Three Phase High Speed and Slow Speed Monoblocks

Instruction & Operating Manual

Taro™ Pumps

Texmo Industries
Est. 1956

OMMB001A

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Table of Contents

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 3043: Code of Practice for earthing: Specification
IS 4029: Guide for testing three phase motors
IS 7538: Three Phase Squirrel Cage induction motors for centrifugal pumps for agricultural applications: Specification
IS9079: Electric monoset pumps for clear, cold water for agricultural and water supply purposes: Specification
IS13730: Specifications for particular types of winding wires

4. Contents of the packing box

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

5. Information about your pump

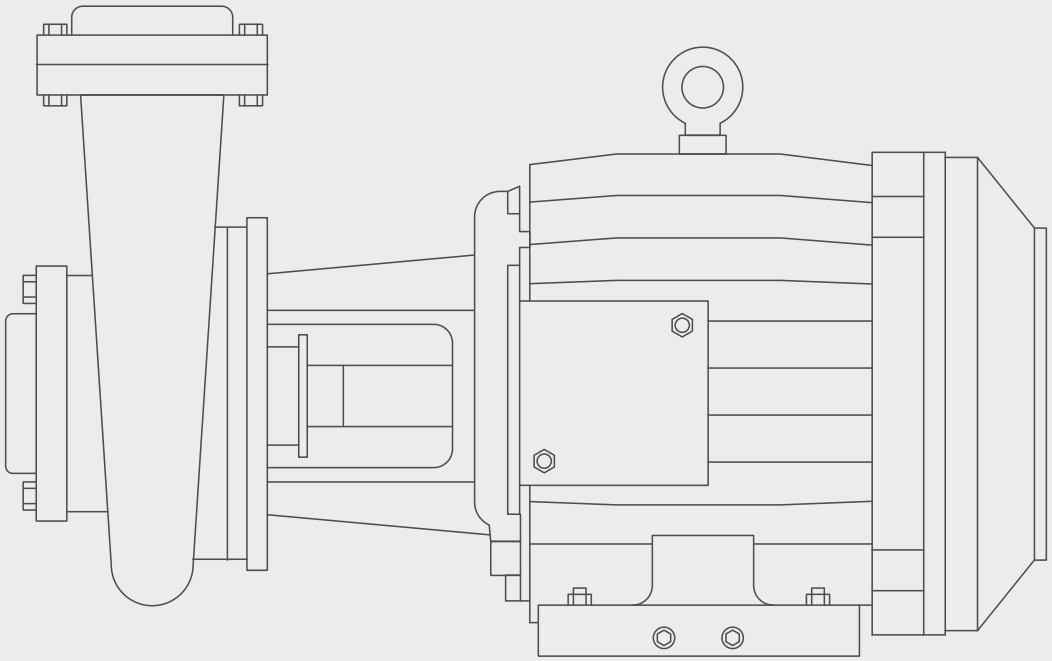
Taro Monoblocks are manufactured using high quality raw materials and components using state-of-the-art manufacturing facilities and will give trouble free performance if they are properly installed and maintained. These monoblocs are compact pumping systems with the pump and motor mounted on a common shaft. As a coupling is not required, alignment of the pump and motor is assured. Installation therefore becomes quick. Monoblocks find wide application for irrigation of farms, domestic water supply, cooling water circulating systems, fountains, dairies, water supply to high rise buildings, housing complexes, bungalows, cattle and poultry farms.

Prior to installation, read this manual carefully and follow the instructions for installation and maintenance of our monoblock so as to ensure reliable operation. The monoblock 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 Three Phase Monoblock is shown below in Fig. 1:

Fig. 1 View of Three Phase Monoblock



7. Key specifications & features

Standard specifications of Monoblock is shown below in TABLE 1:

Phase and Power	Three-phase – 2 Pole: 1.0 - 30 HP
	Three-phase – 4 Pole: 2.0 – 15 HP
Motor Type	Dry
Starting method	up to 2 HP: DOL
	3.0 HP and above: SD
Operating Voltage	350 – 440V
Frequency	50 Hz
Speed	2P: 2850 rpm
	4P: 1440 rpm
Duty	S1 Continuous
Insulation Class	Refer Name Plate
Max. Fluid Temperature	33^0C
Impeller Type	Radial
Type of Enclosure	TEFC

Product performance specification

Texmo Industries has a wide variety of Monoblock to meet your requirements. Please consult our Sales team / your nearest dealer to meet your specific requirements.

Key features

- Low watt loss stampings used in motors
- Designed for wide voltage operation
- The motor houses shielded type deep groove ball bearings, pre-filled with grease, to take up the radial and axial thrust loads
- The rotors are dynamically balanced
- Adequate motor surface area is provided for effective cooling
- Accurate control on the uniformity in air gap to minimize vibration
- Automated Machine winding process ensures consistent quality
- Dynamically balanced rotating parts including rotor & impeller
- Water slinger provided to prevent water entry into the front bearing
- Stainless steel sleeve within the stuffing box provides additional protection to the shaft.

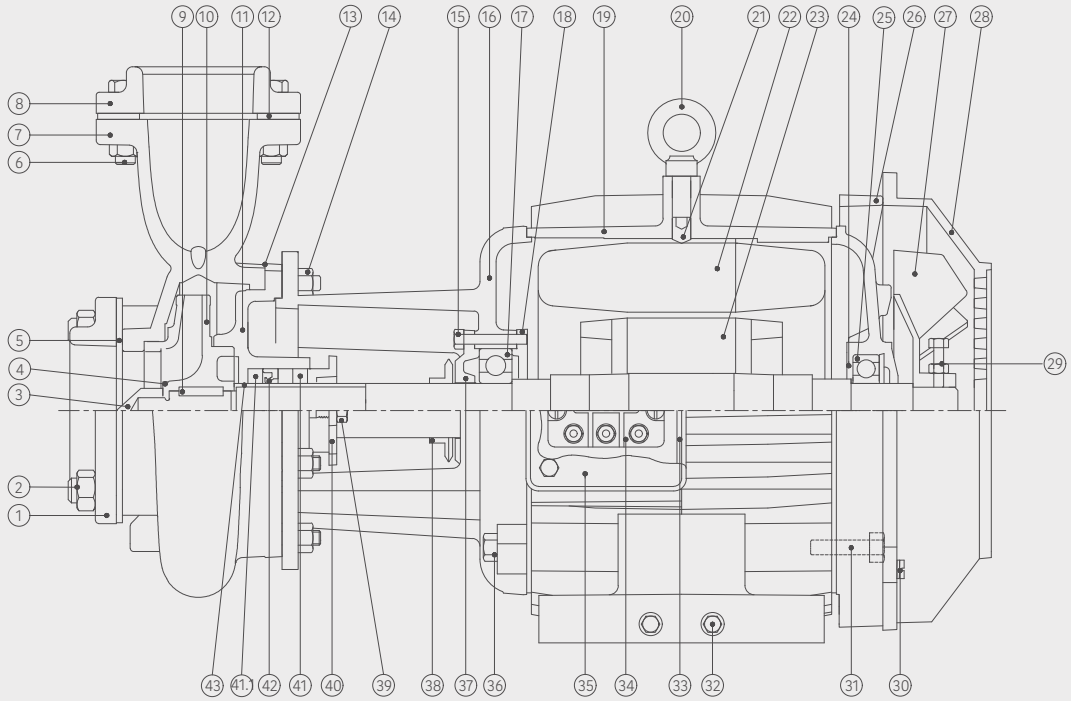
Electrical Connection

- Three phase three lead monoblocks are connected to a direct on line starter
- Three phase six lead monoblocks are connected to a Star - Delta starter

8. Cross-section view

Cross-section view of Three Phase high speed monoblock is shown below in Fig. 2:

Fig. 2 Cross-section view of a three phase high speed monoblock



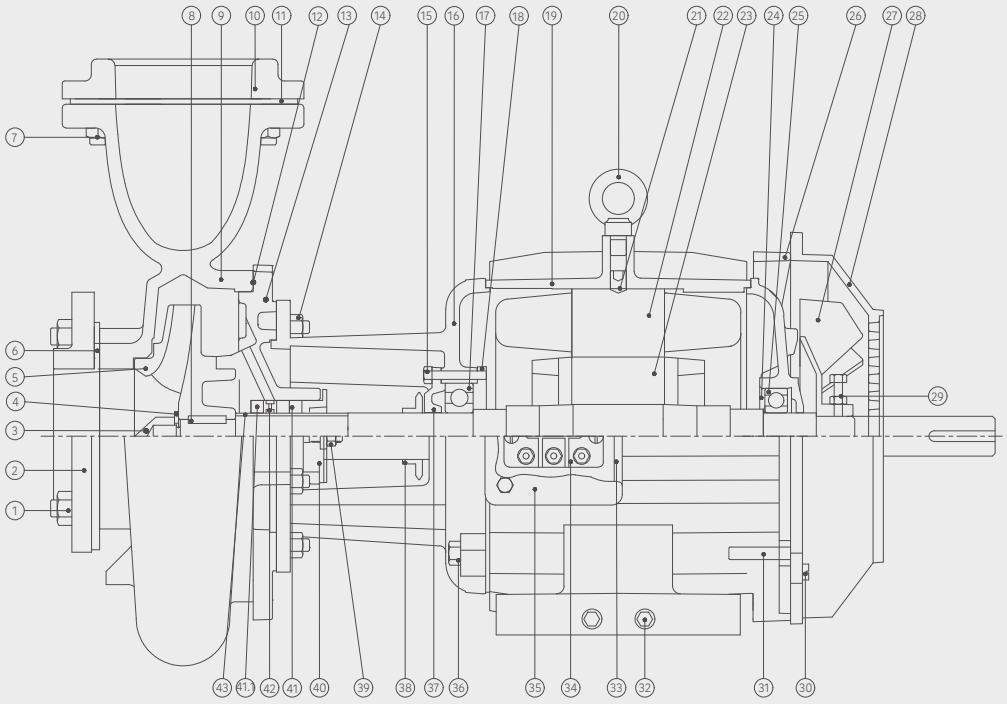
No.	PART NAME
1	Flange-square
2	Stud With Hex.nut
3	Impeller Lock Nut
4	Washer
5	Gasket Square
6	Hex. Head Bolt - Nut
7	Casing
8	Flange Square
9	Parallel Key
10	Impeller
11	Yoke
12	Gasket-square
13	Gasket-circular
14	Stud With Hex. Nut
15	Hex. Head Bolt

No.	PART NAME
16	Cover Dome
17	Ball Bearing-double Shield
18	Bearing Cap - Front Inner
19	Body
20	Eye Bolt
21	Hex. Socket Screw
22	Stator Stack
23	Rotor With Shaft
24	Shield
25	Ball Bearing-double Shield
26	Rear Cover
27	Fan
28	Fan Shield
29	Hex. Head Bolt & Nut
30	C.h.screw & Spring Washer

No.	PART NAME
31	Hex. Head Bolt
32	Hex. Head Bolt & Washer
33	Terminal Box
34	Terminal Board
35	Terminal Box Cover
36	Hex. Head Bolt
37	Bearing Cap - Front Outer
38	Water Slinger
39	Stud With Hex. Nut
40	Gland
41	Packing Rope
41.1	
42	Oil Seal
43	Sleeve

Cross-section view of Three Phase slow speed monoblock is shown below in Fig. 3:

Fig. 3 Cross-section view of a Three phase slow speed monoblock



No.	PART NAME
1	Stud With Hex.nut
2	Flange-square
3	Impeller Lock Nut
4	Washer
5	Impeller
6	Gasket Square
7	Hex. Head Bolt - Nut
8	Parallel Key
9	Casing
10	Flange Square
11	Gasket-square
12	Gasket-circular
13	Yoke
14	Stud With Hex. Nut
15	Hex. Head Bolt

No.	PART NAME
16	Cover Dome
17	Ball Bearing-double Shield
18	Bearing Cap - Front Inner
19	Body
20	Eye Bolt
21	Hex. Socket Screw
22	Stator Stack
23	Rotor With Shaft
24	Shield
25	Ball Bearing-double Shield
26	Rear Cover
27	Fan
28	Fan Shield
29	Hex. Head Bolt & Nut
30	C.h.screw & Spring Washer

No.	PART NAME
31	Hex. Head Bolt
32	Hex. Head Bolt & Washer
33	Terminal Box
34	Terminal Board
35	Terminal Box Cover
36	Hex. Head Bolt
37	Bearing Cap - Front Outer
38	Water Slinger
39	Stud With Hex. Nut
40	Gland
41	Packing Rope
41.1	
42	Lantern Ring
43	Sleeve

9. Pre-installation requirements

Arrangement for Installation

- Use the services of a professional and trained mechanic with experience in erecting monoblocks
- Ensure proper safety during installation
- Ensure that a level foundation is ready before erection of the monoblock. Contact the dealer from where the monoblock was purchased for the motor mounting details for preparing the foundation
- Use the eye bolt to lift the monoblock with an appropriate lifting equipment

General Installation Precautions

- Open the packaging and note down the serial number and model for future reference
- Ensure all fasteners are tightened properly
- Use prescribed pipe sizes as mentioned on the product name plate
- Use a quality foot valve with strainer to ensure proper priming
- Immediately on installation, prime the set before starting the pump
- Do not install the monoblock with high static suction lift
- It is recommended to assemble the monoblock on a level base with foundation bolts to prevent the pump and piping from getting stressed
- Use a check valve fitted on the delivery line when the monoblock has high delivery heads
- Use a single power cable from the monoblock to the starter. It is not recommended to use a power cable with large number of joints as this can result in a significant voltage drop
- While installing the monoblock, ensure the monoblock is not subject to shock loads which can damage the monoblock parts
- As the monoblock is air cooled, ensure that air flow to the cooling fan, located at the rear side of the motor, is not blocked
- Leakage past the gland is necessary to ensure that the heat generated due to friction between the rotating sleeve and stationary packing rope is carried away. About 20 drops / minute is normal

While connecting pumps in series ensure that the pumps are grouted properly as pipe line loads can act on the volute casing suction and delivery flanges, can result in damage to the volute casing. It is not advisable to connect pumps in series when in close proximity of each other as the volute casing of the second pump will be subject to a pressure about twice that of the first pump. It is advisable to place the second pump at a location where the pressure in the delivery line of the first pump has significantly dropped, thereby limiting the pressure rise in the second pump.

 Note	If you detect damage or discrepancy in the product, contact the dealer from whom the pump was purchased
 Warning	Do not use this pump for oil or toxic, acetic, corrosive and flammable liquids. Pumping flammable liquids could cause explosion
 Caution	Use the eye bolt for lifting / lowering the monoblock. Ensure suitable precautions are taken while lifting and lowering the product
 Caution	Use trained professionals to install the monoblock
 Warning	Use a power supply cable that has sufficient rating. Factor in low voltage operation
 Warning	Provide proper earthing as improper earthing can cause electrical shock
 Caution	Use a megger to verify the insulation resistance of the motor. Insulation resistance should be 20MΩ minimum
 Caution	Do not place the monoblock in a location subject to flooding as water can enter the motor and damage the windings and bearings
 Warning	Mount the pump with its axis horizontal

Operation Precautions

 Caution	The shaft of the monoblock passes through a gland and stuffing box arrangement. Do not attempt to run the pump dry as the sleeve / oil seal can get damaged during dry rotation. Ensure the pump is primed and then only run it
 Warning	Switch OFF the power before working on electrical lines
 Caution	Do not use this pump for pumping liquid exceeding 33^{0}C as this may lead to product failure
 Warning	Do not switch ON the pump if there is any human contact with the pumped medium. If any electrical leakage occurs, this could be fatal
 Note	For three phase models use a starter

10. Installation procedure

Please follow the below procedure to install the monoblock.

Caution	The supply voltage should be within the specified voltage range. Water temperature for operation of the pump should not exceed 33^{0}C Failure to observe the precautions given above could cause the pump to malfunction and may lead to current leakage or electrical shock
Warning	If you find any abnormalities like vibration, noise, smell, etc. from the pump during trial operation, switch OFF the pump and contact the dealer where this pump 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 every core of the motor cable in succession
- ✔ Ensure that the insulation resistance, as shown on the megger, is a minimum of 20MΩ
- ✔ Prepare a level concrete foundation for mounting the monoblock and tighten the motor base using the foundation bolts as shown in Fig. 4 below:

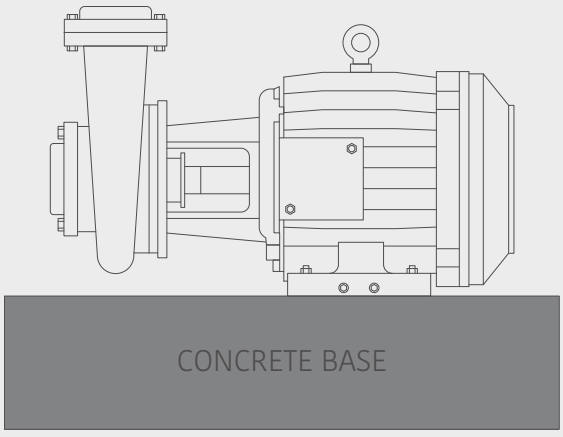


Fig. 4 Assembling a monoblock on a concrete foundation

- Use prescribed pipe sizes as mentioned on the product name plate
- Place the pump centre line as close as possible to the water surface and with the foot valve fixed above the bottom of the well. Refer Fig. 5, shown below, for recommendations:

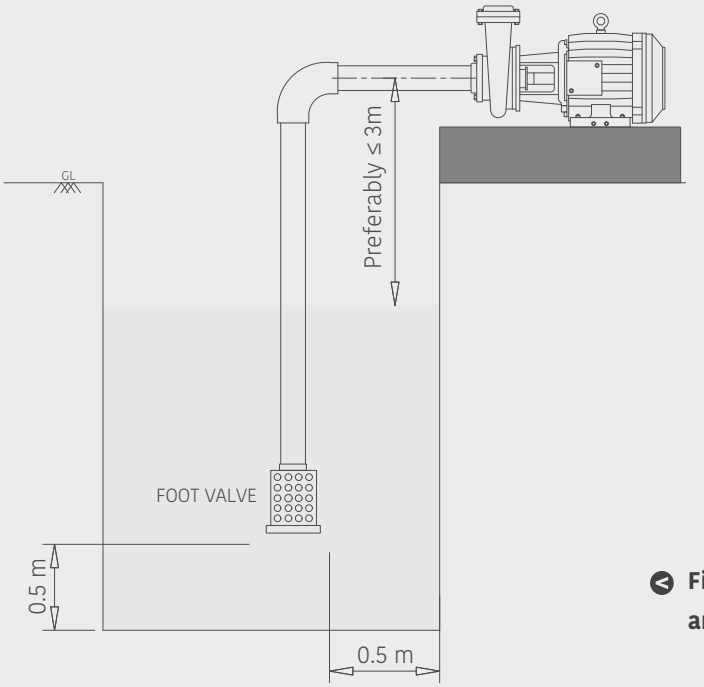
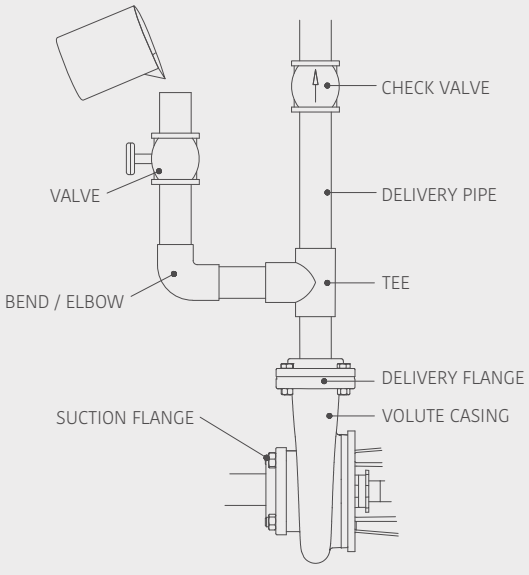


Fig. 5 Recommendations for locating the pump and foot valve

- Use as few pipe fittings as possible in the suction line
- Use a good quality foot valve to reduce suction losses
- Provide a priming facility in the pipe line adjacent to the pump discharge flange as shown in Fig. 6 below:

Fig. 6 Priming arrangement for monoblocks



- During priming, check the pump suction pipe for leakages
- Ensure that the suction pipe connected to the pump suction flange is horizontal or sloping upwards towards the pump suction flange to prevent air lock. A pipe sloping downwards towards the pump suction flange will result in air lock. Refer Fig. 7, shown below, for the preferred suction pipe orientation.

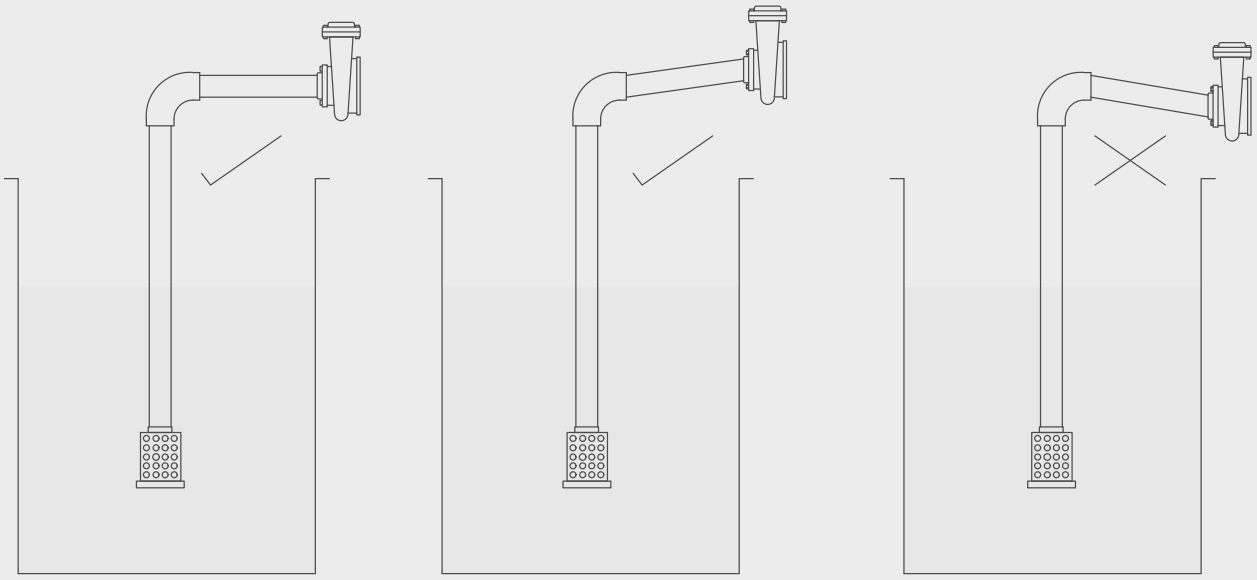


Fig. 7 Preferred orientation of suction pipe for monoblocks

- In case the installation has a high delivery head, mount a good quality check valve in the delivery line as close as possible to the pump delivery flange

Checking direction of rotation of Three phase monoblock

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.

- ✔ Ensure pump is primed
- ✔ Connect the monoblock to the starter and power up the monoblock
- ✔ Check the direction of rotation of the motor shaft
- ✔ If the direction of rotation is in the same direction as that marked on the volute casing, the connections are right
- ✔ In case the direction of rotation of the motor shaft does not match the marking on the volute casing, interchange any two lead wires at the starter and confirm the direction of rotation as before

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 the starter to the monoblock
- ✔ Ground the monoblock using the two earth screws provided on the leg of the motor body
- ✔ Ensure electrical joints, if any, are properly and adequately insulated
- ✔ Connect the cable properly to the starter terminals to avoid loose connections
- ✔ 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 current leakage, electrical shock, or fire.

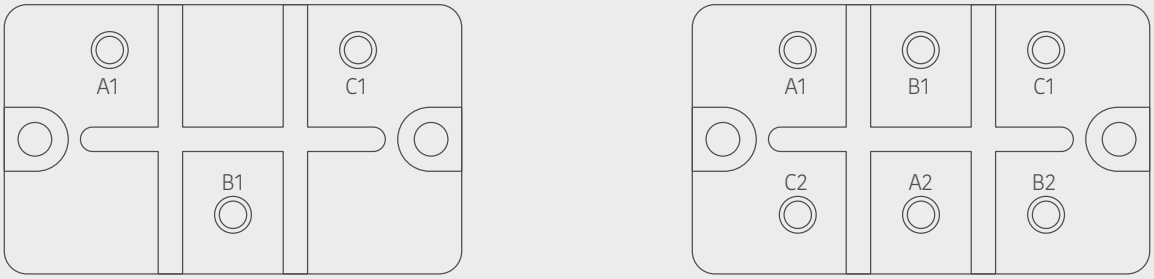
Earthing

 Warning	Be sure to install the ground wire securely. Failure to observe this precaution could damage the pump and cause current leakage, which may lead to 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 pump set
 Warning	Before inserting the power plug or 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 pump
 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

Terminal board connection to monoblock - direct on line and star-delta connection



DOL Connection

Star-Delta Connection

Fig. 8 Cable lead wire connection

11. Basic troubleshooting

Warning

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

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 cause for these and suggested actions are provided in TABLE 2 below:

Fault	**Possible causes**	**Suggested actions**
Pump does not run	No power supply	Check incoming power supply and rectify
	Very low voltage	Operate in the recommended voltage range
	Impeller stuck	Remove the fan cover and rotate fan by hand
	Loose connections	Check the connections
	Fuse blown	Replace fuse
	Pump has been kept for long time	Ensure free rotation of shaft by running the pump idle for a few minutes at least every alternate day
Pump does not discharge water	Faulty foot valve	Check and replace
	Pump not primed	Prime the pump
	Air leakage on the suction side	Check and correct for leakages
	Suction lift too high	Reduce the suction lift
	Foot valve not sufficiently submerged	Lower the foot valve and ensure that the foot valve is submerged at least 1 metre below the free surface of water
	Check valve is jammed	Check and replace
	Motor coil burnt	Rewind the motor
	Low voltage operation	Operate in the recommended voltage range
	The motor starter overload has tripped	Reset the motor starter overload. If it trips again, check the voltage

Fault	Possible causes	Suggested actions
Less discharge from pump	Low voltage operation	Operate in the recommended voltage range
	Wrong direction of rotation	Interchange the supply connections of any two phases
	Static suction lift high	Position the pump within recommended suction lift
	Total head higher than specified head	Ensure delivery head within specified value
	Leakage in pipes	Check the piping system and rectify the faults
	Smaller pipe size used when compared to name plate recommendations	Use recommended size of pipes
	Discharge pipe internally coated with deposits	Clean the pipe
	Foreign bodies lodged in impellers	Check the impellers and remove the foreign bodies
	The valve in the discharge pipe is partly closed / blocked	Check and clean / replace the valves, if necessary
	The Check valve of the pump is partly blocked	Check and clean Check valve. Replace if necessary
	Impeller is worn out	Check and replace
	Leakage in the pipework	Check and repair / replace piping
Current consumption in excess	Single phasing	Check line fuses / availability of three phase supply
	Voltage too low	Check the voltage
	Defective rotor	Change the rotor
	Rotor rubbing against stator ID due to bend	Check and replace the rotor
	Low system head and therefore higher discharge	Throttle the discharge

Fault	Possible causes	Suggested actions
Pump runs rough and noisy	Bearings worn out	Dismantle and replace worn out bearings
	Pump cavitating due to high suction lift	Reduce static suction lift
	Pump not grouted	Grout the pump
	Rotor shaft is bent resulting in rotor rubbing against stator bore	Replace rotor shaft
	Excessive wear and tear	Check impeller. If excessive, replace impeller
Pump leaks excessively	Gland not adequately tightened	Tighten the gland
	Packing rope and oil seal worn out	Replace packing rope and oil seal
	Volute - yoke gasket / delivery flange gasket damaged	Check and replace gaskets
	Pipe line damaged	Check and replace piping

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

12. Preventive maintenance checks

PRECAUTIONS TO BE TAKEN

 Warning	Disconnect the power supply before starting maintenance or inspection of the pump to avoid electrical shock
 Note	If you find any damages or abnormalities, switch OFF the pump 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 monoblock.

 Warning	The pump must not be operated with the delivery valve shut-off for more than a few seconds; otherwise the motor will overheat, possibly causing permanent damage
 Warning	Utilise the services of an electrician to carry out electrical measurements / checking the functioning of the starter

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

- Close the delivery valve for a few seconds and check the shut-off head generated by the pump. Do not run at shut-off conditions for a prolonged period of time as the water in the volute casing will get hot
- Check the current drawn by the pump at the duty flow rate
- Both these data should be compared to corresponding data recorded when the unit was initially installed
- Any reduction in shut-off head may indicate wear of the pump hydraulics
- Any increase in motor current at duty flow rate indicates a possible overload condition
- Measure the insulation resistance of the winding to check the condition of the motor

13. Do’s and don’ts

Do’s	Don’ts
Use a quality foot valve	Do not install the pump with high static suction lift
Ensure leak proof joints on the suction side to prevent air entry and therefore loss of priming	Do not use piping smaller than what is mentioned on the name plate
Use as few joints as possible on the suction line	Provide sufficient space around the monoblock so as to ensure proper airflow
After installation, prime the pump	Restrict the number of joints on the cable. More the cable joints, more will be the voltage drop
Rotate the shaft to ensure that pump is not jammed	Do not place the foot valve right near the bottom of the well / tank / river as there is possibility for solids to be entrained with water
Ensure proper earthing is provided	Do not over tighten the gland. Tighten so that at least a few drops of water continuously flows past the gland, thereby ensuring cooling of the shaft
Mount the monoblock on a level foundation	Do not restrict the space behind the cooling cover as this will obstruct the flow of air required for cooling of the motor
Check the direction of rotation of the monoblock matches the arrow mark cast on the volute casing	Do not use to pump corrosive and flammable liquids
Rubber gaskets assembled on the suction and delivery casing do not have a central hole. Cut out the central hole and re-install	Do not earth to a water line or gas line
Check all fasteners are tight	Do not use undersized electric cables between pump and starter panel. Factor in low voltage usage
Motor portion of monoblock is IP44 protected. Provide protection from rain	Do not cover the product as this will prevent effective cooling of the motor
Use a starter with inbuilt single phase preventer, Overload protection and high voltage and low voltage protection	Do not keep the pump suction tapering down towards the pump suction to prevent air lock

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 by only qualified personnel.

15. Storage & handling

- The monoblocks are supplied from the factory in proper packing in which they 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 pumps 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 pump 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 rubber gaskets

 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
 Caution	After a long period of storage, the pump should be inspected before it is put in operation. Ensure the impeller can rotate freely when turned by hand
 Caution	The shaft of the monoblock passes through a gland and stuffing box arrangement. Do not attempt to run the pump dry as the sleeve / oil seal can get damaged during dry rotation. Ensure the pump is primed and then only run it

16. Company contact information

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

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Taro™ Pumps

Texmo Industries
Est. 1956