BALDOR MN419 AC Motors Manual

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This manual contains general procedures that apply to BaldorReliance Motor products.Be sure to read and understand the Safety Notice statements in this manual. For your protection, do not install, operate or attempt to perform maintenance procedures until you understand the Warning and Caution statements.

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AC Motors
Frame OT260 140hp

2/11 **Installation & Operating Manual** MN419

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Important:

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Section1
General Information

Overview This manual contains general procedures that apply to Baldor•Reliance Motor products.

Be sure to read and understand the Safety Notice statements in this manual. For your protection, do not install, operate or attempt to perform maintenance procedures until you understand the Warning and Caution statements.

A Warning statement indicates a possible unsafe condition that can cause harm to personnel.

A Caution statement indicates a condition that can cause damage to equipment.

Important:

This instruction manual is not intended to include a comprehensive listing of all details for all procedures required for installation, operation and maintenance. This manual describes general guidelines that apply to most of the motor products shipped by Baldor. If you have a question about a procedure or are uncertain about any detail, Do Not Proceed. Please contact your Baldor distributor for more information or clarification.

Before you install, operate or perform maintenance, become familiar with the following:

- NEMA Publication MG-2, Safety Standard for Construction and guide for Selection, Installation and Use of Electric Motors and Generators.
- ANSI C51.5, the National Electrical Code (NEC) and local codes and practices.

Receiving Each Baldor•Reliance Electric Motor is thoroughly tested at the factory and carefully packaged for shipment. When you receive your motor, there are several things you should do immediately.

1. Observe the condition of the shipping container and report any damage immediately to the commercial carrier that delivered your motor.
2. Verify that the part number of the motor you received is the same as the part number listed on your purchase order.

Handling The motor should be lifted using the lifting lugs or eye bolts provided.

Caution: Do not lift the motor and its driven load by the motor lifting hardware. The motor lifting hardware is adequate for lifting only the motor. Disconnect the load (gears, pumps, compressors, or other driven equipment) from the motor shaft before lifting the motor.

1. Use the lugs or eye bolts provided to lift the motor. Never attempt to lift the motor and additional equipment connected to the motor by this method. The lugs or eye bolts provided are designed to lift only the motor. Never lift the motor by the motor shaft.
2. To avoid condensation inside the motor, do not unpack until the motor has reached room temperature. (Room temperature is the temperature of the room in which it will be installed). The packing provides insulation from temperature changes during transportation.
3. If the motor must be mounted to a plate with the driven equipment such as pump, compressor etc., it may not be possible to lift the motor alone. For this case, the assembly should be lifted by a sling around the mounting base. The entire assembly can be lifted as an assembly for installation.

   Do not lift the assembly using the motor lugs or eye bolts provided. Lugs or eye bolts are designed to lift motor only. If the load is unbalanced (as with couplings or additional attachments) additional slings or other means must be used to prevent tipping. In any event, the load must be secure before lifting.

   If the load is unbalanced (as with couplings or additional attachments) additional slings or other means must be used to prevent tipping. In any event, the load must be secure before lifting.

Storage Storage requirements for motors and generators that will not be placed in service for at least six months from date of shipment.

Improper motor storage will result in seriously reduced reliability and failure. An electric motor that does not experience regular usage while being exposed to normally humid atmospheric conditions is likely to develop rust in the bearings or rust particles from surrounding surfaces may contaminate the bearings. The electrical insulation may absorb an excessive amount of moisture leading to the motor winding failure.

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A wooden crate “shell” should be constructed to secure the motor during storage. This is similar to an export box but the sides & top must be secured to the wooden base with lag bolts (not nailed as export boxes are) to allow opening and reclosing many times without damage to the “shell”.

Minimum resistance of motor winding insulation is 5 Meg ohms or the calculated minimum, which ever is greater. Minimum resistance is calculated as follows: **Rm = kV + 1**

where: (Rm is minimum resistance to ground in Meg-Ohms and kV is rated nameplate voltage defined as Kilo-Volts.)

Example: For a 480VAC rated motor Rm =1.48 meg-ohms (use 5 MΩ).
For a 4160VAC rated motor Rm = 5.16 meg-ohms.

Preparation for Storage

1. Some motors have a shipping brace attached to the shaft to prevent damage during transportation. The shipping brace, if provided, must be removed and stored for future use. The brace must be reinstalled to hold the shaft firmly in place against the bearing before the motor is moved.
2. Store in a clean, dry, protected warehouse where control is maintained as follows:
   a. Shock or vibration must not exceed 2 mils maximum at 60 hertz, to prevent the bearings from brinelling. If shock or vibration exceeds this limit vibration isolation pads must be used.
   b. Storage temperatures of 10°C (50°F) to 49°C (120°F) must be maintained.
   c. Relative humidity must not exceed 60%.
3. Measure and record the resistance of the winding insulation (dielectric withstand) every 30 days of storage.
   a. If motor insulation resistance decreases below the minimum resistance, contact your Baldor District office.
   b. Place new desiccant inside the vapor bag and re-seal by taping it closed.
4. Where motors are mounted to machinery, the mounting must be such that the drains and breathers are fully operable and are at the lowest point of the motor. Vertical motors must be stored in the vertical position. Storage environment must be maintained as stated in step 2.
5. Motor anti-friction bearings are to be lubricated at the time of going into extended storage with periodic service as follows:
   a. Motor shafts are to be rotated manually every 3 months and greased every 6 months in accordance with the Maintenance section of this manual.
   b. These bearings are protected for temporary storage by a corrosion inhibitor. If stored for greater than 3 months or outdoor storage is anticipated, connected to the oil lube system while in storage.
6. Coat all external machined surfaces with a rust preventing material.
   An acceptable product for this purpose is Exxon Rust Ban # 392.

Removal From Storage

1. Remove all packing material.
2. Measure and record the electrical resistance of the winding insulation resistance meter at the time of removal from storage. The insulation resistance must not be less than 50% from the initial reading recorded when the motor was placed into storage. A decrease in resistance indicates moisture in the windings and necessitates electrical or mechanical drying before the motor can be placed into service. If resistance is low, contact your Baldor District office.
3. Relube the bearings as instructed in Section 3 of this manual.
4. Reinstall the original shipping brace if motor is to be moved. This will hold the shaft firmly against the bearing and prevent damage during movement.

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Overview Installation should conform to the National Electrical Code as well as local codes and practices. When other devices are coupled to the motor shaft, be sure to install protective devices to prevent future accidents. Some protective devices include, coupling, belt guard, chain guard, shaft covers etc. These protect against accidental contact with moving parts. Machinery that is accessible to personnel should provide further protection in the form of guard rails, screening, warning signs etc.

Motor Enclosure

TEWC, **totally enclosed water cooled** motors are intended for use where moisture, dirt and/or corrosive materials are present in indoor and outdoor locations.

Motor Preparation

Removal of Plugs

The motor has been shipped from the manufacturer with plugs installed in critical orifice inlet points to prevent contamination during shipment/storage, it is necessary that the following plugs are removed before installation:

DE oil supply port

DE oil return port

Lower NPT plug must also be removed for horizontal operation

WEG inlet/outlet ports

Sealant Application

After fastening motor leads, the lead cover plate must be sealed with an anaerobic sealant such as Loctite 515 before operation.

Mounting

Flange mounted machines should be properly seated and aligned.

Note: If improper rotation direction is detrimental to the load, check rotation direction prior to coupling the load to the motor shaft.

Alignment Accurate alignment of the motor with the driven equipment is extremely important.
The pulley, sprocket, or gear used in the drive should be located on the shaft as close to the shaft shoulder as possible.
It is recommended to heat the pulley, sprocket, or gear before installing on the motor shaft.
Forcibly driving a unit on the motor shaft will damage the bearings.

End-Play Adjustment

The axial position of the motor frame with respect to its load is also extremely important.
The motor bearings are not designed for excessive external axial thrust loads.
Improper adjustment will cause failure.

Bolting

Mounting bolts must be carefully tightened to prevent changes in alignment. Use a flat washer and lock washer under each nut or bolt head to hold the motor feet secure. Flanged nuts or bolts may be used as an alternative to washers.

Bolt Torque

Several bolts require proper tightening during installation to avoid stripping threads. Do not exceed the torque limits on the following bolts:

Terminal lugs (M6-1.0):	4 lb-ft
Motor connector bolts (M6-1.0):	6 lb-ft
Terminal cover plate (M6-1.0):	5 lb-ft
Resolver cover plate (M6-1.0):	5 lb-ft
Eyebolt/Ground screw (M12-1.75):	25 lb-ft

WARNING: Guards must be installed for rotating parts and should be permanently guarded to prevent accidental contact by personnel. Accidental contact with body parts or clothing can cause serious or fatal injury.

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Guarding Guards must be installed for rotating parts. This is particularly important where the parts have surface irregularities such as keys, key ways, splines or set screws. Some satisfactory methods of guarding are:

1. Cover the machine and all rotating parts with structural or decorative parts of the driven equipment.
2. Provide covers for the rotating parts. Covers should be sufficiently rigid to maintain adequate guarding during normal service.

Power Connection

Motor and control wiring, overload protection, disconnects, accessories and grounding should conform to the National Electrical Code and local codes and practices. Flying leads must be insulated with two full wraps of electrical grade insulating tape or heat shrink tubing. If motor is installed with a motor control drive system, connect and protect the motor according to the control manufacturers recommendations.

Grounding In the USA consult the National Electrical Code, Article 430 for information on grounding of motors and generators, and Article 250 for general information on grounding. In making the ground connection, the installer should make certain that there is a solid and permanent metallic connection between the ground point, the motor or generator terminal housing, and the motor or generator frame. In non-USA locations consult the appropriate national or local code applicable.

Motors with resilient cushion rings usually must be provided with a bonding conductor across the resilient member. Some motors are supplied with the bonding conductor on the concealed side of the cushion ring to protect the bond from damage.

Motors with bonded cushion rings should usually be grounded at the time of installation in accordance with the above recommendations for making ground connections. When motors with bonded cushion rings are used in multimotor installations employing group fusing or group protection, the bonding of the cushion ring should be checked to determine that it is adequate for the rating of the branch circuit over current protective device being used.

There are applications where grounding the exterior parts of a motor or generator may result in greater hazard by increasing the possibility of a person in the area simultaneously contacting ground and some other nearby live electrical parts of other ungrounded electrical equipment. In portable equipment it is difficult to be sure that a positive ground connection is maintained as the equipment is moved, and providing a grounding conductor may lead to a false sense of security.

Rotation All three phase AC motors are reversible. To reverse the direction of rotation, disconnect and lock out power and interchange any two of the three line leads for three phase motors.

Adjustable Frequency Power Inverters used to supply adjustable frequency power to induction motors produce wave forms with lower order harmonics with voltage spikes superimposed. Turn-to-turn, phase-to-phase, and ground insulation of stator windings are subject to the resulting dielectric stresses.

Suitable precautions should be taken in the design of these drive systems to minimize the magnitude of these voltage spikes. Consult the drive instructions for maximum acceptable motor lead lengths, and proper grounding.

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WARNING: MEDICAL DEVICE/PACEMAKER DANGER– Magnetic and electromagnetic fields in the vicinity of current carrying conductors and industrial motors can result in a serious health hazard to persons with cardiac pacemakers, internal cardiac defibrillators, neurostimulators, metal implants, cochlear implants, hearing aids, and other medical devices. To avoid risk, stay away from the area surrounding a motor and its current carrying conductors.

First Time Start Up

Be sure that all power to motor and accessories is off. Be sure the load is disconnected from the motor shaft and will not cause mechanical rotation of the motor shaft.

1. Make sure that the mechanical installation is secure. All bolts and nuts are tightened etc.
2. If motor has been in storage or idle for some time, check winding insulation integrity.
3. Inspect all electrical connections for proper termination, clearance, mechanical strength and electrical continuity.
4. Be sure all shipping materials and braces (if used) are removed from motor shaft.
5. Manually rotate the motor shaft to ensure that it rotates freely.
6. Replace all panels and covers that were removed during installation.
7. Momentarily apply power and check the direction of rotation of the motor shaft.
8. Verify rotation direction before you continue.
9. Start the motor and ensure operation is smooth without excessive vibration or noise.

The equipment can now be loaded and operated within specified limits. Do not exceed the name plate ratings for amperes for steady continuous loads.

Jogging and Repeated Starts

Repeated starts and/or jogs of induction motors generally reduce the life of the motor winding insulation. A much greater amount of heat is produced by each acceleration or jog than by the same motor under full load. If it is necessary to repeatedly start or jog the motor, it is advisable to check the application with your local Baldor distributor or Baldor Service Center.

Heating - Duty rating and maximum ambient temperature are stated on the motor name plate.
Do not exceed these values. If there is any question regarding safe operation, contact your local Baldor District Office or Baldor Service Center.

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General Inspection Inspect the motor at regular intervals. The following steps should be performed at each inspection:

WARNING: Do not touch electrical connections before you first ensure that power has been disconnected. Electrical shock can cause serious or fatal injury. Only qualified personnel should attempt the installation, operation and maintenance of this equipment.

1. Measure and record the resistance of the winding insulation (dielectric withstand) to ensure that the integrity of the winding insulation has been maintained. Immediately investigate any significant drop in insulation resistance (see Section 1).
2. Check all electrical connectors to be sure that they are tight.

Lubrication This motor uses high speed precision spindle bearings. The motor cannot be operated when not connected to an oil supply. This motor was designed for use with Allison Transynd Oil, contact motor manufacturer for approval of different oil types.

Motor Cooling

1. The motor requires 0.4 GPM of Allison Transynd Oil, or an approved alternate from the motor manufacturer, for lubrication of the bearings as well as cooling for the internal components of the motor. The oil inlet temperature is not to exceed 80°C. (Unless otherwise stated by manufacturer)
2. The motor also requires 8 GPM of 50/50 WEG (Water Ethanol Glycol) for the external water jacket. The WEG inlet temperature is also not to exceed 80°C.

List of Approved Oils:

Oil Type	Viscosity @ 40°C (cSt)	Viscosity @ 100°C (cSt)
Allison Transynd	38.9	7.3
Castrol Dexron VI	28.9	6.0
Mobil 1 Turbo Diesel 5W-40	100.4	14.9
Mobil Delvac 15W-40	92.6	15.3
Mobil SHC 627 ISO 100	99.1	13.9

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