



# KIWI PUMPS

AN ISO 9001 COMPANY

## SUBMERSIBLE PUMPSETS OPERATOR'S MANUAL





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## **SPECIAL INSTRUCTION**

Purchasers / user are cautioned to go through carefully the detailed instruction given for proper installation, operation and use of genuine spare parts as detailed in company's published literature, manuals, pamphlets of other official publications. Any deviations if made by the customers, will void the warranty obligations and / or product reliability or manufacturers' liability, if any.

## **WARNING**

Avoid fatal electrical shock or injury by disconnecting power before working on or around the pumping system. Only technically qualified personnel must perform the works, complying with local electricity rules and regulations. Personnel working in electricals must always wear rubber gloves, boots and other precautions to avoid serious electric shock. Do not use this pumpset in swimming areas (Page no. 14)

To reduce the risk of electrical shock during operation of this pumpset an appropriate earthing is mandatory. For more details read carefully the 'Electrical' instructions.

## **CONGRATULATIONS**

Dear Customer,

Congratulations on your purchase of Kiwi Pumps products.

Kiwi Pumps products are engineered to perfection with innovative design and stringent quality control to give you trouble free service. Kiwi Pumps are robust in construction and tested to a high standard of excellence. Special high grade materials are used to make these pumpsets durable, efficient and easy to maintain.

However, to ensure satisfactory performance of these pumps, it is important that the pumpset is properly selected, installed and maintained. Proper selection of appropriate model is most important for best performance. Equally important is proper installation. Neglect of fundamental precautions, during installation may result in premature failure of the equipment. Finally, good operation depends on good maintenance.

Please read this manual carefully to get the best out of your pump. Utilize the services of technically qualified personnel only, for installation. We wish you years of trouble free performance.

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## INSPECTION ON RECEIVING THE PUMPSET

Inspect the pumpset carefully to make sure no damage has occurred to the pump, motor, cable and capacitor box (if any ) during transit.

Ensure from the details of the pumpset written on packing, that it is according to your order. Do not open the packing till the pumpset is ready for commissioning. The packing is specially designed to protect it from damage. Carefully unpack the pumpset and ensure that the insulation of motor cables are not damaged and the pumpset is not mishandled.

You will find a loose data sheet containing name plate details, with an adhesive backing along with the pumpset. The data sheet should be completed with pen and affixed to the capacitor box / starter.

The motor is equipped with an electrical cable. Under no circumstance the cable should be used to support the weight of the pumpset.

**Please note that the submersible pumpset is water cooled and have water lubricated bushes and therefore must never be run dry.**

## ABOUT KIWI PUMPS

Kiwi Pumps products are available in 3", 4", 6" and 8" nominal dia. with different materials of construction, together with extremely hardwearing bushes results in a highly durable pump. These are multi stage centrifugal pumps with water-lubricated bushes, which are firmly coupled to a submersible electric motor which operates submerged beneath the surface of water.



## ABOUT KIWI'S SUBMERSIBLE MOTORS

Kiwi's submersible motors are rewindable, water lubricated and water cooled. It features water lubricated thrust plates and journal bushes. Specially designed high performance thrust plates are used that can withstand axial thrust loads and up thrust loads with minimum wear and tear. The unique design of thrust creates a wedge of water between the shoe and the disc, and thereby it gives better water lubrication and increases the life cycle of thrust plates. The stator is wound with special waterproof synthetic film insulated copper winding wires. Motor sealing is made by means of grommets, oil seals and sand guard to avoid ingress of well water/sand into the motor. Pressure equalizing rubber diaphragm is provided to guard the pressure and volume variation of the water inside the motor. **Motor must be filled with clean, cold drinking water before commissioning.** The water in the borehole keeps the motor cool.

The motor needs a constant flow of water past its body to keep it at the correct operating temperature. **Care should be taken to ensure that the pumpset does not run when it is not submerged in water. To prevent the pumpset from dry running, install water level monitor/dry run preventer.** Ideally the pumpset should be set just above the level at which water enters the borewell. When this level is not ascertained, fit a "flow inducer tube" over the pumpset to ensure adequate cooling.

Linear flow requirement are: 3"=0.15 m/sec; 4"=0.15 m/sec; 6" = 0.15 m/sec; 8" =0.16 m/sec.

## WATER FILLING OF KIWIS MOTOR

First drain completely the liquid, which is inside the motor by unscrewing all water filling and drain plugs. After draining the liquid, Screw up the bottom drain plug and keep open the top two plugs provided in upper side. Position the motor vertically and **fill in clean, cold fresh water** into the motor with aid of a funnel from anyone of the water filling plug till the water flows out of another plug. (see Fig.1) **The water should be non-acidic, oil free, sand free, drinking water (not distilled water).**

Ensure no foreign particles enter into the motor while pouring water. Gently shake the motor to and fro and leave it for 10 minuts, with the two plugs open, in order to allow escape of the air bubbles trapped in the winding. Pour more water to fill the loss of volume caused by the escaped air bubbles and screw up the top two plugs. The motor is to be checked thoroughly for leakage of water before installation or commissioning. It is preferable to keep the motor vertical after filling water. After filling water check the insulation resistance value by a 500 V megger. The motor is now ready to be coupled to the pump and installed.

If it becomes necessary to store Kiwi Pumps Submersible Motor longer than six months it should be filled with water as instructed above. This is extremely important as the insulation of winding could be weakened.

## PRE-INSTALLATION CHECKS

Before starting installation, the following checks should be made. These are all mandatory checks for proper functioning of the pumpset.

### (1) Pump Model Selection

Ensure whether the pump set model is selected properly in accordance with the field conditions for trouble free operations.

### (2) Well Condition

The borewell must be flushed well so that it is free from sand, silt and cuttings. The materials of construction of Kiwi's Products make it resistant to abrasion. However, no pump, made of any material, can forever withstand the destructive wear that occurs when constantly pumping sandy water. The yield of the borewell is an important criteria for pumpset for an overall efficient performance, the rated discharge of the pump should be taken as 80% of the yield of the borewell. It is desirable to obtained a yield certificate from borewell contractor.

The inside diameter of the well casing should be checked to ensure that it is not smaller than the size of the pump and motor.

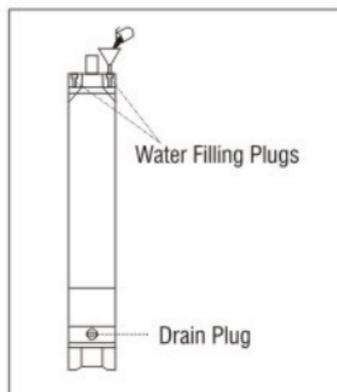


Fig - 1

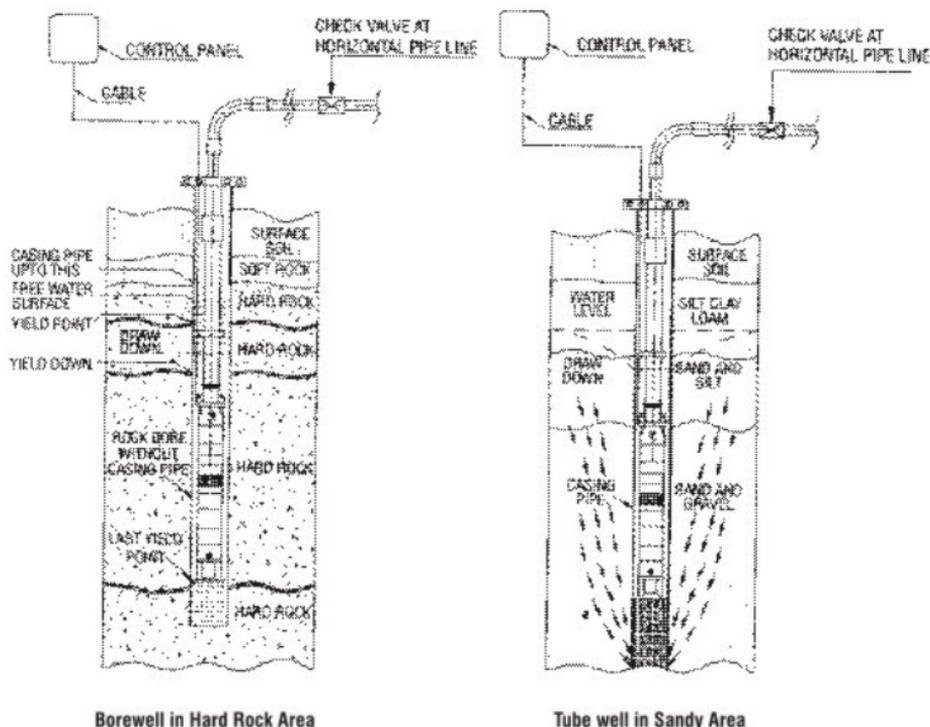


### (3) Water Condition

Kiwi's products are designed for pumping clean, cold, non-aggressive water without abrasives, solid particles or fibers and free of air and gases. Decreased pump performance and life expectancy can occur if the water is not clear, cold or contains air or gases. Water temperature should not exceed 33<sup>o</sup> C. Pump is suitable for pumping of clean water with the maximum permissible sand content of 25 gms per cubic metre.

### (4) Installation Depth of Pumpset

A check should be made to ensure that the installation depth of the pump will always be atleast 5 m below the maximum draw down water level of the borewell. The bottom of the motor should never be installed lower than the water entry level of the well screen in the borewell or within 5 m of the well bottom.



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Installation of the pumpset in the borewell at hard rock area, must be near to the final yield point of the borewell to ensure constant flow of water past the motor body to keep it at the correct operating temperature.

For silt and sandy area, borewell should be lined with casing pipe and a pipe with well screen which is to be deeply driven up to the bottom of the borewell. In this type of borewell the pump should be erected at the bottom of the borewell and also just above the well screen of the pipe, so that the pump will perform well below the drawdown water level. In this type of installation no silt or mud settlement can occur in the region of the pumpset, because this leads to motor winding burnout due to lack of constant effect effect around the motor. The linear flow of water required for free transmission of heat produced by 3", 4", 6" & 8" nominal dia motors are 0.15 m/sec, & 0.16 m/sec respectively.

### **(5) Electrical Supply**

Check the power source for voltage, frequency and phase with the nameplate of the motor and capacitor box or starter. Attach the extra pump and motor name plate data slips with the capacitor box or starter.

### **(6) Cable Type**

The drop cable used between the Submersible motor and capacitor box/starter should be approved for submersible applications. The conductor may be solid or stranded. The cable may consist of individually insulated conductors twisted together, insulated conductors moulded side by side in one flat cable or with a round overall jacket. Refer cable selection charts for recommended sizes of various cable lengths.

Also appropriate size of cable must be used from electric post to the main switch and main switch to capacitor box / starter.

## **CABLE SPLICING PROCEDURE**

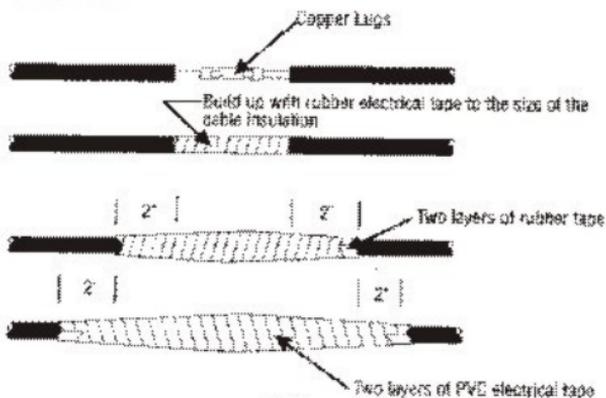
A good cable splice is important for proper functioning of the submersible pumpset and must be done with extreme care.

If the splice is carefully made, it will work as good as any other portion of the cable and will be completely water and airtight.

This splice can be made with commercially available potting or heat shrink splicing kits. The splice should be made in accordance with the splice kit manufacturer's instructions. Alternatively splice can be made with careful tape splicing as detailed below:



1. Check the motor cable and drop cable carefully for any damage.
2. Cut the motor leads in a staggered manner. Cut the ends of the drop cable so that the ends match up with the motor leads. Be sure to match the colours.
3. Strip back and trim off 1 inch of insulation from each lead, making sure to scrap the wire bare to obtain a good connection. Be careful not to damage the copper conductor when stripping off the insulation.



4. Insert a properly sized connector on each lead, making sure that lead colours are matched. Using a crimping pliers, indent the copper lugs. Be sure to squeeze hard on pliers, particularly when using large cable. When connector O.D. is not as large as cable insulation, first build up with rubber electrical tape to the size of the cable insulation.
5. Tape individual joints again with rubber electrical tape, using two layers; the first extending two inches beyond each end of the conductor insulation end, the second layer two inches beyond the ends of the first layer. Wrap tightly, eliminating air spaces as much as possible.
6. Tape PVC electrical tape over the rubber electrical tape. Using two layers as in step 5 and making each layer overlap the end of the proceeding layer by at least 5 Cms. Total thickness of tape should not be less than the thickness of the conductor insulation.
7. To finish the cable splicing, combine the individual spliced leads together and tape the jointing area with atleast two layers of rubber electrical tape. The first extending of 5 cms. beyond the each end of the drop cable main insulation end. The second layer two inches beyond the ends of the first layer. Wrap tightly, eliminating air spaces. Tape two layers of PVC electrical tape over the rubber insulation, making each layer overlap the end of the proceeding layer by at least two inches.
8. To check the insulation of the splice, conduct megger test with 500 V megger after keeping the joint in water.

\*Refer figure.2 for cable splicing procedure.

## INSTALLATION

Pump must be installed only by technically qualified personnel and suitable equipments must be used during installation. Use reputed, good quality electrical and other accessories in the pumping system for better performance of the pumpset.

**CAUTION: Do not use pipe wrench on pump shell. Use only on pump check valve housing flats ( see fig.3).**

The pump should be installed in such a way no slit or mud settlement can occur in the region of the pumpset, because this lead to motor winding burnout due to lack of constant cooling effect around the motor.

The delivery pipe or hose should be properly sized and selected based on estimated flow rates, friction-loss factors, pumpset weight, depth, height and weight of the water column, etc.

It is recommended to first install the delivery pipe to the pipe adaptor. Then install the delivery pipe with the adopter to the pump check valve housing as shown in fig.3.

A back-up wrench should be used when the delivery pipe is attached to the pump. The pump should be gripped only by flats on the top of the check valve housing. The body of the pump (pump shell), cable guard or motor should not be gripped under any circumstances.

We recommen that G.I. riser pipes always be used with the larger submersible pumps. An approved pipe thread compound should be used on all joints. Make sure the joints are adequately tightened in order to resist the tendency of the motor to loosen the joints when stopping and starting.

**When tightened, the pipe adaptor or the first section of the delivery pipe must not come in contact with and obstruct the functioning of check valve in the check valve housing of the pump.**

After the first section of the riser pipe has been attached to the pump, the lifting cable or straining rope should be tied at the check valve housing. Do not clamp the pump. When raising the pump with riser pipe, be careful not to place bending stress on the pump by picking it up by the pump only.

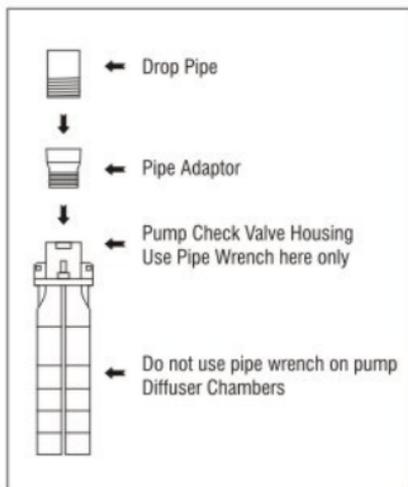


Fig. 3



**Coupling** : Fix the supporting clamp to the short length pipe and suspend the pump in chain block. The motor seating surface and pump seating surface must be cleaned well before it is coupled.

**The pump should be lifted and lowered carefully on the motor ensuring that the pump shaft with coupling is inserted onto the motor shaft, at the same time the suction inter connector holes should pass through motor studs. The pump must be properly coupled with motor by tightening all the nuts firmly.**

Check the free rotation and axial movement of the motor and pump shaft assembly with the help of screwdriver. The axial movement of the shaft assembly should be between 1.0 to 1.5 mm. Fix the cable guard and strainer in its provision.

Plastic and flexible riser pipes are recommended to be used only with low head, smaller domestic submersible pumps. The pipe manufacturer or representative should be contacted to ensure that the pipe type and physical characteristics are suitable for this use. Use the correct joint compound recommended by the pipe manufacturer. In addition to making sure that joints are securely fastened. Do not connect the first plastic or flexible riser section directly to the pump. Always attach a metallic nipple or adopter into the pump. When tightened, the threaded end of the nipple or adopter must not come in contact with and obstruct the functioning of check valve in the check valve housing of the pump.

**Ensure that the cables are not cut or damaged when the pumpset is installed in the borewell.**

The drop cable should be secured to the riser pipe at frequent intervals to prevent sagging, looping and possible cable damage. Nylon cable clips or waterproof tape may be used. The cable splice should be protected by securing it with clips or tape above each joint.

**CAUTION** : Plastic and flexible pipes tend to stretch under load. This stretching must be taken into account when securing the cable to the riser pipe. Leave 3 to 4 inches of slack between clips or taped points to allow for this stretching. This tendency for plastic and flexible pipe to stretch will also affect the calculation of the pump setting depth. As a general rule, You can estimate that plastic pipe will stretch to approximately 2% of its length. For example, if you have installed 250 feet

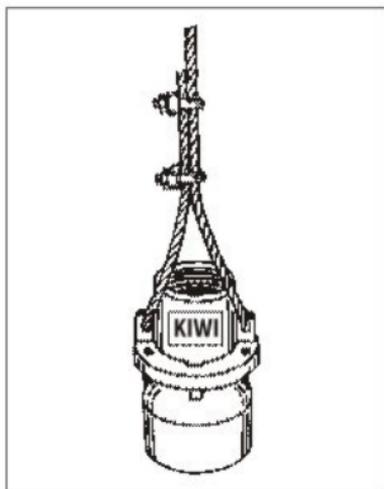


Fig. 4

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of plastic delivery pipe, the pump may actually be down 255 feet. If the depth setting is critical, check with the manufacturer of the pipe. When Plastic delivery pipe is used, it is recommended that a straining rope should be attached to the pump to lower and raise it. The check valve housing of 4" submersible are designed to accommodate this rope. (see fig.4)

## **ELECTRICAL**

**WARNING :** Provide proper good earthing to reduce the risk of electrical shock during operation of the pumpset. By using an appropriate size of copper conductor, (atleast equivalent to the size of the power supply conductor to the pumpset) the pumpset must be earthed. To earth the pumpset first connect the earth conductor to the screws provided in the motor upper housing and then to the earthing screws in the capacitor box/electrical panel.

All electrical work must be performed by technically qualified personnel, complying with local electricity rules and regulations. Personnel working in electricals must always wear rubber gloves, boots and take other precautions to avoid serious electrical shock.

Check the power source for voltage, frequency and phase with the name plates of the motor and capacitor box or starter. Attach the name plate slips of pump and motor to the capacitor box or starter.

**If voltage variations are more than  $\pm 10\%$  , do not operate the pump.**

### **When Engine driven Generators are used**

When engine driven generators are used for the operation of submersible pump, generator capacity must be selected in consultation with the generator supplier for selecting an appropriate capacity suitable for the rating of submersible motor.

Refer following table for recommended generator capacities. This is based on typical 80° C rise continuous duty generators. To ensure adequate starting torque of the motor, generator capacities are recommended with maximum voltage dip of 35% during starting of threewire single phase and three phase motors. For two wire motors generator capacity shall be 50% higher than the following recommended sizes.

When generators are used, first start the generator before the pumpset is switched on. When stopping, first switch off the pumpset before shutting down the generator.

**Table T1**

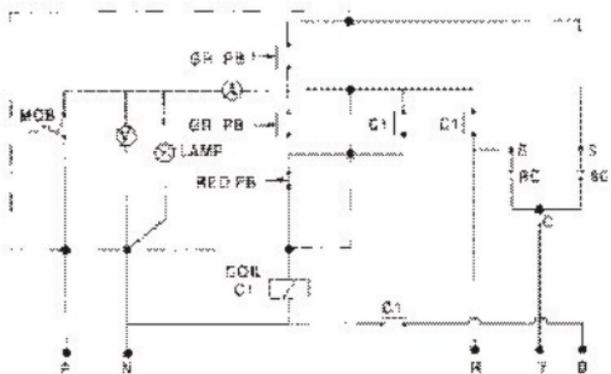
MOTOR kW		RECOMMENDED GENERATOR CAPACITY			
		EXTERNALLY REGULATED		INTERNALLY REGULATED	
kW	HP	kW	KVA	kW	KVA
0.37	0.50	2.0	2.5	1.5	1.9
0.55	0.75	3.0	3.8	2.0	2.5
0.75	1.0	4.0	5.0	2.5	3.125
1.10	1.50	5.0	6.25	3.0	3.8
1.50	2.0	7.5	9.4	4.0	5.0
2.20	3.0	10.0	12.5	5.0	6.25
3.0	4.0	12.5	15.6	6.0	7.5
3.7	5.0	15.0	18.75	7.5	9.4
5.5	7.50	20.0	25.0	10.0	12.5
7.5	10.0	30.0	37.5	15.0	18.8
11.0	15.0	40.0	50.0	20.0	25.0
15.0	20.0	60.0	75.0	25.0	31.0
18.5	25.0	75.0	94.0	30.0	37.5
22.0	30.0	100.0	125.0	40.0	50.0
26.0	35.0	100.0	125.0	45.0	56.25
30.0	40.0	100.0	125.0	50.0	62.5
37.0	50.0	150.0	188.0	60.0	75.0
45.0	60.0	175.0	220.0	75.0	94.0
55.0	75.0	250.0	313.0	100.0	125.0
75.0	100.0	300.0	375.0	150.0	188.0
93.0	125.0	375.0	469.0	175.0	219.0

**Capacitor Box / Starter****I. Single Phase Motors :**

Note : RC-Running Capacitor  
SC-Starting Capacitor

R = Running Winding  
Y = Auxiliary Winding  
B = Common

P = Phase  
N = Neutral

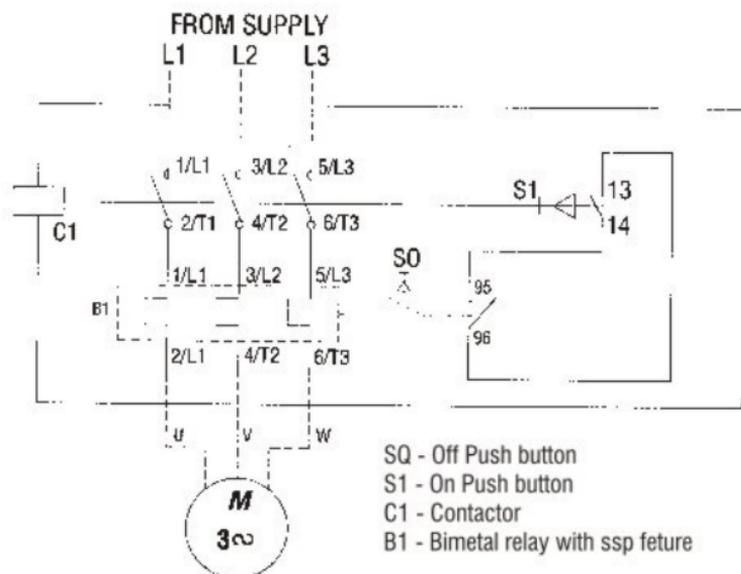
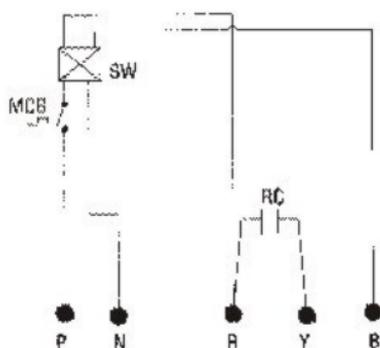


Capacitor box wiring diagram for Kiwi Pumps  
Single phase submersible motor

All Kiwi's single phase submersible motors require capacitor box. Therefore, it is mandatory to install our capacitor box with our single phase submersible motors. Single phase submersible motors must be connected as per diagram indicated in the capacitor box. A typical single phase wiring diagram using a capacitor box as shown in diagram.

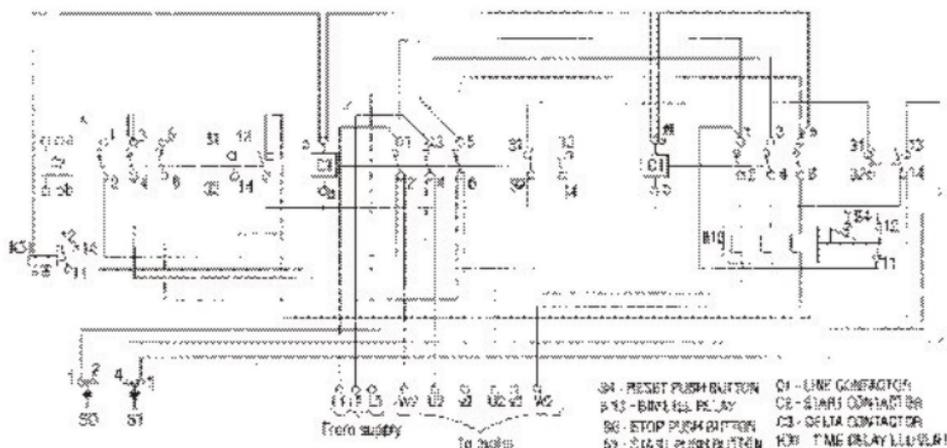
## II. Three Phase Motors.

A reputed, good quality starter may be used of appropriate capacity along with earth leakage circuit breaker of 100 mA rating is compulsory to give total protection to the three phase submersible motor against low voltage, high voltage, overload current, phase failure, unbalanced current between the phases and dry run. Starters only with extra quick trip feature must be used to give all protection to each of the phases. The thermal overload relays used shall trip within 12 seconds at locked rotor current. Please connect the starter as per the diagram given below.



- SQ - Off Push button
- S1 - On Push button
- C1 - Contactor
- B1 - Bimetal relay with ssp feture

**DOL Starter Wiring Diagram**



### Star - Delta Starter Wiring Diagram

The starter relay range should not be more than 30% of the current specified on the pumpset name plate.

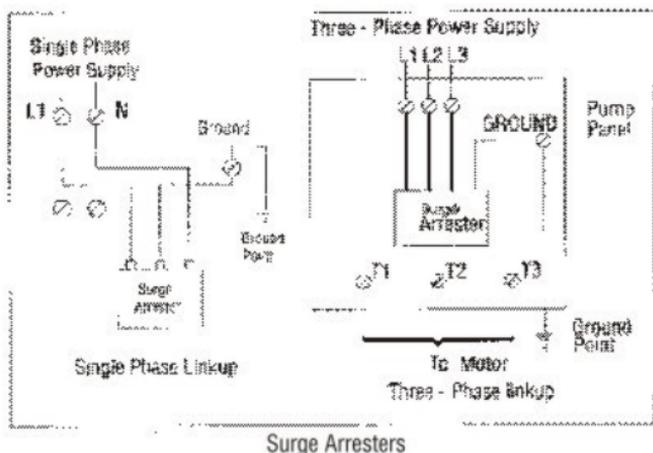
For direct online starters (3 core single cable pumpset) set the relay equivalent to the pump name plate current specified in the pumpset for proper functioning.

For star delta starters (for 2x3 core double cable pumpset) set the relay at 0.58 times of the name plate current specified in the pump name plate.

**Capacitor Box or starter must be mounted vertically upright and be protected from rain and direct sunlight. Enclosure must have good air circulation and be away from high temperature locations as this will decrease the life of capacitor and also lead to frequent tripping of overload relays. Also ensure that the capacitor box/starter location is easily accessible for regular inspection and it should be relatively free from dust, fumes and moisture.**

### Surge Arresters

Surge arresters must be used to give protection to the submersible motor against high voltage surges created by lighting and switching which is due to operation of switches on the main power distribution lines, which carries high voltage. Surge arresters of required voltage shall be fixed in the supply power line of the capacitor box/starter. The surge arresters must be installed by a technically qualified personnel, complying with the local electrical codes and regulations. A typical single phase and three phase surge arrester linkup diagram is shown in diagram.



### IMPORTANT NOTE

Please note that the guarantee does not hold good when the above said "Electrical instructions are not adhered to.

### Earthing - Capacitor Box/Starter

Provide proper earthing to the capacitor box/starter to reduce the risk of fatal electrical shock or injury. Earthing must be made in accordance with the local electrical codes and regulations. A bare copper conductor atleast to the equivalent size of the power supply conductor to the pumpset must be used for earthing and firmly connected to the earthing screws provided in the capacitor box/starter. When fixing earth conductor, first connect the earth conductor to the earth point and then to the earthing screws in the capacitor box/starter.

Reduce the length of the earth wire as much possible and connect to the good earthing points such as earth rod driven deeply into the water strata. Alternatively a good earth point can be the steel casing pipes, when used in the borewell, which is submerged in water and driven into the ground lower than pump setting depth.

### Resistance & Wiring check

Check the insulation resistance with the help of a tester/megger to make sure that the drop cable and splice are good. Insulation resistance should be atleast 20 m. ohm. Pumpset should not be operated if the measurement is less than 20m.ohm.

Final wiring connection of the drop cable to the capacitor box/starter can be completed when the insulation resistance value is more than 20m.ohm. Close the borehole in such a way that no foreign particles enter into the well casing. All surface cables must be protected by conduits. Ensure that the pumpset, capacitor box/starter and surge arresters are properly earthed as said before. Check complete wiring and ensure that all electrical connections are made according to the wiring diagrams are complying with local electrical codes and regulations.



## OPERATION

**Caution : The submersible pumpset is water cooled and have water lubricated bushes and therefore must never be run dry.**

Fix a temporary pipe to the delivery pipe of the pump after gate valve. Close the gate valve in such a way that only 1/3 of the pipe is open. At any point of time do not operate the pumpset with the fully closed gate valve as this will lead to serious damage to the motor and pump.

### **a) Sand Test :**

Care should be taken before installing the pump that the borewell is well flushed so that it is free from sand and silt. The pumpset is suitable for pumping clear cold water with maximum permissible sand content of 25gms per cubic meter. In a newly bored well the pump must be run first with the gate valve partially opened. The water is then examined for sand content. If there is noticeable quantity of sand content in the water the pumpset should be run with a gate valve partially opened until the sand content in the water falls to an unnoticeable level. It is important that the pump is not stopped until clear water flows. Pump must not be switched off while pumping sandy water. High sand content will cause premature wear of pump parts.

### **b) Direction of Rotation :**

All three phase motors must be checked for direction of rotation as these will run in either direction. To ensure that it is connected for correct direction of rotation, start the pumpset and observe the water discharge. Then switch off the pumpset and power mains. Interchange any two phases of the power connection. Again start the pumpset and observe water discharge. The connection which gives higher discharge of water is the correct direction of rotation.

### **c) Unbalance - Current check**

In case of three phase motors check the current in all the three phases when the pumpset is in operation. Unbalance current between each phase shall not exceed 5% under normal conditions. If unbalance is noticed more than 5%, please check with the electricity supply service once again. Ensure that the engine driven generators are of proper capacity as detailed in table T1.

#### d) Final Pipe Connections

After Completing the direction of rotation & unbalance-current checks, start the pumpset and leave it till the discharged water comes out of the well without sand & silt. Do not switch off the pumpset till the water is clear of sand & silt. Open the valve slowly to get the required flow. Ensure that when the pumpset is operated, the water level does not drop below the estimated draw down water level and the pumpset is always submerged by atleast 15 feet.

You can now proceed for final pipe connection after removing the temporary pipes.

#### e) Shut Down Periods

The pumpset must not remain idle for more than a week since it might lead to jamming of moving parts. If the pumpset is to remain idle for longer periods, it is to be run atleast once in every week for ten minutes. This will ensure that the pumpset is ready to perform at any desired time.

#### f) Switching Frequency

The Stand still time of the pump between switching off and switching on again should be as follows:

Maximum starts per hour: 3" - 12 times, 4" - 12 times, 6" - 12 times, and 8" - 4 times.

#### g) Supervision

Generally Kiwi's Pumps products do not require day-to-day maintenance under normal operating conditions, if properly selected and installed. However, it is mandatory to check the whole pumping system at regular intervals with regard to current drawn in each phases, voltage, water discharge, draw down water level, starters cable, wiring, earthing and other electricals. When any abnormality is noticed or if the pump fails to work, please refer trouble shooting chart.

### CABLE SELECTION TABLE

FOR SINGLE PHASE MOTOR MAXIMUM LENGTH OF COPPER CABLE

For Supply Voltage Condition with Variation of  $\pm$  3% - 50 Hz

MOTOR RATING			CABLE SIZE SQUARE MILLIMETRES											MAXIMUM LENGTH IN METERS
VOLTS	KW	HP	1.5	2.5	4	6	10	16	25	35	50	70	95	
220/ 240 VOLT	0.37	0.50	120	200	320	480	810	1260	1900	2590	3580	4770	5920	
	0.55	0.75	80	130	250	320	550	850	1290	1760	2430	3230	4000	
	0.75	1.0	60	100	170	250	430	670	1010	1380	1910	2550	3160	
50 Hz	1.10	1.5	40	70	120	180	300	470	710	980	1360	1850	2320	
	1.50	2.0	30	60	90	130	230	360	550	760	1060	1440	1820	
	2.20	3.0		40	60	100	170	280	430	600	820	1080	1310	

**CABLE SELECTION TABLE**

FOR THREE PHASE MOTOR MAXIMUM LENGTH OF COPPER CABLE

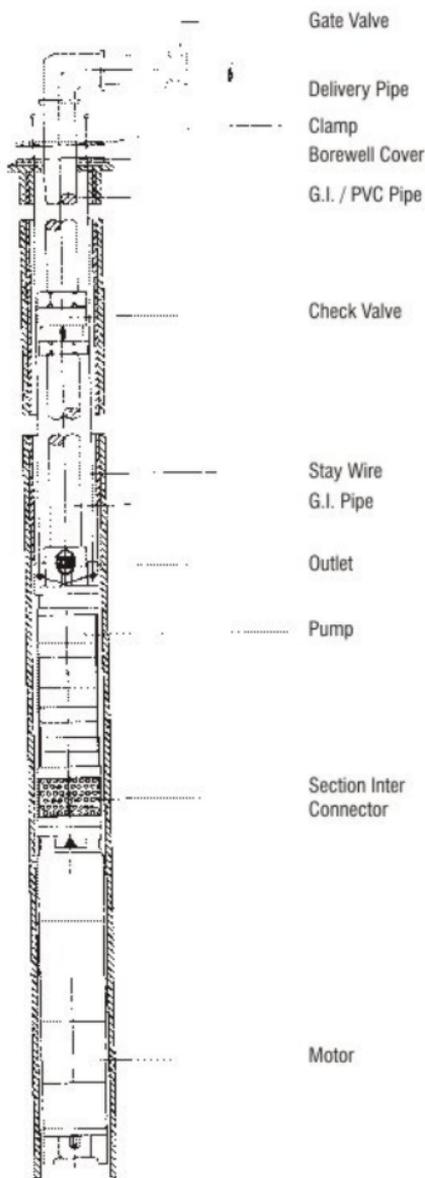
For Supply Voltage Condition with Variation of  $\pm$  3% - 50 Hz

MOTOR RATING			CABLE SIZE SQUARE MILLIMETRES											
VOLTS	KW	HP	1.5	2.5	4	6	10	16	25	35	50	70	95	120
380/ 415 VOLT	0.75	1.0	380	630	1020	1525	2595	4032	6111	8366				
	1.10	1.5	300	500	810	1210	2060	3200	4850	6640	9220			
50 Hz	1.50	2.0	220	370	590	880	1500	2340	3560	4890	6830	9230		
	2.20	3.0	150	250	400	600	1030	1600	2440	3350	4680	6340	7990	
	3.00	4.0	110	190	310	460	790	1230	1880	2590	3630	4930	6230	
	3.70	5.0	90	150	240	370	630	980	1490	2050	2870	3900	4920	
	4.00	5.5	80	140	230	340	590	920	1390	1910	2670	3600	4520	
	4.50	6.0	70	130	220	320	550	860	1310	1790	2510	3390	4260	
	5.50	7.5	60	110	170	260	440	690	1060	1450	2030	2750	3460	
	7.50	10.0	50	80	130	200	340	530	810	1110	1560	2120	2680	
	9.30	12.5		60	110	160	280	440	670	920	1310	1780	2250	
	11.00	15.0		50	90	130	230	360	550	750	1060	1440	1820	
	13.00	17.5			80	100	200	310	480	650	920	1250	1580	
	15.00	20.0			70	100	170	270	410	570	800	1080	1370	
	18.50	25.0				80	140	210	330	450	630	860	1090	
	22.00	30.0				70	120	180	280	380	540	740	930	
	26.00	35.0					100	150	230	310	440	610	770	870
	30.00	40.0					90	130	210	280	400	540	680	780
	37.00	50.0						110	170	230	320	440	550	700
	45.00	60.0							140	190	260	360	460	560
	56.00	75.0								160	220	290	380	340
	75.00	100.0									160	220	280	340
93.00	125.0										170	220	260	

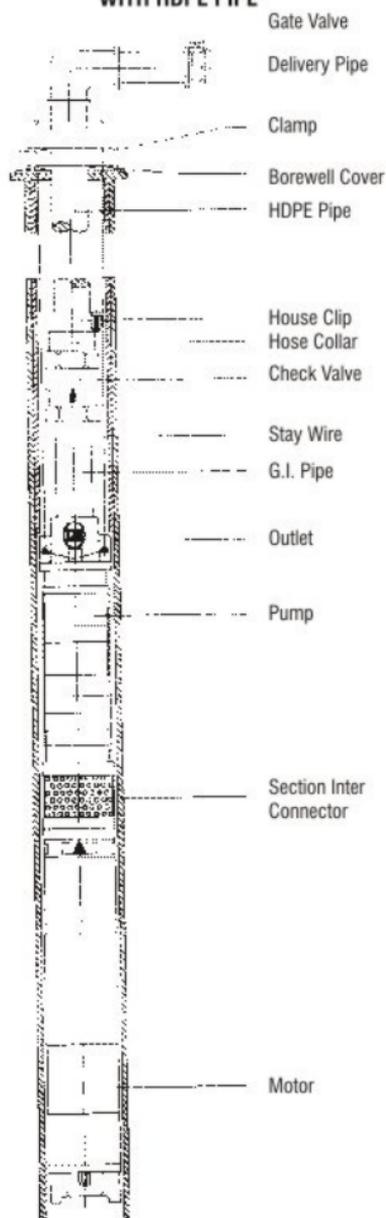
MAXIMUM LENGTH IN METERS

These are maximum length of cable in meters from power source to motor exceeding these lengths will void guarantee.

### FIELD INSTALLATION DRAWING WITH G.I. PIPE



### FIELD INSTALLATION DRAWING WITH HDPE PIPE

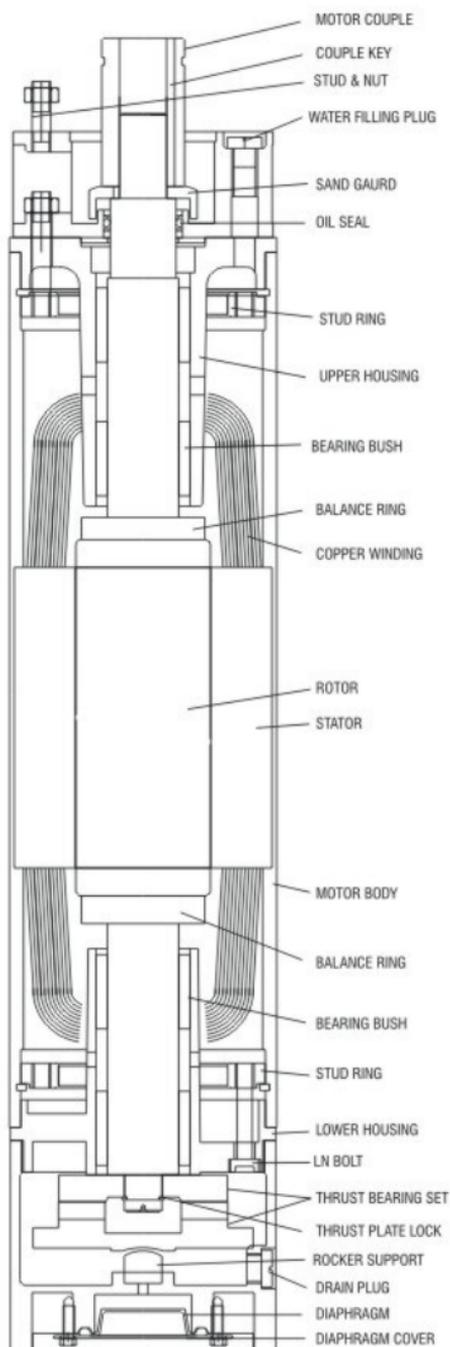


#### RECOMMENDATION :

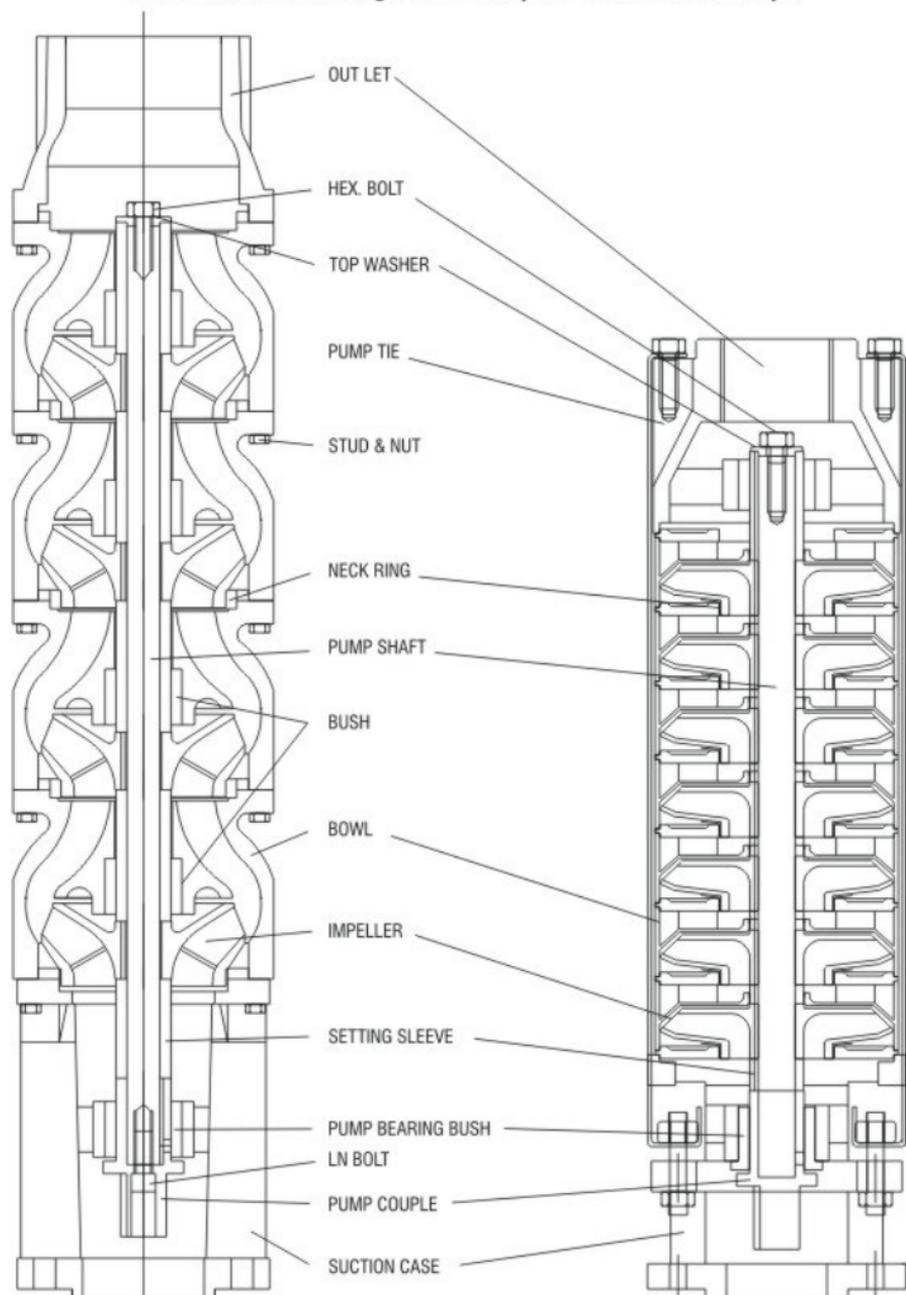
A check valve should always be installed at the surface of the well. In additions deeper than 200 feet, check valves should be installed at every 100 feet intervals to avoid water hammering effect and to improve the of pump and motor bushes. Check the direction of check valve while fixing in the delivery line.



### Cross Sectional Drawing of Submersible Motor



## Cross Sectional Drawing of Kiwi Pumps 6" Submersible Pumps



**TROUBLE SHOOTING CHART**

**WARNING :** All the following corrective actions must be performed by technically qualified personnel only, complying with local rule and regulations.

**1. Pump Does Not Work**

CAUSES	HOW TO CHECK	REMEDIES
[1] No power in main control panel / capacitor box	<p>Check for blown out fuses in main.</p> <p>Check for tripped circuit breakers.</p>	<p>Replace blown out fuses. If new fuse also blows out recheck all electrical wiring and earthing. Check fuse wire size against actual requirement.</p> <p>Check the wiring to capacitor box / starter. If the circuit breaker trips again, recheck all electrical wiring including earthing</p>
[2] Defective capacitor Box / starter or incorrect wiring	Check the wiring connectoin, voltage, relay and coil size of the starter	Rectify or replace defective parts of capacitor box / starter. Reconnect th capacitor box / starter correctly. Change the relay and coil size of the capacitor box / starter for actual requirement.
[3] Faulty pressure switch or other controls.	Check pressure switch & other control devices for defects.	Repair or replace faulty pressure switch or control devices.
[4] Defective submersible motor or cable	Switch off the main power line. De-link pumpset power leads from capacitor box / starter. Check the motor winding insulation resistance with the help of a megger to see whether the resistance reading is atleast 20 m. ohm. and check for defective cable.	When ohm meter reading shows less 20 m. ohm remove the pumpset and cable and recheck values on the ground. Check the cable splice. Repair or replace motor and / or cable.
[5] Defective capacitor (for single phase motor)	Switch off the main power line. Discharge the capacitor and check the condition.	Replace the capacitor
[6] Pump choked	Remove the pump from the borewell. Ensure whether the pump rotates freely and the water is free from excessive sand and silt.	If pump is damaged, repair or replace it. In case repairing, make sure that pump is rinsed with water before installations.
[7] Rotor seized due to prolonged shut down of pumpset.	Remove the pumpset from the borewell and ensure that the motor shaft rotates freely.	Repair the motor.
[8] Pump shaft seized due to dry running. solids entering into the pump.	Remove the pumpset from the borewell and inspect.	If pump is damaged, repair or replace it. In case of repairing make sure that pump is rinsed with water before installation.

## 2. Pump works but does not deliver water

CAUSES	HOW TO CHECK	REMEDIES
[1] Gate valve / check valve fitted in the riser pipe defective/ closed.	Inspect the gate valve / check valve.	If closed open the gate valve. If defective, rectify or replace it.
[2] Check valve at pump housing is blocked.	Remove the pump from the borewell and inspect.	Rectify the defect in the check valve seating area and clean the pump thoroughly with water.
[3] Low water level or borewell collapsed.	Check draw down water level. Ensure that the pumpset is submerged in by atleast 10 feet below the draw down water level.	If possible lower the pumpset When the yield of the borewell not matches with pumps discharge, fit one gate valve in delivery pipe and throttle according to the yield. Install the dry run preventor.
[4] Water inlet strainer of the pump is clogged.	Remove the pump from the borewell and inspect.	Clean the strainer. If the strainer is damaged, replace.
[5] Defective Pump	Remove the pump from the borewell. Ensure whether the pump rotates freely and the water is free from excessive sand silt.	When pump is damaged, repair or replace. In case of repairing, make sure that pump is rinsed with water before re-installation
[6] Pumping system total head is higher than pump head capacity	Check the total head pumping system.	Select and change the pumpset suitable for the system head.
[7] Low voltage or low frequency of supply resulting lesser speed.	Check the voltage at starter / capacitor box when pump operates. Check power cable size and drop cable size	Contact electricity supplier for low voltage supply from mains when cable size are found inadequate, change cables.
[8] Coupling from motor shaft to pump disconnected.	Check whether coupling key is properly inserted while at coupling.	Dismantle and recouple the pumpset. make sure to insert the coupling key properly.
[9] Defective capacitor (for single phase motor)	Switch off the main powerline. Discharge the capacitor and check the condition.	If defective, replace the capacitor.

**3. Pump delivers insufficient water or very low total head**

<b>CAUSES</b>	<b>HOW TO CHECK</b>	<b>REMEDIES</b>
[1] Borewell water yield reduced.	Check draw down water level and ensure that the pump is always submerged in water during operation.	If possible lower the pumpset. Adjust the gate valve of the riser pipe to match the yield of the borewell. Install dry run preventor.
[2] Leak in riser pipe and or valves.	Check for leakages.	Arrest the leakage.
[3] Water inlet strainer of the pump partially blocked	Remove the pump and inspect.	Clean the strainer. If damaged, replace.
[4] In case of three phase motors wrong direction of rotation.	Refer electrical drawing of the control box / starter and check the wiring.	Interchange any two phases of the power line connection. start the pump and check the water discharge.
[5] Worn out impellers, diffusers and bushes.	Remove the pump from the borewell Ensure that the water is free from excessive sand silt.	Repair or replace the pump.
[6] Partially closed gate valve / check valve.	Inspect the gate valve / check valve.	Open the valve fully. If stuck, free the valve.
[7] Low voltage.	When the pump operates, check the voltage at capacitor box / starter. Check power cable size and drop cable size.	Contact electricity suppliers for low voltage supply from mains. When cable size are found inadequate change cables. Refer cable selection chart.
[8] Riser pipe inner passage coated with deposits from water.	Remove the pump and inspect riser pipes.	Clean or replace the pipes.
[9] Clogged impellers.	Remove the pump and inspect the water inlet strainer and impellers.	Dismantle and clean the impellers or replace the pump. Clean or replace the damaged strainer.
[10] Smaller size riser pipe is used.	Excessive head loss due to smaller dia pipe.	Change to adequate capacity pipes.
Abrasive wear of pump bushes	Due to prolonged operation in water of higher sand content or corrosiveness.	Remove the pumpset from the borewell and inspect. Replace the damaged bushes.

#### 4. Circuit Breakers / over load protectors trip or fuses blow during operation of pump

CAUSES	HOW TO CHECK	REMEDIES
[1] Low or high voltage.	Check voltage at tarter / capacitor box whether it is with in $\pm$ 10% Check power cable and drop cable sizes.	Contact electricity suppliers and correct the voltage fluctuations when cable sizes are found inadequate; change to cable selection chart.
[2] Defective capacitor box / starter or incorrect wiring.	Check for faults, damages in capacitor box / starter, wiring connections, relay and no volt coil.	Rectify or replace defective parts of the capacitor box / starter. Check the wiring and reconnect as per diagram. Change the relay and coil size for actual requirement.
[3] Defective capacitor (for single phase mototrs)	Switch off the main power line. Discharge the capacitor and check the condition.	Replace the capacitor.
[4] Power line cable shorted, earthed or cable insulation damaged.	Switch off the main power line and inspect.	If required change the cable.

#### 5. Pump Starts very often

CAUSES	HOW TO CHECK	REMEDIES
[1] Improper setting of pressure switch or defective pressure switch	Check the pressure switch setting and examine defects in the switch.	Adjust and reset the pressure switch or replace the switch if defective.
[2] Leakage in the system.	Check all pipes, valves, tank and all plumbings for leaks.	Arrest leakage or replace components wherever necessary.
[3] Water level motor is not properly set or defective.	Check the water level monitor setting and inspect for defects.	Adjust and reset the water level monitor or replace if defective.
[4] Tank water logged	Check air pressure in the tank. Also diaphragm must be checked for leakage after pumping air into the thank	Repair or replace all defective parts.
[5] Inadequate size of tank	Check tank size against consumption and pump discharge capacity.	Change to an adequate sized tank.

**6. Absorbed current / power is excessive**

<b>CAUSES</b>	<b>HOW TO CHECK</b>	<b>REMEDIES</b>
[1] Defective fuse or single phasing.	Check for blown out fuses.	Replace blownout fuses. If new fuse also blows out, recheck all electrical wiring and earthing. Check fuse wire size against actual requirements.
[2] Abrasive wear of pump bushes	Check for higher sand content or solids.	Remove the pumpset from the borewell and inspect. Replace the wornout pump bushes.
[3] Borewell water yield reduced.	Check drawn down water level and ensure that the pumpset is always submerged in water during operation.	If possible lower the pumpset . Adjust the gate valve of the riser pipe to match the yield of the borewell. Install dry run preventor.
[4] Low voltage.	When the pump is in operation, check the voltage of capacitor box / starter. Check power cable size and drop cable size.	Contact electricity supplier for low voltage supply from mains when cable size are found inadequate appropriate voltage stabilizer.
[5] High voltage / high frequency. Resulting in high motor speed.	Check the voltage / frequency at capacitor box / starter.	Contact electricity supplier for high voltage and high frequency to the main power supply. Use and appropriate voltage stabilizer.
[6] Mechanical friction	Misaligned pump and motor coupling.	Remove the pumpset from the borewell and check for misalignment or improper coupling. Repair and re-install the pumpset.
[7] Cable is defective.	Check the cable for damage.	Cable size is found inadequate change the cable.
[8] Loose connections	Check for loose connections as loose connections will drop more voltage results as low voltage.	Check the joint and connections. Connect the joints permanently. Avoid excessive joints.
[9] Improper selection of pumpset.	Verify the pumpset datas with field conditions.	If the pump selection is wrong select the suitable pump.

## 7. Pump runs roughly and noise / excessive vibrations

CAUSES	HOW TO CHECK	REMEDIES
[1] Abrasive wear of pump bushes.	Check for higher sand content and solids.	Remove the pumpset from the borewell and inspect. Replace the worn bushes.
[2] Clogged impellers.	Remove the pump and inspect the water inlet strainer and impeller.	Dismantle and clean the impellers or replace the pump. Clean or replace the damaged strainer.
[3] Mechanical friction.	Due to misalignments of coupling, dry running of pump and failure of thrust plate.	Remove the pumpset. Check the damage. Replace the wornout parts.
[4] Water level of bore is insufficient.	Check draw down water level and ensure that the pump is always submerged in water during operation.	When the yield of the borewell not matches with pumps discharge, fit one gate valve in delivery pipe and throttle according to the yield. Install a dry run preventor.
[5] Vibration fo delivery pipe line	Check whether the valves are properly functioning or not.	Change the defective check valve or gate valve. Provide proper supports to the delivery pipe.



## PUMPS DETAILS

Model Kw/ H.P. SL. No. Date Signature	Dealer Name & Address	
	No. / Date	Signature

Customer Feedback & Suggestions	
Customer Name & Address	
I have read the warranty terms mentioned in the manual.	
Date	Customer Signature

Note : The Warranty becomes valid only after this customer reply slip cum business reply envelop is duly filled in all aspects and posted to the address mentioned withing 30 days from the date of purchase.

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## Warranty

The company grants to the actual user only, a limited conditional warranty for pump supplied by it to the extent and purposes detailed below.

- 01 The warranty shall be only with respect to defects in manufacturing for a period of 12 months from the date of purchase or 15 months from of the date of dispatch from the factory whichever is earlier.
- 02 The scope of the warranty shall extend only to the repairing or replacing of the defective parts, free of charge. The decision as to whether a part should be repaired or replaced shall be at the sole discretion of the company. In case of replacement of a part, the defective part will become property of the company. As this is not an on site warranty, the defective pump has to be brought to authorized dealer or authorized service center, freight and insurance pre-paid along with warranty card, details of installation record, document evidencing purchase and failure details to obtain warranty claim. Failure to present warranty card, documents and other detail shall render the warranty claim invalid.
- 03 The warranty shall not cover any costs or charges including cost of removal, installation, transportation etc., that may be occasioned by a claim under this warranty.
- 04 This warranty does not extend to any products are supplied as accessories to pumpsets or not.
- 05 This warranty does not extend to any damage or wear to pumpsets resulting from abnormal operating conditions, accident, abuse, misuse, unauthorized alteration or repair. Further this warranty will not hold if the pump used exclusively for the purpose of pumping clear, cold fresh water and for damages caused due to silt, excessive and more than permitted level of sand any other foreign particles in water.
- 06 This warranty does not cover any damage or wear to pump if it was not installed, operated and maintained in accordance with company's operator's manual.
- 07 The warranty does not hold good if the supply voltage is not within the prescribed range. Further, it does not hold good for all electrical components including burning of electrical winding and capacitors. The warranty does not hold for the defects caused due to dry running, wrong relay current setting and failure of any electrical equipments and accessories.
- 08 The warranty does not hold good if the pump is operated at a load, over and above its specified range of operation or at very low head operation below its specified range.
- 09 The liability of the company under this warranty shall not extend to any incidental or consequential damages. Losses or expenses arising out of or in the course of installation, use or any other causes or any claim arising out of fire, accident, will full damage, transit damage or normal wear and tear or any other force majeure conditions.
- 10 This warranty does not hold good if the serial number is deleted, defaced or altered.
- 11 The scope of warranty shall be only as stated above. Apart from these there are no other warranty whether implied or express, including merchantability or fitness for a particular purpose.
- 12 In case of any dispute during the warranty period for establishing the case of break down, until it is established that it is manufacturing defect, the authorized dealer / service center will render service and supply spares only on receipt of payment.
- 13 In case of any dispute or claims over the term of this warranty, the decision of the company shall be final.
- 14 The warranty becomes valid only if the date of purchase is confirmed by the dealer's stamp and signature on the customer reply slip cum and is duly filled in all aspects and post to the address mentioned within 30 days from the date of purchase.
- 15 Any dispute is subject to Coimbatore jurisdiction, other courts jurisdiction excluded.



**KIWI PUMPS**

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