

# Installation, Operation & Maintenance Instructions

Please read and retain this manual

## NEMA



56C & 145TC TEFC  
Round Body Motors



56C & 145TC TENV  
Round Body Motors



180TC TEFC Round Body &  
Foot & Flange Mounted Motors



56C & 145TC TEFC  
Foot & Flange Mounted Motors

## IEC METRIC



Small frame metric  
TENV Motors



Small frame metric  
TEFC Motors



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## SAFETY FIRST

**Before proceeding to install, operate or perform maintenance please read this manual in its entirety.**



Electric Motors when operating have live and rotating components with temperatures that can exceed 50 °C. Therefore, the motor must only be installed, moved, put into service, handled, controlled and repaired exclusively by qualified and responsible personnel.



**WARNING:** Surface temperatures of motor enclosures may reach temperatures which can cause discomfort or injury to personnel coming in contact with hot surfaces. Protection should be provided by the user to protect against accidental contact with hot surfaces. Failure to observe this precaution could result in bodily injury.

It is highly recommended that the above mentioned personnel be familiar, pay special attention to and adhere to the following:

- NEMA publication MG-2: Safety Standard for construction and guide for Selection, Installation and Use of Electric Motors
- ANSI C51.5, the National Electrical Code (NEC) and local codes and practices
- OSHA standard 1910.147 titled: The Control of Hazardous energy (lockout/tag-out)
- IEC 60034-1 Electrical and IEC 60072-1 Mechanical Specifications.



The motor must be installed in adherence with all of the above codes & regulations



It is very important to observe proper safety precautions to protect personnel from possible injury. An incorrect installation, improper use, the removing or disconnection of protective devices, the lack of inspections & maintenance, the inadequate connection can cause serious or fatal injury. Property damage may also occur.

Motors of these instructions are suitable for installation in industrial areas. Additional protection measures if necessary for other applications must be adopted and assured by the person responsible for the installation.

## SELECTION

The buyer/purchaser shall be solely responsible for determining the adequacy of the product for any and all uses to which the buyer/purchaser shall use/apply the product. The application of the buyer/purchaser shall not be subject to any implied warranty of suitable fitness for a particular application.

# GENERAL INFORMATION

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## 1. RECEIVING

Upon receipt please inspect the unit to make sure that no damage has occurred during shipment. If any damage is noticed please report it immediately to the commercial carrier that delivered the product.

If there is damage to the motor **DO NOT** put the motor into service.

For any damaged motors please contact the shipper immediately.

## 2. HANDLING

Use proper handling equipment and act with care in accordance with prescribed procedures when handling the motor to avoid injury. Sharp edges may exist on the motor shaft keyway and the motor surface.

Verify that the Model # or Part # corresponds correctly to the motor Model # or Part # which is on the actual packing slip. If the Model # or Part # do not match please contact the shipper immediately.



Eyebolts on the motors, if present, are suitable for lifting the motor only. They are not suited for other equipment that are or may be fitted to the motor and must not be used to lift any additional weight. If present, make sure that the eyebolt is fully threaded and tight in its mounting hole.

Do not use lifting eyebolts to lift any other objects or additional weight such as gear reducers, pumps, etc...

Using lifting devices to lift other objects or additional weight may cause the lifting devices to fail and this could cause serious personal or fatal injury or property damage.



## 3. INSTALLATION

Check the name plate data for correct Horsepower, Speed (RPM), Voltage, Hertz and Phase for conformance with the power supply and equipment.

Before wiring up to the electrical power supply make sure that the voltage corresponds to the nameplate data for the motor.

The power supply must agree with the values on the motor nameplate. Motors not correctly matched to the power supply and/or load will not operate properly.

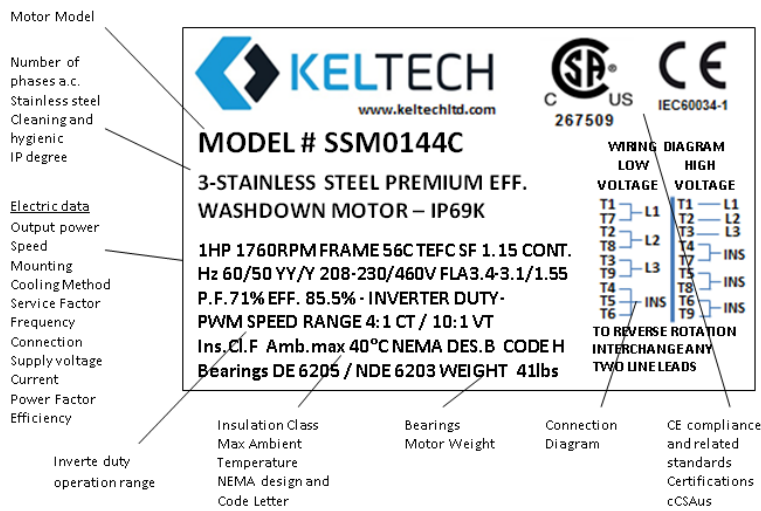
Wiring of the motor and grounding, should be in accordance with the National Electrical Code (NEC) and with any older local codes that may apply.

Make sure to ground the motor according to the National Electrical Code (NEC) and local codes. The wiring, fusing and grounding must comply with the National Electrical Code (NEC) and local codes.

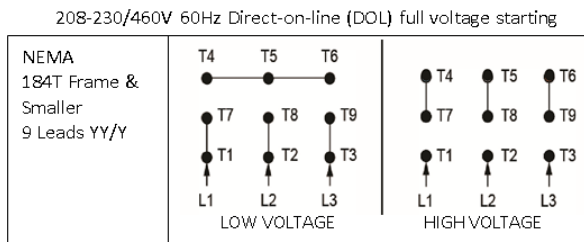
The nameplate data of the motor and the connection diagram are clearly marked on the motor housing.

Motor connections should be made by following the instructions on the connection diagram on the motor nameplate.

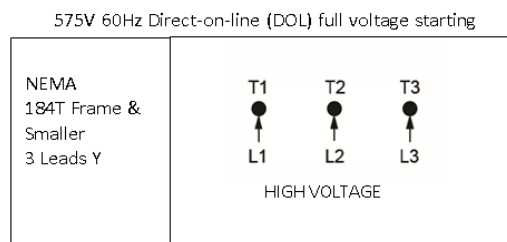
An example of the nameplate is shown below:



The following are the connection diagrams for the standard three phase general 9-lead and 3-lead motors.



To reverse rotation interchange any two line leads  
NEMA MG 1 Part 2



To reverse rotation interchange any two line leads  
NEMA MG 1 Part 2

Select cables of suitable size in order to avoid over heating and/or excessive voltage drops at the motor terminals. Make sure the cables being used are suitable with the cable glands for the proper tightening and ensuring compliance with the IP rating that is IP69K as standard.

## 4. MOUNTING

**FOOT MOUNTED:** Foot mounted motors should be mounted to a rigid foundation to prevent excessive vibration. Shims may be used if the location is uneven. Improper alignment may void the motor's warranty.

**FLANGE MOUNTED:** Flange mounted motors should be properly seated and aligned. Note: If improper rotation direction is detrimental to the load, check the rotation or 'bump' the motor prior to coupling the load to the motor shaft.

**V-BELT DRIVE:** Mount the sheave pulley close to the motor housing. Allow clearance for end to end movement of the motor shaft. Do not over tighten belts as this may cause premature bearing failure or shaft breakage.

**DIRECT COUPLED:** Direct coupled motors should be carefully aligned and the shaft should rotate freely without binding or drag.

## 5. WIRING – CONNECTING YOUR MOTOR



**WARNING:** Do not touch electrical connections unless you first ensure that power has been disconnected. Please refer to: OSHA standard 1910.147 titled: The Control of Hazardous Energy (lockout/tag-out)

- Connect the motor as shown in the connection diagram on the motor nameplate. The wiring fusing and grounding must comply with the National Electrical Code (NEC) and local codes.
- Make sure unit is electrically grounded in accordance with code requirements.  
**WARNING:** Failure to properly ground unit may cause serious injury to personnel
- **DO NOT** apply power to the motor until the motor is securely mounted by its mounting holes.
- This motor must only be connected to the correct and proper line voltage, line frequency and load size.
- Mounting bolts should be of high tensile steel. Use a suitable locking device on each bolt such as a spring washer or thread lock compound.
- Shaft key must be fully secured before starting motor.

## 6. GUARDING

### After motor installation is complete:

- Provide a permanent guard to prevent accidental contact of body parts or clothing with any rotating or moving parts of the motor. Beware of heat burns if motor is hot. Provide proper guarding for personnel against rotating parts.
- Be sure equipment is properly enclosed and protected to prevent access by unauthorized personnel to prevent possible accidents.

## 7. OPERATING CONDITIONS

Unless otherwise specified on nameplate, motors are designed for operation in accordance with the NEMA M61 “Usual Service Condition” in an ambient temperature for -15 °C to 40 °C (5 °F to 104 ° F)

It is forbidden to use these motors in aggressive environments such as explosion proof areas or ATEX etc.

## 8. ALTITUDE

Maximum altitude of 1,000 METRES or 3,300 FEET above sea level; if motor location is more than 1000M/3300FT above sea level the operating temperature of the motor will be 5° to 10° higher. The motor may require de-rating to allow for this additional heating. If these conditions apply please contact Keltech Ltd.

## 9. POWER SUPPLY

Per NEMA Standards motors are designed to operate +/- 10% of the nameplate voltage at rated frequency.

Unbalanced line voltage greater than 1% can cause overheating. DO NOT exceed the rated load amperes on the motor nameplate. Starting controls and overload protection should be correctly sized in accordance with the National Electrical Code (NEC).



## 10. USE OF VARIABLE FREQUENCY DRIVE

NEMA MG-1 Part 31 defines performance and application considerations for Definite-Purpose Adjustable Frequency Control-Fed Motors.

Three-phase stainless steel motors are suitable for use with inverter, as standard. Constant torque speed range is 450-1800 RPM.

The use of inverters in any case requires some precautions relevant to voltage peaks ( $U_{max}$ ) and voltage gradients ( $dV/dt$ ) that are generated with this type of power supply; values will gradually become higher by increasing the mains voltage  $U_N$ , the motor size, the length of the power cables between the inverter and motor and by depending on the inverter quality. For mains voltages  $U_N > 400V$ , voltage spikes  $U_{MAX} > 1000V$ , voltage gradients  $dV/dt > 1kV$ , power cables between the inverter and motor  $> 30m$ , it is recommended to insert the appropriate filters between the inverter and the motor.

## 11. MAINTENANCE



**WARNING:** Do not touch electrical connections unless you first ensure that power has been disconnected. Please refer to: OSHA standard 1910.147 titled: The Control of Hazardous Energy (lockout/tag-out)

**Disconnect** all power sources to the unit before attempting any maintenance or repair. Discharge all parts which may retain an electrical charge.

Inspect units at regular intervals. Keep units clean and clear of dust and older debris. Failure to observe this warning may result in personal injury.

### 10.1 CONDENSATE DRAINS

Many Keltech Ltd. motors come standard with provision for one way sintered stainless steel condensation drains. These drains allow the motor to expel liquids from the casing without allowing liquids to enter the motor. Drains may require periodic maintenance to keep them clean of debris and flowing freely. Occasionally, remove the stainless steel drains and wash them thoroughly. Eliminate any built up debris which may be impeding their operation.

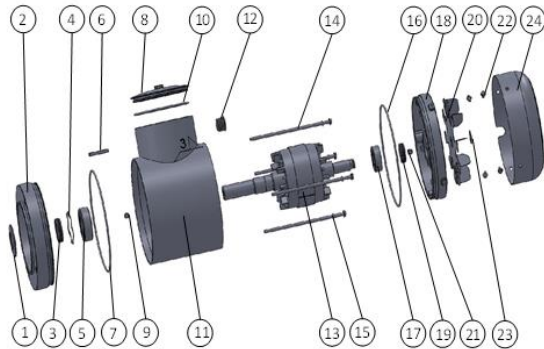
In all instances, ensure that the drain is in the lowest portion of the motor. Some motors may require rotation of the end bells (i.e. if the mounting location is a typical horizontal mounting).

### 10.2 SEALS

Inspect seals regularly for excessive wear which could lead to bearing failure. If significant wear is present, please contact Keltech Ltd. for replacement seals.

## 12. PARTS LIST

If necessary, please contact our after sales office, indicating the model and the parts to be replaced. The opening of the motor without specific authorization and appropriate instructions will void any warranty.



- |   |                                    |
|---|------------------------------------|
| 1. disk oil seal protection             | 13. rotor with shaft               |
| 2. DE flange                            | 14. tie rods for motor tightening  |
| 3. DE oil seal                          | 15. locking washer                 |
| 4. wavering                             | 16. NDE O-Ring gasket              |
| 5. DE bearing                           | 17. NDE bearing                    |
| 6. key                                  | 18. NDE shield                     |
| 7. DE O-Ring gasket                     | 19. NDE oil seal                   |
| 8. terminal box cover                   | 20. fan                            |
| 9. drain hole cap                       | 21. NDE drain hole cap             |
| 10. DE O-Ring gasket terminal box cover | 22. fan cover fixing screws        |
| 11. wound stator in the housing         | 23. seeger ring for fixing the fan |
| 12. cap or cable gland                  | 24. fan cover                      |

## 13. STORAGE

Motors should be stored indoors in a clean, dry location.

Temperature swings if possible should be kept to a minimum to prevent condensation. Always protect motors from humidity; if unit has been stored for more than one year please contact Keltech Ltd. before putting into service.

## 14. WARRANTY

Keltech Ltd. standard warranty is one (1) year from date of installation or 18 months from date of shipment (manufacture), whichever comes first. Keltech Ltd. is not responsible for the application, installation or proper maintenance of the motor. Proper application, and whether a given motor is suited for a given application, is the responsibility of the purchaser and/or user of the motor.

Our company will not be responsible for any direct or indirect damages, caused by a wrong use of the products or for not observing any of the conditions stated above.

The warranty applies to physical goods purchased from Keltech Ltd. and only covers defects in material or workmanship under normal use during the warranty period.

Keltech Ltd. and its affiliates will not be liable for direct, indirect (including but not limited to any loss of business or anticipatory profits), incidental, or consequential damages resulting from the use or misuse of products purchased from Keltech Ltd.

The warranty will become null and void if repairs or changes are carried out without our prior written authorization.





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