Borewell Compressor Pumps

Instruction & Operating Manual





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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 PurposeIS 3043: Code of Practice for earthing - SpecificationIS13730: Specifications for Particular Types of Winding Wires

4. Contents of the packing box

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

5. Information about your pump

Compressed air, pumped down the well, is mixed with water in the discharge pipe as very fine air bubbles by the air distributor installed at the end of the air pipeline. The air-water mixture has a lower density than water in the surrounding water column and so the air-water mixture rises in the discharge pipe and eventually flows out of the pipe. The outlet from the discharge pipe should never be connected to a pipeline running over a long distance since this will cause hammering as the water is ejected due to large air pockets formed during horizontal travel of air-water mixture. The flow of water is not continuous and delivery of water depends on the yield and water level in the bore well. Taro Borewell Compressors are designed for pumping water from deep wells of up to 400 feet. Borewell Mono compressor pumps are designed for domestic purpose of pumping water from bore wells. These Borewell Mono compressor pumps are coupled directly to the motor for higher operating efficiency. Our compressors are sound in design and robust in construction and are manufactured and tested to high standard of excellence. They give satisfactory service with proper installation and normal routine maintenance.

Туре	HP	No. Of Cylinders	Compressor Speed rpm	Motor Speed rpm	Pressure kg/cm²	Belt Size	Lubrication Oil Capacity mL	Air Displacement lpm
TMC 07N	1	1	1440	1440	7	NA	250	123.6
TMC 1N	1.5	1	1440	1440	7	NA	250	178
TBC 07N	1	1	1000	1440	9	A47	180	113
TBC 11N	1.5	1	820	1440	9	A42	200	144
TBC 15N	2	2	900	1440	10	B42	300	219
TBC37N	5	2	930	1440	9	A70	650	608

TABLE 1, shown below, indicates the range of Borewell Compressor Pumps offered by us. Selection is based on the availability of power, Single/Three Phase, and on the air displacement volume.

6. Schematic drawing

View of a Borewell Mono and Belt Compressor is shown below in Fig. 1:

Fig. 1 View of Borewell Mono and Belt Compressor



7. Key specifications & features

Standard Specification of Compressor is shown below in TABLE 2:

Single Phase Mono-compressor	1.0 and 1.5 HP
Single Phase Belt Driven Compressor	1.0 and 1.5 HP
Three Phase Belt Driven Compressor	2.0 and 5.0 HP
Motor Type – 1Ø Mono-Compressor	Squirrel Cage Induction Motor - Capacitor Start Capacitor Run
Operating Voltage: 1Ø Mono-Compressor	180 – 240V
Frequency	50 Hz
Speed	1440 rpm
Duty	S1 Continuous

Key features: Monoblock Compressor Pump

 Image: A start of the start of	Compressor mounted on the motor shaft and so belt drive is not required, resulting in no slip and higher overall efficiencies
\checkmark	The motor is a single phase squirrel cage induction motor with capacitor start capacitor run.
 Image: A start of the start of	The motor shaft is supported on two deep grove ball bearings provided with double shields to retain the high temperature grease
\checkmark	The rotors are dynamically balanced.
\checkmark	Adequate motor surface area is provided for effective cooling
\checkmark	To prevent oil from entering the motor, an oil seal is provided

Key features: Belt Driven Compressor Pump



Both single phase and three phase models are available



Twin cylinder compressors are connected by intercooler for improved efficiency



Adequate motor surface area is provided for effective cooling

Fan guard provided to protect personnel from visible rotating parts and accidental contact with hot surfaces

8. Cross-section view

Cross-section view of a Single Phase Mono Compressor is shown below in Fig. 2:

Fig. 2 Cross-section view of single phase mono compressor



No.	PART NAME	No.	PART NAME	No.	PART NAME
1	Air Filter Unit	14	Cotter Pin	27	Spider Washer
2	Oil Breather	15	Bearing	28	Needle Roller
3	Gudgeon Pin	16	Rear Cover	29	Connecting Rod
4	Piston Ring-Compression	17	Hexagon Bolt	30	Connector
5	Piston Ring - Scraper	18	Lock Washer	31	Reducer
6	Piston	19	Centrifugal Switch	32	Drain Plug
7	Piston Ring - Oil	20	Terminal Box	33	Sight Glass
8	Cylinder Head	21	Rotor With Shaft	34	Crank Case
9	Middle Plate	22	Stator	35	Stud
10	Cylinder	23	Oil Seal	36	Spring Washer
11	Hex Socket Set Screw	24	Circlip	37	Hexagon Nut
12	Fan Guard	25	Crank Web	38	Air Cock
13	Fan	26	Oil Splasher	39	Valve Blade

Cross-section view of a Single Phase Belt Driven Compressor is shown below in Fig. 3:

Fig. 3 Cross-section view of single phase, single cylinder belt driven compressor



No.	PART NAME
1	Base Plate
2	Motor Pulley
3	Washer
4	Rail
5	Hexagon Bolt & Nut
6	Drain Plug
7	Sight Glass
8	Stud
9	Connecting Rod
10	Oil Splasher

No.	PART NAME
11	Crank Case
12	Crank Shaft
13	Fan
14	Fan Pulley
15	Housing
16	Circlip
17	Oil Seal
18	Cylinder
19	Piston Ring - Oil
20	Piston Ring Scraper

No.	PART NAME
21	Piston Ring -Compression
22	Center Plate
23	Fan Guard
24	Clamp
25	Valve Blade
26	Gudgeon Pin
27	Oil Breather
28	Air Filter Unit
29	Cylinder Head
30	Air Cock

Cross-section view of a Three Phase Belt Driven Compressor is shown below in Fig. 4:





No.	PART NAME
1	Base Plate
2	Motor Pulley
3	Rail
4	Hexagon Bolt
5	Hexagon Nut
6	Washer
7	Drain Plug
8	Sight Glass
9	Crank Case
10	Stud
11	Connecting Rod
12	Air Filter Unit
13	Piston
14	Clamp
15	Intercooler Nut

No.	PART NAME
16	Intercooler Nipple
17	Copper Washer
18	Intercooler
19	Reducer Elbow
20	Coupling
21	Connector
22	Oil Breather
23	Air Cock
24	Cylinder Head
25	Fan Guard
26	Fan
27	Center Plate
28	Piston Ring
29	Piston Ring Scraper
30	Piston Ring - Oil

No.	PART NAME
31	Circlip
32	Gudgeon Pin
33	Fan Pulley
34	Oil Seal
35	Bearing
36	Fly End Cover
37	Crank Web
38	Needle Roller
39	Spacer
40	Spider Washer
41	Free End Cover
42	Connector
43	Valve Blade

9. Pre-installation requirements

Arrangement for Installation



General Installation Precautions



Ensure all fasteners are tightened properly



Check for oil leaks



Use prescribed pipe sizes as mentioned on the product name plate





Check the availability of single / three phase power

Ensure availability of a starter with inbuilt single phase preventer, overload protection and high voltage and low voltage protection for three phase products

It is recommended to place the compressor pump set on a concrete foundation



If you detect damage or discrepancy in the product, contact the dealer from whom the pump was purchased

Caution	Ensure suitable precautions are taken while lifting and lowering the product.
Caution	Use trained professionals to install the compressor pump.
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 20M Ω minimum.
Caution	Check the level of oil in the crank case before powering up the compressor pump.
Warning	Mount the compressor pump with the motor axis parallel to the foundation.

Operation Precautions

Warning	Switch OFF the power before working on electrical lines
Note	For three phase models use a starter

Caution	The crank case is filled with oil for lubricating the cylinder walls as also the big end and small end bearings on the connecting rod. Do not run the compressor pump if the crankcase is not filled or has low oil level in the crank case as the bearings and cylinder walls can get damaged due to dry running.
Note	During operation, if there is a power shut down, the motor will stop. On resumption of power, do not power up the motor. First, open the air cock and release all the compressed air. Then shut off the air cock and then power up the compressor motor.
Caution	Ensure proper direction of rotation of the compressor pump on powering up.

10. Installation procedure

Please follow the below procedure to install the Borewell Compressor Pump.



Bolt down the Monoblock Compressor Motor base / Base Plate of belt driven compressors using the foundation bolts as shown in Fig. 5 and Fig. 6, shown below.

♥ Fig. 5 Installation of monoblock compressor pump



♥ Fig. 6 Installation of belt driven compressor pump



Installation:



Recommended lubricants

Ambient Temperature ºC	ISO VG No.	Bharat Petroleum	Hindustan Petroleum	Indian Oil	Castrol
10 - 25	ISO 100	Hydrol 100	Enklo 100	Servo Press 100	Perfecto T 100
25 - 80	ISO 150	Hydrol 150	Enklo 150	Servo Press 150	Hyspin AWS 150

NOTE:



Lubricating oil is poured into the crankcase by removing the oil breather



Lubrication oil is drained by removing the drain plug

Always top up with the same grade of oil available in the crank case

Oil filling / removal

Monoblock Compressor Pumps and Belt Driven Compressor Pumps are prefilled with the specified quantity and grade of oil prior to dispatch from the factory. The sight glass has a red circle marked on it. Observe the level of oil through the sight glass. If the oil level is within this circle, then there is no need to top up the oil. In case the oil level drops below the red circle, top up is required. Top up is possible by removing the Oil Breather and pouring oil into the reducer as shown in Fig. 7 and Fig. 8. After top up, replace the Oil Breather.

Fig. 7 Filling / topping up the crank case of monoblock compressor pump



♥ Fig. 8 Filling / topping up the crank case of belt drive compressor pump



To reduce the oil level or drain the oil, remove the drain plug. Re-fit after draining.

Foundation details for mono compressor pumps and belt driven compressor pumps are shown below in TABLE 4.

Туре	A	В	с	D	ØE	Tolerance on A & B
TMC 07 N	140	190	260	210	ø11	±0.30
TMC 1 N	140	190	260	210	ø11	±0.30
TBC 07 N	187	355	520	280	ø13	±2
TBC 11 N	194	430.5	600	280	ø13	±2
TBC 15 N	194	430.5	600	280	ø13	±2
TBC 37 N	271	790	1000	360	ø14	±2

Recommended air and water pipe sizes are shown below in TABLE 5:

Compressor HP	Air pipe size OD in mm	Water pipe size OD in mm
1 - 2	16	32
5	20	50

Pipe selection

Air pipe working pressure	Minimum 10 kg/cm² (HDPE) Minimum 15 kg/cm² (PVC)
Water pipe working pressure	Minimum 4 kg/cm² (HDPE) Minimum 6 kg/cm² (PVC)

NOTE: Use at least 25 - 30 feet GI pipe from the compressor pump outlet as it withstands heat better. HDPE is preferable for the air pipe and water pipe located inside the bore well.

Cable selection

The motor for both single and three phase compressor pump requires a 3 core PVC insulated cable. Refer to TABLE 6, shown below, for selection of cables:

S. No	НР	Phase	Cable Size mm ²
1	1	1	1.5
2	1.5	1	1.5
3	2	3	1.5
4	5	3	2.5

Checking direction of rotation of Compressor



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



Connect the pump set to the starter, power up the compressor pump and observe the direction of rotation of the fan



If the fan rotates in the same direction as the arrow marked on the crank case, this is the correct direction of rotation



In case the fan rotates opposite to the marked arrow on the crank case, then this is the wrong direction



In case of wrong direction of rotation, interchange any two phase wires. Power up the compressor pump and observe the direction of rotation of the fan. This should match the arrow direction marked on the crank case.



Never run the compressor pump with crank case without oil or oil lower than the specified level

Electrical Installation



Electrical wiring work



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

Earthing



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 un-intended 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.

Pulley positioning, alignment and belt tensioning

It is essential to ensure the compressor pump has an adequate degree of protection from dust and water. Ensure that the compressor pump has no obstruction around it as this can reduce the free circulation of cooling air. The motor drives the compressor through a belt drive. The motor pulley and compressor fan pulley must be properly aligned. The motor and compressor 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 raceways over a period of time.

Refer Fig. 9 for pulley positioning and alignment.

> Fig. 9 Pulley positioning and alignment

Belt tension is provided by adjusting the center distance between the compressor and motor. The compressor is firmly bolted to the base plate, while the motor is moveable. Use the bolts to adjust the position of the motor and therefore the belt tension. 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.



Refer to Fig. 10 for tensioning the belt:



♥ Fig. 10 Belt tensioning



11. Basic troubleshooting



To prevent serious accidents, disconnect the power supply before inspecting the Borewell Compressor Pump.

Read this Operation Manual carefully before requesting repair. Contact the dealer from whom the pump 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 7 below:

Fault	Possible Causes	Suggested Actions
	Dirty oil	Change oil
Comprossor	Oil level LOW	Fill correct grade of oil up to the maximum mark on the oil level indicator
Compressor Pump	Cylinder and intercooler fin dirty	Clean the fins
Overheats	Recommended air pipe not used	Fit the recommended pipe sizes
	Located in a closed room with no ventilation	Improve the ventilation
	Breather valve not working	Clean the breather valve and refit after checking
	Choked Air Filter	Clean the air filter/ replace it
	Oil level HIGH	Drain excessive oil
Oil contamination	Piston Rings end gap may be inline	Change the piston rings end gap
in compressed air	Oil viscosity too low	Use recommended oil grade
	Piston Rings are broken or stuck in grooves	Remove the piston and loosen the rings. Replace if broken. Check all related parts for wear before fitting.
	Piston to cylinder clearance excessive	Change as required.

Fault	Possible Causes	Suggested Actions
	Worn out piston, cylinder, crank shaft and connecting rod bearings	Overhaul the pump
Compressor Pump knocking	Piston to Cylinder clearance excessive	Change as required
	Fan – Fly Wheel loose	Remove fan-fly wheel and examine key-way and key for wear
	Leaky joints in pressure lines	Leak proof the identified leaky joints
Water discharge is	Improper seating of inlet and outlet delivery blades	Dismantle and seat the blades and reassemble
poor	Worn out piston rings	Replace the rings as a set
	Loose belts	Adjust or replace if elongated
Unusual wear of cylinder, piston and	Inadequate air filter maintenance	Clean the air filter frequently
	Insufficient frequency of oil change	Check the oil frequently and change when necessary
piston rings	Incorrect grade of oil	Use grade of oil
Water or rust formation in crankcase	Faulty breather	Check and replace breather if necessary
Excess belt wear	Incorrect motor and compressor pump pulley alignment.	Check and adjust using a straight edge/string across the diameter of both pulleys
	Incorrect belt tension	Check belt adjustment frequently

Fault	Possible Causes	Suggested Actions
Oil leak through breather	Breather valve not working	Open, clean and refit the breather
	Piston rings are broken or stuck in grooves	Remove the piston rings and replace as a set
	Piston to cylinder clearance excessive	Inspect and change the non-conforming components
	Oil level HIGH	Drain till the correct level is achieved
	Dirt in the crankcase	Drain the oil, clean the crankcase and replace with fresh oil
Oil leak past	Dust deposits on Oil Seal outside	Clean the dirt near the oil seal
Oil Seal	Alignment between motor pulley and compressor pulley incorrect	Correct the alignment between the pulleys
	Excessive belt tension	Adjust the belt tension for 10mm play
	Choked air filter	Clean/replace the air filter
Oil leak through	Oil level HIGH	Drain till correct level is achieved
cylinder Head and Inter- Cooler Joints	Dust deposits on the compressor	Clean the compressor regularly
	Lower cooling of compressor pump	Increase cooling by providing sufficient space around the compressor

NOTE: Not applicable to Monoblock Compressor Pumps

Note	Conduct trial operation after maintenance
Note	Dispose replaced components/oil with appropriate care so as to protect the environment
Warning	Do not try to solve unspecified troubles of the Borewell Compressor Pump set as it may lead to severe damage to the pump or injury to personnel. Contact the dealer from whom the pump set was purchased.
Caution	If the Borewell Compressor Pump runs with unusual noise, stop it immediately.



12. Preventive maintenance checks

Precautions to be taken

Warning	Disconnect the power supply before starting maintenance or inspection of the Borewell Compressor Pump to avoid electrical shock.
Warning	During operation, the compressor gets hot. Cool before working on the compressor.
Note	If you find any damages or abnormalities, switch OFF the Borewell Compressor 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. Below check list does not represent an exhaustive survey of maintenance steps necessary to ensure safe operation of the pump set.

Warning	The Borewell Compressor 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	Utilize 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 pump set. Diagnosis may be carried out by checking the following:



Check the direction of rotation of the pump set



Check all electrical connections are proper

Daily checks



Clean the compressor pump thoroughly



Check the oil level in the crankcase. If required, replenish with the right grade and quantity of oil

Check the belt tension

Monthly checks



Check the air filter, clean the filter mesh in kerosene, dry and then refit

The breather valve should be dismantled, cleaned and checked for perfect seating of valve



All the pipe joints should be checked for leakage

Every 500 hours of operation

Check if there is unusual operational noise and vibration of the compressor pump

Check if all mounting bolts and other fasteners are tight



Clean the air filter. If the air filter element is contaminated, replace it

Examine the lubricating oil in the crank case. If necessary, drain and refill. The compressor should be run for some time and draining the oil should be done when the oil is warm

Note:

First oil change shall be done after 150 hours of operation.



The subsequent oil change shall be carried out every 500 hours of operation



Not applicable to Monoblock Borewell Compressor Pumps

13. Do's and don'ts

Do's	Dont's
Before installation, rotate the shaft to ensure that compressor pump is not jammed	Do not run without fan guard
Ensure proper earthing is provided	Do not place the product in a poorly ventilated space
Mount the compressor pump on a concrete foundation.	Do not have multiple joints on the cable. More the cable joints, more will be the voltage drop.
Ensure the compressor pump runs in the right direction.	Do not run the product without air filter
First oil change is after 150 hours of operation.	Do not start the product with back pressure. Release the air by opening the air cock and re-start.
Subsequent oil changes should be carried out once every 500 hours of operation.	Do not earth to a water line or gas line
Inspect the air filter regularly. Clean if required. If not, replace the filter element.	Do not use undersized electric cables. Factor in low voltage usage.
Check the drain and filling plugs for tightness before erection.	Do not run the compressor pump if the oil level in the sight glass is below the prescribed level
Check for oil leak through breather	Do not run with air cock open
Check for oil leak into the motor	Do not run with over tight belts
Oil contamination in compressed air	Do not run with loose belts

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.



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



Hot surfaces. Do not touch.

15. Storage & Handling



The product should be stored in a closed, dry and well ventilated room.



Do not store the products in direct sunlight.



Handle the Borewell Compressor Pump 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 Borewell Compressor Pump to ensure that the product is not subjected to shock loads.

If the product has been stored for a very long period, check for free rotation of the shaft and level of oil inside the crank case.

Caution	If the compressor is stored, the shaft must be turned by hand at least once a month
Caution	If the compressor 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 compressor should be inspected before it is put in operation. Ensure the impeller can rotate freely when turned by hand.
Caution	For mono compressors, an Oil Seal is provided to prevent oil from leaking into the motor. For belt driven compressors, the oil seal prevents oil from leaking into the environment. Check the condition of the oil seal if the product has not been use for a long period of time.

16. Company contact information

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



P.B.No. 5303, Mettupalayam Road, Coimbatore - 641 029, India 1800-102-8888 www.taropumps.com info@taropumps.com



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