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MOTOR/GEARMOTOR SAFETY, INSTALLATION, USE, AND MAINTENANCE INFORMATION

Bodine Electric Co., 2500 W. Bradley Place, Chicago, IL 60618 U.S.A.© www.bodine-electric.com

Form P/N 074 00045 (ehg 08/2007)

Congratulations … and thanks on your selection of a Bodine Motor/Gearmotor. With your new drive unit you will find yourself enjoying the same high performance and relatively trouble free operation that have been characteristic of Bodine products since 1905. We call it ADE (After Delivery Economies).

The Bodine Electric Company prides itself on the quality of design and manufacture of its products. Great care is taken in an attempt to provide products free of defective design, workmanship, or materials. It will be considered a favor to have cases of unsatisfactory service from Bodine products brought to our attention.

SAFETY

"The use of electric motors and generators, like that of all other utilization of concentrated power, is potentially hazardous. The degree of hazard can be greatly reduced by proper design, selection, installation, and use, but hazards cannot be completely eliminated. The reduction of hazard is the joint responsibility of the user, the manufacturer of the driven or driving equipment, and the manufacturer of the motor or generator." *

Bodine products are designed and manufactured to comply to applicable safety standards and in particular to those issued by ANSI (American National Standards Institute), NEMA (National Electrical Manufacturers Association), U.L. (Underwriters Laboratories, Inc.), and CSA (Canadian Standards Association).

Most Bodine products are "third party approved" with respect to construction. Motors and gearmotors having component recognition by U.L. Inc. have a "C" or "RU " symbol in the left-most unlabeled space on the bottom row of their nameplates. Those that are CSA certified have a "CSA " mark in the same location. If you need specific information regarding the "third party approval" of Bodine products, contact your Bodine representative, or the home office.

However, since even well-built apparatus can be installed or operated in a hazardous manner, it is important that safety considerations be observed by the user. With respect to the load and environment, the user must properly *select, install,* and *use* the apparatus—for guidance on all three aspects see safety standards publication No. ANSI/NEMA MG-2.*

* Standards Publication No. ANSI/NEMA MG-2. "Safety Standard for Construction and Guide for Selection, Installation and Use of Electric Motors and Generators."

Available from:
National Electrical Manufacturers Assoc.
2101 L Street N.W.
Washington, D.C. 20037, U.S.A.

SELECTION

Before proceeding with the installation, the user should review the application to confirm that the proper drive has been selected. This should be done after reading this notice and all applicable safety standards. If in doubt, contact your Bodine Representative or the Home Office if there is no Representative in your area. Any selection or application suggestions made by Bodine are only to assist the customer—and in all cases, determination of fitness for purpose or use is solely the customer's responsibility.

Unless otherwise agreed to by Bodine, all nameplate ratings are based on the following *normal operating conditions*:

1. Duty—8 hours per day; 5 days per week if nameplated continuous duty (CONT), without frequent reversals or starts and stops. Products intended for intermittent duty show a time rating on the nameplate based on keeping the winding temperature within the maximum allowable temperature of the insulation system when the motor is started with windings within 5ºC of the ambient temperature.
2. Ambient temperature 0 to 40ºC (104ºF).
3. Load—Uniform and free from shock or high inertia.
4. Voltage—Within 10% of nameplate rating.
5. Frequency—Within 5% of nameplate rating.
6. Combined variation of voltage and frequency—Within a total of 10% providing frequency variation does not exceed 5%.

Consult Bodine if variations from the above conditions are contemplated.

INSTALLATION

It is the responsibility of the equipment manufacturer or individual installing the apparatus to take diligent care in installing it. The National Electrical Code (NEC), sound local electrical and safety codes, and when applicable, the Occupational Safety and Health Act (OSHA) should be followed when installing the apparatus to reduce hazards to persons and property.

Inspection

Examine for damage from shipment before connecting. Any claim(s) for shipping damage should be made to the freight carrier. Do not attempt to turn the output shaft of a gearmotor with an externally applied torque arm.

Mounting

Any screws, or similar devices, that penetrate the motor frame either for mounting the Bodine product or mounting something to the product should be limited in length so as not to come in contact with, or in close proximity to, intended features that conduct electricity. Spacings as high as .158" may be required based on voltages and circuitry involved. Consult factory if necessary.

Preferred mounting positions for Bodine products are illustrated in selection literature. Gearmotor mountings other than those shown are not recommended on some *gearmotors* due to (a) the possibility of gearhead lubricant leakage into the motor portion and (b) possible leakage from gearhead breather and oil level holes. Also, for parallel-shaft gearmotors, the proper lubricant quantity provided for horizontal mounting is not sufficient for vertical mounting. By making the proper adjustments (normally done at the factory), mountings other than the preferred positions of gearmotors are possible.

Connection

Follow nameplate for voltage, frequency, and phase of power supply. See accompanying wiring diagram as to connections for rotation (and capacitor, resistor, relay, protector, if required). *When connecting, make sure that your motor/gearmotor is securely and adequately grounded—failure to ground properly may cause serious injury to personnel.* (If wiring diagram shipped with drive unit becomes lost or missing, contact Bodine, providing serial number (NO) and (TYPE) information shown on the nameplate of the unit.)

Wiring

For wire sizes and electrical connections refer to the National Electrical Code (NEC)—Article 430—"Motors, Motor Circuits, and Controllers" and/or applicable local area codes. If extension cords are used, they should be kept short for minimum voltage drop. Long or inadequately sized cords can cause motor failure, particularly with hard starting loads when current draw tends to be at its highest.

USE

Additional Safety Considerations

The chance of electric shocks, fires, or explosions can be reduced by giving proper consideration to the use of grounding, thermal and over current protection, type of enclosure, and good maintenance procedures.

The following information *supplements* the foregoing safety considerations: This information is not purported to be all-inclusive and the aforementioned references should be consulted.

1. Do not insert objects into the ventilation openings of products.
2. Sparking of starting switches in AC motors so equipped, and of brushes in commutator type motors, can be expected during normal operation. In addition, open-type enclosures may eject flame in the event of an insulation failure. Therefore, avoid, protect from, or prevent the presence of flammable or combustible materials in the area of motors/gearmotors.
3. Bodine totally enclosed products are not explosion proof or dust ignition proof nor does Bodine offer such products for hazardous locations (flammable/explosive gas, vapor, dust). When dealing with hazardous locations, an *approved* explosive proof or dust ignition proof product is the recommended approach. Exceptions are allowed by the National Electrical Code: The NEC and the NEMA safety standard should be studied thoroughly before exercising this option.
4. Open, ventilated motors are suitable for clean, dry locations where cooling air is not restricted, Enclosed motors/gearmotors are suitable for dirty, damp locations. For outdoor use, wash downs, etc., enclosed motors must be protected by a cover while still allowing adequate air flow.
5. Moisture will increase the electrical shock hazard of electrical insulation. Therefore, consideration should be given to the avoidance of (or protection from) liquids in the area of motors. Use of totally enclosed motors/gearmotors will reduce the hazard if all openings are sealed.
6. Products equipped with thermal protectors are labeled "THERMALLY PROTECTED." If severe over-loading, jamming, or other abnormal operating conditions occur, such heat sensitive protectors operate to open the electric power supply circuit. Motors/gearmotors with "automatic" thermal protectors MUST NOT be used where automatic restarting of the drive unit could be hazardous in that clothing or parts of the human body could be in electrical or physical contact with a machine that *starts unexpectedly* when the thermal protector cools down. MANUAL RESET protectors or suitable electric supply disconnect devices/procedures should be used where such hazards could be created.

7. The windings of DC stepper motors, or their switching transistors, must be disconnected from the DC power source to avoid unexpected motion. If not, extraneous signals could turn on the power transistors and generate motion.
8. Some oil-type capacitors contain a non-PCB impregnate which is *flammable*. Such capacitors are identified by means of a Warning Label and, in addition, are stamped "NON-PCB." The user has to provide at least .57 in. (14.5 mm) clearance beyond the terminal blades for case expansion to allow an internal safety switch to *permanently* open and electrically disconnect the capacitor. The internal pressure sensitive switch is designed to prevent the expulsion of the flammable dielectric medium if excessive temperatures are generated by electrical operation. Do not discard such capacitors into open fire as excessive internal heat could cause them to explode.
9. Motors/gearmotors which employ capacitors can develop more than nameplate voltage across the capacitor and/or capacitor winding (depending on design). Also, overdrive voltages may be many times greater than a stepper motor's continuous voltage rating. Suitable precautions should be taken when applying such motors.
10. Abnormal conditions, such as cut-out switch failure, or a partial winding failure, can very occasionally cause some AC motors/gearmotors to start in a direction reverse from normal. Also, use of a capacitance or resistance value other than that recommended for Hy-Sync™ motors may result in unpredictable reverse operation. Susceptibility to unplanned reversing under such conditions is greatest when the motor's actual load is light relative to its rated load. One-way clutches or similar devices are advisable if unexpected reverse rotation is unsafe in the application.
11. Do not rely upon self-locking gears or permanent magnet, stepper, Hy-Sync™, or energized motors to hold a load in place if movement could result in personal injury. Mechanical locking devices should be used in such applications.
12. For motors driven by electronic controls, do not use a function of the control for safety interlock purposes. An independent switch or relay should be used. On stepper motors, the device should be between the control and the motor.

Before Starting

1. Before attempting to start, check all connections and fuses.
2. Proper consideration should be given to rotating members: Before starting, be sure keys, pulleys, etc. are securely fastened. *Proper guards should be provided to prevent hazards to personnel while rotating.*
3. Other mechanical considerations include proper mounting and alignment of products and safe loads on shafting and gearing.

Starting

1. The motor/gearmotor should be test-started in an unloaded state (because of possible reaction torque, the drive should be securely mounted when starting—even when unloaded).
2. If the drive unit does not start promptly and run smoothly, disconnect at once.
3. If unable to correct the problem, contact your purchase source, or a Bodine Authorized Service Center, describing the trouble in detail. Include the serial number, type, and other nameplate data. Do not dismantle the product—unless authorized by Bodine, removing screws voids the warranty.

MAINTENANCE

IMPORTANT—*Before* servicing or working on equipment, disconnect power source (this applies especially to equipment using automatic restart devices instead of manual restart devices and when examining or replacing brushes on brush-type motors/gearmotors).

Clean regularly to prevent dirt and dust from interfering with ventilation or clogging moving parts.

Brush Type Motors/Gearmotors—The wear rate of brushes is dependent upon many parameters (armature speed, amperage duty cycle, humidity, etc.). For optimum performance, brush-type motors and gearmotors need periodic user-maintenance. The maintenance interval is best determined by the user. Inspect brushes regularly for wear (replace in same axial position). Replace brushes when their length is less than ¼ inch (7 mm). Periodically remove carbon dust from commutator and inside the motor—this can be accomplished by occasionally wiping them with a clean, dry, non-linting cloth. Do not use lubricants or solvents on the commutator. If necessary, use No. 0000 or finer sandpaper only to dress the commutator. Do not use solvents on a non-metallic endshield if the product is so equipped.

Products Employing Capacitors—Before servicing motors/gearmotors employing capacitors, always discharge the capacitor by placing a conductor across its terminals before touching the terminals with any part of your body.

LUBRICATION INSTRUCTIONS

Motor Ball Bearings (not gearhead bearings)—are grease lubricated and do not require re-lubrication.

Motor Sleeve Bearings (not gearhead sleeve bearings)—are lubricated for life, and do not require re-lubrication.

Gearhead Lubrication—most standard gearmotors and all current stock gearmotors are of "unvented" construction, that is, no vent hole or oil fill hole is present or required.

Unvented gearmotors are lubricated for life, and do not require re-lubrication.

Please contact our technical support staff or customer service department in Chicago, if you have additional questions regarding gearmotor or gearhead lubricants. You can also submit a technical support request via our web site, at…

www.bodine-electric.com

Contact Us:

Tel: 1-800-7BODINE (U.S. only)

Tel: 773-478-3515

Fax: 773-478-3232

e-mail: service@bodine-electric.com



BODINE LIMITED WARRANTY

The Bodine Electric Company warrants all products manufactured by it to be free of defects in workmanship and materials when used under Normal Operating Conditions and when applied in accordance with nameplate specifications. This warranty shall be in effect for a period of twelve months from date of purchase or eighteen months from date of manufacture, whichever comes first.

The Bodine Electric Company will repair or replace at its option, any of its products which has been found to be defective and is within the warranty period, provided that the product is shipped freight prepaid, with previous authorization, to Bodine's plant in Chicago, Illinois 60618 U.S.A., or to the nearest Bodine Authorized Service Center. At its option, all return shipments are F.O.B. Bodine's plant or Authorized Service Center. Bodine is not responsible for removal, installation, or any other incidental expenses incurred in shipping the product to or from Bodine.

This warranty is in lieu of any other expressed or implied warranty—including (but not limited to) any implied warranties of merchantability and/or fitness for a particular use or purpose.

Bodine's liability under this warranty shall be solely limited to repair or replacement of the Bodine product within the warranty period and Bodine shall not be liable, under any circumstances, for any consequential, incidental or indirect damages or expenses associated with the warranted products.

Commutators and/or brush wear and its associated effects are a normal occurrence and are not covered by this warranty unless otherwise agreed to by Bodine in writing.

Any Bodine product which is damaged due to misuse, abuse, negligence or has been modified or dismantled without the knowledge or written consent of Bodine, is not covered by this warranty.

Motor/Gearmotor Serial No. _____ Purchase Date_____ Installed By _____

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