the enclosure and external rotating parts for damage or corrosion.
- (3) Check to insure that rotating parts do not contact with stationary one.
- (4) Inspect the shaft sealing for correct mounting.
- (5) Check the screws and base or flange-bolts have been tightened.
- (6) In maintain the necessary degree of protection required for enclosures of machines used for outdoor applications, refit gaskets. When provided, and carefully coat all surfaces to be sealed with a sealed with a sealing agent when reassembling.

Terminal box, terminals :

- (1) Check cable terminals are correctly connected electrically.
- (2) Check all electrical terminals have been tightened.
- (3) With flexible leads : Check the cable connections are properly insulated, all bare, live metal should be wrapped with insulation tape.
- (4) Make sure that direction of rotation of machine is correct.

Storage of spare parts

Storage locations :

Packing should be stored in the storeroom. The storeroom should be well ventilated and selected for possible protection against moisture and dirt. Spare machine with anti-friction bearings should be stored in a place not subject to vibration.

Packing conditions :

- (1) Anti-friction bearings : Spare bearings with packing which protects for long storage-periods should preferable be purchased.
- (2) Sleeve bearings : Apply RUST VETO HEAVY (E.F.Houghton), TECTYL 506 (Valvoline Oil) or equal to finished surface, P103 (Nippon Sekiyu) or equal on lining. Coat the painting for other faces. Re-coat them every one year.
- (3) Other parts : Fully seal the packing.

End.