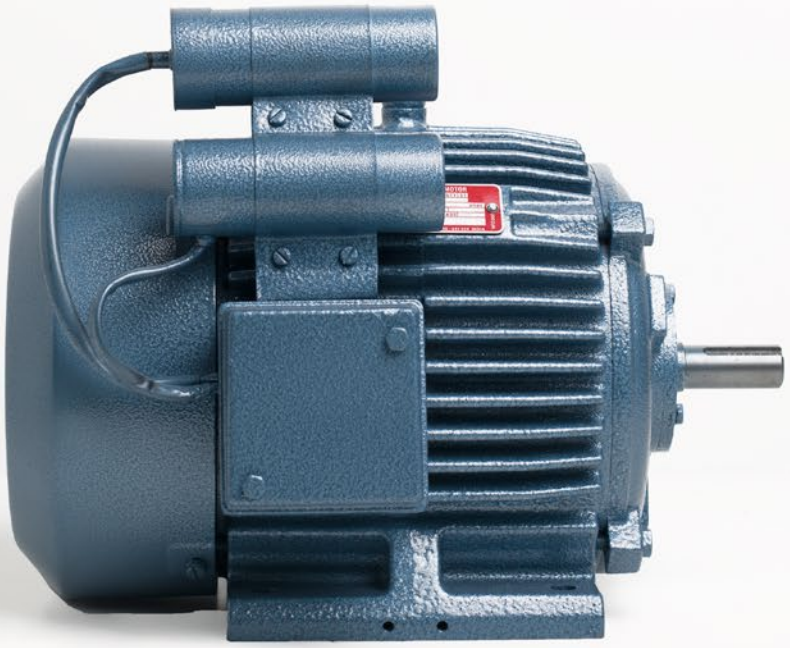
Single Phase, 4-Pole Foot-Mounted SCI Motors

Instruction & Operating Manual



Taro™ Pumps

Texmo Industries
Est. 1956

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1. Introduction

Thank you for choosing a quality product manufactured by Texmo Industries. We request you to read this manual carefully to ensure that the system you have purchased will be operated correctly.

This manual is intended to provide you with information on your product and information on installation and operation. You will also find information on how you could contact Texmo Industries, should you need further information or help and support.

2. Warranty information

Please refer to your warranty card or visit **www.taropumps.com** for more information on your warranty.

3. Complying standards

IS 996: Single Phase A.C. Induction Motors for General Purpose
IS 3043: Code of practice for earthing: Specification
IS 7572: Guide for testing single phase A.C. and universal motors
IS13730: Specifications for particular types of winding wires

4. Contents of the packing box

Based on the model you have purchased, your Single Phase Motor is packed along with the instruction manual and warranty card in either a corrugated box or in a wooden crate.

5. Information about your motor

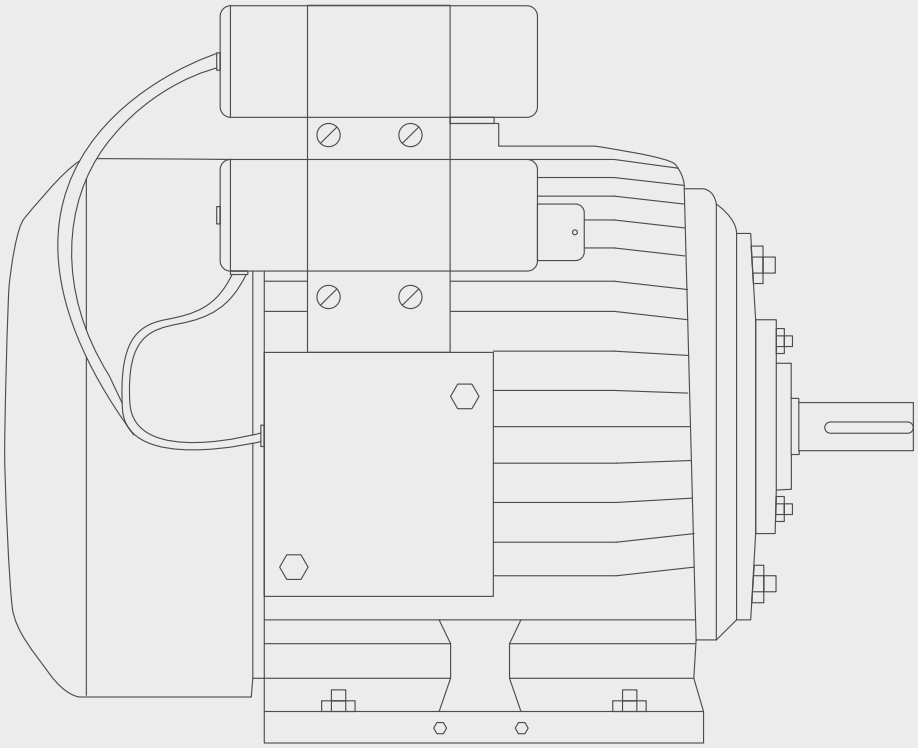
Taro Single Phase, 4P Foot-mounted Squirrel-cage Induction Motors are manufactured using high quality raw materials and components using state-of-the-art manufacturing facilities and will give trouble-free performance if properly installed and maintained. Such motors find wide application for driving compressors, blowers, pumps, domestic flour mills, machine tools, agriculture and farm machinery, etc.

Prior to installation, go through this manual thoroughly and follow the instructions for installation and maintenance of our motor so as to ensure reliable operation. The motor should be installed by technically qualified personnel in compliance with national and local electrical codes and as per our instructions in order to avoid electrical shocks, unsatisfactory performance and equipment failure.

6. Schematic drawing

View of a Single Phase CSIR / CSCR 4P Foot-mounted SCI Motor is shown below in Fig. 1:

Fig. 1 View of Single Phase CSIR / CSCR 4P Foot-mounted SCI Motor



7. Key specifications & features

Standard specifications of 4P Foot-mounted SCI Motor ae shown below in TABLE 1:

Phase	Single
Motor Type	Squirrel-cage induction motor – CSIR / CSCR
Power	CSIR: 0.5, 2.0 HP
	CSCR: 1.1, 1.5, 2.0 HP
Operating Voltage	180 – 240V
Frequency	50 Hz
Speed	1440 rpm
Duty	S1 Continuous
Insulation Class	Refer name plate
Type of Enclosure	TEFC

Product Performance Specification

Texmo Industries has a wide variety of Single Phase, CSIR / CSCR 4P Foot-mounted SCI Motors to meet your requirements. Please consult our sales team / your nearest dealer to meet your specific requirements

Key features: Motor

- The motor houses shielded type deep groove ball bearings, pre-filled with grease to take up the external radial and axial thrust loads
- The rotors are dynamically balanced
- Adequate motor surface area is provided for effective cooling
- Silicon steel stampings

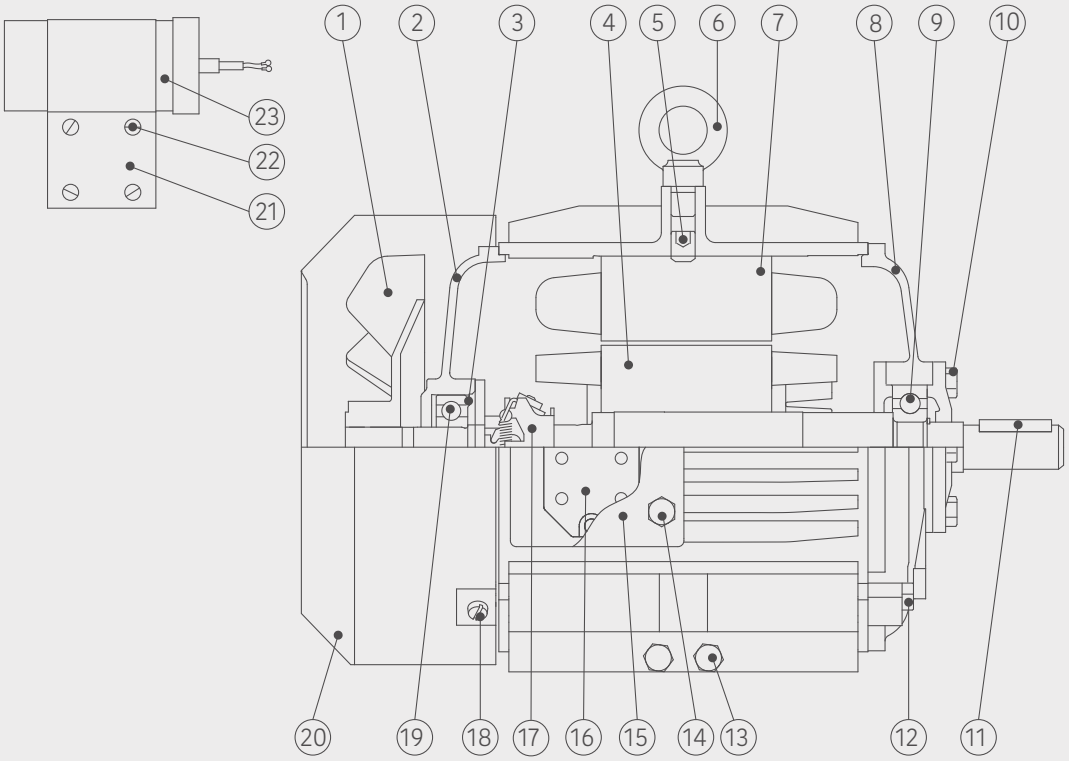
Electrical connection

- The motors are internally wired and pre-connected with the capacitor leads
- Connect phase and neutral to the terminal board

8. Cross-section view

Cross-section view of a Single Phase CSIR / CSCR 4P Foot-mounted SCI Motor is shown below in Fig. 2:

Fig. 2 Cross-section view of single phase , CSIR / CSCR 4P Foot mounted SCI motor – cast iron motor body



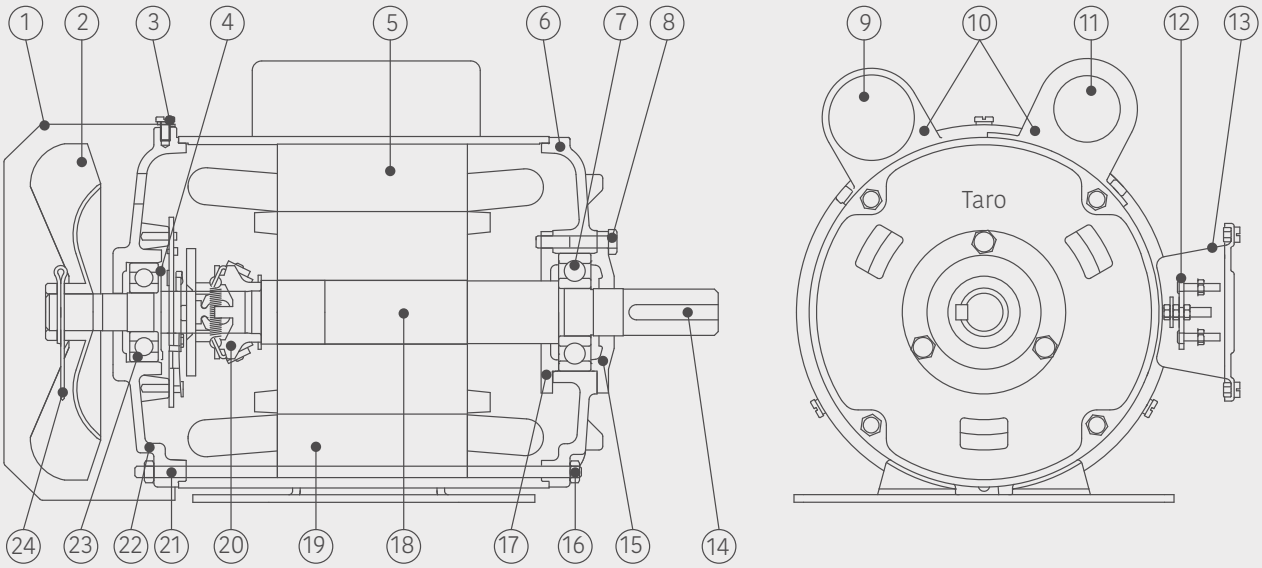
No.	PART NAME
1	Cooling Fan
2	Rear Cover
3	Bearing Shield
4	Rotor With Shaft
5	Hex. Socket Screw
6	Eye Bolt
7	Body With Stator
8	Front Cover

No.	PART NAME
9	Deep Groove Ball Bearing
10	Hex. Head Bolt
11	Parallel Key
12	Hex. Head Bolt
13	Hex. Head Bolt & Washer
14	Hex. Head Bolt
15	Terminal Box With Cover
16	Terminal Board

No.	PART NAME
17	Centrifugal Switch
18	C.H Screw
19	Deep Groove Ball Bearing
20	Fan Shield
21	Capacitor Clamp
22	C.H Screw
23	Capacitor

Cross-section view of a Single Phase, Sheet Metal Body, CSCR 4P Foot-mounted SCI Motor is shown below in Fig. 3:

Fig. 3 Cross-section view of single phase, CSCR, 4P SCI motor – sheet metal motor body



No.	PART NAME
1	Fan Shield
2	Cooling Fan
3	C.H. Screw
4	Bearing Shield
5	Body With Stator
6	Front Cover
7	Deep Grove Ball Bearing
8	Hex. Head Bolt

No.	PART NAME
9	Capacitor
10	Capacitor Cover
11	Capacitor
12	Terminal Board
13	Terminal Box
14	Parallel Key
15	Front Cap Outer
16	Hex. Nut

No.	PART NAME
17	Front Cap Inner
18	Rotor With Shaft
19	Body With Stator
20	Centrifugal Switch
21	Tie Rod
22	Rear Cover
23	Deep Groove Ball Bearing
24	Split Cotter Pin

9. Pre-installation requirements

Arrangement for Installation

- Use the services of a professional and trained mechanic with experience in erecting Single Phase, CSIR / CSCR 4P Foot-mounted SCI motors
- Ensure proper safety during installation
- Ensure that a level foundation is ready before erection of the motor. Contact the dealer from whom the motor was purchased for mounting details for preparing the foundation.

General Installation Precautions

- Open the packaging and note down the serial number and model for future reference
- Ensure all fasteners are tightened properly
- It is recommended to assemble the motor on a level base with foundation bolts
- As the motor is air cooled, ensure that air flow to the cooling fan located at the rear side of the motor, is not blocked
- Use a single power cable from the power source to the motor. Do not use a power cable with large number of joints as this can result in a significant voltage drop
- While installing the motor, ensure the motor is not subject to shock loads which can damage the motor parts

Note	If you detect damage or discrepancy in the product, contact the dealer from whom the motor was purchased
Warning	Do not use this motor in a dusty and damp environment

 Caution	Use trained professionals to install the motor
 Warning	Use a power supply cable that has sufficient rating. Factor in low-voltage operation
 Warning	Provide proper earthing. Improper earthing can cause electrical shock
 Caution	Use a Megger to verify the Insulation resistance of the motor. Insulation resistance should be 20MΩ minimum

Operation Precautions

 Warning	Switch OFF the power before working on electrical lines
 Caution	Do not use this motor in a very hot environment as this may lead to product failure
 Warning	If any electrical leakage occurs, this could be fatal. Earth the motor

10. Installation procedure

Please follow the below procedure to install the motor.

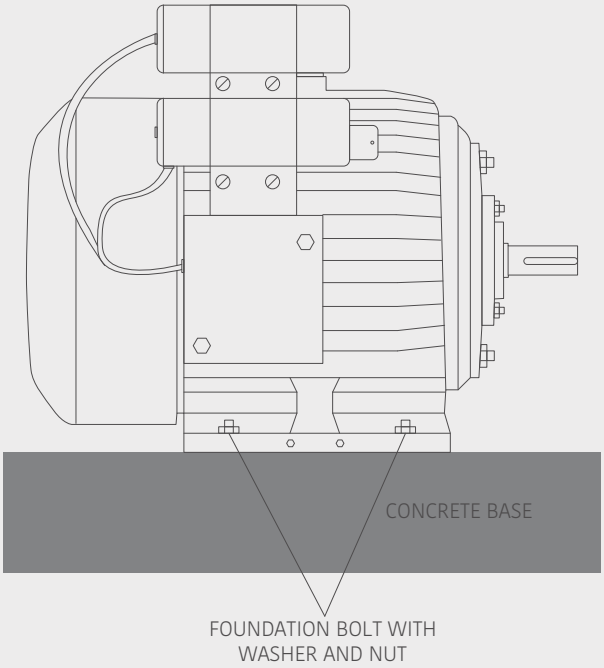
Caution	The supply voltage should be within the specified voltage range. Failure to observe the precautions given above could cause the motor to malfunction and may lead to current leakage or electrical shock
Warning	If you find any abnormalities like vibration, noise, smell, etc. from the motor during trial operation, switch OFF the motor and contact the dealer from whom this motor was purchased

Installation:

The following steps are executed prior to installation

- ✔ Measure the insulation resistance using a Megger of 500 VDC
- ✔ Ensure contact points are clean
- ✔ Connect the measuring cable to the ground conductor
- ✔ Connect the other measuring cable to phase terminal
- ✔ Ensure that the insulation resistance, as shown on the megger, is a minimum of 20MΩ
- ✔ Obtain the foundation details from the dealer from whom the motor was purchased. Prepare a level concrete foundation for mounting the motor and tighten the motor base using the foundation bolts as shown in Fig. 4 below.

Fig. 4 Single phase 4P motor on a concrete foundation - installation



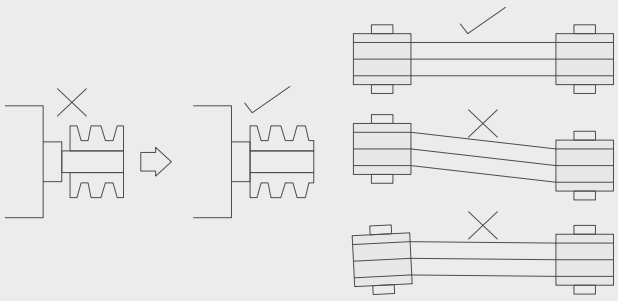
Pulley positioning, alignment and belt tensioning

It is essential to ensure the motor has an adequate degree of protection from dust, fumes and water. Ensure that the motor has no obstruction around it as this can reduce the free circulation of cooling air. For direct drive, use a flexible coupling between the driver and driven. For belt drives, the motor pulley and driven pulley must be properly aligned. The driver and driven shafts must be parallel to each other. The belt should not be overly stretched or tensioned. To assemble the pulley on the motor shaft, insert the pulley halfway up the keyway manually. Intense hammering should be avoided during fitting of pulley as this process can result in damage to the ball bearing raceways over a period of time.

Refer Fig. 5 for pulley positioning and alignment.

Fig. 5 Pulley positioning and alignment

Belt tension is provided by adjusting the centre distance between the motor and driven. If the belt tension is slack, the belt can slip. If the belt tension is too high, the bearings can get overloaded leading to premature failure.



Electrical Installation

- Check the power supply voltage and frequency and compare with the product requirements specified on the name plate
- Observe relevant EB regulations while giving power supply to the motor
- As far as possible, do not use multiple joints in the electrical cabling while connecting from power source to the motor
- Ground the motor using the earth screws provided on the leg of the motor body / on the motor body
- Ensure electrical joints, if any, are properly and adequately insulated
- Connect the cable properly to a MCB
- Factor in low-voltage operation while selecting cable size

Electrical wiring work

Warning

All electrical work must be performed by an authorised electrician in compliance with local electrical equipment standards and internal wiring codes. Improper wiring can lead to electricalv leakage, electrical shock, or fire

Earthing

Warning

Be sure to install the ground wire securely. Failure to observe this precaution could damage the motor and cause current leakage, which may cause electrical shock

Caution

Do not connect the ground wire to a gas pipe, water pipe, lightning rod, or telephone ground wire. Improper grounding could cause electrical shock

Connecting the Power Supply

 Caution	Observe relevant Electricity Board regulations while powering up the motor
 Warning	Before connecting the wires to the terminal board, make sure the power supply is properly disconnected. Failure to do so may lead to electrical shock, short, or injury caused by the unintended starting of the motor
 Caution	Do not use damaged cables, power plugs, or loose power outlets. Failure to observe this precaution could lead to electrical shock, short circuit or fire

Power cable connection to single phase 4P CSIR / CSCR SCI motor

- The motors are internally wired and pre-connected with the capacitor leads
- Only phase and neutral need to be connected to terminals marked A1 and A2 on the terminal board

Checking direction of rotation of Single phase 4P CSIR /CSCR SCI motor

 Danger	Hazardous voltage will cause death, serious injury, electrocution. All electrical work must be performed by an authorised electrician, in compliance with local electrical equipment standards and internal wiring codes.

- Our single phase motors rotate in the counter-clockwise direction when looking from the drive end
- Power up the motor and check the direction of rotation of the motor shaft
- If the direction of rotation is counter-clockwise when viewed from the drive end, the connections are right
- In case the direction of rotation of the motor shaft is clockwise when viewed from the drive end, bring this to the notice of the dealer from whom the purchase was made and get the set repaired
- In case you have an application requiring clockwise direction of rotation when viewed from the drive end, bring this to the notice of the dealer from whom the purchase was made and get the set modified

11. Basic troubleshooting

Warning

To prevent serious accidents, disconnect the power supply before inspecting the motor.

Read this Operation Manual carefully before requesting repair. Contact the dealer from whom this equipment was purchased. Servicing and troubleshooting must be handled by qualified persons with proper tools and equipment. Common faults, root causes for these and suggested actions are provided in TABLE 2 below:

Fault	**Possible causes**	**Suggested actions**
Motor not starting	No power supply to the motor	Check for availability of power
	Burnt motor coil	Rewind the motor
	Low-voltage operation	Operate in the recommended voltage range
	The ELCB has tripped out	Reset the ELCB, If trips again check the insulation resistance of the motor.
	Blown fuse	Replace fuse
	Loose connections	Tighten the electrical connections
	Motor shaft has sheared	Replace the assembly rotor
	Weak Capacitors	Replace capacitors
Motor drawing excessive current	Low-voltage operation	Operate in the recommended voltage range
	Motor overloaded	Reduce the load
	Motor belt pre-tension excessive	Reduce belt pre-tension
	Misalignment between motor drive and driven	Align motor and load
	Centrifugal switch stuck	Replace centrifugal switch

Fault	Possible Causes	Suggested Actions
Motor runs rough and noisy	Motor bearings worn out due to overload	Reduce the overload. Dismantle and replace worn out bearings
	Motor bearings worn out due to misalignment between drivers and driven	Measure misalignment and correct. Dismantle and replace worn out bearings
	Motor bearings damaged due to excessive belt tension	Reduce the belt tension. Dismantle and replace worn out bearings.
	Rotor shaft is bent resulting in rotor rubbing against stator bore	Replace rotor shaft grout the motor
	Motor not grouted	Grout the motor
	Insufficient lubrication in bearings	Replace the bearings

 Note	Conduct trial operation after maintenance
 Note	Dispose replaced components with appropriate care so as to protect the environment
 Warning	Do not try to solve unspecified troubles of motor as it may lead to severe damage to the motor or injury to personnel. Contact the dealer from whom the motor was purchased

12. Preventive maintenance checks

Precautions to be taken

 Warning	Disconnect the power supply before starting maintenance or inspection of the motor to avoid electrical shock
 Note	If you find any damages or abnormalities, switch OFF the motor and report the problem to the dealer from whom the set was purchased

NOTE: The manufacturer assumes no responsibility for damage or injury due to disassembly in the field.

A definite schedule of preventive maintenance inspections should be established to avoid breakdown, serious damage and extensive downtime. The schedule will depend on operating conditions and experience with similar equipment. The below check list does not represent an exhaustive survey of maintenance steps necessary to ensure safe operation of the motor.

 Warning	Utilise the services of an electrician to carry out electrical measurements / checking the functioning of the control panel

It is good practice to monitor the conditions and performance of the motor. Diagnosis may be carried out by checking the following:

- Checking the current drawn by the motor at no load conditions and compare with the data recorded when the unit was initially installed
- Any increase in motor current at no load conditions indicates a possible overload condition
- Measure the insulation resistance of the winding to check the condition of the motor
- Check the capacitance of the capacitor/s
- Check the alignment between motor and driven

13. Do’s and don’ts

Do’s	Don’ts
Use a flexible coupling to connect to the drive	Do not overload the motor. Ensure that the current does not exceed that mentioned on the name plate
Align the motor and drive shaft	Do not restrict the space behind the cooling cover as this will obstruct the flow of air required for cooling of the motor
Rotate the shaft to ensure that motor is not jammed	Do not cover the product as this will prevent effective cooling of the motor
Ensure proper earthing is provided	Restrict the number of joints on the cable. More the cable joints, more will be the voltage drop
Mount the motor on a level foundation and bolt down the motor	Do not use undersized electric cables between motor and power source. Factor in low-voltage usage
Check all fasteners are tight	Do not earth to a water line or gas line
Motor is IP44 protected. Provide protection from rain	When using a belt drive, do not pre-tension the belt beyond a limit as this will overload the motor
If the motor is kept idle for a very long time period, the capacitor needs reforming. This can be done by switching the power supply on and off quickly about 10 times before starting the motor	When using a belt drive, do not have over slack on the belt as the belt will slip

14. Important safety instructions

Only qualified personnel should be involved for inspection, maintenance and repairs. The successful and safe operation of such a product depends on proper handling, installation and maintenance. It is suggested that in case of non-functioning of the product, the customer is requested to contact the dealer through whom the purchase was made.

Danger

Hazardous voltage will cause death, serious injury, electrocution.
Disconnect all power before working on this equipment.
Maintenance should be performed only by qualified personnel.

15. Storage & Handling

- The Single Phase 4P CSIR / CSCR SCI motor is supplied from the factory in proper packing in which it should remain until they are to be installed
- The product should be stored in a closed, dry and well ventilated room
- Do not store the products in direct sunlight
- Handle the motor with care and do not expose the product to unnecessary impact and shocks
- During unpacking and prior to installation, care must be taken when handling the motor to ensure that the product is not subjected to shock loads
- If the product has been stored for a very long period, check the condition of the lubrication of the bearings and the centrifugal switch

 Caution	If the motors are stored, the shaft must be turned by hand at least once a month
 Caution	If the motor has been stored for more than one year before installation, dismantle the motor and check the rotating parts before use

16. Company contact information

For most up to date information on Texmo Industries, please visit www.taropumps.com

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