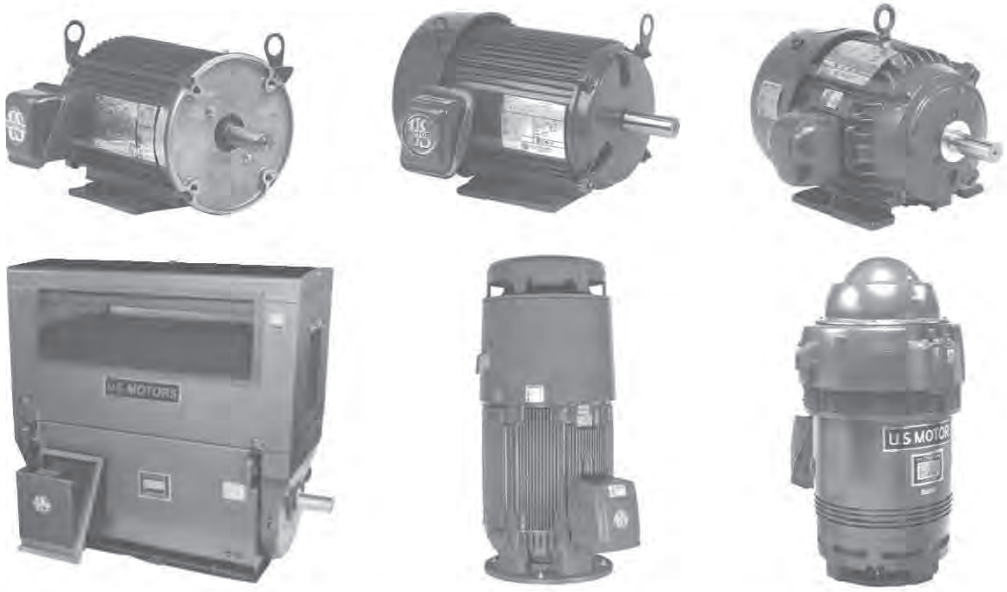
Installation, Operation & Maintenance Instructions



HORIZONTAL MOTORS

TITAN MOTORS

VERTICAL MOTORS

For your safety, read and retain this manual.

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ENGLISH

SAFETY FIRST

⚠ DANGER ***High voltage and rotating parts can cause serious or fatal injury. Safe installation, operation and maintenance must be performed by qualified personnel. Familiarization with, and adherence to, NEMA MG2, the National Electrical Code (NEC), and local codes is required. It is important to observe safety precautions to protect personnel from possible injury.***

PERSONNEL SHOULD BE INSTRUCTED TO:

1. Be familiar with the equipment and read all instructions thoroughly before installing or working on equipment.
2. Avoid contact with energized circuits or rotating parts.
3. Disconnect all power sources before initiating any maintenance or repair.
4. Act with care in accordance with prescribed procedures in handling and lifting this equipment.
5. Be sure unit is electrically grounded in accordance with code requirements.
6. Be sure equipment is properly enclosed or protected to prevent access by children or other unauthorized personnel to prevent possible accidents.
7. Be sure shaft key is fully captive before unit is energized.
8. Avoid contact with capacitors until safe discharge procedures have been completed.
9. Provide proper guarding for personnel against rotating parts and applications involving high inertia loads which can cause overspeed.
10. Avoid extended exposure to equipment with high noise levels.

INSPECTION AND HANDLING

Inspect unit to make sure no damage has occurred during shipment. Check nameplate for correct speed, horsepower, voltage, hertz and phase for conformance with power supply and equipment.

⚠WARNING ***Units should be lifted using all eyebolts or lugs if provided. These eyebolts or lugs are provided for lifting this unit only and must not be used to lift any additional weight. Lifting angle, from shank of eyebolt, must not exceed 30 degrees for machines with single and 45 degrees for machines with multiple lifting means. Replacement eyebolts must be per ASTM A489 or equivalent. All eyebolts must be securely tightened. Be careful not to touch overhead power lines with lifting equipment. Failure to observe this warning may result in serious personal injury.***

STORAGE

Units should be stored indoors, in a clean, dry location & winding should be protected from excessive moisture absorption. NOTE: If motors are to be stored for over one year, refer to Nidec Motor Corporation (NMC). If motors are to be stored for over one year and if gear and belt transmission units are to be stored for over six months, refer to Nidec Motor Corporation.

LOCATION

⚠WARNING ***Use only UL Listed Hazardous Location Motors for service in Hazardous Locations as defined in Article 500 of the NEC. Units should be located in a clean, well-ventilated area. Units should be located in a suitable enclosure or protected to prevent access by children or other unauthorized personnel to prevent possible accidents.***

INSTALLATION / MOUNTING

Mount unit on a firm, flat surface sufficiently rigid to prevent vibration. Drive belts and chains should be tensioned in accordance with supplier recommendations. Couplings should be properly aligned and balanced. For belt, chain and gear drive selection refer to the drive or equipment manufacturer. For application of drive equipment refer to applicable information in NEMA MG1.

Motors have been dynamically balanced using a half key the same length as the full key shipped with the motor. If pulley length keyway is less than this length, rework long key by removing one-half of excess length between pulley and end of key to maintain balance.

Do not restrict motor ventilation. Unless otherwise specified on nameplate, motor is designed for operation in accordance with NEMA MG1 "Usual Service Conditions" which states an ambient temperature range of -15° C to 40° C (5° F to 104° F). Standard grease lubricated units are suitable for operation within this temperature range. Special lubricants may be required for ambient temperatures outside of this range. Note: Motors operating under rated load and allowable ambient conditions may feel hot when touched; this is normal and should not be cause for concern. When in doubt, measure frame surface temperature and confer with nearest office. Enclosed motors normally have condensation drain openings. Insure that drain openings are properly located and open (plugs removed) for the motor mounting position. Drain openings should be at lowest point of end brackets, frame housing and terminal housing when the motor is installed. This may require modification of motor to accomplish. If unit appears wet, and/or has been stored in a damp location, dry out thoroughly and check for adequate insulation resistance to ground before operating.

⚠WARNING ***Guards should be provided for all exposed rotating parts to prevent possible personal injury. Keep fingers and foreign objects away from ventilation and other openings. Applications involving high inertia loads may damage this equipment due to motor overspeed during coast shutdown. Such applications should be referred to Nidec Motor Corporation.***

⚠ CAUTION ***Do not force drive coupling or other equipment onto shaft, as bearing damage may result.***

POWER SUPPLY AND CONNECTIONS

The power supply must agree with values on nameplate. Terminal voltage should not vary more than ±10% of nameplate voltage at rated frequency. Unbalanced line voltage, greater than one percent, can cause overheating. Do not exceed the rated load amperes on the nameplate. Starting controls and overload protection should be properly sized in accordance with the NEC and the control manufacturer's recommendations.

Motor connections should be made by following instructions on connection diagram. Determine direction of rotation before connecting driven equipment. If direction of rotation label is supplied, operate only in specified direction. Rotation may be reversed on three phase motors by interchanging any two line connections. On single phase motors interchange leads per connection diagram on motor. Wiring of units, controls and grounding shall be in accordance with local and NEC requirements.

⚠WARNING ***Failure to properly ground unit may cause serious injury to personnel. Where unexpected starting could be hazardous to personnel, do not use automatic reset starting devices.***

USE OF VARIABLE FREQUENCY DRIVES

Electric motors can be detrimentally affected when applied with variable frequency drives (VFD's). The non-sinusoidal waveforms of VFD's have harmonic content which causes additional motor heating; and high voltage peaks.

Other effects of VFD's on motor performance include reduced efficiency, increased load current, vibration and noise. Standard motors utilized with VFD's must be limited to those application considerations defined in NEMA MG-1 Part 30. For most current guidelines on installing and applying a US Motors product refer to http://www.usmotors.com/guidelines. This information takes precedence over previous published information.

NEMA MG-1 Part 31 defines performance and application considerations for Definite-Purpose Inverter Fed Motors. To insure satisfactory performance and reliability, Nidec Motor Corporation offers and recommends nameplated inverter duty motor products which meet the requirements of NEMA MG-1 Part 31. The use of non-inverter duty motors may result in unsatisfactory performance or premature failure, which may not be warrantable under the Terms and Conditions of Sale. Contact your Nidec Motor Corporation Field Sales Engineer for technical assistance for motor selection, application and warranty details.

OIL LUBRICATION

Most oil lubricated units are shipped without oil. Refer to Instruction Manual with unit for specific type and grade of oil to be used, change interval and level. If lubrication instructions specify synthetic oil, do not substitute.

⚠WARNING ***For applications in the food and drug industry (including animal food), consult the petroleum supplier for lubricants that are acceptable to the Food and Drug Administration and other governing bodies.***

MAINTENANCE

Inspect units at regular intervals. Keep units clean and ventilation openings clear of dust, dirt or other debris. Lubricate units per this operating instruction folder and instruction plate on unit. Excessive lubrication may damage the unit. Do not over grease.

⚠WARNING ***Disconnect all power sources to the unit and discharge all parts which may retain an electrical charge before attempting any maintenance or repair. Screen and covers must be maintained in place when unit is in operation. Failure to observe this warning may result in personal injury.***

U.L. Listed Motors for use in Hazardous Locations: Repair of these motors must be made by the manufacturer or manufacturer's authorized service station approved to repair U.L. Listed Motors. The U.L. listing applies to the electric motor only and not the belt or gear transmissions or other devices that may be connected to the motor.

COOLING TOWER DUTY MOTORS

During installation, insure drain plugs are removed from lower drain holes in bracket and outlet box. All upper drain holes must be plugged at all times. External umbrella seal must be in place for shaft up applications. Motors with Bearing numbers "XXXX-2RS" are double sealed and not to be relubricated.

GREASE LUBRICATION INSTRUCTIONS

Units are prelubricated at the factory and do not require initial lubrication. Relubricating interval depends upon speed, type of bearing and service. Refer to Table 1 for suggested regreasing intervals. Operating conditions may dictate more frequent lubrication. Motor must be at rest and electrical controls should be locked open to prevent energizing while motor is being serviced (refer to section on Safety). If motor is being taken out of storage, refer to storage procedures.

To relubricate bearings, remove the drain plug. Inspect grease drain and remove any blockage with a mechanical probe taking care not to damage bearing.

⚠ CAUTION ***Under no circumstances should a mechanical probe be used while the motor is in operation. Add new grease at the grease inlet, refer to Table 1 for replenishment quantities. New grease must be compatible with grease in the motor (See Caution Note). Run the motor for 15 to 30 minutes with the drain plug removed to allow purging of any excess grease. Shut off unit and replace the drain plug. Return motor to service. Some motors have sealed bearings and are not regreasable.***

Over greasing can cause excessive bearing temperatures, premature lubricant breakdown and bearing failure. Care should be exercised against over greasing.

Table 1

Recommended Grease Replenishment Quantities & Intervals (For lubrication of units in service)

Bearing Number				Bearing Type	Grease FL Oz.	Lubrication Interval		
Common		AFBMA						
62XX	63XX	XXBC02	XXBC03			1801-3600 RPM	1201-1800 RPM	0-1200 RPM
6203-6207	6303-6306	17-35	17-30	Ball	0.2	2 Years	3 Years	3 Years
6208-6212	6307-6309	40-60	35-45		0.4	1 Year	2 Years	2 Years
6213-6215	6310-6311	65-75	50-55		0.6	1 Year	2 Years	2 Years
6216-6219	6312-6315	80-95	60-75		1.0	6 Mos.	1 Year	2 Years
6220-6228	6316-6320	100-140	80-100		1.8	3 Mos.	1 Year	1 Year
NU307		35RU03		Roller	0.3	N/A	6 Mos.	1 Year
NU309		45RU03			0.4			
NU311		55RU03			0.6			
NU215		75RU02			0.6			
NU315		75RU03			1.0			
NU220		100RU02			1.1	N/A	3 Mos.	6 Mos.
NU222		110RU02			1.4			
NU226		130RU02			1.6			
NU228		140RU02			1.9			
C2211 CARB		N/A			0.4	N/A	6 Mos.	1 Year
C2213 CARB		N/A			0.6			
C2316 CARB		N/A			1.8			
C2220 CARB		N/A			1.4	N/A	3 Mos.	6 Mos.
C2222 CARB		N/A			1.8			
C2226 CARB		N/A			2.5			

For motors mounted vertically or in hostile environments, reduce intervals shown by 50 percent.

Refer to motor nameplate for bearings provided on a specific motor.

For bearings not listed in table above, the amount of grease required may be calculated by the formula:

$$G=0.11 \times D \times B$$

Where;

G = Quantity of grease in fluid ounces.

D = Outside diameter of bearing in inches.

B = Width of bearing in inches.

Table 2
RECOMMENDED GREASES

THE FOLLOWING GREASES ARE INTERCHANGEABLE WITH THE GREASE AS PROVIDED IN UNITS SUPPLIED FROM FACTORY (UNLESS STATED OTHERWISE ON A LUBRICATION NAMEPLATE PROVIDED ON MOTOR).

MANUFACTURER	GREASE (NLGI No. 2)
MOBIL CORP.	POLYREX - EM
CHEVRON U.S.A. INC.	SRI NO. 2

⚠ CAUTION ***Greases of different bases (lithium, polyurea, clay, etc.) may not be compatible when mixed. Mixing such greases can result in reduced lubricant life and premature bearing failure. When necessary, prevent such intermixing by disassembling the motor, removing all old grease from bearings and housings (including all grease fill and drain holes). Inspect and replace damaged bearings. Fill bearing housings and bearing approximately 30% full of new grease. Remove any excess grease extending beyond the edges of the bearing races and retainers. Refer to Table 2 for recommended greases.***

WARRANTY

LIMITED WARRANTY

All Nidec Motor Corporation products are warranted against defects in workmanship and materials for 12 months from date of installation, not to exceed 18 months from date of shipment from NMC. Some of Nidec Motor Corporation products carry a warranty period longer than 12 months. Please refer to the current price catalog or to NMC for details on specific products. This limited warranty does not apply to any product which has been subject to misuse, misapplication, neglect (including without limitation, inadequate maintenance), accident, improper installation, modification, adjustment, or repair. This constitutes NMC's only warranty in connection with this sale and is in lieu of all other warranties, expressed or implied, written or oral. THERE ARE NO IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE THAT APPLY TO THIS SALE. No employee, agent, dealer or other person is authorized to give any warranties on behalf of NMC nor to assume for NMC any other liability in connection with any of its products.

EXCLUSIVE REMEDY

NMC's liability shall be limited exclusively to repairing or replacing any product found by NMC to be defective, or at NMC's option, to refund the purchase price of its product. Such product shall be returned, freight prepaid, to the nearest Nidec Motor Corporation authorized service station or NMC factory. It is agreed that such replacement, repair, or refund be the sole and exclusive remedies available from NMC. NMC shall not be liable for damages of any sort whatsoever beyond these exclusive remedies including incidental and consequential damages regardless of whether any claim is based upon contract, negligence, strict liability, tort, warranty, or other basis. The repair or replacement of the product, or the refund of the purchase price, at NMC's option, constitutes fulfillment of all liabilities of NMC to the buyer for defective products.

RENEWAL PARTS AND WARRANTY SERVICE

When inquiring for renewal parts, call the nearest Nidec Motor Corporation Parts Stocking Distributor. For warranty service, call the nearest Nidec Motor Corporation Authorized Service Station. Give them complete Nameplate data, including identification number, etc.

Request installation and maintenance manuals by product name.

FOR SERVICE CALL:

NEAREST NIDEC MOTOR CORPORATION AUTHORIZED SERVICE STATION OR NIDEC MOTOR CORPORATION PRODUCT SERVICE ST. LOUIS, MO 1-800-566-1418

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