



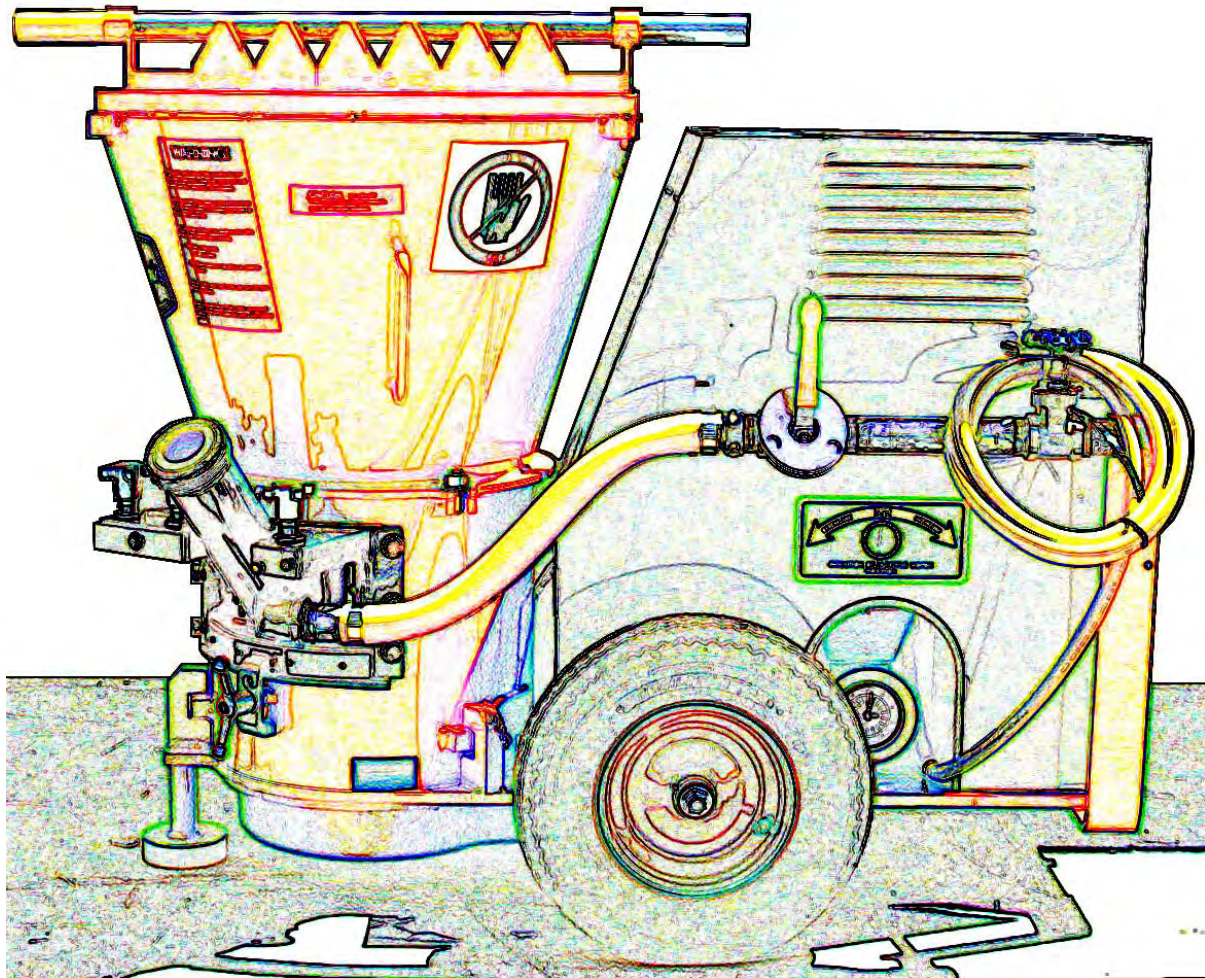
LOHE - PNEUMATIC SPRAYING MACHINE VENDOR SECTION

LOHE
VENDOR

FIGURE 00
PAGE 00

REED PNEUMATIC SPRAYING MACHINE MODEL **LOHE** VENDOR
SECTION CONTAINS THE FOLLOWING FIGURES:

- FIGURE 00 TABLE OF CONTENTS
- FIGURE 01 NORD GEAR
- FIGURE 02 NONE



REVISION:

REED MANUFACTURING

Electric powered Reed guncrete machines furnished with three phase, 50/60 cycle electric drive motors are equipped with a solid state adjustable three phase motor protective relay. These relays are furnished to match the voltage requirements as specified, for each Reed machine ordered.

This device is installed as a protective measure and is located inside the control box directly beneath the electric drive motor.

When properly adjusted (see following instructions) for local operational power source conditions, the adjustable relay within the device will open, and cut off electric power to the drive motor should any of the following occur:

1. Prevents burn-outs in 3-phase induction motors.
2. Wide setting ranges - rated current (1 to 160A) and operating time (2 to 40 seconds).
3. Protect delta - connected motors against open phase in the 3-phase circuit.
4. Prevents the motor from reversing without starting it.
5. Stable operation against noise, induction, and current wave form distortion.

Due to the fact that variations in electrical source power exist world wide, it is recommended that the attached pre-operation test procedures be carried out before this electric powered Reed guncrete machine is put into service.

NOTE:

CAUTION

Failure to comply with this recommended test procedure can cause serious damage to the Reed machine and could void the manufacturers warranty.

REED MANUFACTURING

The following test procedure must be made to all Reed guncrete machines powered by 3 phase electric drive motors, both 3 and 5 horsepower, 50/60 cycle, before attempting to put the machines into operation.

A. PHASE REVERSAL CHECK

Steps No. 1A, 2A and 3A are to be followed with no electric power supplied to the machine.

Step No.1A - Remove (by lifting) the entire sheet metal protective cover off the machines and set it aside. This exposes the drive motor, the vari-speed pulleys and drive belt, and the electric control and switch plate panel beneath the drive motor.

Step No.2A - Remove the four (4) switch plate mounting screws and withdraw the plate outward and downward to expose the interior of the switch box beneath the drive motor.

The built-in solid state motor protective relay is mounted vertically in the center of the switch box. (It is not necessary to remove the device from its base mounting to make any adjustments).

Step No.3A - With on-site or source electric power in "OFF" position, connect the bare motor lead wires from the Reed machine in accordance with the electric wiring diagram attached to these instructions.

Step No.4A - Turn on-site or source electric power to "ON" position.

CAUTION - DO NOT OPERATE THE MAIN "ON/OFF" SWITCH ON THE REED MACHINE UNTIL THE FOLLOWING STEPS ARE COMPLETED.



Step No.5A - With electric power now connected to motor leads, make sure wiring is grounded.

Step No.6A - Using a small phillips screwdriver, remove the clear plastic cover of motor protective relay. (This step should be followed only if the voltage and current ratings are different to set ratings by Reed Manufacturing or faster response time is required).

Step No.7A - The main "ON/OFF" power switch mounted on the switch plate of the Reed machine may now be safely operated.

Step No.8A - If the unit does not start and the test button has been tripped change the phase sequence of 3 phase voltage, press and reset the test button and try step No.7A once more.

STEPS TO CONVERT LOW VOLTAGE ELECTRIC GUN TO HIGH VOLTAGE

NEVER ATTEMPT TO CONVERT AN ELECTRIC GUN FROM LOW VOLTAGE TO HIGH OR VICE VERSA, PRIOR TO READING THE INSTRUCTION MANUAL AND CONVERSION STEPS.

IN ANY CONVERSION THE FOLLOWING PARTS HAVE TO BE REPLACED, ADDED OR MODIFIED.

| | | | |
|--------------------------------------|--------------|--------|-----------------|
| MOTOR PROTECTIVE RELAY | HIGH VOLTAGE | SEK4 | #10118 |
| MOTOR PROTECTIVE RELAY | LOW VOLTAGE | SEKP24 | #10117 REPLACED |
| 8 PIN SOCKET (USED WITH SEKP24 ONLY) | | | #10111 |
| CURRENT CONVERTER | | SET3A | #10120 MODIFIED |

- 1) Turn machine off and disconnect input electric power supply.
- 2) Take off electric motor cover. On some models removal of hopper is necessary for performing this step.
- 3) Take off electric control box and mount cover.
- 4) Pull out **motor protective relay**, SEKP24 #10117, plug in type, from 8-pin socket, #10111.

The 8-pin socket will not be used with high voltage but 6 color coded wires (red, black, white, orange, green and blue) connected to 8-pin socket with insulated male ends will be used. (These extended wires are provided in late model guns, with low voltage units, to simplify the conversion procedures). If your unit does not have these wires, refer to wiring diagrams provided.

- 5) Inside the control box, we have added four color coded wires (red H₁, yellow H₃, blue H₂, white H₄) to step down transformer so you may be able to change from low voltage to high voltage input without taking the whole wiring assembly out. So for 440-480 high voltage, refer to wiring diagram and connect yellow H₃ to blue H₂ with incoming lines connected to red H₁ and white H₄.
- 6) In changing from high voltage or vice versa, you have to make sure that the number of primary conductor runs (pass) through current converter (set-3A) holes and setting tap from table below match your electric motor current.

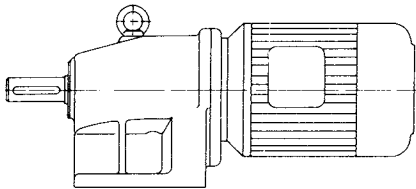
Example: 5HP 50HZ motor will pull 14 and 7 amps at 220 and 440 voltage respectfully. If the unit is wired for low voltage 220V, it will draw 14 amps, therefore the number of conductor passes will be one. Now in switching over to high voltage 440V the unit will draw 7 amps and the number of conductor passes will be two. So you have to make sure to increase the number of passes by one when changing above mentioned unit from low to high voltage.

Table 1 - Current Setting Range

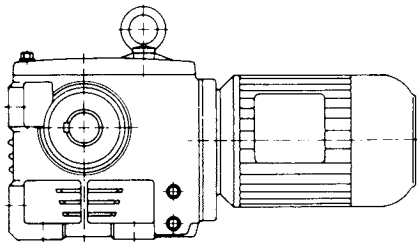
| Motor Protective Relay | | Current Converter | | |
|---|--|--|----------------|--------|
| Rated Current (current setting range) (A) | Current Scale Multiplying Factor Decal No. | Number of Conductor Runs Through Holes | Setting Tap | Type |
| 1 to 2.5 | 0.25 | 8 | 20 | SET-3A |
| 2 to 5 | 0.5 | 4 | 20 | |
| 4 to 10 | 1 | 2 | 20 | |
| 8 to 20 | 2 | 1 | 20 | |
| 16 to 40 | 4 | 1 | 40 | |
| 32 to 80 | 8 | 1 | 80 | |
| 64 to 160 | 16 | 1 | Fixed | SET-3B |

- 7) Connect SEK4 motor protective relay to 6 color coded wires (refer to step 4) extended from 8-pin socket per enclosed print. Make sure the unit is bolted down securely.
- 8) Install motor control box cover, (refer to step 2).
- 9) Referring to wiring diagrams provided change electrical wiring of electric motor by connecting wires 6 and 9 - 5 and 8 - 4 and 7 - 3 to T₃ - 2 to T₂ - and 1 to T₁.
- 10) The unit is now wired for 440-480V and now you may follow our starting directions on the enclosed instruction sheet.
- 11) Reverse procedure for changing to low voltage 220-240V. See instructions provided.

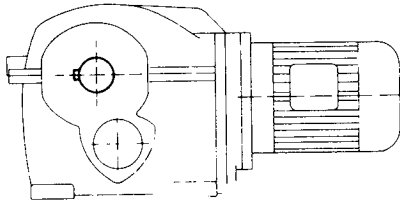
OPERATING & MAINTENANCE INSTRUCTIONS



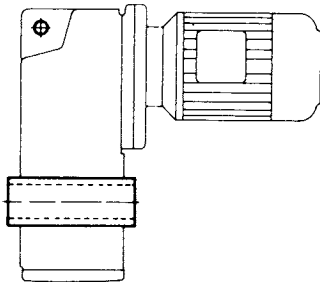
HELICAL



HELICAL-WORM



BEVEL-HELICAL



SHAFT MOUNT

NORD Gear Corporation

INSTALLATION

The gearmotor or reducer should be mounted on a structure with enough rigidity to prevent vibration or flexure caused by dynamic loading. The mounting surface should be flat so stresses are not introduced during assembly of the unit on the structure. Externally mounted gears, sprockets and sheaves should be carefully aligned to prevent stresses caused by poorly aligned members.

If a coupling is used it should be a flexible coupling and the halves should be aligned in accordance with the coupling manufacturer's recommendations.

When mounting anything on the shaft of the gear unit the member should be heated if possible to make assembly easier.

Gears, sprockets or sheaves should be mounted as close to the gear housing as possible. Coupling guards should be provided by the customer.

ELECTRICAL CONNECTIONS

Check the motor nameplate to verify the phase, hertz and voltage agrees with the available power supply. Connection should conform to local codes. A connection diagram for the motor is located inside the conduit box and on the motor nameplate. The motor starter should incorporate an overload protector.

START-UP

All units are lubricated before shipment. The breather is plugged for shipment. Before start-up or prolonged storage remove the plastic wick from the breather. The lubricant level should be checked with the unit mounted in it's correct operating position. Lubricant should be added or removed to bring it to the correct level. The catalog for the gear unit shows the oil level for various mounting positions.

MAINTENANCE

A. MOTOR

During maintenance, inspect the fan guard and remove any accumulated debris from under it and around the motor and gear. Motor bearings are greased during assembly. For re-lubrication the following suggestions are offered:

| HOURS OF SERVICE PER YEAR | HP RANGE | SUGGESTED RELUBE INTERVAL |
|--|----------------------------------|---------------------------------|
| 5,000 | ¼ to 7½ 10 to 40 50 to 150 | 5 years 3 years 1 year |
| CONTINUOUS Normal Application | ¼ to 7½ 10 to 40 50 to 150 | 2 years 1 year 9 months |
| SEASONAL SERVICE Motor is idle for 6 months or more | All | 1 year (beginning of season) |
| CONTINUOUS High ambients, dirty or moist locations, high vibrations, or where shaft is hot (pumps—fans). | ¼ to 40 50 to 190 | 6 months 3 months |

Use high quality ball bearing grease. Use consistency of grease suitable for class of insulation stamped on nameplate as follows:

| INSULATION CLASS | CONSISTENCY | TYPE | TYPICAL | FRAME TYPE |
|------------------|-------------|--------------|--------------------------|-----------------|
| A & B | #2 | Lithium Base | Shell Alvania Grease R 3 | 215 T & smaller |
| A & B | Medium | Polyurea | Shell Dolium Grease R | 254T & larger |
| F & H | Medium | Polyurea | Shell Dolium Grease R | All |

Procedure:

If motor is equipped with Alemite fitting, clean tip of fitting and apply grease gun. Use 1 to 2 full strokes on motors in NEMA 215 frame and smaller. Use 2 to 3 strokes on NEMA 254 through NEMA 365 frame. Use 3 to 4 strokes on NEMA 404 frames and larger. On motors having drain plugs, remove grease drain plug and operate motor for 20 minutes before replacing drain plug.

On motors equipped with slotted head grease screw, remove screw and apply grease tube to hole. Insert 3 to 3 inch length of grease string into each hole on motors in NEMA 215 frame and smaller. Insert 3 to 5 inch length on larger motors. Motors having grease drain plugs, remove plug and operate motor 20 minutes before replacing drain plug.

Caution: Keep grease clean. Lubricate motors at standstill. Remove and replace drain plugs at standstill. Do not mix petroleum grease and silicone grease in motor bearings.

B. GEARS

Gear units should have the oil changed every 10,000 hours or 2 years. If synthetic lubricant is used it should be changed every 20,000 hours or 4 years. For adverse operating conditions the interval should be shorter. DO NOT MIX SYNTHETIC & MINERAL BASE OILS. Units should be checked periodically for increased noise, surface temperature, vibration, shaft movement & amperage draw. Units with inspection covers should not be operated with the inspection cover removed.

The table below offers suggestions on the viscosity & manufacturers of recommended lubricants.

VISCOSITY RANGE FOR AGMA LUBRICANTS

| RUST AND OXIDATION INHIBITED GEAR OILS | VISCOSITY RANGE ‡ | EQUIVALENT ISO GRADE ◀ | EXTREME PRESSURE GEAR LUBRICANTS ‡‡ | VISCOSITIES OF FORMER AGMA SYSTEM ◀◀ |
|--|-----------------------------------|------------------------|-------------------------------------|--------------------------------------|
| AGMA Lubricant No. | mm ² /s (cSt) at 40 °C | | AGMA Lubricant No. | SSU at 100 °F |
| 1 | 41.4 to 50.6 | 46 | | 193 to 235 |
| 2 | 61.2 to 74.8 | 68 | 2 EP | 284 to 347 |
| 3 | 90 to 110 | 100 | 3 EP | 417 to 510 |
| 4 | 135 to 165 | 150 | 4 EP | 626 to 765 |
| 5 | 198 to 242 | 220 | 5 EP | 918 to 1122 |
| 6 | 288 to 352 | 320 | 6 EP | 1335 to 1632 |
| 7 Comp | 414 to 506 | 460 | 7 EP | 1919 to 2346 |
| 8 Comp | 612 to 748 | 680 | 8 EP | 2837 to 3467 |
| 8A Comp | 900 to 1100 | 1000 | 8A EP | 4171 to 5098 |

NOTE: Viscosity ranges for AGMA lubricant numbers will henceforth be identical to those of ASTM 2422.

‡ "Viscosity System for Industrial Fluid Lubricants", ASTM 2422. Also British Standards Institute, B.S. 4231.

◀ "Industrial Liquid Lubricants—ISO Viscosity Classification." International Standard, ISO 3448.

‡‡ AGMA 250.03, May, 1972 and AGMA 251.02, November, 1974.

◀◀ Oils marked Comp are compounded with 3% to 10% fatty or synthetic fatty oils.

RECOMMENDED LUBRICANTS FOR HELICAL & BEVEL-HELICAL GEARING

| Type of Lubricant | Ambient Temperature Range (°F) | kin Viscosity (cSt) at 40°C (mm 2/S) | Viscosity SUS 175 100°F | AGMA Lubricant No. | ISO Grade | AMOCO | CHEVRON | EXXON | MOBIL | SHELL | TEXACO |
|-------------------|--------------------------------|--------------------------------------|-------------------------|--------------------|-----------|---------------|-----------------------|----------------|----------------------|---------------|--|
| Oil | 15 to 125 | 198 to 242 | 900 to 1100 | 5EP | 220EP | AMOGEAR EP220 | NL GEAR Compound 220 | SPARTAN EP220 | Mobil Gear 630 | Omala Oil 220 | Meropa 220 |
| | -10 to +75° | 90 to 765 | 465 to 165 | 3-4EP | 100-150EP | AMOGEAR EP150 | NL GEAR Compound 150 | SPARTAN EP 150 | Mobil 629 | Omala Oil 100 | Meropa 150 |
| | Below 10° ‡‡ | 15 to 680 | 135 to 165 | — | — | — | E.P. Hydraulic Oil 22 | UNIVIS J13 | Mobil D.T.E. 11 | — | Texamatic Fluid 9226 or Texamatic Type F |
| Oil— Synthetic | -40° to 175° ‡ | — | 90 to 4000 | — | — | — | — | — | Mobil SHC 629 or 634 | — | Synstar GL75W-140 |
| Fluid Grease | 5° to 120° | — | — | — | — | — | — | — | — | — | MARKFAK 00 |

For bearings not lubricated in oil bath use a lithium base bearing grease, NLGI #2 or #3

‡ Ambient temperatures below -20°F and above 140°F require special oil seals

‡‡ Consult with Nord Gear Corporation for these applications

Bold ambient temperature indicates factory filled

Actual capacity should be established by opening the oil level plug and filling until oil runs out of the oil level hole.

RECOMMENDED LUBRICANTS FOR HELICAL-WORM GEARING

| TYPE OF LUBRICANT | AMBIENT TEMP RANGE °F | KIN VISCOSITY (cSt) AT 40°C (mm 2/S) | VISCOSITY SUS 175 100°F | ISO GRADE | MOBIL | TEXACO |
|-------------------|-----------------------|--------------------------------------|-------------------------|-----------|-------------|-------------------|
| Oil Synthetic | -40° to 175° ‡ | 198 to 352 | 900 to 1600 | 220 | Glygoyle 30 | Synstar GL75W 140 |

For bearings not lubricated in oil bath use a lithium base bearing grease, NLGI #2 or #3

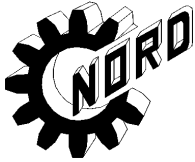
‡ Ambient temperatures below 0°F and above 100°F require special oil seals

Consult NORD GEAR CORPORATION for these applications

STORAGE

Units shipped from Nord are intended to be used within 30 days after receipt and presumed to be stored indoors in a heated building. If you intend storing units under adverse conditions or for a long period of time special storage precautions will be necessary.

1. Store in a sheltered area away from chemical vapors or steam.
2. Cover.
3. Do not store in sunlight or near high heat.
4. Remove plastic wick from breather.
5. Spray oil on exposed shafts & seals. Remove oil on start-up.
6. Rotate output shaft 360° every 3-4 weeks.



TITAN™ Adjustable Speed Drives Installation and Maintenance Instructions

BIM-4010/2004

USA

CDN

Retain These Safety Instructions For Future Use



In-Line Helical



Parallel Shaft Helical (Clincher™)



Helical-Bevel (3-Stage)



Helical-Worm

INSPECTION OF UNIT

Thoroughly inspect the equipment for any shipping and handling damage before accepting shipment from the freight company. If any of the goods called for in the bill of lading or express receipt are damaged or the quantity is short, do not accept until the freight or express agent makes an appropriate notation on your freight bill or express receipt. If any concealed loss or damage is discovered later, notify your freight carrier or express agent at once and request him to make an inspection. We will be very happy to assist you in collecting claims for loss or damage during shipment; however, this willingness on our part does not remove the transportation company's responsibility in reimbursing you for collection of claims or replacement of material. Claims for loss or damage in shipment must not be deducted from the NORD Gear invoice, nor should payment of the NORD Gear invoice be withheld awaiting adjustment of such claims, as the carrier guarantees safe delivery.

If considerable damage has been incurred and the situation is urgent, contact the nearest NORD Gear Sales Office for assistance. Please keep a written record of all communications.

RECORD NAMEPLATE DATA

Locate the gear reducer nameplate and record all nameplate data for future reference.

SK _____ S/N _____

RATIO _____ MAX TORQUE _____ RPM _____ MTG. POS. _____

GENERAL INFORMATION

The following operating and maintenance instructions are intended to help with general installation and maintenance procedures.

It is presumed that system design, as well as all work with regard to transport, assembly, installation, starting-up, maintenance and repair, is performed by qualified personnel or supervised by skilled labor taking overall responsibility.



WARNING:

LOCK OUT POWER before any maintenance is performed. Make absolutely sure that no voltage is applied while work is being done on the drive.

BASIC OPERATION AND SPEED ADJUSTMENT

Titan™ Adjustable-Speed Drives are ideal for use when operating conditions dictate infinitely variable output speeds over a fixed range. The Titan™ Drive consists of a motor, belt casing, and main gear drive.

The beltbox contains an Adjusting Pulley (Driver) that is attached to the motor output shaft. A handwheel (or optional Electric Remote Control) is used to vary the operating pitch diameters of the driver pulley in-turn making a corresponding adjustment to the Spring Pulley (Driven). Belt center distance remains fixed. Speed is typically adjusted by loosening the lock nut handle on the handwheel.



WARNING:

Speed adjustments must be performed when the motor is operational. Failure to comply may damage the belt and pulleys.



WARNING:

Initial adjustment of the speed stops located internal to the beltbox are completed at the factory. Further adjustments of the speed stops can cause damage to the beltbox and/or main drive.

INSTALLATION

Titan™ drive packages may be supplied with a variety of gear units including foot-mounted, flange-mounted or shaft-mounted options. *Complete drive packages may also be assembled in the "U"-Flow or "Z"-Flow patterns as shown on Page 4.*

When selecting the drive installation site, one should remember that air-cooled motors are ideally designed for ambient temperatures between -4°F and +104°F (-20°C and +40°C) and for installation at altitudes of 3,300ft (1,000m) above mean sea level.

The installation site should also ensure the following:

- Unrestricted airflow over the motor and variable speed drive.

- Accessibility to the oil fill-hole, level-hole and vent-hole locations on the main gear drive.
- A foundation (mounting base) of adequate size that is flat, torsionally rigid, and vibration-proof.
- Adequate shaft alignment between the drive and the driven equipment.
- Adequate space to allow motor removal and/or maintenance.
- In cases where brake motors are used, fan guard removal may be necessary to allow for brake adjustment and maintenance.

MOTOR

Please reference the manufacturers Installation and Maintenance Manual/s to obtain detailed instructions pertaining to the motor or brakemotor.

Connect the motor in accordance with the wiring diagram information supplied with the motor. Be sure the voltage supplied to the motor is accordance with the rated voltage on the nameplate. A protective motor switch is recommended to help protect the motor windings from overload and/or phase failure.

To insure the same performance the replacement motor must be of the same design and style as the original. The end of the motor shaft must also have a tapped hole in it as shown below.

| NEMA FRAME SIZE | THREAD SIZE | MINIMUM THREAD DEPTH |
|-----------------|-------------|----------------------|
| 56C | 1/4-20 | 1.00 inch |
| 143TC/145TC | 1/4-20 | 1.00 inch |
| 182TC/184TC | 3/8-16 | 1.25 inch |
| 213TC/215TC | 5/8-11 | 1.25 inch |
| 254TC/256TC | 5/8-11 | 1.50 inch |
| 284TC | 5/8-11 | 1.50 inch |

GEAR REDUCER

For the main gear drive, please reference the appropriate Installation and Maintenance manual, as shown below:

| Number | Description |
|---------|---|
| IM-1010 | UNICASE™ Helical Inline Drives |
| IM-1020 | CLINCHER™ Parallel Shaft Helical Drives |
| IM-1040 | Helical-Bevel Drives (3-Stage, "90XX-Series") |
| IM-1030 | Helical-Worm Drives |

TITAN™ BELT CASING

Pulleys are manufactured from the corrosive resistant and extremely durable alloy "Durfondal" to provide superior wear resistance and assure grooving and wear will be minimized under rated operating conditions. Pulleys are permanently grease lubricated and should require no disassembly during the normal life of the Titan™ drive. All sliding components are coated to resist fretting and corrosion.

When operating in extremely dusty or dirt environments, an air filter must be installed to the main housing vents to protect the V-belt, pulleys, and coated shafts.

When operating in areas of higher ambient temperatures, or when installed where ventilation is poor, additional cooling may need to be applied to the belt housing.

The adjustment wheel spindle (511) must occasionally be cleaned and lubricated to assure trouble-free operation. Detailed instructions concerning belt removal and pulley removal will be covered in later sections of this manual.

V-Belt Replacement

Please reference the General Parts List shown on Page 8 of this manual.

1. Run the Titan™ drive to its maximum speed and switch off. Be certain the power can not be inadvertently switched on again.
2. Unscrew the socket head screws (521) and remove the belt casing cover, together with the entire speed control unit.
3. Remove the old V-belt by first drawing it over the cones of the spring-loaded pulley (507) and then sliding over the open adjustable pulley (506). Installing a tapered wedge made of soft pine between the spring pulley halves will help keep the adjustable pulley open, and may aid in the removal of the old V-belt.
4. Wrap the new V-belt around the cones of the open adjustable pulley (506) and then draw it over the spring-loaded pulley (507). Installing a tapered wedge made of soft pine between the spring pulley halves will help keep the adjustable pulley open, and may aid in the installation of the new V-belt.
5. Reassemble the belt casing cover.



WARNING

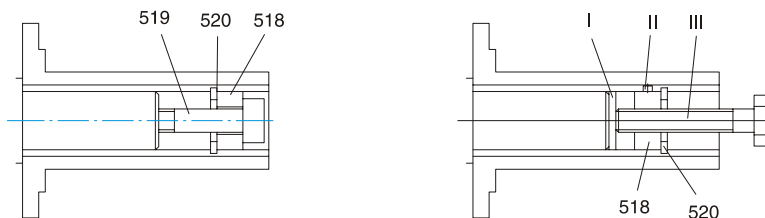
Nord does not support the use of the Titan™ belt drive in explosion proof or hazardous environments. Although the belt is non-sparking, the belt drive does not have a safety to disengage the belt. Should an overload occur and the belt begin to slip, excessive heat could be generated.

Pulley Replacement

Please reference the diagrams shown below, as well as the General Parts List shown on Page 8 of this manual.

1. The spring loaded pulley (507) and the adjustable pulley (506) are held securely to the shaft using a holding screw (519/516), a thrust washer (518/515), and a snap ring (520/517). Remove the screw (519/516), thrust washer (518/515) and snap ring (520/517) that are used to hold the pulley on the shaft.
2. In order to protect the tapped hole in the shaft, place a steel disc (I), slightly smaller than the shaft diameter, against the end of the shaft.
3. The thrust washer has an internal thread diameter that is slightly larger than the thread on the holding screw (516/519). Refit the snap ring (520/517) and replace the thrust washer (518/515). In order to aid in the removal of the pulley, a disassembly screw, slightly larger than the holding screw (516/519) can be inserted into the thrust washer (518/515) and tightened against the steel disc (I). Remove the spring loaded pulley (507) or the adjustable pulley (506) by using the thrust washer and disassembly screw (III) as a "jacking bolt".
4. If the thrust washer (518/515) rotates when trying to remove the pulley, secure the thrust washer with a pin inserted into the keyway (II).
5. After the old pulley is removed, disassemble or remove the disassembly screw (III), thrust washer (518/515), snap ring (520/517), and protective steel disc (I) that was placed over the shaft.
6. Before installing the new pulley, apply an anti-seize compound to the shaft. Reassemble the snap ring (520/517) and thrust washer (518/515) into the pulley bore. Use the holding screw (519/516), pull the pulley onto the shaft. Do not drive the pulley onto the shaft with a hammer.

Spring Loaded Pulley Shown Below



WARNING:

When installing new pulleys, care must be taken to ensure they are installed in the same exact orientation as the old pulleys. Assembly of the pulley the wrong way can result in damage to the machinery. Special care must be taken when reassembling the Z-Flow pattern, as the moving parts of the pulleys must always be situated on opposite (diagonal) sides.

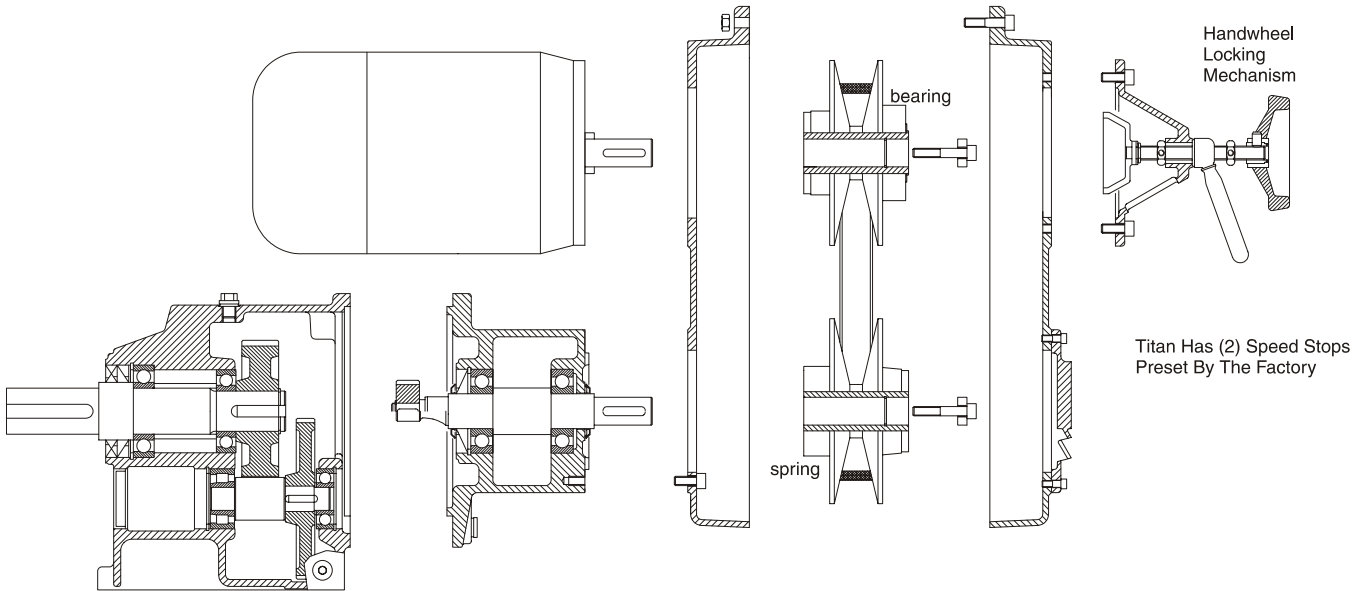


WARNING:

Do not attempt to disassemble spring pulley. Failure to remove the spring without the proper fixtures/tools can result in serious injury.

U-FLOW

Pulleys Mounted On Motor Shaft And Cast Iron
Input Housing Secured By Washer And Bolt



Titan Has (2) Speed Stops
Preset By The Factory

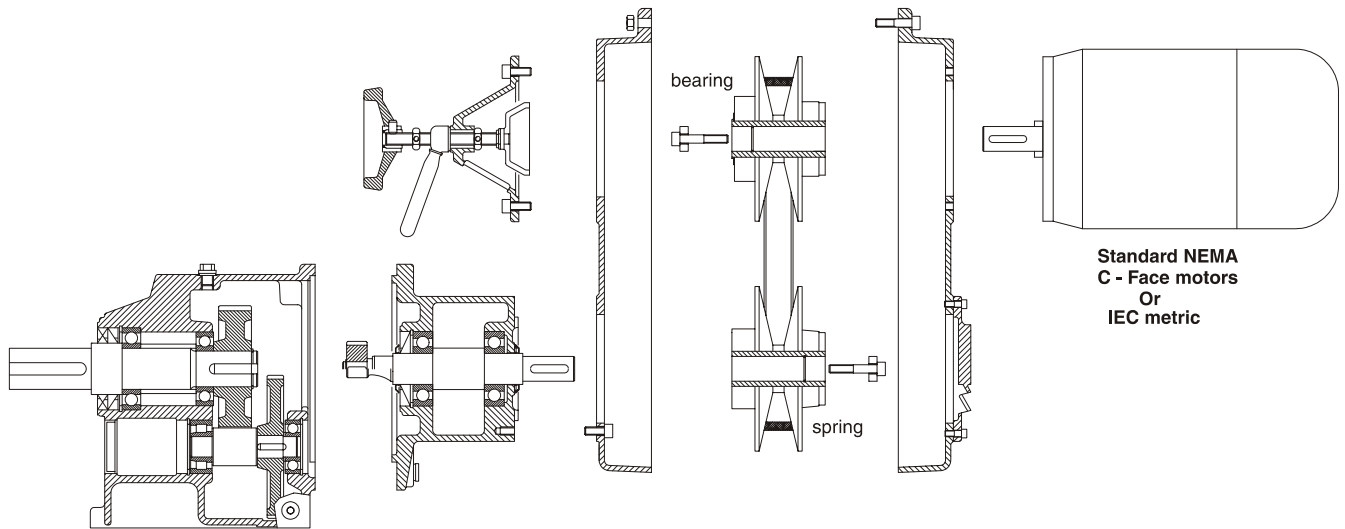
Gear Reducer Can Be:

- * Unicas - Inline Helical
- * Unicas - Clincher Helical
- * Unicas - Helical Worm
- * Unicas - Helical - Bevel

- * No Bearings Mounted
In Housing
- * Corroduty Alloy

Z-FLOW

Pulleys Mounted On Motor Shaft And Cast Iron
Input Housing Secured By Washer And Bolt



Standard NEMA
C - Face motors
Or
IEC metric

Gear Reducer Can Be:

- * Unicas - Inline Helical
- * Unicas - Clincher Helical
- * Unicas - Helical Worm
- * Unicas - Helical - Bevel

- * No Bearings Mounted
In Housing
- * Corroduty Alloy

ADJUSTING SPEED WITH OPTIONAL ELECTROMECHANICAL REMOTE CONTROL (ERC)

The Electromechanical Remote Control (ERC) replaces the hand wheel when remote speed adjustment is desired. The typical ERC is a worm-gearmotor with limit switches and potentiometer located under the cover of the speed control gearmotor. The limit switches are used to prevent the ERC motor from rotating the spindle adjustment all the way against the mechanical speed stops located inside the friction drive. The friction drive leaves the factory set to the speed range indicated on the nameplate.

NOTE: NORD Gear does not supply the motor starter, overload protection, or push buttons.

DIAGRAM FOR THREE PHASE ERC MOTOR

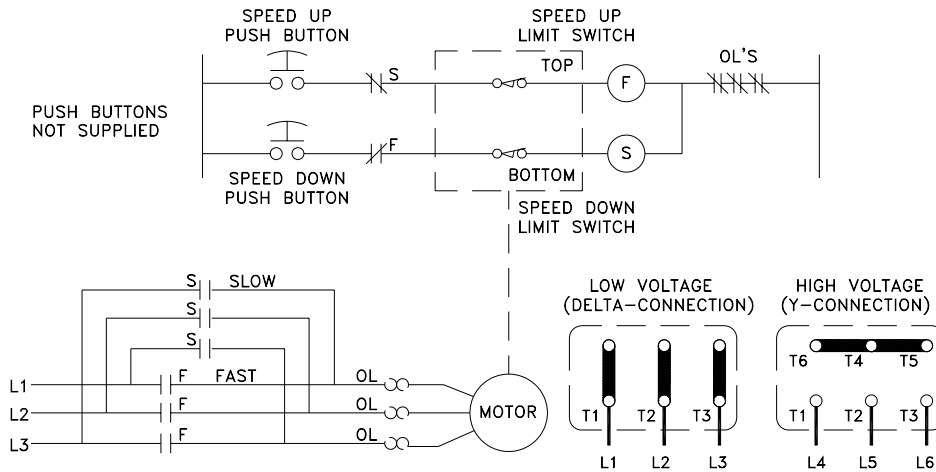
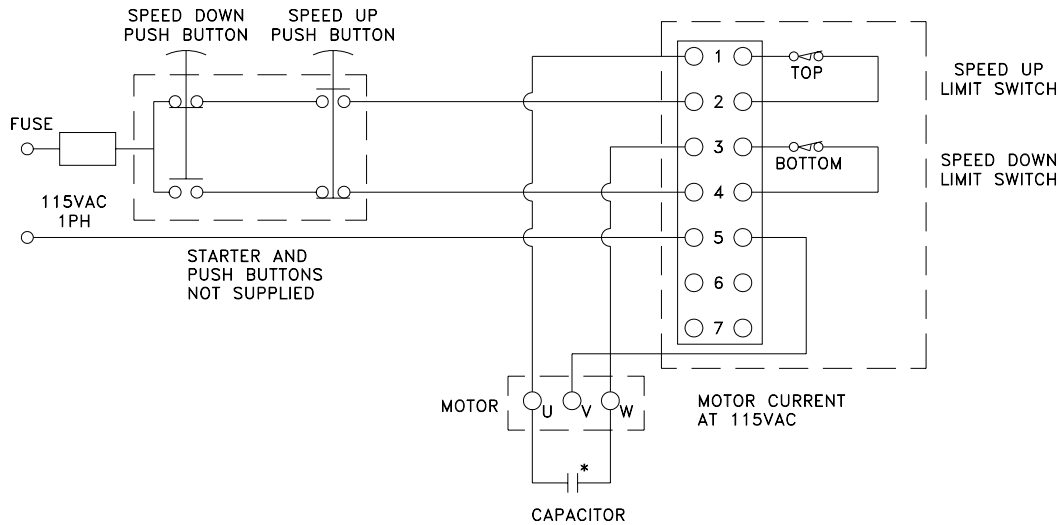


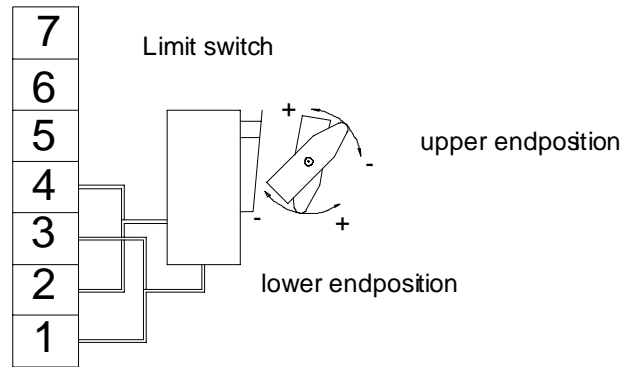
DIAGRAM FOR SINGLE PHASE ERC MOTOR




| Electromechanical Remote Control (ERC) | | | |
|--|---|---|---|
| | Three Phase Operation | | Single Phase Operation |
| ERC Part Number | 28090100 | 28090100 | 28090110 |
| Operating Frequency | 60 Hz | 50 Hz | 60 Hz |
| Power Rating | 70 W | 70 W | 70 W |
| Input Speed | 1650 RPM | 1375 | 1650 RPM |
| Supply Voltage | 230 Δ / 460 Y Volts | 230 Δ / 400 Y Volts | 110-115 Volts |
| Current | 0.44-0.25 Amps | 0.51-0.29 Amps | 1.15 Amps |
| Enclosure | TENV | TENV | TENV |
| Output Speed | 30 RPM | 25 RPM | 30 RPM |
| Limit Switch | 15A, 250 V | 15 A, 250 V | 15A, 250 V |
| Potentiometer | 22 kΩ linear turning range: 270° loading capacity: 0.15 W | 22 kΩ linear turning range: 270° loading capacity: 0.15 W | 22 kΩ linear turning range: 270° loading capacity: 0.15 W |

Limit Switch / CAM Adjustment

1. Remove cover from the speed control unit.
2. Loosen the locking screw on the CAM of the upper end limit switch.
3. Run the motor to the maximum drive output speed.
4. Rotate the CAM of the upper end limit switch clockwise, until the cam trips the limit switch. Re-tighten the locking screw.
5. Loosen the locking screw on the CAM of the lower end limit switch.
6. Run the motor to the minimum drive output speed.
7. Rotate the CAM of the lower end limit switch counter-clockwise, until the cam trips the limit switch. Re-tighten the locking screw.
8. Re-install the cover onto the speed control unit.



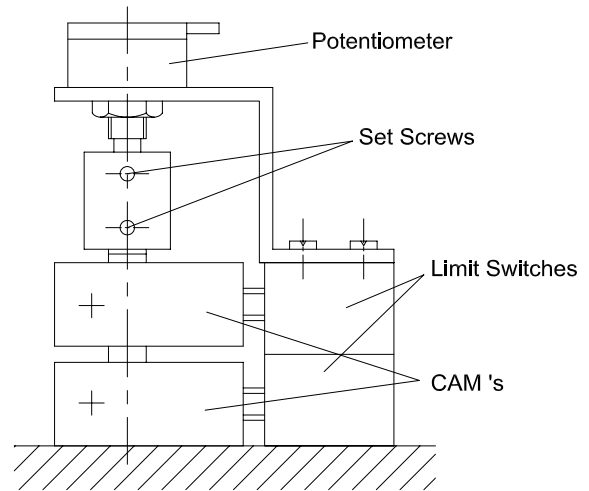


WARNING:
When adjusting the speed control range take care to make sure the speeds indicated on the nameplate are not exceeded or under run.

Potentiometer Adjustment

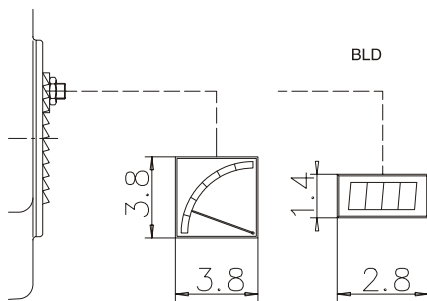
Like the limit switches, the potentiometer is factory preset. The potentiometer is coupled to the limit switches.

1. Turn the potentiometer counter-clockwise until it runs against the stop (Variable speed unit must be set to minimum speed).
2. Loosen the coupling set screws.
3. Turn the potentiometer approximately 15° clockwise.
4. Between Terminals 6 and 7 there must be a resistance of 120 Ω.
5. Tighten the coupling set screws.



Non Contacting Speed Indicator

Type BLA – with analog indicator
Type BLD – with digital indicator



Type BLA:

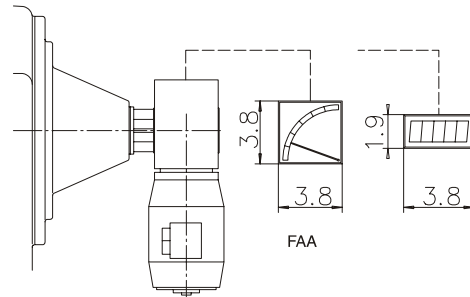
The speed indicator contains a built in sensor which converts the signals coming from the pulse generator into a direct current which is connected to the analog indicator. Adjustment of the meter is possible by means of set screws on the back of the meter.
Type of enclosure: IP 53 – Terminals IP 00
Scale Marking: 0-100% - Scale deflection: 90°

Type BLD:

The digital indicator has a 4 digit – 7 segment red LED display.
Type of enclosure: IP 50 – Terminals IP 00.

Electro-Mechanical Remote Control EMFST with Remote Speed Indicator

Type FAA – with analog indicator
Type FAD – with digital indicator



Type FAA:

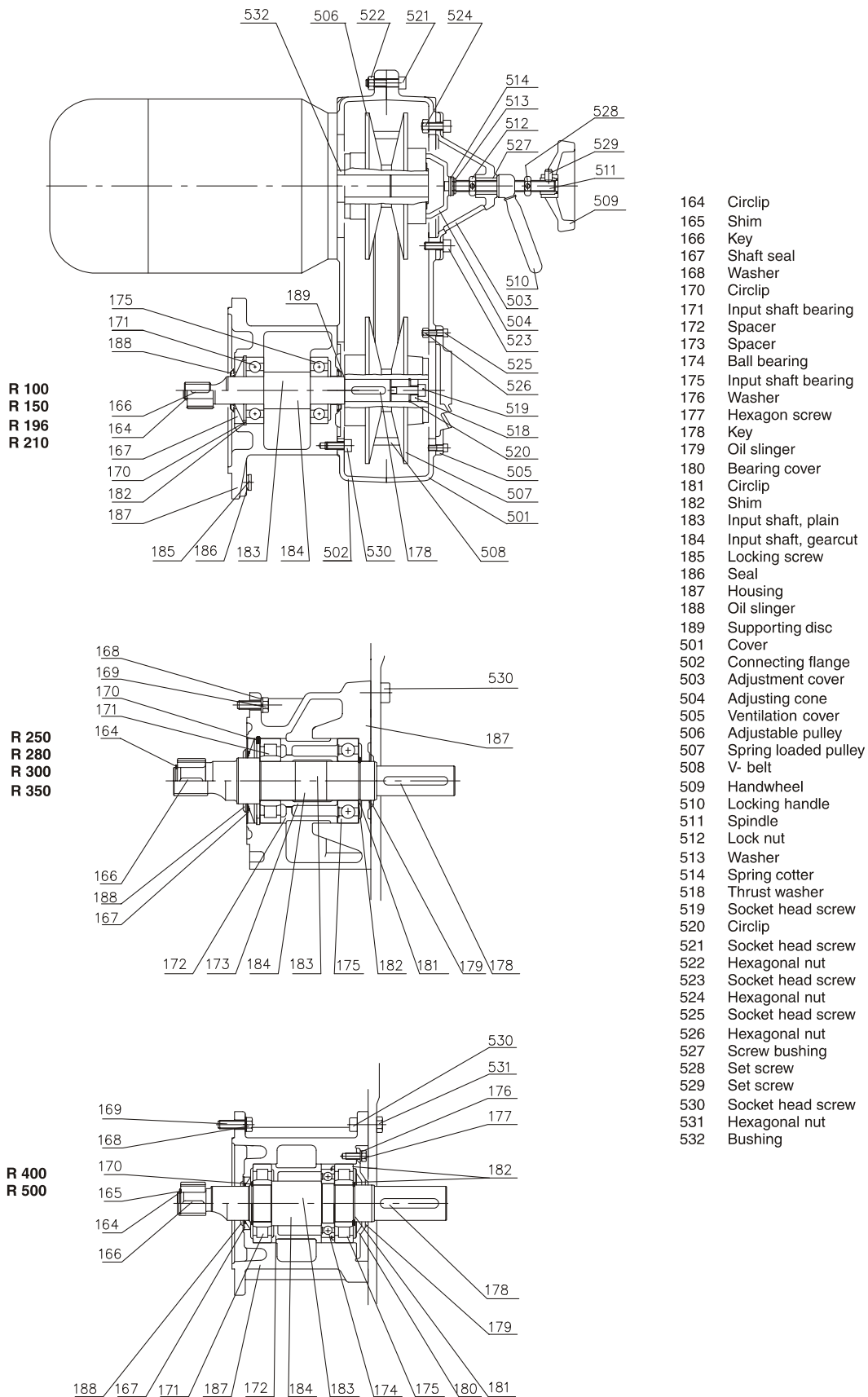
In addition to the electro-mechanical remote control the remote speed indicator is available, showing the speed setting in percent.
Type of enclosure: IP 21 – Terminals IP 00
Marking of Scale: 0-100%
Scale deflection: 90°

Type FAD:

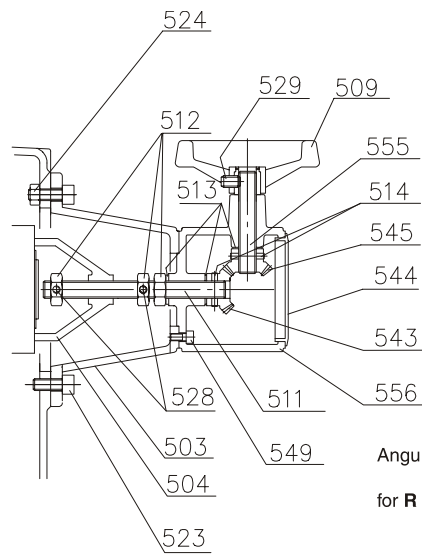
The digital indicator has a 4 1/2 digit – 7 segment red LED display, Type of enclosure: Casing IP 20, Terminals IP 00.

NOTES

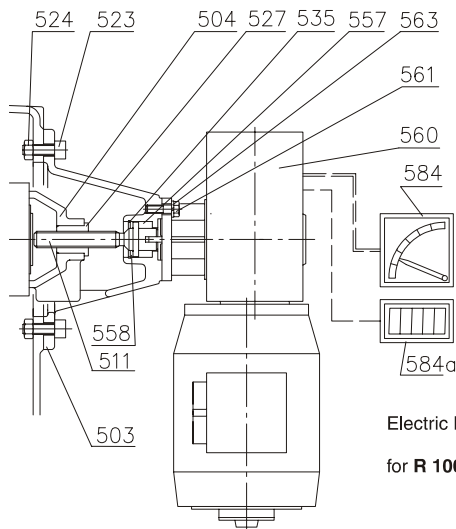
General Parts Lists



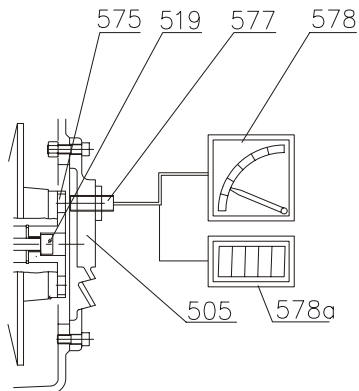
General Parts List



Angular control type **WST**
for **R 100 - R 400**



Electric Remote Control type **EMFST**
for **R 100 - R 350**



Non-contacting speed indicator
for **R 100 - R 500**

- 503 Adjustment cover
- 504 Adjusting cone
- 505 Ventilation cover
- 509 Handwheel
- 511 Spindle
- 512 Lock nut
- 514 Spiral pin
- 519 Socket head bolt
- 523 Socket head bolt
- 524 Hexagonal nut
- 527 Tapped bushing
- 528 Set screw
- 529 Set screw
- 535 Circlip
- 543 Bevel Gear
- 544 Sealing plug
- 545 Bevel Gear
- 549 Socket head bolt
- 555 Shaft
- 556 Case
- 557 Bushing
- 558 Washer
- 560 Worm geared motor
- 561 Hexagon bolt
- 563 Washer
- 575 Pulse generator
- 577 Pulse sensor
- 578 Speed indicator
- 584 Teleindicator

TITAN™ V-BELT PART NUMBERS AND SIZES

| TYPE | R100 | R150 | R196 | R210 | R250 | R280 |
|-----------|----------------------|----------------------|----------------------|----------------------|----------------------|--------------------------|
| Belt P/N | 7109200 | 71592000 | 71992000 | 72192000 | 72592000 | 72892100 |
| Belt Size | 22 x 7 x 567 x 28° | 28 x 8 x 754 x 28° | 33 x 9 x 906 x 28° | 37 x 10 x 954 x 28° | 47 x 12 x 1135 x 28° | 55 x 15 x 1255 x 28° |
| TYPE | R300 | R350 | R375 | R400 | R500 | |
| Belt P/N | 73092100 | 73592100 | 73792100 | 74092100 | 75092100 | <i>(Dimensions = mm)</i> |
| Belt Size | 51 x 16 x 1444 x 28° | 70 x 18 x 1515 x 30° | 83 x 23 x 1767 x 32° | 83 x 23 x 1842 x 32° | 83 x 26 x 2877 x 32° | |

TROUBLESHOOTING

| PROBLEM WITH VARIABLE SPEED UNIT | POSSIBLE CAUSES | SUGGESTED REMEDY |
|----------------------------------|--|---|
| Drive Slips | V-Belt is worn. | Replace V-Belt (Page 3). |
| | V-Belt or face of adjustment pulley is dirty or contaminated. | Clean Contaminated part: <ul style="list-style-type: none"> V-Belt – use dry cloth or paper. Adjustment Pulley – okay to use mild solvent provide excess is cleaned with a dry cloth. |
| | Load is too high. | Check measured power and reduce operating load to catalog values. |
| Drive heats up excessively | Load is too high. | Check measured power and reduce operating load to catalog values. |
| Drive appears noisy or too loud. | V-Belt is damaged: <ul style="list-style-type: none"> May be caused after a brief stalling of the drive. May be caused by intermittent loading of the drive. | Determine cause of damage, and replace V-Belt. |

| PROBLEM WITH ELECTROMECHANICAL REMOTE CONTROL | POSSIBLE CAUSES | SUGGESTED REMEDY |
|---|---|---|
| Speed cannot be adjusted. | Unit is not wired properly | Wire unit in accordance with circuit diagram (Page 5). |
| Speed range cannot be reached. | Limit switches of ERC motor switch off too early. | Adjust limit switch CAM's (Page 6). |
| Adjust rate is too low. | Sluggish adjustment rate may be due to corrosion between the slide plate and the cam grooves that are internal to the intermediate housing. | Re-establish low-friction conduction. <ul style="list-style-type: none"> Separate driven disc assembly from driving disc assembly. Clean and re-lubricate slide plate and cam grooves by applying a molybdenum-based anti-seize compound to these surfaces. <p>In some instances it may be necessary to remove the motor and cam grooves in order to thoroughly clean the cam grooves and slide plate. In these instances the cam grooves may need to be re-adjusted (Page 4)</p> |

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MIDWEST

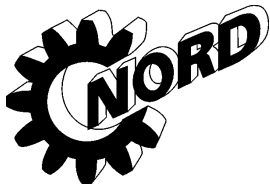
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BIM 1004

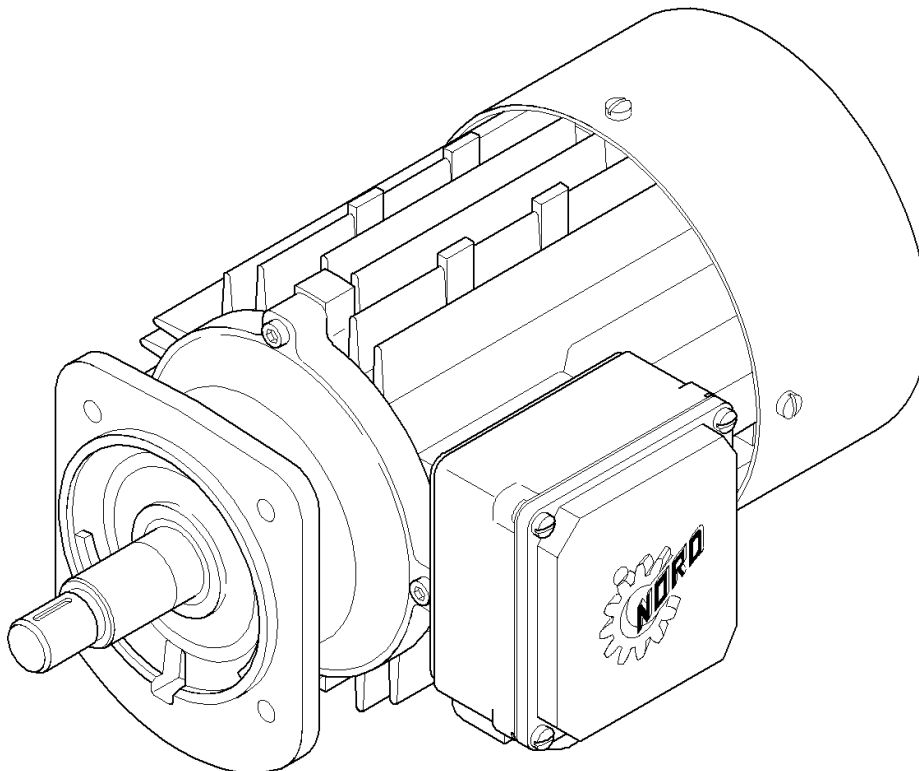
USA

CDN

MOTORS

AC Induction, Single and Polyphase

Installation and Maintenance Instructions



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NOTES

TABLE OF CONTENTS

| <u>Subject</u> | <u>Page</u> |
|--|-------------|
| Introduction..... | 4 |
| Description and Operation | 4 |
| Inspection..... | 6 |
| Testing and Fault Isolation..... | 7 |
| Lubrication..... | 9 |
| Removal, Installation, and Handling..... | 9 |
| Connection Diagrams..... | 12 |
| Repair..... | 13 |
| Parts List | 14 |
| Motor Options & Nomenclature | 17 |

LIST OF ILLUSTRATIONS

| <u>Figure No.</u> | <u>Figure Title</u> | <u>Page</u> |
|-------------------|---|-------------|
| Figure 1 | Motor Nameplates..... | 5 |
| Figure 2 | Motor & Options Connection Diagrams..... | 12 |
| Figure 3 | General Motor Exploded View and Generic Parts List (2 pages)..... | 15 |

LIST OF TABLES

| <u>Table No.</u> | <u>Table Title</u> | <u>Page</u> |
|------------------|--|-------------|
| Table 1 | Related Publications | 4 |
| Table 2 | Nameplate Data..... | 5 |
| Table 3 | Motor Inspection Criteria..... | 6 |
| Table 4 | Motor Fault Isolation | 8 |
| Table 5 | Motor Option Codes & Nomenclature..... | 17 |
| Table 6 | Space Heater Data..... | 19 |
| Table 7 | Encoder Wiring Designations..... | 19 |
| Table 8 | Blower Cooling Fan Data | 20 |

INTRODUCTION

1. General

This manual includes general motor description and operation, inspection, testing and fault isolation procedures and information, general lubrication instructions and materials, general installation, removal, and handling instructions, and general repair and parts information.

2. Related Publications

The related publications listed in Table 1 provide additional information to support maintenance and fault isolation of the motor and its installation.

| Publication Number | Publication Title |
|---------------------------|---|
| BIM 1001 | Hollow Shrink Disc Shaft |
| BIM 1002 | Hollow Keyed Shaft and Fixing Element |
| BIM 1003 | Expansion Chambers |
| BIM 1004 | Motors AC Induction, Single Phase and Polyphase |
| BIM 1009 | NORD Gearbox Inputs (Motor Adapters and Couplings) |
| BIM 1010 | UNICASE [®] Helical Gearboxes |
| BIM 1011 | NORDBLOC [®] Helical Gearboxes |
| BIM 1012 | Standard Helical Inline Gearboxes |
| BIM 1020 | UNICASE [®] Shaft Mount Gearboxes |
| BIM 1030 | UNICASE [®] Helical Worm Gearboxes |
| BIM 1031 | MINICASE [®] Worm Gearboxes |
| BIM 1033 | SI Design UNIBLOC [®] Worm Gearboxes |
| BIM 1040 | UNICASE [®] 90.1 Helical Bevel Gearboxes |
| BIM 1090 | Motor Brakes |
| BIM 1142 | NORDBLOC [®] 92 Series Helical Bevel Gearboxes |
| BIM 4010 | Titan Mechanical Adjustable Speed Drives |
| BIM 4020 | NORDISC [®] Friction Disc Mechanical Adjustable Speed Drives |

Table 1. Related Publications

DESCRIPTION AND OPERATION

1. General

This manual provides general installation and maintenance information for the NORD family of motors described in this section.

2. Description

The NORD motors covered in this manual are single phase and poly-phase motors (refer to Table 2), can be single speed or two-speed, and may include the options listed in the Motor Options Section. Motor options, electrical requirements, performance characteristics, and motor data are identified on the motor nameplate. The nameplate drawing is provided in Figure 1. Definition of each entry field is provided in Table 2.

3. Operation

The motors described in this manual are alternating current (AC) induction motors, single speed or two-speed, and convection-cooled, fan cooled, or blower cooled. The motors may use single phase or three phase alternating current.

Cooling options include convection cooling (TENV), fan cooling (TEFC), and blower cooling (TEFB). Because the fan is mounted on the motor shaft, the fan speed is identical to the motor speed, and the cooling capacity varies with the motor speed. The blower uses its own motor and a separate power supply to provide a specific airflow and cooling capacity. The blower power data are provided in Table 8.

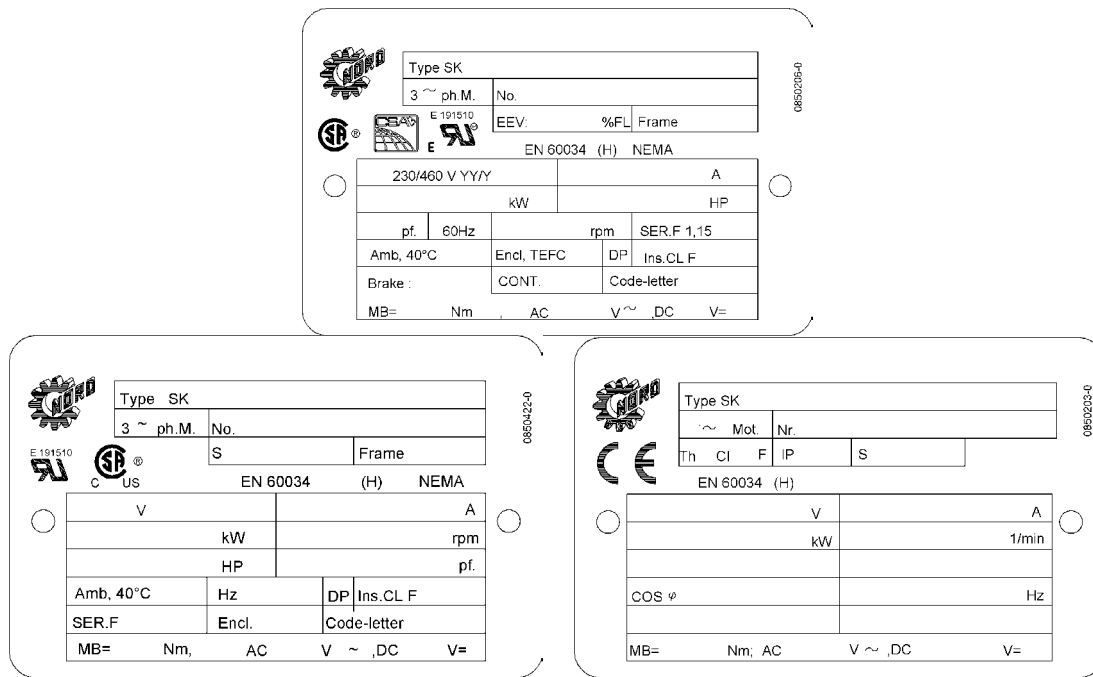


Figure 1. Motor Nameplates

| Field | Definition | Field | Definition |
|---------|------------------------------|---------|---|
| Type | Model Number | DP | Drip Proof |
| 3~ph.M. | Number of Motor Phases | Ins. Cl | Insulation Class |
| No. | Motor Number | SER. F | Service Factor (allowable horsepower loading) |
| S | Duty Cycle (i.e. S1, S3-40%) | Encl. | Enclosure Description |
| Frame | Motor Frame Size | Code | NEMA Code Letter |
| V | Motor Voltage | EEV | |
| A | Motor Full-Load Amperage | COS φ | Power Factor |
| HP | Motor Horsepower | MB= | Motor Brake Force (Newton Meters) |
| rpm | Motor Speed | AC | Alternating Current |
| pf. | Power Factor | V~ | AC Voltage |
| Amb | Maximum Ambient Temperature | V= | DC Voltage |
| Hz | Motor Power Frequency | | |

Table 2. Nameplate Data

INSPECTION

1. Inspection Interval
Inspect the motor after every 500 operating hours.
2. Inspection Criteria
Inspect the motor according to the criteria in Table 3.

CAUTION: IF IT IS NECESSARY TO CLEAN THE MOTOR EXTERIOR, DO NOT USE SHOP AIR. SHOP AIR CAN FORCE CONTAMINANTS INTO THE MOTOR, AND CAN CAUSE THE BLOWN CONTAMINANTS TO AFFECT OTHER COMPONENTS.

| Inspect | Check | Action |
|------------------------------|---|---|
| Motor exterior | Check the external surfaces for contamination. Accumulation of dirt and fibrous deposits must be removed. | Clean the motor external surfaces using clean, lint-free cloths. Clean deposits from between cooling fins using a vacuum cleaner and a stiff-bristled nylon brush. |
| | Check the external surfaces for oil film and greasy deposits. | Clean the oil film and greasy deposits from the motor surface using clean, lint-free cloths. If necessary, moisten the cloth with an approved non-flammable, residue-free solvent. Do not pour solvent on the motor. |
| | Check for evidence of damage or overheating. | If the motor has physical damage, replace the motor. |
| Motor mountings | Make sure the mounting hardware is secure. | If the mounting hardware is not secure, check the motor/gearbox alignment, and tighten the mounting hardware. |
| Motor electrical connections | Check that all electrical connections are secure. | If the electrical connections are not secure, tighten them. |
| | Check the electrical connections for evidence of arcing. | Loose electrical connections can cause arcing, which is evident by discoloration and charring. If you find evidence of arcing, replace the damaged connections. |
| Insulation resistance | Using an ohmmeter, check and record the resistance of motor winding insulation. | Compare the current resistance reading to previous readings. If the resistance drops significantly, perform an internal inspection for insulation damage or deterioration. |
| Motor Brake | On motors that have a brake, use a feeler gauge to check the air gap in between the brake pad and the rotor according to NORD Gear Corporation Manual BIM-1090, Motor Brakes Installation and Maintenance Instructions. | If the air gap exceeds the maximum allowed for that brake configuration provided in the manual, adjust the air gap or replace the brake pad according to the instructions in NORD Gear Corporation Manual BIM-1090, Motor Brakes Installation and Maintenance Manual. |

Table 3. Motor Inspection Criteria

TESTING AND FAULT ISOLATION

1. General

NOTE: NORD electric motors do not require periodic testing. However, if a motor is removed from its installation, NORD recommends that the motor be checked according to the static and dynamic testing provided below before it is reinstalled. Finding a condition that will require future repair before the motor is reinstalled decreases the overall maintenance time.

This section provides general test information and functional checks for the types of motors covered by this manual. All tests provided below may not apply to all motor types and models. Read and understand the tests and checks before performing them on your motor. Understand how the test or check is to be performed and the pass/fail criteria.

Record and date all measurements taken. Retain the measurements in a file. Comparing current and previous measurements is useful in tracking motor condition and brake wear, if the motor is equipped with a brake.

If the motor fails any of the test procedures provided below, use the fault isolation procedures to determine the motor problem. Refer to the REPAIR section to determine if the failure is a repairable failure.

2. Testing

A. Static Testing

1. The motor can only be static tested if it is disconnected from the component it drives and securely mounted on a fixture or mounting plate. These tests are usually conducted when a motor has been removed for any reason other than failure
2. Turn the motor shaft slowly by hand. Feel and listen for evidence of a failed bearing, which is indicated by a rough feel as the shaft rotates, and by noise.
3. Check for smooth rotation, with no evidence of binding or catching. If the shaft does not rotate smoothly, or binds or catches, the bearings are worn or failing, lack lubrication, or are contaminated.
4. Check the motor shaft for side play by applying pressure at right angles to the shaft in several places around the circumference. If the shaft moves perceptibly, the front bearing is worn.
5. If the motor shaft feels rough as it is turned or makes unusual noise, the motor bearings are failing, lack lubrication, or are contaminated. Replace the motor bearings, or clean and re-lubricate the bearings, as applicable. Refer to the REPAIR section.
6. If the bearing shaft shows play in the bearing, the bearing is worn or failing. Replace the motor bearings according to the REPAIR section.

B. Dynamic Testing

1. Find the motor voltage and rated load current values as listed on the motor nameplate.
2. Using a volt-ohmmeter, verify that the motor power supply is in the correct range.
3. Run the motor with no load. As the motor is operating, listen for unusual motor noise and check for excessive vibration. Vibration and motor noise are indications of bearing contamination, lack of lubrication, damage, or failure.
4. Use an ammeter to measure the no-load current. Record the no-load current for comparison with previous readings, and for reference during future testing.
5. If the motor passes the no-load test, operate the motor at rated load and check and record the current.
6. Check the motor operating temperature at rated load. If the motor operates at a higher than normal temperature, the motor is failing.
7. If the motor has an integral brake, check the brake operating temperature. If the brake operates at a higher than normal temperature, the brake is not releasing completely. Refer to the REPAIR section.

3. Fault Isolation

If the motor has failed or does not meet the requirements of any of the tests described above, use the fault isolation procedures provided in Table 4, Motor Fault Isolation. The table is based on the assumption that the motor has been operating correctly, and that a problem has occurred. If a newly installed motor does not operate correctly, the problem is an installation problem.

| Fault | Check | Corrective Action |
|--------------------------------|--|--|
| Motor doesn't operate | Check the circuit breaker. | The breaker has tripped. Reset the breaker. If the breaker trips immediately, the motor windings have shorted. Replace the motor. |
| | Check the motor and the gearbox separately to determine which has failed. | Replace the motor or the gearbox, as applicable. |
| | If the breaker has not tripped, check the power circuitry to the motor. | If the power circuitry has opened, repair the power circuitry. |
| | Check for an open in the motor windings. | If the motor windings have an open circuit, replace the motor. |
| Motor is noisy | Separate the motor from its gearbox and check the shaft bearings by hand according to the TEST instructions. | If the bearings feel rough, replace the bearings according to the instructions in REPAIR. |
| Motor thermal protection trips | Check the motor exterior for an excessive accumulation of oil and dirt that can inhibit cooling. | If the motor exterior is excessively dirty, clean the motor surface using clean, lint-free cloths. If the motor has a finned casing, use a vacuum cleaner and a stiff-bristled nylon brush to remove dirt and debris from between the fins. |
| | If the motor has a vented enclosure, check the vent openings to make sure they are clear. | If necessary, clean the vent openings. |
| | Visually check for heat-discolored paint, which is evidence of a motor overheat. | If the motor casing shows heat discoloration, the motor is failing. Replace the motor. |
| | Check the system load. | If the load applied to the system is above rated load, it should be reduced, if possible, to avoid affecting motor life. |
| Motor slows during operation | Check for increased load. | If the load has increased beyond rated load, correct the overload condition to prevent damage to the motor. |
| | Check for supply voltage drop. | Supply voltage must be within 10 percent of nominal voltage. If the supply voltage is less than 90 percent of rated voltage, correct the supply voltage to avoid damage to the motor. |
| | Check the gearbox and the motor bearings for wear and drag that increases as the system temperature rises. | If the gearbox drag increases during operation, repair the gearbox. If the motor bearing drag increases as the motor operates, replace the bearings according to REPAIR. |

Table 4. Motor Fault Isolation

LUBRICATION

1. General

NORD motor frame sizes 63 up to and including 225 are prelubricated, therefore require no lubrication during normal operation.

Frame sizes 250 and larger will have grease fittings for regreasing the motor bearings. Relubricate bearings every six months (more often if conditions require) using a polyurea base grease, No. 2 consistency & stabilized against oxidation.

REMOVAL, INSTALLATION, AND HANDLING

1. General

Removing, installing, and handling any NORD electric motor follow the same general procedures. Follow the general procedures provided below. Observe all WARNINGS and CAUTIONS.

If you have any questions about the procedure to use to handle, install, or remove a specific motor, call NORD Gear Corporation. Please read the following WARNINGS & CAUTIONS prior to any work on the motor.

WARNING: **IF THE MOTOR HAS AN INTEGRAL BRAKE, VERIFY THAT THERE IS NO LOAD ON THE GEARBOX BEFORE RELEASING THE BRAKE. THIS WILL PREVENT POSSIBLE INJURY AND POTENTIAL EQUIPMENT DAMAGE FROM A DROPPED LOAD.**



WARNING: **THE MOTOR ELECTRICAL POWER HAS DANGEROUS CURRENT LEVELS. TO PREVENT SERIOUS INJURY, SHUT DOWN THE POWER TO THE MOTOR AT ITS CIRCUIT BREAKER OR POWER SWITCH BEFORE REMOVING OR INSTALLING ANY MOTOR. LOCK OUT THE BREAKER OR SWITCH AND POST IT WITH AN "OUT OF SERVICE" PLACARD.**



WARNING: **LARGE MOTORS ARE HEAVY, EASY TO UNBALANCE, AND ARE AWKWARD TO LIFT AND MOVE. EVEN SMALLER MOTORS ARE HEAVY. HAVE ASSISTANCE WHEN LIFTING AND MOVING HEAVY MOTORS. IF NECESSARY, USE APPROPRIATE LIFTING DEVICES TO LIFT AND MOVE HEAVY MOTORS.**



CAUTION: **TO PREVENT DAMAGE TO THE MOTORSHAFT, BEARINGS, AND THE MATING HUB/SHEAVE IN THE GEARBOX, MAINTAIN SHAFT ALIGNMENT WHILE REMOVING THE MOTOR FROM ITS GEARBOX.**

2. Removal

- A. Drain the oil from the mating gearbox, or rotate the motor/gearbox assembly so that the motor is up, to prevent oil from spilling from the gearbox when the motor is removed.
- B. Shut down the power to the motor at the main circuit breaker or power switch. Lock out the breaker or switch and place an "OUT OF SERVICE" placard on the breaker or switch.
- C. Disconnect the wiring to the motor. Tag each wire as it is disconnected.
- D. Prepare the motor for removal by supporting the motor appropriately. For smaller motors, use assistance to steady the motor or support it. For larger motors, use mechanical lifting or support devices to steady and support the motor.
- E. Remove the bolts and washers securing the motor to the its mounting.
- F. Maintain motor shaft alignment, and move the motor away from its mounting pad until the motor shaft clears its mating hub/sheave or gearmesh. If the motor shaft is a keyed shaft, keep the drive key with the motor.
- G. Remove and discard the flange gasket. Clean the gasket material from the flange.

3. Installation with NEMA and IEC Flanges

Refer to NORD Gearbox Inputs Installation and Maintenance Instructions in BIM1009.

- A. Make sure the flanges are clean and free of gasket material. Install a new gasket between the mating flanges, if applicable.
- B. Carefully move the motor to insert the motor shaft and its hub/sheave into the adapter spline, making sure the shaft key enters the mating keyway.
- C. Seat the motor flange against the mating flange. Install the mounting bolts and tighten them securely.
- D. Reconnect the wiring to the motor. Refer to Figure 2 for the motor and options connection diagrams.

4. Removing and Replacing C-Face Motors

- A. Shut off the power to the motor and post the shutoff with an “OUT OF SERVICE” placard. Disconnect the wiring to the motor. Tag each wire as it is disconnected.
- B. Support the motor. Remove four bolts securing the motor to the NEMA or IEC adapter.

NOTE: The bolts securing the motor to the adapter are retained using a medium strength thread locker such as blue Loctite.

- C. Pull the motor straight out from the adapter.
- D. Measure and record the dimension from the coupling to the motor flange. Use this dimension to locate the coupling on the replacement motor.
- E. Install a new drive key in the keyway, staking the key or using Loctite to retain the key in the keyway, according to the following instructions:

- 1) If the drive key is not trapped in the keyway (the keyway is open at both ends), stake and install the drive key as follows:

- a. Make sure the keyway is free of contamination so that the drive key will seat properly.
- b. Add a few drops of an approved lubricant to the keyway.
- c. Place the drive key on an appropriate surface with the shaft side of the drive key up. Stake the key in two places near each long edge to deform the edge outward.

CAUTION: SUPPORT THE MOTOR SHAFT BEFORE STAKING THE KEY TO PREVENT DAMAGE TO THE MOTOR BEARINGS.

- d. Support the motor shaft in V-blocks. Place the key with the staked surface down over the key slot. Place a sheet of copper shimstock, or equivalent, on the drive key and tap it into the keyway using a hammer.
- e. Check the key to make sure it is fully seated and securely retained.

- 2) Install and Loctite the drive key as follows:

- a. Make sure the keyway is clean of old Loctite and is free of oil film.
- b. Apply Loctite primer and medium strength (blue) Loctite to the surface of the key and keyway according to the Loctite instructions.

CAUTION: IF THE DRIVE KEY IS TO BE LOCTITED IN PLACE, CLEAN ALL THE LOCTITE FROM THE SURFACE OF THE DRIVE KEY AND THE MOTOR SHAFT TO PREVENT POSSIBLE BONDING OF THE COUPLING AND SPLINE SHAFT TO THE DRIVE KEY.

- c. Install the drive key and center it in the keyway. Cure the Loctite according to Loctite instructions.

- F. Clean all contamination and corrosion from the mating flanges.
- G. Support the motor and mount it to the adapter.
- H. Apply a medium strength thread locking compound such as blue Loctite to the bolt threads according to the instructions. Install the bolts and tighten them securely.
- I. Reconnect the wiring to the motor. Refer to Figure 2 for the motor and options connection diagrams.

5. Removing and Replacing Integral Motors

- A. Shut off the power to the motor and post the shutoff with OUT OF SERVICE. Disconnect the wiring to the motor. Tag each wire as it is disconnected.
- B. Support the motor and remove the bolts securing the motor to the gearbox.
 - NOTE: Most integral motor installations have mounting bolts accessible from the motor exterior. If the bolts are not visible, unbolt the input flange from the gearbox. Remove four bolts that mount the motor. Remove and discard the Dubo gaskets from the bolts.
- C. Remove the motor from the gearbox.
- D. Clean the gasket faces on the motor and gearbox, making sure no cleaning debris enters the gearbox.
- E. Check the replacement motor to make sure the motor flange, motor shaft, and motor pinion are identical to the motor that was removed.
- F. Place a new gasket between the gearbox and new motor.
- G. Position the motor on the gearbox, making sure the input pinion meshes with the input gear. Rotate the motor as necessary to align the bolt holes and seat the motor flange. Make sure the gasket remains properly aligned and seated.
- H. Apply a medium strength thread locking compound such as blue Loctite to the bolt threads according to the instructions. Install the bolts and tighten them securely.
 - NOTE: If the motor/gearbox installation uses an input flange, mount the input flange to the motor using four mounting bolts and new Dubo gasket. Tighten the bolts securely.

CAUTION: DO NOT TO MIX TYPES OF OIL.

- I. Check the gearbox oil level. If necessary fill the gearbox or add oil to bring the gearbox oil to the correct level. Check the installation and maintenance manual for your gearbox to find the correct oil for the gearbox.
- J. Reconnect the wiring to the motor. Refer to Figure 2 for the motor and options connection diagrams.

6. Handling and Lifting

- A. Before lifting any motor, disconnect all electrical connections. Tag each wire as it is disconnected.
- B. Disconnect the motor from the gearbox. Do not lift the motor while it has other equipment attached to it.
- C. If the motor has provisions for a lifting eye, turn in an appropriately sized lifting eye and lock it in place with the locking nut. Lift the motor by the lifting eye using an appropriate lifting device.
- D. If the motor does not have provisions for a lifting eye, seek assistance or use appropriate lifting devices as necessary.

7. Storage

If the motor is not in service, store it according to the following conditions:

- A. Cover the motor and store it in a clean warehouse environment protected from dust and fluids.
- B. If the motor has internal heaters, power the heaters during storage if the storage environment is extremely humid. The heaters will prevent moisture buildup in the motor interior.
- C. Before placing the motor in service, visually inspect the motor exterior for evidence of deterioration during storage. Turn the motor shaft by hand to make sure the shaft turns smoothly and freely.

CONNECTION DIAGRAMS

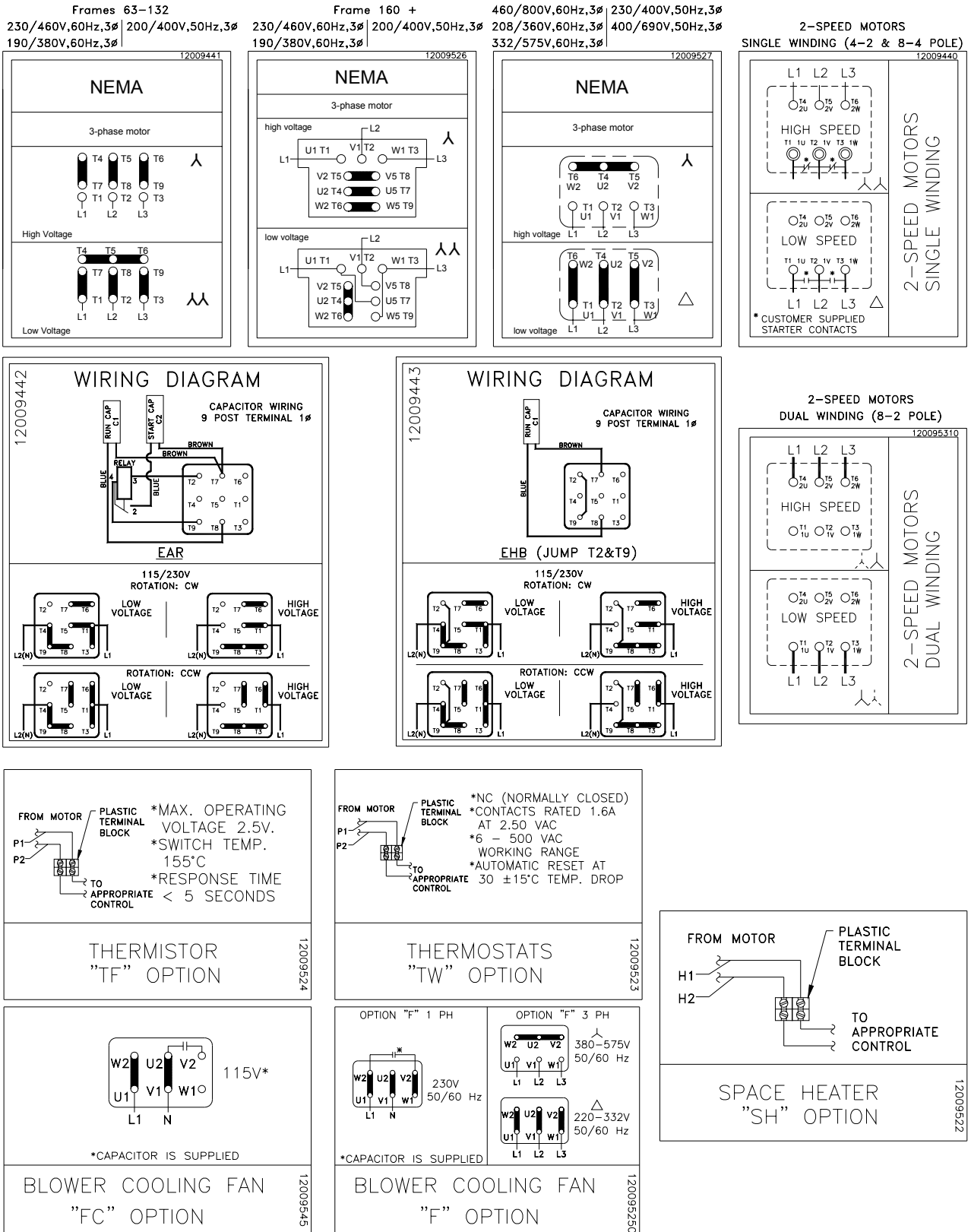


Figure 2. Motor Connection and Wiring Diagrams

REPAIR

1. General

These instructions can be generally applied to NORD motor applications. The exploded view provided in the PARTS INFORMATION section shows the parts orientation for NORD motors.

To procure replacement parts from NORD, contact NORD's customer service department (refer to INTRODUCTION). Provide NORD with the motor part number and serial number, and the item reference number and nomenclature from the parts information figure, which will identify the part for your motor application.

A. The following parts must be replaced if they are removed:

- Oil seal (904), Oil seal (933)
- Gasket (909), Gasket (910), Gasket (921)
- Gasket on plug (961)
- Self-locking screws (907-1, 908-1, 923, 932-1, 940-1)

B. If the following parts are removed, inspect them, and replace them if they are deformed:

- Retaining ring (919), Retaining ring (947), Retaining ring (948)
- Fan clip (952)

C. Disassemble the motor according to the general exploded view in PARTS INFORMATION. Disassemble only as far as necessary to replace the failed parts.

D. Whenever the motor is disassembled, clean all dust and contamination from the motor interior using a vacuum cleaner and a soft-bristled nylon brush.

PARTS LIST

1. General

Refer to Figure 4 for parts information. If you are ordering a part, provide the model and serial number of your motor. This will determine the part number you need.

| Part Number | Part Description | Qty per Assembly |
|--------------------|--|-------------------------|
| 900 | Rotor Assembly | 1 |
| 902 | A-Endbell | 1 |
| 904 | Oil Seal | 1 |
| 905 | Bearing | 1 |
| 906 | Preload Spring | 1 |
| 907 | T-Box Frame | 1 |
| 907-1 | Screw | 4 |
| 908 | T-Box Cover | 1 |
| 908-1 | Screw | 4 |
| 909 | T-Box Frame Gasket | 1 |
| 910 | T-Box Cover Gasket | 1 |
| 916 | Stator Assembly | 1 |
| 918 | Drive Key | 1 |
| 919 | Retaining Ring | 1 |
| 920 | Oil Plug | 1 |
| 921 | Gasket | 1 |
| 923 | Screw | 4 |
| 929 | Bearing | 1 |
| 932 | B-Endbell | 1 |
| 932-1 | Screw | 4 |
| 933 | Oil Seal | 1 |
| 939 | Fan | 1 |
| 940 | Fan Cowl | 1 |
| 940-1 | Screw | 4 |
| 947 | Retaining Ring | 1 |
| 948 | Retaining Ring | 1 |
| 952 | Fan Clip | 1 |
| 960 | NPT Thread Adapter | 1 |
| 961 | Plug (includes O-ring) | 1 |
| *** | Spur Drive Gear (alternate to integral bevel gear) | AR |
| TBLK | Terminal Block | 1 |
| TBLK-1 | Screw, Terminal Block Mounting | 2 |
| ø ø ø | Jumper Bar (not illustrated) | AR |

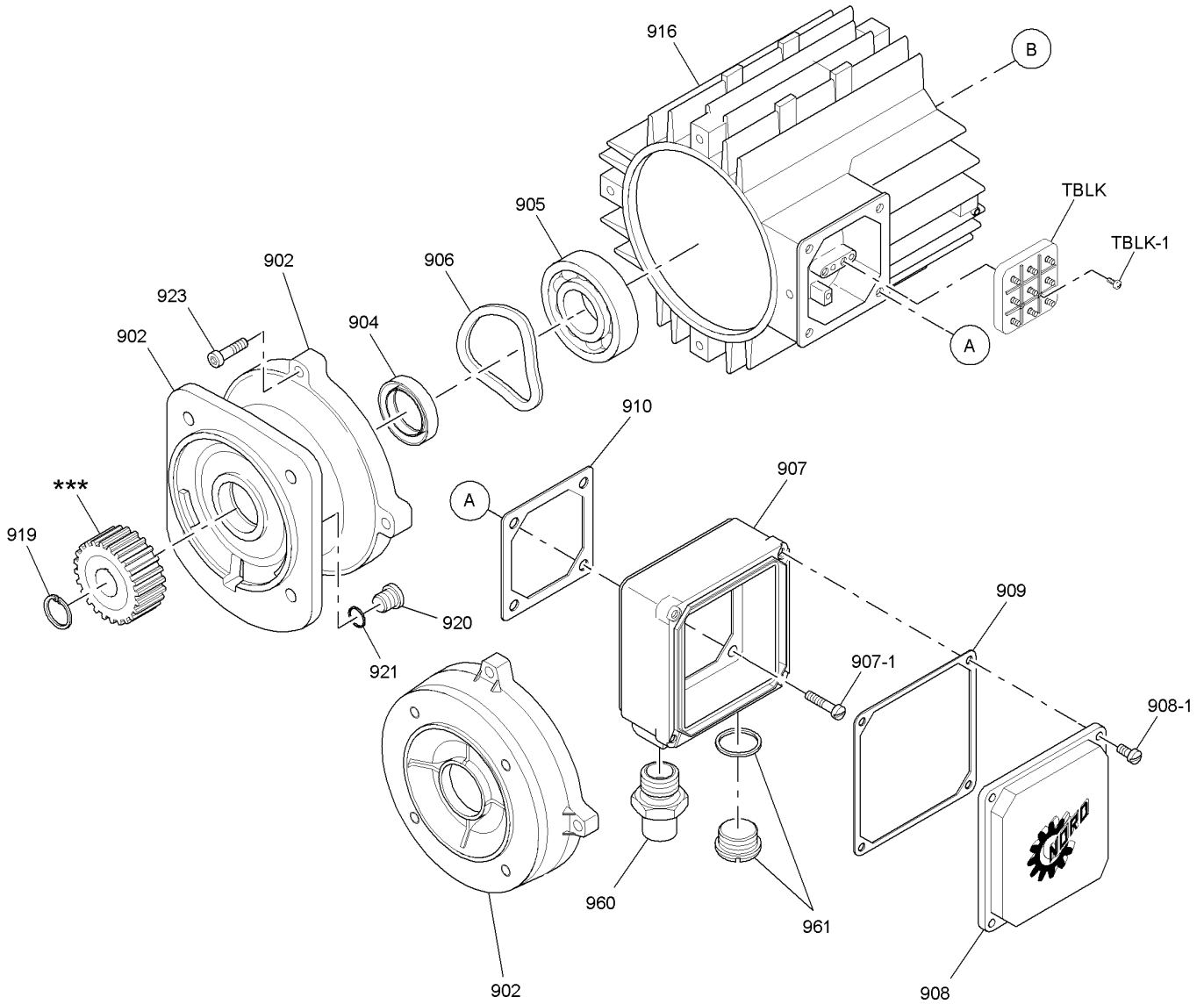


Figure 3. General Motor Exploded View and Generic Parts List (Sheet 1 of 2)

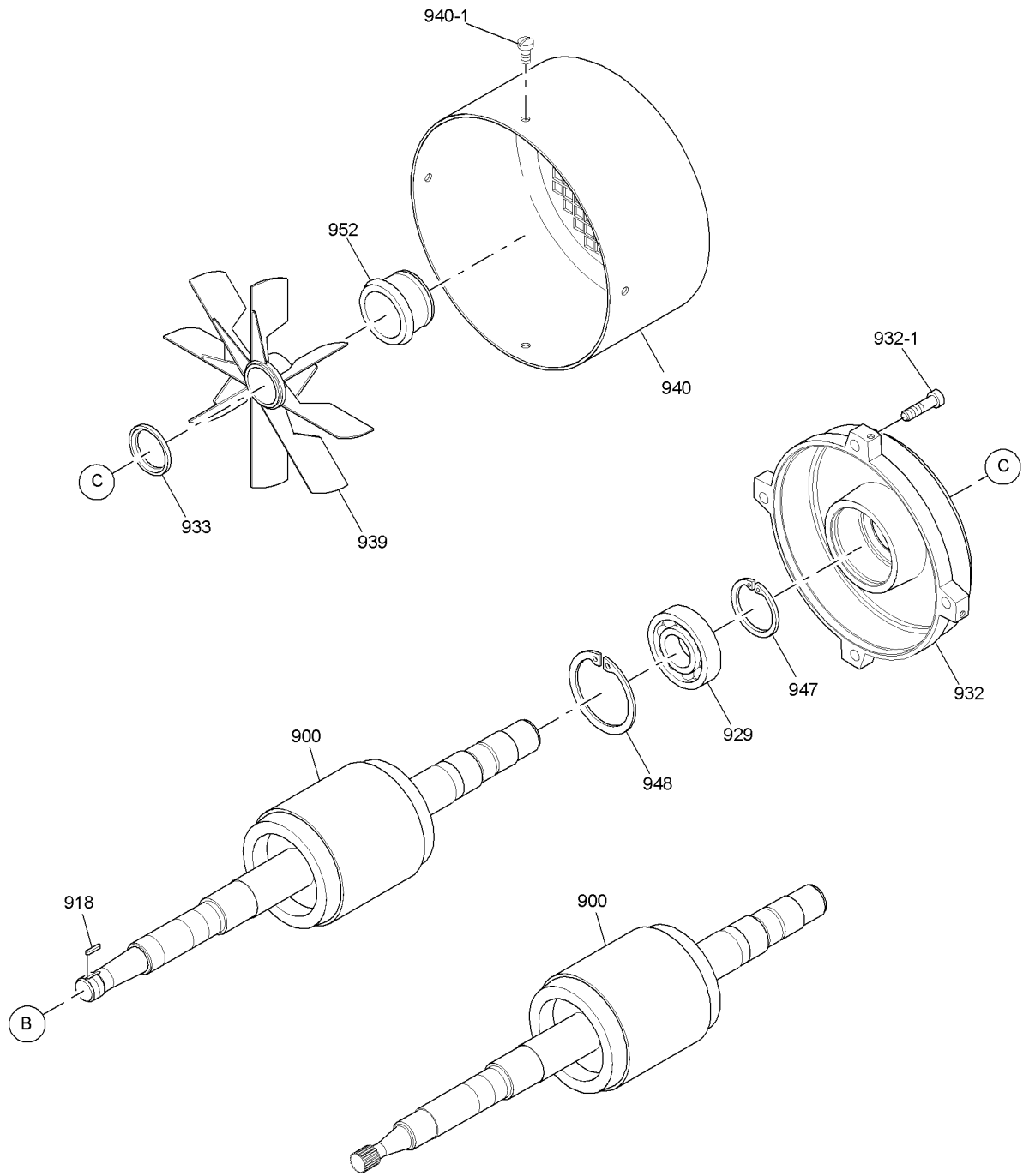


Figure 3. General Motor Exploded View and Generic Parts List (Sheet 2 of 2)

MOTOR OPTIONS & NOMENCLATURE

1. General

NORD offers many options for its motors. The option code will be shown in the motor nomenclature. Below are the available options

| Code | Description | Code | Description |
|-------------|----------------------------------|--------------|-------------------------------------|
| BRE | With Brake | OL | TENV Motor – Without Fan |
| RG | Brake – Corrosion Protected | OL/H | TENV Motor - Without Fan & Cover |
| SR | Brake – Dust Protected | RD | Canopy Cover |
| HL | Brake – Manual Hand Release | RDD | Double Canopy Cover |
| FHL | Brake – Lockable Manual Release | RLS | Backstop |
| MIK | Brake – Microswitch | SH | Motor Space Heater |
| IR | Brake – Current Sensing Relay | TF | Thermistor |
| KD | Condensation Holes | TW | Thermostat |
| KB | Condensation Holes - Plugged | WE | 2 nd Motor Shaft End |
| MS | Power Plug Connector | WU | High Slip Rotor |
| NSD+ | NORD Severe Duty Plus Protection | Z | High Inertia Motor Ran |
| EHBU | Single Phase, Run Capacitor | H | Energy Efficient |
| EARU | Single Phase, Start Cap/Run Cap | IP66 | IP66 Environmental Protection |
| F | Blower Cooling Fan - 3ph & 1ph | ISO H | Class H Insulation |
| FC | Blower Cooling Fan - 1ph | EP | Epoxy Dipped Windings |
| IG | Incremental Encoder | FK | Over Running Clutch |
| VR | 5:1 Constant Torque Rated Motor | VN | 10:1 Constant Torque Rated Motor |
| VW | 20:1 Constant Torque Rated Motor | VZ-F | 1000+:1 Constant Torque Rated Motor |

Table 5. Motor Option Codes

| Motor Nomenclature | | | | | |
|--------------------|---|--------------|---------------|---------------|---------------|
| Motor | | | Motor Options | | |
| 100L | / | 4 | BRE | 40 | ... |
| Frame Size | | No. of Poles | Brake | Brake size Nm | Other Options |

Examples

90SH/4 IG SH

Energy Efficient, 1 Speed, Encoder & Space Heater

100L/4-2 WE RDD

2 speed, 2nd Motor Shaft & Double Canopy Cover

132M/4 BRE100 HL IR TW

Brake, Hand Release, Current Sensor & Thermostat

Technical information follows for THERMISTORS, THERMOSTATS, SPACE HEATERS (Table 6), ENCODERS (Table 7) & BLOWER COOLING FAN (Table 8).

Thermistors (Option TF)

- Connection Diagram shown on Page 12
- Three PTC (Positive Temperature Coefficient) temperature sensitive resistors are wired in series
- One PTC on each phase of the stator winding
- The leads will be labeled P1 and P2 in the terminal box
- This unit must be connected to a Motor Control Protection module such as a Kriwan INT69 or a Variable Frequency Drive with PTC inputs

All wiring must be done by qualified personnel and adhere to all local codes.

WARNING: Thermistors will automatically reset.

Thermistor Ratings:

- Switching temperature 310°F(155°C)
- Maximum operating voltage 2.5 volts
- Resistance at 25°C less than or equal to 300 Ohms
- Response time < 5 seconds

Thermostats (Option TW)

- Connection Diagram shown on Page 12
- Three temperature sensitive, bimetallic switches with normally closed contacts wired in series
- One switch on each phase of the stator winding
- The leads will be labeled P1 and P2 in the terminal box

All wiring must be done by qualified personnel and adhere to all local codes.

WARNING: Thermistors will automatically reset.

Thermostat Ratings:

- Switching temperature 310°F (155°C)
- Switch contacts 1.6A at 250 VAC
- Permissible working 6 to 500 VAC
- Automatically resetting with 30 ± 15°C drop below switching temperature
- Resistance less than 50 mΩ
- Switch rebound less than 1 millisecond
- 10g shock in all directions
- 2,000 VAC Insulation rating
- 10,000 cycles
- Normally closed

Space Heaters (Option SH)

- Connection Diagram shown on Page 12
- Space Heaters are mounted directly on the motor winding
- The leads are brought into the terminal box and labeled H1 and H2
- They require a separate voltage supply and must not be energized when the motor is energized
- The heaters will keep the winding of the motor approximately 5°C above the surrounding ambient

| FRAME SIZE | WATTAGE | VOLTAGES | HEATER P/N | HEATER STRIPS/MTR |
|------------|---------|----------|------------|-------------------|
| 63 & 71 | 18W | 110V | 18900770 | 1 |
| | | 230V | 18900780 | |
| | | 460V | 18900790 | |
| 80 | 25W | 110V | 18900820 | 1 |
| | | 230V | 18900800 | |
| | | 460V | 18900810 | |
| 90 – 112 | 50W | 110V | 18900820 | 2 |
| | | 230V | 18900800 | |
| | | 460V | 18900810 | |
| 132-180 | 100W | 110V | 18900830 | 2 |
| | | 230V | 18900840 | |
| | | 460V | 18900850 | |
| 200 & 225 | 120W | 110V | 18900860 | 2 |
| | | 230V | 18900870 | |
| | | 460V | 18900880 | |

Table 6. Space Heater Data

Encoder (Option IG)

- Standard encoder manufacturer is Heidenhain (www.heidenhain.com)
- All encoders will be enclosed inside the fan shroud
- Incremental, Quadrature, Differential, Marker Channel
- IP 64 Protection
- IG1 = 1024PPR, IG2 = 2048PPR, IG4 = 4096PPR
- RS422 & Push/Pull available
- 5V or 10-30V available

| Color | Signal | | Pin (optional mating plug) | Heidenhain Callouts | Explanation |
|-----------------|-----------|------------------------|----------------------------------|------------------------|----------------------|
| | Push-pull | RS 422 | | | |
| Pink | --- | \overline{B} (B-) | 1 | $\overline{U_{a2}}$ | Signal line |
| Blue | --- | Sensor (+) | 2 | U_P | Sense Supply Voltage |
| Red | R (R+) | R (R+) | 3 | U_{a0} | Signal line (Marker) |
| Black | --- | R- | 4 | $\overline{U_{a0}}$ | Signal line |
| Brown | A (A+) | A (A+) | 5 | U_{a1} | Signal line |
| Green | --- | \overline{A} (A-) | 6 | U_{a1} | Signal line |
| Violet | --- | Spare | 7 | $\overline{U_{aS}}$ | Spare |
| Gray | B (B+) | B (B+) | 8 | U_{a2} | Signal line |
| Yellow | --- | --- | 9 | Shield | Spare |
| White/ Green | 0 V | 0 V | 10 | 0 V / U_N | Common |
| White | 0 V | Sensor (-) | 11 | 0 V / Sensor | Sense Common |
| Brown/ Green | V_S | V_S | 12 | U_P | Supply Voltage |

Table 7. Encoder Wiring Designations

BLOWER COOLING FAN (Option F & FC)

- Connection Diagram shown on Page 12
- Option FC is 1 phase 115V only
- Option F has capability of 1 phase or 3 phase by connecting a supplied capacitor

| Motor Frame | | 60 Hz Ratings | | | 50 Hz Ratings | | |
|---|-------|---------------|-------------|-----------|---------------|-------------|-----------|
| | | Voltage [V] | Current [A] | Power [W] | Voltage [V] | Current [A] | Power [W] |
| Single Phase Connection - 1~Δ | FC63 | 100-135 | 0.23 | 42 | 100-135 | 0.30 | 42 |
| | FC71 | 100-135 | 0.23 | 47 | 100-135 | 0.30 | 44 |
| | FC80 | 100-135 | 0.27 | 57 | 100-135 | 0.30 | 43 |
| | FC90 | 100-135 | 0.46 | 102 | 100-135 | 0.57 | 78 |
| | FC100 | 100-135 | 0.53 | 105 | 100-135 | 0.54 | 78 |
| | FC112 | 100-135 | 0.60 | 115 | 100-135 | 0.55 | 80 |
| Single Phase Connection 1~Δ | F63 | 230-332 | 0.11 | 38 | 230-277 | 0.10 | 27 |
| | F71 | 230-332 | 0.12 | 41 | 230-277 | 0.10 | 28 |
| | F80 | 230-332 | 0.13 | 44 | 230-277 | 0.11 | 29 |
| | F90 | 230-332 | 0.25 | 88 | 230-277 | 0.26 | 72 |
| | F100 | 230-332 | 0.28 | 88 | 230-277 | 0.26 | 70 |
| | F112 | 230-332 | 0.31 | 107 | 230-277 | 0.26 | 73 |
| | F132 | 230-332 | 0.27 | 89 | 230-277 | 0.29 | 82 |
| Three-Phase Low Voltage Connection 3~Δ | F63 | 230-332 | 0.08 | 23 | 230-290 | 0.10 | 27 |
| | F71 | 230-332 | 0.08 | 24 | 230-290 | 0.10 | 28 |
| | F80 | 230-332 | 0.08 | 25 | 230-290 | 0.10 | 29 |
| | F90 | 230-332 | 0.21 | 64 | 230-290 | 0.28 | 86 |
| | F100 | 230-332 | 0.21 | 66 | 230-290 | 0.27 | 86 |
| | F112 | 230-332 | 0.23 | 70 | 230-290 | 0.27 | 85 |
| | F132 | 230-332 | 0.25 | 74 | 230-290 | 0.32 | 96 |
| | F160 | 230-332 | 0.49 | 165 | 230-290 | 0.53 | 155 |
| | F180 | 230-332 | 0.49 | 165 | 230-290 | 0.53 | 155 |
| | F200 | 230-332 | 0.49 | 165 | 230-290 | 0.53 | 155 |
| | F225 | 230-332 | 0.49 | 165 | 230-290 | 0.53 | 155 |
| Three-Phase High Voltage Connection 3~Y | F63 | 380-575 | 0.04 | 23 | 380-500 | 0.05 | 29 |
| | F71 | 380-575 | 0.04 | 25 | 380-500 | 0.05 | 30 |
| | F80 | 380-575 | 0.04 | 26 | 380-500 | 0.05 | 29 |
| | F90 | 380-575 | 0.12 | 62 | 380-500 | 0.16 | 82 |
| | F100 | 380-575 | 0.12 | 66 | 380-500 | 0.16 | 83 |
| | F112 | 380-575 | 0.13 | 70 | 380-500 | 0.16 | 82 |
| | F132 | 380-575 | 0.14 | 75 | 380-500 | 0.18 | 96 |
| | F160 | 380-575 | 0.28 | 165 | 380-500 | 0.30 | 155 |
| | F180 | 380-575 | 0.28 | 165 | 380-500 | 0.30 | 155 |
| | F200 | 380-575 | 0.28 | 165 | 380-500 | 0.30 | 155 |
| | F225 | 380-575 | 0.28 | 165 | 380-500 | 0.30 | 155 |

Table 8. Blower Cooling Fan Data

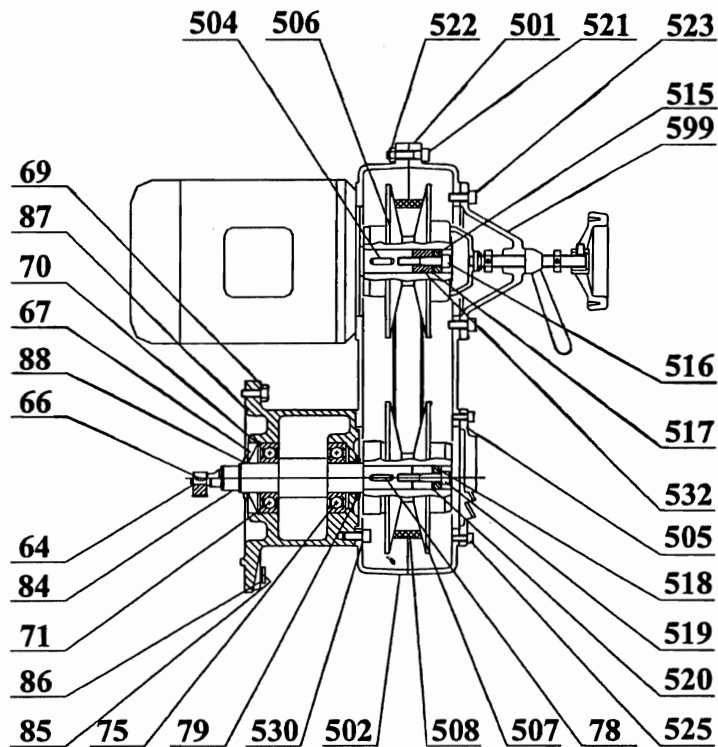


PARTS LIST
TITAN-BELT BOXES
FRAME SIZE: R150
INPUT SIZE: 160s

Parts List No.

715100

IMPORTANT: When ordering parts supply nameplate data:
1) Serial No., 2) Frame Size, 3) Ratio



| |
|-----------------|
| Assembled with |
| INLINE |
| SK02 |
| SK11 |
| SK12 |
| SK13 |
| SK23 |
| SK33 |
| CLINCHER |
| SK1282 |
| SK1382 |
| SK2382 |
| SK3382 |
| BEVEL |
| SK9012 |
| SK9013 |
| SK9022 |
| SK9023 |
| SK9033 |
| WORM |
| SK02050 |
| SK12063 |
| SK12080 |
| SK13050 |
| SK13063 |
| SK13080 |
| SK33100 |

| ITEM | PART NAME | DESCRIPTION | PART NO. | QTY | ITEM | PART NAME | DESCRIPTION | PART NO. | QTY |
|------|-------------------|----------------|-----------|-----|------|----------------------|--------------|-----------|-----|
| 64 | SNAP RING | CONTACT | FACTORY | 1 | 506b | ADJUSTABLE PULLEY | 7/8in. | 71591020 | 1 |
| 66 | KEY | CONTACT | FACTORY | 1 | 507 | SPRING LOADED PULLEY | 24mm | 71591110 | 1 |
| 67 | OIL SEAL | 30x72x10Amm | 25030160 | 1 | 508 | V-BELT | 28x8x754LRJ | 71592000 | 1 |
| 69 | HEX HEAD BOLT | M8x25mm | 22008250 | 4 | 515a | THRUST WASHER | 5/8in. | 171082010 | 1 |
| 70 | SNAP RING | 72mm int. | 27307200 | 1 | 515b | THRUST WASHER | 7/8in. | 171082020 | 1 |
| 71 | BEARING (BALL) | 6306ZZ | 24630620 | 1 | 516a | SOCKET HEAD BOLT | 1/4-20x1-1/4 | 126504120 | 1 |
| 75 | BEARING (BALL) | 6306-2RS | 24630640 | 1 | 516b | SOCKET HEAD BOLT | 1/4-20x1-1/2 | 126504150 | 1 |
| 78 | KEY (HARDENED) | 3/16x3/16x1in. | 126003080 | 1 | 517a | SNAP RING | 5/8in. int. | 127410000 | 1 |
| 79 | OIL SLINGER | RB30mmW/WIPER | 28583010 | 1 | 517b | SNAP RING | 7/8in. int. | 127414000 | 1 |
| 84 | INPUT SHAFT | CONTACT | FACTORY | 1 | 518 | THRUST WASHER | m10x23.5x8mm | 71582010 | 1 |
| 85 | DRAIN PLUG | M10x1.0mm | 22110003 | 1 | 519 | SOCKET HEAD BOLT | M8x45mm | 22108450 | 1 |
| 86 | GASKET | 10x13.5x1.0mm | 25310130 | 1 | 520 | SNAP RING | 24mm int. | 27302400 | 1 |
| 87 | INPUT CYLINDER | 160S | 50615010 | 1 | 521 | SOCKET HEAD BOLT | M8x35mm | 22108350 | 6 |
| 88 | OIL SLINGER | RB30mm | 28583000 | 1 | 522 | HEX NUT | M8 | 22500800 | 6 |
| 501 | BELTCASE | NEMA 143/5 | 71511120 | 1 | 523 | SOCKET HEAD BOLT | M8x20mm | 22108205 | 4 |
| 502 | BELTCASE | NEMA 143/5 | 71511120 | 1 | 525 | SOCKET HEAD BOLT | M6x16mm | 22106165 | 2 |
| 504a | KEY | 3/16x3/16 | 126003100 | 1 | 530 | SOCKET HEAD BOLT | M8x20mm | 22108205 | 4 |
| 504b | KEY | 5/16x5/16 | 126005090 | 1 | 532a | SPACER | 5/8x25.21mm | 171582510 | 1 |
| 505 | VENTILATION COVER | | 71513110 | 1 | 532b | SPACER | 7/8x23.62mm | 171582520 | 1 |
| 506a | ADJUSTABLE PULLEY | 5/8in. | 71591010 | 1 | 599 | HANDWHEEL ADJ. COV. | COMPLETE | 71590500 | 1 |

a: 56C FRAME MOTOR
b: 143/145; 184TC FRAME MOTOR

CONTACT FACTORY: THIS APPLIES TO PARTS WHERE A VARIETY OF SIZES ARE AVAILABLE.

6/21/02

NORD GEAR CORPORATION
800 NORD DRIVE
P.O. BOX 367
WAUNAKEE, WI 53597

Telephone: (608) 849-7300
Fax Number: (800) 373-6673

REED GUNITE MACHINES-MANUAL **SPEED CONTROL ADJUSTMENT PROCEDURES** **FOR NORDGEAR ELEC-GEARMOTORS**

THIS PROCEDURE IS FOR BOTH THE SOVE/209E-LOHE/215E GUNITE MACHINES. BEFORE ADDING ANY MATERIAL INTO THE REED GUNITE MACHINES'S HOPPER, ADJUST FOR THE DESIRED OPERATING BOWL R.P.M. USING THE FOLLOWING STEPS:

- *TURN ON THE GUNITE MACHINE AT THE CONTROL BOX (FIG. 1)
- *AFTER THE MACHINE IS RUNNING, TURN THE ROUND DIAL THAT IS LOCATED AT BOTTOM LEFT OF THE MACHINE AS FOLLOWS (FIG. 2):
 1. TO INCREASE SPEED-TURN THE DIAL IN A CLOCKWISE MANNER.
 2. TO DECREASE SPEED-TURN THE DIAL COUNTER-CLOCKWISE.(NOTE: ALL REED UNITS HAVE A DECAL THAT INDICATES DIRECTIONS-FIG.3)

THE NORDGEAR UNITS HAVE A BELT-DRIVEN PULLEY ENCLOSED IN A METAL CASE (FIG. 4) . THE BELT GEAR RATIO ON ALL REED UNITS IS 6 TO 1. BY TURNING THE SPEED CONTROL DIAL AT THE BOTTOM OF THE GEARMOTOR, THE DRIVE BELT IS EITHER TIGHTEN FOR MORE SPEED, OR LOOSEN FOR LESS SPEED. THE ELECTRIC MOTOR ALWAYS RUNS AT IT'S MAX R.P.M. IT SHOULD NOTED THAT ALL SPEED CONTROL ADJUSTMENTS ARE TO DONE WHILE THE MACHINE IS RUNNING, FAILURE MAY HAPPEN TO THE BELT AND PULLEYS IF NOT COMPLIED WITH.

SPEED DIAL INFO-(FIG. 5)- SEE SHEET 4 OF 4

FIG. 1



FIG. 2





FIG. 3



FIG. 4



FIG. 5

SPEED DIAL INFO-(FIG. 5)

THE SPEED DIAL IS ACTUALLY A 4 3/4" DIAMETER HANDWHEEL WITH GLASS ENCLOSED DIAL (3 3/8" DIAMETER) IN THE CENTER. THE DIAL HAS 18 GRADUATIONS WITH (2) INDICATORS-(1) BLACK AND (1) RED THAT SHOWS THE RELATIVE POSITION OF THE "SET SPEED". THE SPEED DIAL CONTROLS THE BELT TENSION IN THE GEARBOX AS STATED PREVIOUSLY.

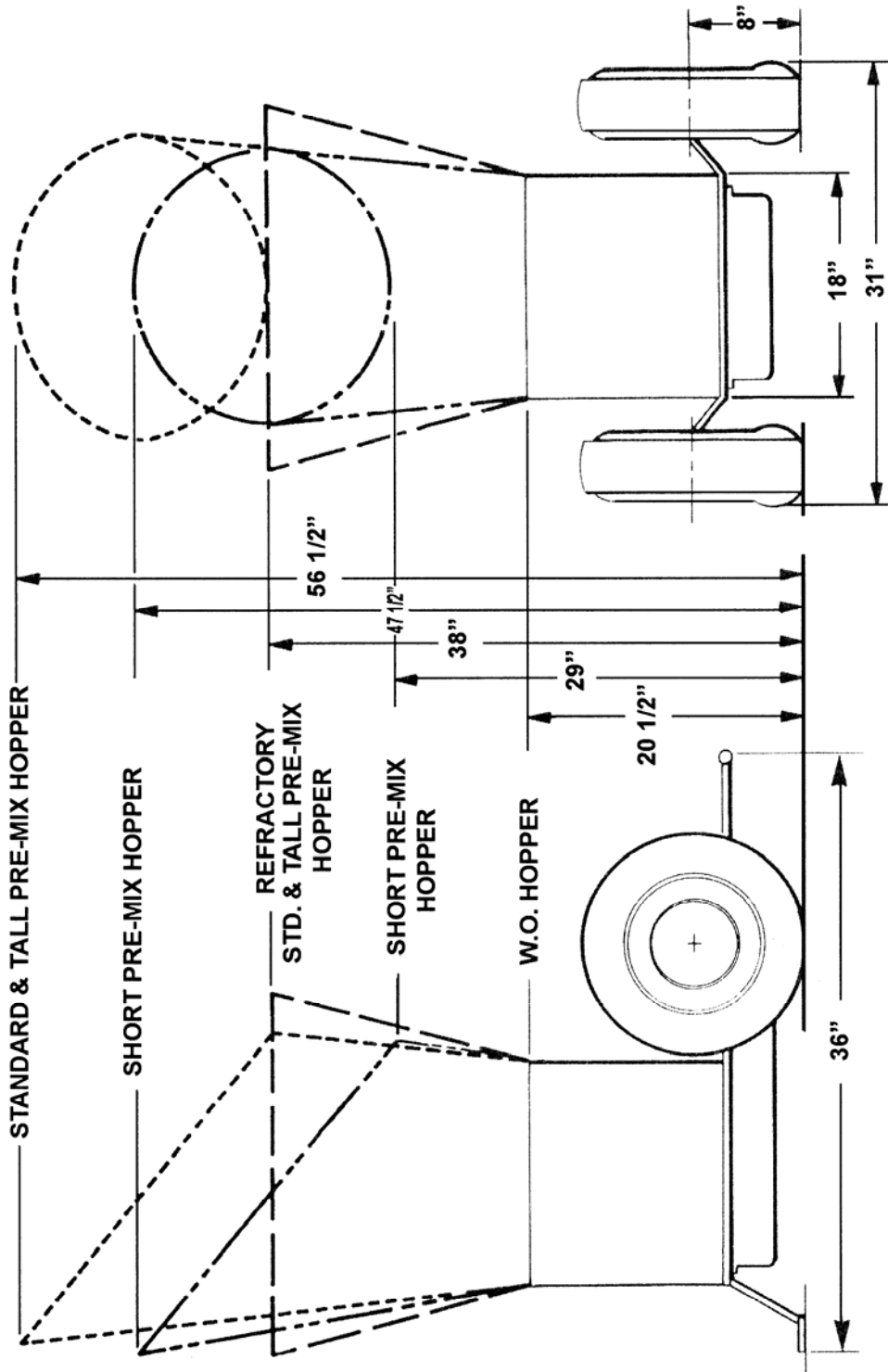


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SCHEMATIC SECTION

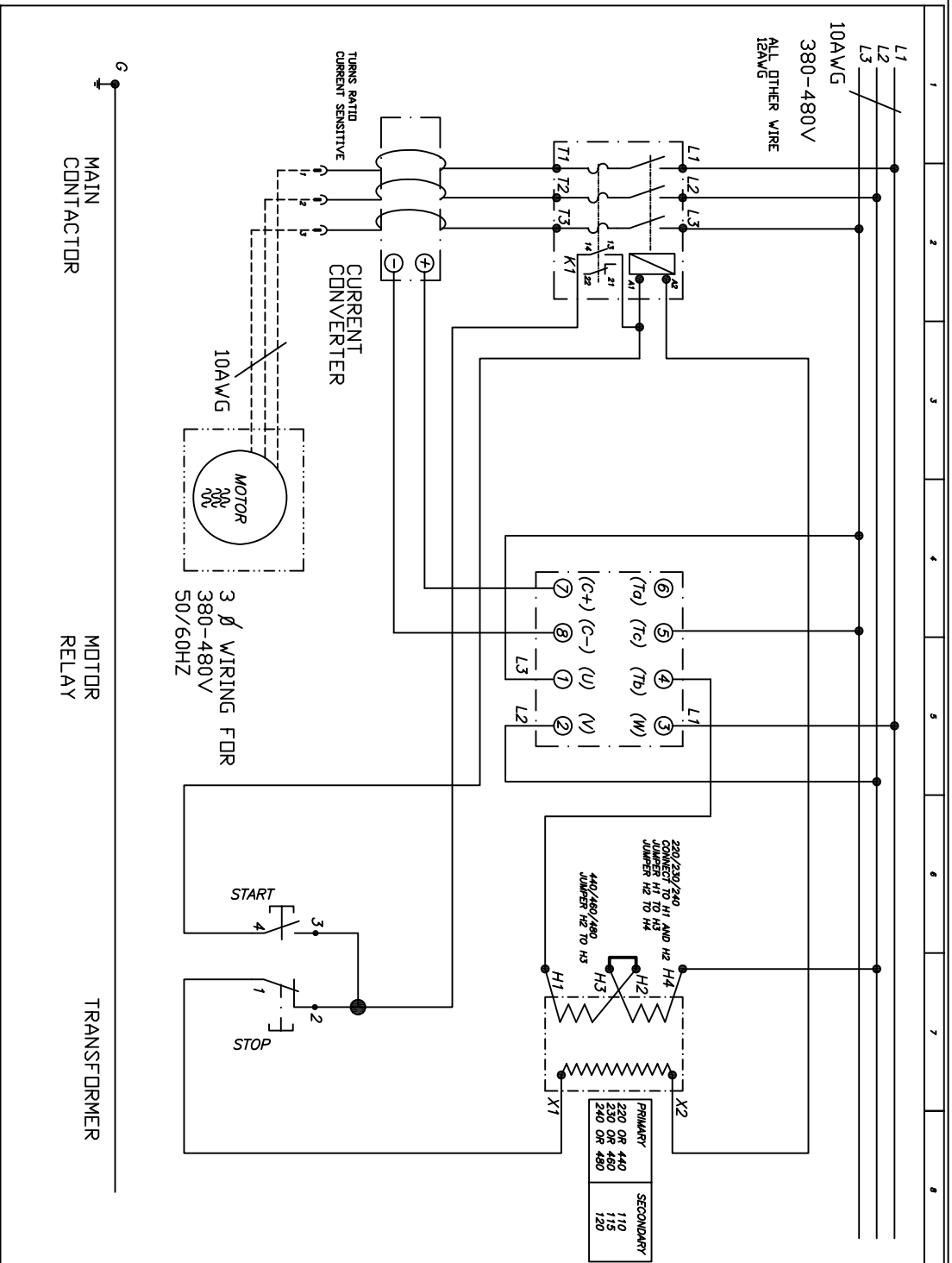
SCHMT

PAGE 01

DIMENSIONS

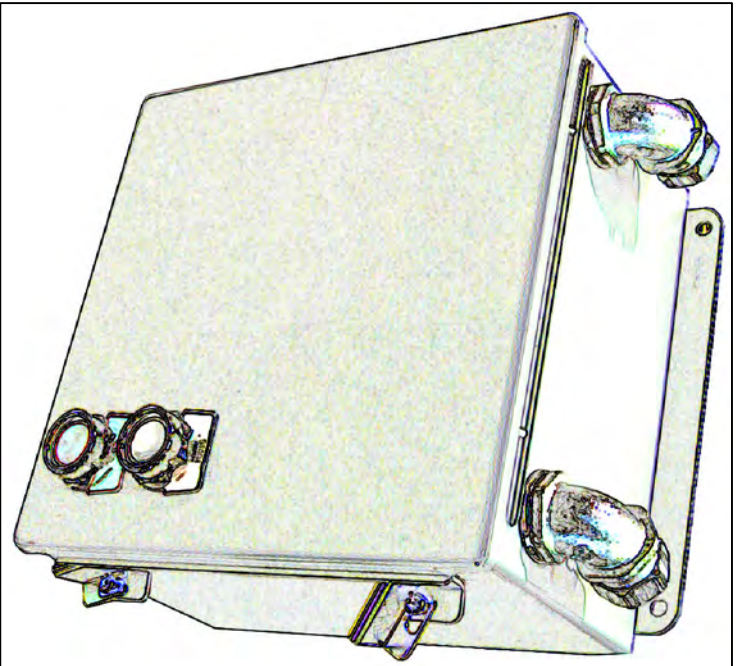


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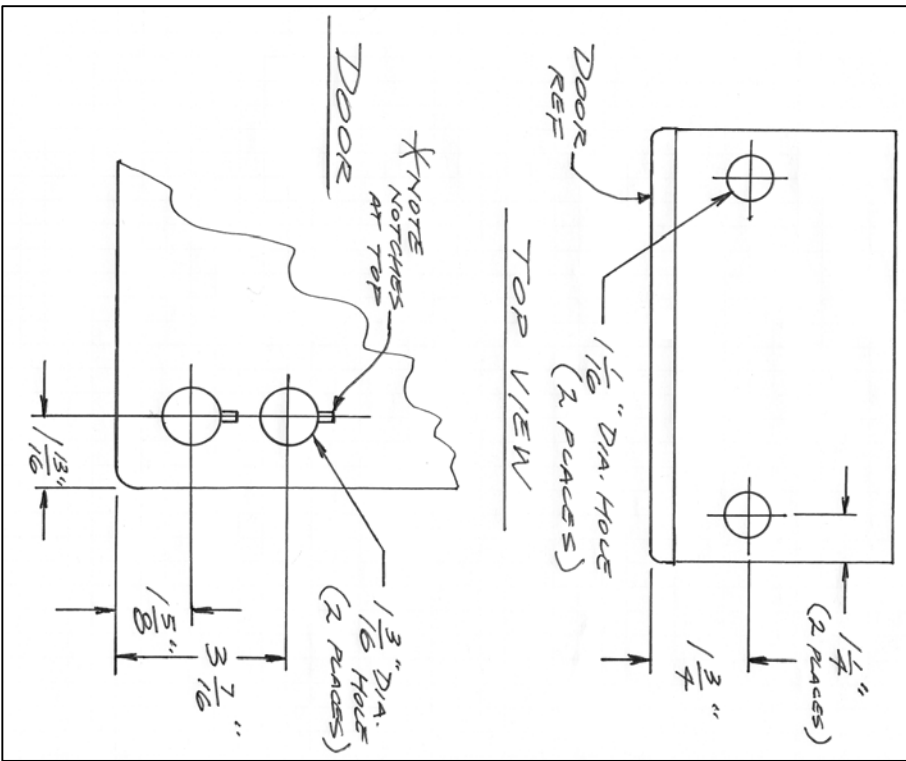
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| REV | DATE | DESCRIPTION OF CHANGE | BY | APPVD |
| A | 9/27/07 | ECN #1224 | EY | |
| REVISIONS | | | | |

| | | | |
|---|--|---|----------|
| DD NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES. TOLERANCES: .XX .030 .XXX .010 FRACTION 1/32 ANGLE 1/2° BREAK ALL SHARP EDGES .010 MAX. x 45 ALL MACHINED SURFACES 125/ UNLESS OTHERWISE SPECIFIED | | TITLE WIRING DIAGRAM-380V-480V | |
| MATERIAL | | CONCRETE PLACING EQUIPMENT CHIND, CA 91710 | |
| THIS DRAWING IS THE PROPERTY OF REED MANUFACTURING AND IS LOANED WITHOUT CONSIDERATION OTHER THAN THE BORROWER'S AGREEMENT THAT IT SHALL NOT BE REPRODUCED, COPIED, LOANED, OR DISPOSED OF, DIRECTLY OR INDIRECTLY, NOR USED FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT IS SPECIFICALLY FURNISHED. | | PART NUMBER 10174 | REV A |
| SHEET 1 OF 2 | | | |



PN 10174 ELECTRICAL CONTROL BOX

**PN 73771 HOFFMAN BOX
MODIFICATIONS**

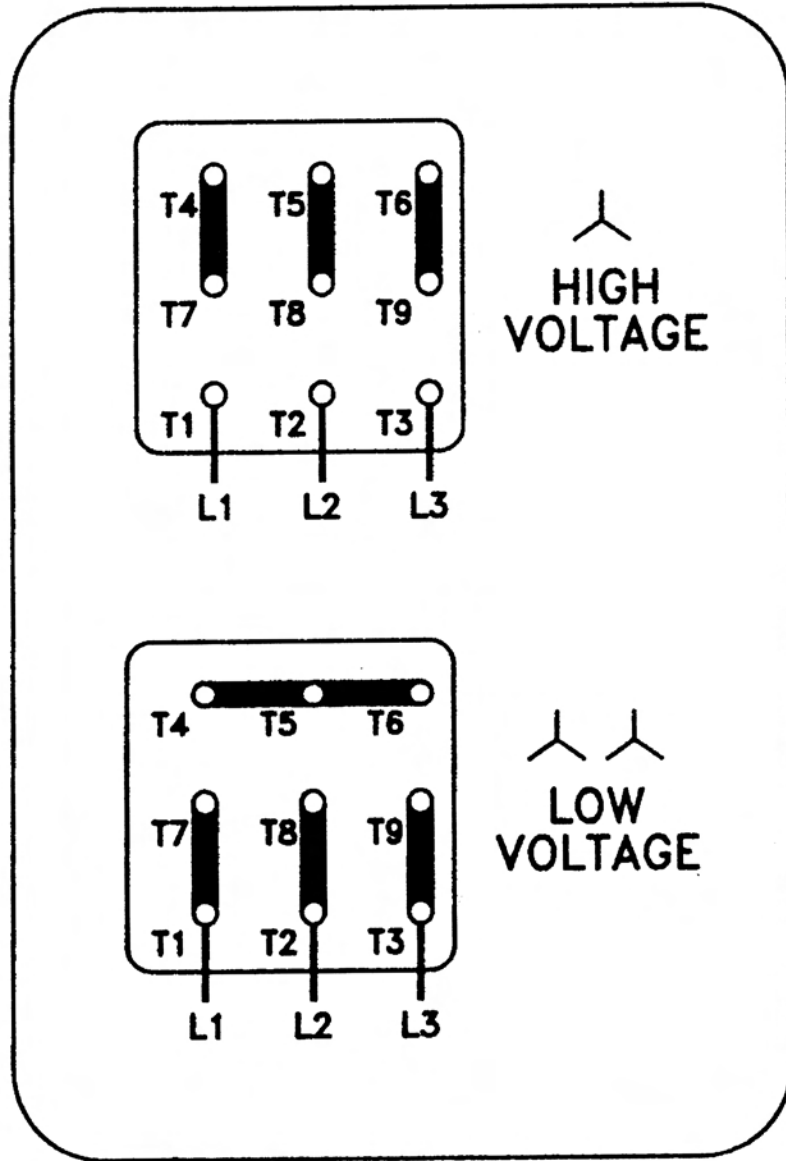


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|--|---------|-----------------------|----|-------|-------|
| DD NOT SCALE DRAWING UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES. | | | | | |
| TOLERANCES: | | | | | |
| .XX .030 | | | | | |
| .XXX .010 | | | | | |
| FRACTION 1/32 | | | | | |
| ANGLE 1/2° | | | | | |
| BREAK ALL SHARP EDGES .010 MAX. x 45 | | | | | |
| ALL MACHINED SURFACES 1/64 UNLESS OTHERWISE SPECIFIED | | | | | |
| REV | DATE | DESCRIPTION OF CHANGE | BY | DRAWN | DR/EY |
| A | 9/27/07 | ECN #1224 | EY | | |
| REVISIONS | | | | | |
| APPVD | | | | | |

| | | | |
|--|-----|----------------------------|--|
| TITLE | | CONCRETE PLACING EQUIPMENT | |
| REEED | | CHIND, CA 91710 | |
| MATERIAL | | CONTROL BOX-MODIFICATIONS | |
| THIS DRAWING IS THE PROPERTY OF REED MANUFACTURING AND IS LOANED WITHOUT CONSIDERATION OTHER THAN THE BORROWER'S AGREEMENT THAT IT SHALL NOT BE REPRODUCED, COPIED, LOANED, OR DISPOSED OF, DIRECTLY OR INDIRECTLY, NOR USED FOR ANY PURPOSE OTHER THAN THAT FOR WHICH IT IS SPECIFICALLY FURNISHED. | | | |
| PART NUMBER | REV | | |
| 10174 | A | | |
| SHEET 2 OF 2 | | | |

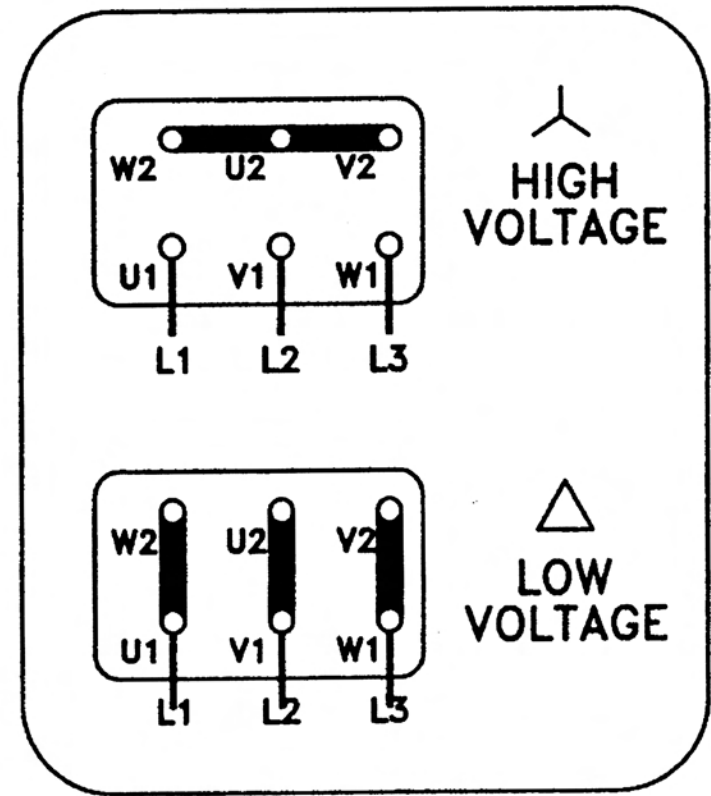
NORD GEAR-ELECTRIC MOTOR CONNECTION DIAGRAMS

3-PHASE MOTOR (NEMA)

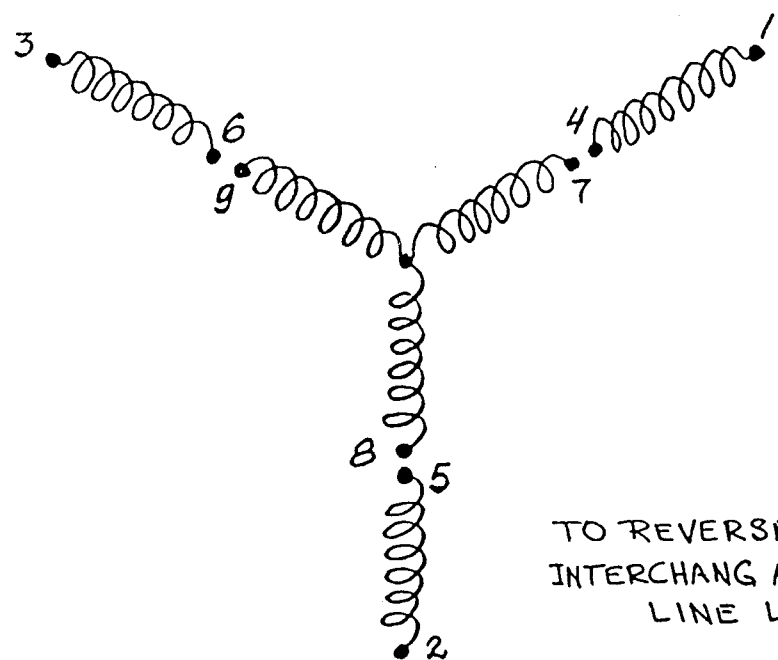


230/460V - 60 Hz

332/575V - 60 Hz
230/400V - 50 Hz
400/690V - 50 Hz



Frame 63 - 132

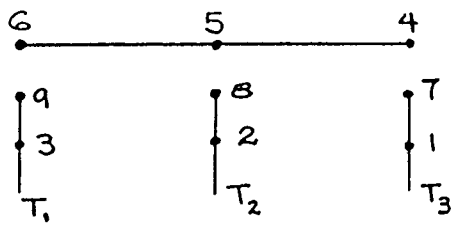


TO REVERSE ROTATION
INTERCHANG ANY TWO
LINE LEAD

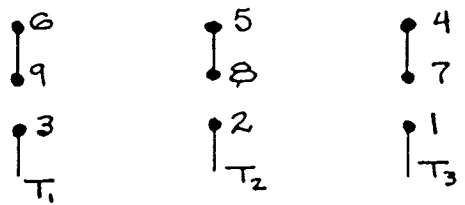
9 LEADS Std. 60 CPS MOTOR

| FOR | LINE | | | TIE LEADS | TIE LEADS | TIE LEADS |
|--------------|----------------------|----------------------|----------------------|-----------|-----------|-----------|
| | 'T ₁ ' TO | 'T ₂ ' TO | 'T ₃ ' TO | | | |
| LOW VOLTAGE | 3 & 9 | 2 & 8 | 1 & 7 | 6, 5, 4 | — | — |
| HIGH VOLTAGE | 3 | 2 | 1 | 6, 9 | 5, 8 | 4, 7 |

LOW VOLTAGE

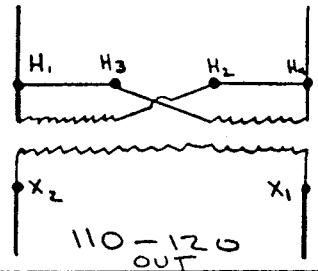


HIGH VOLTAGE



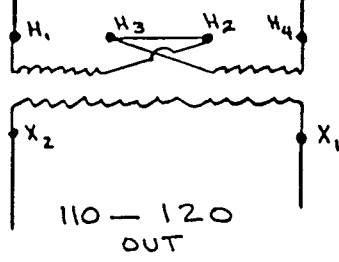
LOW VOLTAGE

V IN
220 - 240



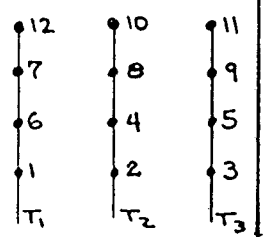
HIGH VOLTAGE

V IN
440 - 480

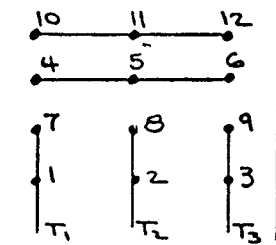


3 Φ MOTOR (1-575A) TRIPLE VOLTAGE
12 LEADS 50 CPS.

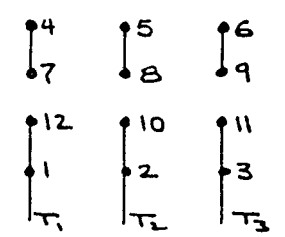
220 VOLT CONN.



380VOLT CONN.



440 VOLT CONN.



TO REVERSE ROTATION: INTERCHANGE ANY TWO LINE LEADS