



Techtop Australia Pty Ltd

Installation & Maintenance Manual

The following items should be taken into consideration prior to the installation, operation or maintenance of this motor.

UPON RECEIPT

Please inspect the motor thoroughly for any damage that may have occurred during transport. Any damage should be reported immediately to Techtop Australia Pty Ltd.

INSPECTION

Check the following:

- Name plate details are correct as ordered,
- Shaft turns freely without binding,
- Condensation drain holes (if provided) are in the correct position for the mounting,
- If checking winding resistance to earth, please ensure the thermistors are not inadvertently damaged.

STORAGE

Motors should be stored under the following provisions:

- Store in a clean and dry location,
- Vibration can cause bearing damage to static motors, store in a vibration free location,
- Shaft locking clamps (if fitted) should be removed and the shaft turned by at least one full rotation, every 3 months. Replace shaft lock after rotation.
- Energise anti-condensation heaters (if fitted) if the environment is damp or wet.

SAFETY NOTICE

Only qualified personnel, trained in the safe installation and operation of this equipment, should install this motor.

When improperly installed or used, rotating equipment can cause serious or fatal injury.

MOUNTING

- **Foot mount** motors should be mounted to a rigid base to prevent excessive vibration. Shims may be used if the foundation is uneven and should be placed adjacent to and between the motor mounting bolts.

Warning: Improper alignment may void the motor warranty.

- **Flange mount** motors should be properly seated and aligned.
- **Belt drive** motors should have the pulley mounted on the mid-point of the motor shaft with the hub facing to the shaft end.
- **Direct drive** motors should have the coupling properly aligned as excessive angular displacement can result in premature failure of the shaft or bearings.

SURROUNDINGS

Motors should be protected against the ingress of dust, water and oil during installation, particularly in construction zones.

Make sure the fan cowl is not obstructed allowing unrestricted access to free air at the fan entry, the minimum clearance at the rear of the fan cowl to allow unrestricted free air intake is detailed below:

| Frame size | Clearance (mm) |
|-------------------|-----------------------|
| 63-71 | 15 |
| 80-100 | 20 |
| 112-132 | 30 |
| 160-180 | 40 |
| 200-280 | 50 |
| 315 | 65 |
| 355 | 85 |

CONNECTION

- All electrical connections should be solid and continuous.
- Circuit breakers, fuses or other protective devices must be rated to suit the motor full load current and starting characteristics,
- Check the motor starter and overloads for the correct trip setting and rating,
- Incoming supply cables shall be appropriately selected to consider any voltage drop,
- Check the motor connection diagram in the terminal box and ensure the supply leads are connected in accordance with the supply phase sequence,
- All supply cable terminations on the terminal block should be adequately tightened to prevent cables from becoming loose during operation,
- Provide adequate clearance between the supply cables and earth,
- Ensure a proper earth connection is made using the washer and earth stud provided,
- If using long supply cables with a variable speed drive, please check with Techtop Australia for a recommendation to minimise the risk of high voltage transients occurring at the motor terminals,
- If using conduit for the supply leads, please ensure the conduit is completely threaded and the threads are appropriately sealed.

LUBRICATION

Please use polyurea based grease such as Mobil Polyrex EM and keep the grease clean.

Mixing of dissimilar greases is not recommended and may result in premature bearing failure.

All aluminium frame motors are fitted as standard with sealed for life bearings using double shielded neoprene seals.

Cast iron motors from 80 to 132 frame size are fitted as standard with sealed for life bearings using metal shields.

**** Open bearings are prepacked with grease but it is recommended to lubricate the bearing one hour after commissioning.**

- Lubrication is recommended when the motor is warm and the shaft is stationary.
- Remove all dirt and wipe the outside of the grease fills and drains.
- Clean the grease fitting (or area around grease hole, if equipped with slotted grease screws). If the motor has a purge plug, remove it. Motors can be re-greased while stopped (at less than 80°C) or while running.
- When applicable, locate the grease inlet at the top of the bearing hub. If the motor is not equipped with grease fitting, clean the area and replace the 1/8-inch pipe plug with grease fitting.
- Remove grease drain plug located opposite the grease inlet.
- Apply grease gun to fitting (or grease hole). *Too much grease or injecting grease too quickly can cause premature bearing failure.* Slowly apply the recommended amount of grease, taking a few minutes or so to apply.
- Operate the motor for 20 minutes and reinstall the purge plug if previously removed.
- Install grease drain plug located opposite the grease inlet.

RECOMMENDED GREASE REPLENISHMENT INTERVALS

| Frame | Bearing | Grease Qty (g) | Interval Hours | | | |
|-------------|------------|----------------|----------------|-------|-------|-------|
| | | | 2P | 4P | 6P | 8P |
| 160 | 6309 C3 | 15 | 6600 | 11000 | 14000 | 16200 |
| 180 | 6311 C3 | 18 | 6100 | 10600 | 14000 | 15250 |
| 200 | 6312 C3 | 20 | 5200 | 10200 | 14100 | 15000 |
| 225 | 6313 C3 | 25 | 4900 | 9600 | 13600 | 15000 |
| 250 | 6314 C3 | 38 | 2600 | 9200 | 13200 | 14600 |
| 280 | 6316 C3 | 42 | 2100 | 9000 | 12800 | 14000 |
| 315 (2P) | 6317 C3 | 44 | 2000 | X | X | X |
| 315 (4/6/8) | NU/6319 C3 | 48 | X | 6400 | 9300 | 12000 |
| 355 (2P) | 6319 C3 | 48 | 1900 | X | X | X |
| 355 (4/6/8) | NU/6322 C3 | 68 | X | 4400 | 8300 | 11000 |

BEARING SIZE

All Techtot motors are fitted as standard with premium quality steel cage NSK bearings.

Detailed in the table below is the standard bearing size used on Techtot motors from frame size 56 to 355.

| Frame size | Bearing | |
|-------------------|----------------|--------------|
| <i>Aluminium</i> | D.E. | N.D.E |
| 56 | 6201 2RS | |
| 63 | 6202 2RS | |
| 71 | 6202 2RS | |
| 80 | 6204 2RS | |
| 90 | 6205 2RS | |
| 100 | 6206 2RS | |
| 112 | 6306 2RS | 6206 2RS |
| 132 | 6308 2RS | 6208 2RS |
| 160 | 6309 2RS | 6209 2RS |

| Frame size | Bearing | |
|-------------------|----------------|--------------|
| <i>Cast Iron</i> | D.E. | N.D.E |
| 80 | 6204 ZZ C3 | |
| 90 | 6205 ZZ C3 | |
| 100 | 6206 ZZ C3 | |
| 112 | 6306 ZZ C3 | |
| 132 | 6308 ZZ C3 | |
| 160 | 6309 C3 | |
| 180 | 6311 C3 | |
| 200 | 6312 C3 | |
| 225 | 6313 C3 | |
| 250 | 6314 C3 | |
| 280 | 6316 C3 | |
| 315 (2P) | 6317 C3 | |
| 315 (4/6/8) | NU319 C3 | 6319 C3 |
| 355 (2P) | 6319 C3 | |
| 355 (4/6/8) | NU322 C3 | 6322 C3 |

Please contact Techtot Australia for alternative bearing arrangements.

BEARING LOAD

The table below details the maximum radial and axial loads permissible with the standard bearing arrangement.

The values are calculated based on horizontal foot mount motors with a bearing life L^{10} of 40,000 hours.

| Frame size | <i>Permissible Radial Load (N)</i> | | | | <i>Permissible Axial Load (N)</i> | | | |
|--------------------|------------------------------------|--------|--------|--------|-----------------------------------|--------|--------|--------|
| | 2 Pole | 4 Pole | 6 Pole | 8 Pole | 2 Pole | 4 Pole | 6 Pole | 8 Pole |
| 80 | 470 | 595 | 690 | 750 | 395 | 540 | 655 | 635 |
| 90 | 485 | 625 | 720 | 785 | 420 | 570 | 685 | 690 |
| 100 | 710 | 890 | 1035 | 1150 | 570 | 780 | 940 | 1075 |
| 112 | 950 | 1240 | 1420 | 1580 | 790 | 1085 | 1310 | 1520 |
| 132 | 1420 | 1820 | 2100 | 2325 | 1160 | 1590 | 1915 | 2210 |
| 160 | 1800 | 2350 | 2720 | 3040 | 1480 | 2035 | 2450 | 2810 |
| 180 | 2490 | 3200 | 3780 | 4215 | 1990 | 2710 | 3270 | 3760 |
| 200 | 2915 | 3750 | 4350 | 4835 | 2225 | 3065 | 3710 | 4235 |
| 225 | 3270 | 4000 | 4700 | 5210 | 2460 | 3390 | 4130 | 4750 |
| 250 | 3590 | 4650 | 5400 | 5980 | 2725 | 3780 | 4575 | 5225 |
| 280 | 3700 | 8100 | 9375 | 10300 | 3280 | 4560 | 5590 | 6375 |
| 315 (2P) | 4500 | X | X | X | 3825 | X | X | X |
| 315 (4/6/8) | X | 15800 | 17950 | 19750 | X | 4855 | 5895 | 6780 |
| 355 (2P) | Upon Request | | | | Upon Request | | | |
| 355 (4/6/8) | Upon Request | | | | Upon Request | | | |

STARTS PER HOUR

Detailed below is a guide to generally accepted starts per hour based on standard loads.

| Frame | Starts per hour | | | |
|----------------|-----------------|--------|--------|--------|
| | 2 Pole | 4 Pole | 6 Pole | 8 Pole |
| 56-71 | 22 | 40 | 40 | X |
| 80-90 | 18 | 35 | 40 | 40 |
| 100-132 | 12 | 22 | 25 | 25 |
| 160-180 | 10 | 18 | 22 | 22 |
| 200 | 6 | 12 | 12 | 12 |
| 225 | 5 | 10 | 10 | 10 |
| 250 | 4 | 8 | 8 | 8 |
| 280 | 3 | 6 | 6 | 8 |
| 315 | 3 | 4 | 6 | 6 |
| 355 | 2 | 3 | 3 | 3 |

OPERATION

Prior to operation of the newly installed motor, please check the following:

- Terminal box lid is firmly secured and there is suitable clearance to live parts,
- The earth lead is in place and firmly secured,
- Mounting bolts are in place and adequately tightened to reduce vibration,
- Coupling guards are in place,
- There are no loose objects on the motor or within the fan cowl,
- Ensure the load applied is within the name plate specification and the ambient is no greater than 40°C.

MAXIMUM START TIME

Start times should not exceed the time as indicated in the table below.

| Maximum starting time (seconds) | | | | | |
|--|---------------|---------------|---------------|---------------|---------------|
| Frame | Method | 2 Pole | 4 Pole | 6 Pole | 8 Pole |
| 56-71 | D.O.L | 20 | 28 | 44 | X |
| 80 | D.O.L | 15 | 26 | 40 | 40 |
| 90 | D.O.L | 10 | 15 | 25 | 30 |
| 100 | D.O.L | 12 | 14 | 18 | 40 |
| 112 | D.O.L | 10 | 10 | 18 | 35 |
| 132 | D.O.L | 14 | 12 | 12 | 25 |
| 160-315 | D.O.L | 15 | 15 | 20 | 22 |
| 355 | Star-Delta | 45 | 45 | 60 | 65 |

MAINTENANCE

Periodical maintenance is necessary to make sure the motor operates reliably, the following maintenance schedule can be used as a guide.

Monthly

- The air intake space (fan cowl) should be inspected for any obstructions,
- Inspect the motor body for any signs of dust or debris build up between the fins, if necessary remove the build up with an air hose,
- Do not clean the motor with a high pressure hose unless the motor is IP66 rated,
- Check the motor for condensation, remove and clean drain plugs if required.

6 Months

- Check motor terminals for tightness and proper contact,
- Check starting equipment terminals for tightness,
- Check mechanical operation of thermistor relays, thermal overloads etc,
- Check operation of anti-condensation heaters if fitted,
- Re-grease the bearings as per recommendations shown on page 3.

MAINTENANCE Cont.

Yearly

- Check bearings for abnormal noise, vibration or overheating,
- Check winding resistance between supply terminals and compare to original values taken at commissioning,
- Check supply voltage at the motor terminals,
- Check all mounting bolts for tightness, cracks or signs of fatigue

For a more comprehensive installation and maintenance manual, please contact Techtop Australia Pty Ltd.



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