

A View of KBL Dewas Manufacturing Plant



Enriching Lives

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Enriching Lives

**Kirloskar “KOSN Series”
Centrifugal Submersible Pump**

INSTALLATION, OPERATION & MAINTENANCE MANUAL



KIRLOSKAR BROTHERS LIMITED
A Kirloskar Group Company

CM - 9862

CONGRATULATIONS.....

Congratulations..... on your acquiring one of the finest pumps in the country.

The **Kirloskar Openwell Submersible New- version** Series in your possession is scientifically designed by using the state of art design software (Pro/E, ANSYS, CFD) for better aesthetics, performance, optimum material Contents etc. These pumps are reliable, robust, compact in size and cheaper in their class. Careful selection of materials, manufacturing and testing assures you a satisfactory performance over a long period of time.

These pumps will give you years of trouble free performance if it is handled with due care. This booklet is a step in this direction. It covers general instructions on installation, operation and maintenance of KOSN Pumps. Please read this booklet comply with the instructions and your pump is bound to serve you well.

Our products are meant for pumping water and they do not have any significant effect on environment during their use, if properly selected and used as per instructions given in this manual.

Customers are advised to dispose unusable components through appropriate disposal agencies to avoid the impact on work environment.

FOR PROMPT SERVICE & SPARES
Register on our website : www.kirloskarpumps.com

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1. **Handling :** When the entire pump is to be lifted in vertical direction, then it is recommended to lift the pump at the Lifting bolt by means of straps/ropes as shown in figure 1.1 If pump to be moved from one place to another place then it is recommended to lift the pump at mounting casing by means of hand.

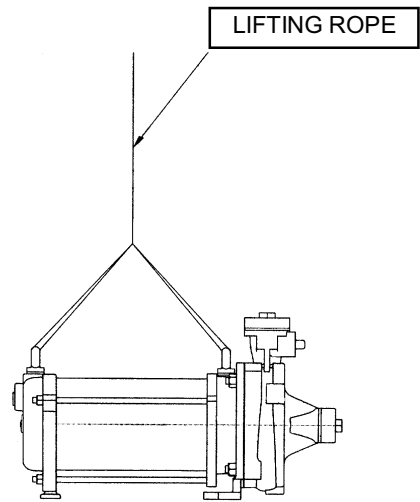


figure 1.1

2. **Pump designation key :** Following 7 key characters designate Kirloskar KOSN series monoblocs.

Example	KOSN-128					
K	O	S	N	1	28	
Name of firm	Type of pump	Type of pump	Version	Power rating in HP	Head at 0 discharge	
Kirloskar	Open Well	Submersible	New	1 for 1 HP 1.5 for 1.5 HP etc	Shut of head	

3. **Features:**
Kirloskar Openwell Submersible New version Pumps of designed for a wide range of applications.

- Designed for underwater applications - No need of priming and foot valve.
- Easy installation - Foundation and installation platform or pump house not required .
- Can withstand wide voltage fluctuations from 160-260 V.
- Desined to prevent overloading and motor burning.

- Dynamically balanced rotating parts to ensure minimum vibrations during running .
- Replacable wearing parts and hence longer life .
- Easy maintenance and spares availability .

Applications :

- Submerged pump in Fountains, Wells, Sumps and Water tanks .
- Water supply for domestic use in high rise Apartments, Buildings and Hotels.
- Gardening and sprinklers/conventional irrigation .
- Industries, for clear water handling .

4. **Operating Conditions :**

4.1 **Pumped Liquids :**

Kirloskar Openwell Submersible New version Pumps are suitable only to pump thin, non-explosive liquids, not containing solid particles. The liquid must not attack the pump materials chemically. When pumping liquids with density and/or viscosity higher than that of water, suitability of motor winding with correspondingly higher outputs must be checked, if required.

4.2 **Submerged Condition :**

The pump must be submerged in water more than 1 meter .

4.3 **Technical Data :**

Maximum Liquid Temperature	-	50° C
Rated voltage	-	210 volt for single phase 380 volt for three pahse
Voltage Range	-	160-260 for single phase 350-415 for three phase
Type of Duty	-	S 1 continuos
Direction of rotation	-	Anti-clock wise form suction side.
Frequency	-	50Hz
Sound Level	-	80dB
Degree of protection	-	IP-68
Class of Insulation	-	‘PP’

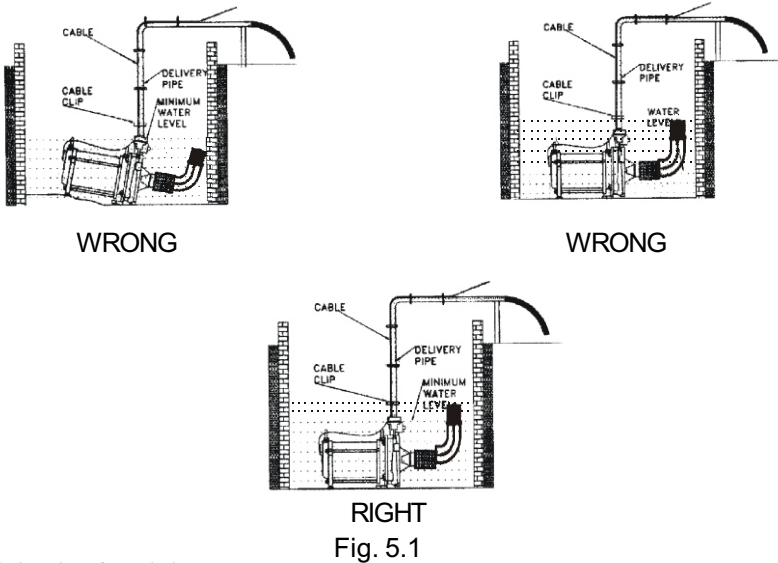
5. **INSTALLATION**

5.1 **Guidelines :**

For avoiding the un-necessary troubles in Installation, Operation Maintenance and for Utmost Performance of the Pump, we are suggesting few guidelines. We hope by following these guidelines our customer will able to install the pump easily and operate the pump at optimum performance.

5.2 Guideline for Installation :

5.2.1 Location : The pump should be installed in horizontal position and submerged in the water more than 1 meter . This will eliminate dry run and pump will give better performance. The pump does not require any foundation ; however if installing dug cum borewell , surface should be plain . The pump should not be installed in tilted position. (Ref. fig. 5.1)

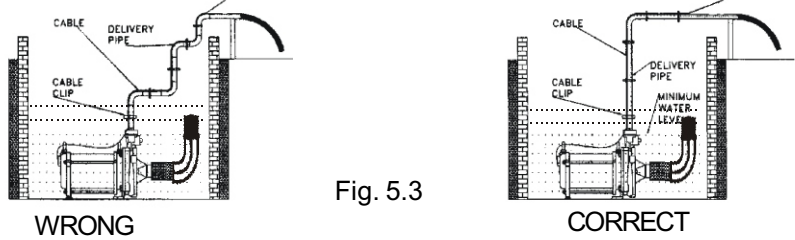


5.2.2 Guideline for Piping :

- Pipe size should be as per flange size to get higher discharge. It is not recommended to reduce pipe size. If length of delivery pipe is more than 3 m., use higher pipe (Please refer table 1.1 and 1.2 for proper pipe size) .
- The piping should be airtight. Any leakage in pipe may drastically affect the performance of the pump. (ref. fig. 5.2)



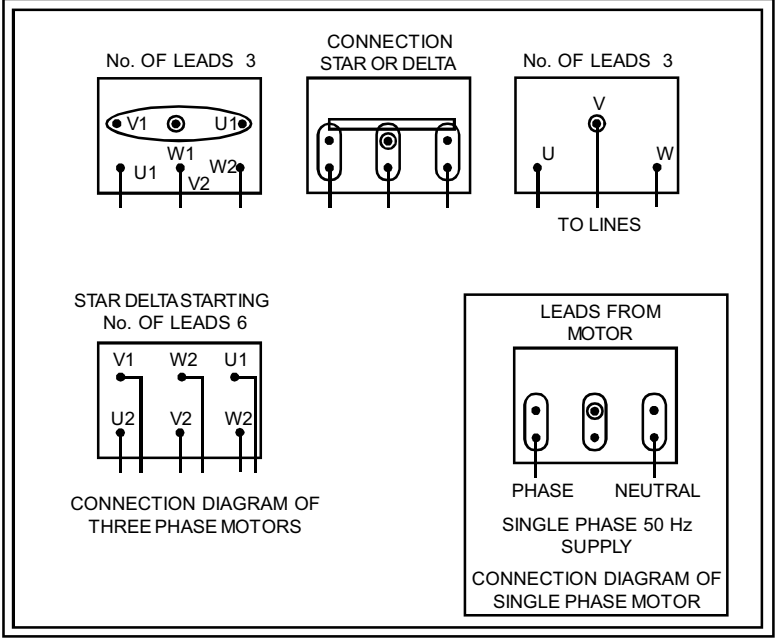
- The suction pipe should be as short as possible for getting better discharge. (in case of dug cum borewell type arrangement.)
- No. of bends and other fittings should be as minimum as possible to reduce frictional losses. (ref. fig. 5.3)
- Adequate supports should be provided to pipes so that its dead weight should not fall on delivery casing completely.



- For delivery pressure more than 20 meters, it is recommended to install a check (non-return) valve in the discharge line. The check valve placed near the pump is to protect the pump from excessive backpressure to prevent the water running back through the pump in case of sudden failure of prime mover .

6 Guideline for Electrical Connections :

- Proper earthing connection should be made at the bolts provided for earthing.
- Proper size of cable should be used between supply and motor terminals to minimize voltage drop and to carry full load current (FLC) as well as the maximum current in the operating voltage range specified.



- Nuts at terminal should be tightened properly.
- No. of joints in cable should be less as possible, preferably joints should be avoided.

- Wires and connections should be properly insulated. If not it may lead to fatal shock.
- Proper backup protection (reputed make starter, main switch and fuse) should be used.

7 Guideline for Starting the Pump

7.1 Check following before starting the pump :

- The shaft rotates freely by hand.
- Electrical connection is proper as per above mentioned diagram .
- The motor is filled with clear cold water by opening both the lifting bolts. The water should be filled through one hole till the water comes out of the other .
- Usage of bend at suction.
- Remove Suction and Delivery Rubber Packing before Installation

7.2 Check following during running condition :

- The direction of rotation is correct.
- The pump is running smoothly.
- See that the prime mover is not overloaded .
- Avoid idle running on operation against closed discharge valve for a longer period of time .

8 Maintenance :

8.1 When the pump will not be used for a long time :

- When pump is kept unused for a long time, switch off the power. Drain water in the pump and tank to avoid damages, i.e. risk of water freezing. Unscrew drainage screw. Protect water supply pipe and accessories from frost : insulate them or store them inside.
- There is a possibility for the motor not to start in spite of switching on the power because of the sticking and solidification of the dirty particle in the pump head. In that case, it requires some service before usage. Switch off the power, then rotate the stiff shaft at the back of the motor with a screwdriver to make it easy, safety and reliable for its operation as usual.

8.2 Recommended spares for two years of normal working

1. Impeller.
2. Bush bearings.
3. Capacitors (In case of single phase pump)
4. Paper packing.
5. Oil seal .
6. Teflon coated plate .

8.3 Check the following periodically (six monthly)

1. Impeller wear out
2. Oil seal wear out
3. Bearing bush wear out
4. Pipe connections
5. Strainer choking

9. TROUBLE SHOOTING CHART :

Types of Failure	Failure to deliver water	Pump does not deliver rated discharge	Pump does not deliver rated head	Pump loses water after start	Pump over loads prime mover	Vibration	Bearing wear rapidly	Seized pump	Irregular delivery
Wrong direction of rotation	✓	✓	✓						
Inlet insufficiently submerged	✓	✓		✓		✓			
Pump not upto rated speed	✓	✓	✓						
Viscosity/specific gravity greater than rated		✓	✓		✓				
Impeller blocked or damaged		✓	✓			✓			
Internal leakage		✓	✓						
Gas or vapour in liquid				✓	✓				✓
Speed to high					✓				
Total head lower than recommended					✓				
Worn or loose thrust plate					✓				✓
Rotor out of balance						✓			
Bent shaft						✓	✓		
Thrust plate rubbing on bush					✓	✓	✓		
Excessive thrust							✓		
Lack of lubrication							✓		
Pump does not deliver rated capacity	✓		✓					✓	
Pipes exert forces on pump					✓	✓	✓	✓	
foreign matters in pump								✓	
Viscosity lower than rated	✓	✓							
Speed to low	✓	✓	✓						
Lead in delivery pipe work	✓	✓			✓				

CAUSE & REMEDY CHART (In case of any problem, please check the underlined instructions).			
1. PUMP DOES NOT WORK			
S. No.	CAUSES	HOW TO CHECK	REMEDIES
1	No power in main control panel/capacitor box	Check for blown out fuses in main.	Replace blownout fuses. If new fuse also blows out recheck all electrical wiring and earthing. Check fuse wire size against actual requirement.
		Check for tripped circuit breakers.	Check the wiring to capacitor box/starter. If the circuit breakers trips again, recheck all electrical wiring including earthing.
2	Defective capacitor box/starter or incorrect wiring.	Check the wiring, connection, voltage, relay and coil size of the starter.	Rectify or replace defective parts of capacitor box/starter. Reconnect the capacitor box/ starter correctly. Change the relay and coil size of the capacitor box/starter for actual requirement.
3	Faulty pressure switch & other control devices for defects.	Check pressure switch & other control devices for defects.	Repair or replace faulty pressure switch or control devices.
4	Pump has been stored unfavorable condition for a long time before installation or defective submersible motor or cable	Switch off the main power line, de-link pump power leads from capacitor box/ starter. Check the motor winding insulation resistance with the help of a megger to see whether the insulation resistance reading is atleast 20m. ohm and check for defective cable.	When megger reading shows less than 20m. ohm remove the pumpset and cable and recheck values on the ground. Repair or replace motor and/or cable.
5	Defective capacitor (for single phase pumpset).	Switch off the main power line. Discharge the capacitor and check the condition.	Replace the capacitor if required.
6	Pump choked.	Remove the pump from the well. Ensure whether the pump rotates freely and the pump is free from excessive sand, silt & mud.	If the pump portion is damaged, repair or replace the parts. In case of repairing, make sure that the pump is rinsed with water before installation.
7	Rotor seized due to prolonged shut down of pumpset.	Remove the pump from the well ensure that the motor shaft rotates freely.	Repair or replace the rotor.

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S. No.	CAUSES	HOW TO CHECK	REMEDIES
1	Gate valve/check valve fitted in the riser pipe is defective/closed.	Inspect the gate valve/check valve.	If closed open the gate valve / check valve. If defective, rectify or replace it.
2	Low water level.	Check draw down level. Ensure that the pump is submerged in by atleast 2 feet below the draw down water level.	If possible lower the pumpset. When the yield of the well not matches with the pumps discharge. Fit one gate valve in delivery pipe and throttle according to the yield. Install the dry run preventor.
3	Water inlet strainer of the pump is clogged.	Remove pump from the well and inspect	Clean the strainer, if the strainer is damaged, replace it.
4	Defective pump.	Remove the pump from the well ensure that the pump rotates freely and the pump is free from excessive sand, silt and mud.	When the pump portion is damaged, repair or replace the parts. In case of repairing, make sure that pump is rinsed with water before reinstallation.
5	Pumping system total is higher than the pump head capacity.	Check the selection of the pumping system.	Select and change the pumpset suitable for the system head.
6	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.	When cable size are found inadequate change cable and replace to adequate size.
7	Defective capacitor (for single phase pumpset).	Switch off the main power line. Discharge the capacitor and check the condition.	Replace the capacitor if required.
3. PUMP DELIVERS INSUFFICIENT WATER OR VERY LOW TOTAL HEAD			
S. No.	CAUSES	HOW TO CHECK	REMEDIES
1	Well water yield reduced.	Check draw down water level. 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 surface pipe and / or valves.	Check for leakage.	Remove the leakages.
3	Water inlet strainer to the pump partially blocked	Remove the pump and inspect.	Clean the strainer, if damaged replace it.
4	Worn out impeller, bushes, thrust assembly	Remove the pump from the well, ensure that the water is free from excessive sand silt and mud.	Repair or replace pump parts.

8

3. PUMP DELIVERS INSUFFICIENT WATER OR VERY LOW TOTAL HEAD			
S. No.	CAUSES	HOW TO CHECK	REMEDIES
5	Wrong direction of rotation (three phase)	Refer electrical Drawing.	Interchange any two phase or the power line connections.
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.	When cable size are found inadequate change cable and replace to adequate size.
8	Riser pipe inner passage coated with deposits from water. Clogged impeller.	Remove the pump and inspect the water inlet strainer and impeller.	Clean or replace the pipes. Dismantle and clean the impellers or replace the pump parts.
9	Smaller size riser pipe is used.	Excessive head loss due to smaller dia pipe.	Clean or replace the damaged strainer. Change with adequate capacity pipes.
9			
4. TRIPPING OF CIRCUIT BREAKERS OVER LOAD PROTECTORS OR FUSES BLOWN UP DURING OPERATION OF PUMP			
S. No.	CAUSES	HOW TO CHECK	REMEDIES
1	Low or high voltage.	Check voltage at starter/capacitor box whether it is with in 10%. Check power cable and drop cable size.	When cable size are found inadequate change cable and replaces to adequate size.
2	Defective capacitor box/starter or incorrect wiring.	Check the wiring, connection, voltage, relay and coil size of the starter.	Rectify or replace defective parts of capacitor box/starter. Reconnect the capacitor box/ starter correctly. Change the relay and coil size of the capacitor box/starter for actual requirement.
3	Defective capacitor (for single phase pumpset).	Switch off the main power line. Discharge the capacitor and check the condition.	Replace the capacitor if required.
4	Power line cable shortaed, earthied or cable insulation damaged.	Switch off the main power line and inspect.	If required change the cable.
10			
5. PUMP STARTS VERY OFTEN			
S. No.	CAUSES	HOW TO CHECK	REMEDIES
1	Improper setting of pressure switch or defective pressure switch.	Check the pressure switch setting and examine defect 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 component wherever necessary.
3	Water level monitor is not properly set or defective.	Check the water level monitor setting and inspect for defects.	Adjust and reset the water level, replace monitor if defective.
4	Inadequate size of tank.	Check tank size against consumption and pump discharge capacity.	Change to an adequate sized tank.
6. ABSORBED POWER / CURRENT IS EXCESSIVE.			
S. No.	CAUSES	HOW TO CHECK	REMEDIES
1	Defective fuse or single phasing.	Check for blown out fuses.	Replace blownout fuses. If new fuses also blows out recheck all electrical wiring and earthing. Check fuse wire size against actual requirement.
2	Abrassive wear of pump bushes and thrust assembly.	Check for higher sand content, solids & mud.	Remove the pumpset from the well and inspect. Replace the wornout pump bushes and thrust assembly.
3	Well water yelid reduced.	Check draw 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 yelid of the borewell. install dry run prevent.
4	Low voltage.	When the pump operates, check the voltage at capacitor box/starter. Check power cable size and drop cable size.	When cable size are found inadequate change cable and replace to adequate size.
5	High voltage/high frequency. Resulting in high motor speed.	Check the voltage frequency at capacitor box/starter.	Use an appropriate voltage stabilizer.
6	Cable defective.	Check the cable for damage.	When cable size are found inadequate change cable and replace to adequate size.
7	Loose connections.	Check for loose connections, as loose connection will drop more voltage results as low voltage.	Check the joints and connections, connect the joints permanently. Avoid excessive joints.
8	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 NOISY / EXCESSIVE VIBRATION			
S. No.	CAUSES	HOW TO CHECK	REMEDIES
1	Abrasive wear of pump bushes and thrust assembly.	Check for higher sand content, solids & mud.	Remove the pumpset from the well and inspect. Replace the wornout pump bushes and thrust assembly.
2	Clogged impeller / strainer.	Remove the pump and inspect the water inlet strainer and impeller.	Disassemble and clean the impellers or replace the pump parts. Clean or replace the damaged strainer.
3	Mechanical friction.	Due to dry running of pump and failure of thrust assembly.	Remove the pumpset from the well and inspect. Replace the wornout pump parts.
4	Water level of well is insufficient.	Check draw down water level and ensure that the pump is always submerged in water during operation.	When the yield of well not matches with the pumps discharge, fit one gate valve in delivery pipe and throttle according to the yield. Install a dry run Preventor.
5	Vibration of delivery pipe.	Check whether the valves are properly functioning or not.	Change the defective check valve or gate valve. Provide proper supports to the delivery pipe.

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11 **Dismantling Procedure**

- Remove the suction housing and delivery pipe.
- Unscrew the nut and remove the suction and delivery flange.
- Unscrew the nut and remove the delivery casing from the mounting casing .
- Unscrew the nyloc nut and remove washer and impeller from shaft .
- Remove oil seal from mounting casing.
- Unscrew the nut from tie rod and remove mounting casing from motor body.
- Unscrew the cable plug and remove cable grommet.
- Remove cover NDE. Please ensure that cable does not get damaged.
- Remove the shaft along with the rotor.

12 **Disposal**

Our products are meant for pumping water and they do not have any significant effect on environment during their use. If properly selected and used as per instructions given in the manual. Customers are advised to dispose off unusable components through government or private disposal waste collection to avoid the harmful impact (if any) on the environment .

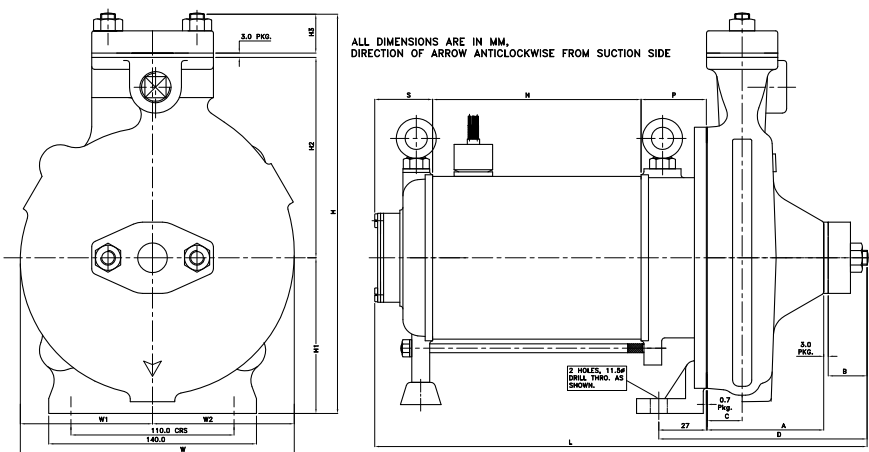
This diagram shows an exploded view of a mechanical assembly, likely a pump or valve. The components are numbered as follows:

- 0580
- 580.1
- 0490
- 513.1
- 0601
- 513
- 0490.1
- 580.1
- 0590
- 0101
- 0593
- 0151
- 0500
- 0566
- 0330
- 0510
- 0303
- 0516
- 1161
- 1228
- 0130
- 0911
- 1091
- 0296.1
- 0303
- 0516
- 1234
- 0611
- 1091.1
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- 2069
- 1234
- 0164
- 0341
- 1174
- 3032
- 0919
- 1187

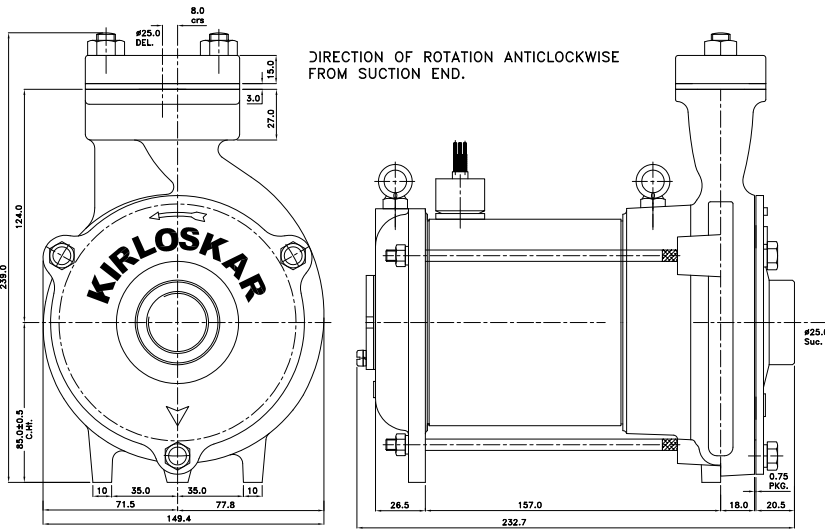
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Part No.	Part description	Qty
0513.1	Gasket for Delivery Flange	1
0513	Gaske for Suction Flange	1
580.1	Nut for Suction Flange	2
590	Stud for Del. Casing & Suc. Flange	2
490.1	Suction Flange	1
0601	Drain Plug for Casing	1
0590.1	Stud for Del. Casing & Del. Flange	1
0580	Nut for Delivery Flange	2
0490	Delivery Flange	1
0101	Delivery Casing	1
0593	Stud for Delivery Casing	4/6
0330	Impeller Nut	1
0621	Washer for Impeller Nut	1
0510	Packing for Del. Casi. Mounti. Casi.	1
0586	Nut for Del. Casi. & Mounti. Casing	4/6
0151	Impeller	1
0296.1	Mounting Casing	1
0303	Lifting Bolt	2
0516	Packing for Lifting Bolt	2
1161	'O' Ring betn Motor Body & Mont Cas.	2
1091	Collared Bush	2
1228	Cap for Winding	2
0130	Motor Body	1
1340	Screw for Clamping Plate	2
2103	Clamping Plate	1
0919	Diaphragm	1
1187	End Cover	1
0911	Stator	1
2069	Circlip	2
0189	Rotor Shaft	1
1234	Thrust Plate	2
0611	Locating Pin/Dowel Pin	2
0320	Key for Impeller	1
0164	Rotor (Motor)	1
0341	Tie Rod	3
1174	Rubber pad for Motor Support	1
3032	Nut for Motor Body Housin. Cover NDE	3
4015	Cover NDE	1

14. OUTLINE DRAWING :



KOSN - SERIES PUMP



KOSN - 0520 PUMP

MODEL	SUC.	DEL.	L	W	H	W1	W2	H1	H2	H3	A	B	C	D	P	N	S
KOSN-0516	25	25	295	171	268	82	89	110	128	30	25	30	23	142.7	39	133	68
KOSN-0827	25	25	373	176.5	280.5	86.8	89.7	105	115.5	30	73	30	21	133.7	39	163	68
KOSN-116	50	40	373	189.5	276	88.5	101	110	135	28	71	32	28	198.2	39	163	68
KOSN-123	32	25	365	190.5	281	91.5	99	105	145	28	70	25	27.5	125.7	39	163	68
KOSN-128	25	25	378.5	186	273	90	96	105	135	30	78.5	30	23.5	139.2	39	163	68
KOSN-128	40	40	380.5	187.5	271	91	96.5	105	135	28	64	32	23.5	126.7	39	163	68
KOSN-128	50	40	380.5	187.5	271	91	96.5	105	135	28	64	32	23.5	126.7	39	163	68
KOSN-134	25	25	373	176.5	250.5	86.8	89.7	105	115.5	30	73	30	21	133.7	39	163	68
KOSN-1522	50	40	397	189.5	276	88.5	101	110	135	28	71	32	28	198.2	39	187	68
KOSN-1525	50	40	390	187.5	271	91	96.5	105	135	28	64	32	23.5	191.2	39	187	68
KOSN-1540	32	25	385	225	298	112.5	112.5	125	146	24	66	25	21	121.7	39	187	68
KOSN-216	65	40	430.5	176	260	80	96	100	132	28	73.5	32	34.5	200.7	50	204	68
KOSN-225	50	40	416.5	190.5	281	91.5	99	105	148	28	73.7	32	29	200.7	39	204	68
KOSN-0523	25	25	333	185	262	89.2	95.5	97	135	27	78.5	27	23.5	141	44	140.5	33
KOSN-0527	25	25	333	185	262	89.2	95.5	97	135	27	78.5	27	23.5	141	44	140.5	33

Product range manufactured by Kirloskar Brothers Limited, Dewas

Pump Series	Construction Feature	Drive Unit	Power Rating
KDS+/++	Monobloc	Electric Motor (1 and 3 Phase)	1.5 HP - 30.0 HP
KDT+	Monobloc	Electric Motor (1 and 3 Phase)	1.0 HP - 20.0 HP
KS+	Monobloc	Electric Motor (1 and 3 Phase)	3.0 HP - 10.0 HP
KOS	Monobloc	Electric Sub. Motor (1 and 3 Phase)	0.5 HP - 10.0 HP
SP	Monobloc/Coupled	Electric Motor (Monobloc)	0.5 HP - 5.0 HP
KJV/H,KJ+	Monobloc	Electric Motor (1 and 3 Phase)	0.5 HP - 3.0 HP
MINI,DC,DHX	Monobloc	Electric Motor (1 and 3 Phase)	0.25 HP - 1.0 HP
Submersible Ku4 Winner	-----	Electric Sub. Motor (1 and 3 Phase)	0.5 HP - 75.0 HP
NW,KE,KH KHDT+,SR	Coupled	Engine / Motor	-----
KV, DV	Monobloc/Coupled	Electric Motor	-----
Alternator	-----	-----	2 KVA - 50 KVA
Motor	-----	-----	0.5 HP - 120 HP

For details contact the dealer

Warranty Certificate

This product is warranted against manufacturing defects and workmanship under normal use and service for the period of 24 months from the date of manufacturing OR 12 months from date purchase of the end user whichever is earlier.

We undertake to repair or replace the product at our discretion or any part thereof, for which we are satisfied that it was originally defective in material or workmanship, provided that product or its parts are returned to our nearest regional office / dealer on freight paid basis, within the warranty period. This warranty does not cover any consequential damage of any nature.

This warranty excludes every condition, whether statutory or otherwise, whatsoever is not expressly set out here.

Product Model:_____

Sr. No. :_____

Date of Purchase :_____

Bill/Cash Memo No. :_____

SPECIAL INSTRUCTIONS: “ Customers are advised to go through the product manual carefully for proper installation, use and servicing product & genuine spare parts. It is also advisable to go through the company’s published literature, catalogue or other official publication. Any deviation, if made by the customers will void the warranty obligations. Repair by trained mechanics will get you better results.”

This card must be produced at the time of claiming the warranty along with purchase documents.

Dealer’s stamp and signature :_____