

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.

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

SPECIAL INSTRUCTION

"Purchasers are cautioned to go through the detailed instructions given for proper installation, use and servicing of the product and genuine spare parts as detailed in company's published literature, manuals, pamphlets or other official publications. Any deviations, if made by the customers, will void the warranty obligation and / or manufacturer's liability, if any, for any compensation consequential or otherwise. Use of trained mechanics will get you better results".

Technical Manual

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FOR

DV-40/DV-50

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

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PLEASE FURNISH COMPLETE NAMEPLATE DETAILS, NAME OF PART, PART NOS. AND MATERIAL OF CONSTRUCTION WHILE ORDERING SPARE PARTS FOR THE PUMP.

GENERAL

1.1 Principle of Working

The Kirloskar Vacuum Pump is a water ring pump of particularly simple design. The rotor casing of the pump which is during operation partly filled with water, accommodates the eccentrically mounted rotor.

The rotation of the rotor forces the water to the periphery of the casing thus forming rotating water ring along the rotor surfaces. the inner surface of the water ring seals off the gas compartments which are formed between the rotor blades.

Due to eccentric rotation, the gas compartments increase in size as rotor rotates for part of the rotation and decrease in size for rest of the rotation. The action of these gas compartments formed between the blades of the rotor is thus, similar to that of many water pistons working together.

During the rotation, some of the gas compartments act as outward stroke and draw the gas through suction port. The same compartments when rotate further act as inward stroke, compress the gas due to decrease in volume and force it out through the delivery port. The cycle repeats for every rotation.

1.2 Working Fluid

The clear and cold water fed through sealing connection plays an important role as the 'Working Fluid" The uninterrupted flow of water at the pressure of 0.5 Kg/cm² (gauge) is very essential since it has the following functions :

- 1.2.1 The water forms a ring due to centrifugal force and seals the lateral gaps between the rotor and the casing. These water rings make the gas compartments airtight.
- 1.2.2 When the gas or air is being compressed, heat is generated. The sealing water dissipates this heat of compression and keeps all the components free from getting hot.
- 1.2.3 During operation some of the water escapes with the gas through the delivery. The water ring, therefore, requires replenishment, which is achieved by supplying fresh water.

The quantity of water to be supplied as working fluid depends on various factors as under :

- ^a Temperature of the air/gas to be expelled out.
- ^a The amount of heat generated due to compression which in turn, depends on compression ratio (relation between pressures at suction port and delivery port).
- ^Q Temperature of the water itself.
- ^o Clearances between rotor and casings.

There are no established formulae for determining the quantity of working fluid. However, the following table may be used as a general guide line for supplying approximate quantity of water at 30°C at various working pressures :-

Suction Pressure

Vacuum in mm/Hg	100	200	300	400	500	600	650
Service water in I/m	2	3.5	5	7	9	12	14

1.3 Special instructions :

- 1.3.1 Do not run the pump without clear cold Sealing Water, (Working fluid).
- 1.3.2 If there is any possibility of frost, drain the pump completely through drain plug, when not in operation.

1.4 Influence of Temperature of Working Fluid on Delivery

During the compression of the gas in the rotor compartments the greater portion of the heat of compression is absorbed by the working fluid and thus compression is practically isothermic. In consequence of the intimate mixture of gas and water, however, the rotor compartments also fill with water vapor, the pressure of which corresponds to the temperature of water.

1.5 Water Separator

The working fluid is ejected together with the gas. If water is required to be separated then for this purpose water separator is supplied against specific order.

The water separator is a cylindrical vessel having exhaust port at the top and drain connection at the bottom. The mixture of gas and water gets automatically separated due to difference in specific gravity of water and gas. Gas being lighter, gets expelled through the exhaust port and water being heavier gets accumulated at the bottom and can be drained periodically. For the effective separation, the flow of the drain must be, uninterrupted.

The water separator is generally mounted directly on the delivery flange of the pump, since this arrangement economizes the space. The drainpipe is generally led directly into water pipe.

2.0 INSTALLATION:

GENERAL INSTRUCTIONS FOR INSTALLATION, OPERATION & MAINTENANCE OF KIRLOSKAR CENTRIFUGAL PUMPS

WARNING

The equipment supplied is designed for specific capacity, speed, pressure and temperature. Do not use the equipment beyond the capacities for which it is manufactured. The equipment manufactured is also shop tested for the satisfactory performance and if it is operated in excess of the conditions for which it is manufactured, the equipment will be subject to excessive stress and strains.

LOCATION

Ample space should be provided on all the sides so that the pump can be inspected while in operation and can be serviced conveniently whenever required.

FOUNDATION

The foundation should be sufficiently substantial to absorb any vibration and to form a permanent rigid support for the base plate. This is important in maintaining the alignment of a direct con nected unit . A concrete foundation on a solid base is advisable. Foundation bolts of the proper size should be embedded in the concrete located by a drawing or template. A pipe sleeve about two and one-half diameter larger than the bolt should be used to allow movement for the final position of the foundation bolts.

ALIGNMENT

Pumps and drivers that are supplied by the manufacturers, mounted on a common base plate are accurately aligned before dispatch. However as the alignments are likely to be disturbed during transit to some extent and therefore must not be relied upon to maintain the factory alignment. Realignment is necessary after the complete unit has been leveled on the foundation and again after the grout has been set and foudation bolts have been tightened. The alignment must be checked after the unit is piped up and re-checked periodically.

FLEXIBLE COUPLING

A flexible coupling will not compensate for misalignment of the pump and driver shafts. The purpose of the flexible coupling is to compensate for temperature changes and to permit the movement of the shafts without interference with each other while transmitting power from the driver to the pump.

TYPE OF MISALIGNMENT (SEE FIGURE 1)

There are two types of misalignment between the pump shaft and the driver shaft.

- (a) Angular misalignment
- (b) Parallel misalignment

Shafts with axis concentric but not parallel. Shafts with axis Parallel but not concentric.



LEVELLING THE UNIT

When the unit is received with the pump and driver mounted on the base plate, it should be placed on the foundation and the coupling halves disconnected. The coupling should not be reconnected until all alignment operations have been completed. The base plate must be supported evenly on wedges inserted under the four corners so that it will not be distorted or sprung by the uneven destribution of the weight. Adjust the wedges until the shafts of the pump and driver are in level. Check the coupling faces, suction and discharge flanges for the horizontal or vertical position by means of spirit level.

FLEXIBLE COUPLING ALIGNMENT (SEE FIGURE 2)

The two halves of the coupling should be at least 4 mm apart so that they con not touch each other when the driver shaft is rotated. Necessary tools for approximately checking are straightedge and on an outside caliper,





A check for parallel alignment is made by placing a straight-edge across both coupling periphery at the top, bottom and both the sides. The unit will be in parallel alignment when the straightedge rests evenly on the coupling periphery at all positions. Care moust be taken to have the straightedge edge parallel to the axis of the shafts.

A check for angular alignment is made by using an outside caliper across the width of the coupling faces at various points.

Coupling alignment can be checked with dial gauge indicator as shwn in Fig. 2.

GROUTING

When the alignment is correct, the foundation bolts should be tightened evenly but not too firmly. The unit can then be grouted by working soft concrete under the edges. Foundation bolts should not be fully tightened until the grout is hardened, usually 48 hours after pouring.

FACTORS THAT MAY DISTURB ALIGNMENT

The unit should be periodically checked for alignment. If the unit does not stay in line after being properly installed, the following are possible causes :

- (a) Setting, seasoning of the foundation.
- (b) Pipe strains distorting or shifting the machines.
- (c) Wear of the bearings.

PIPING

Both suction and delivery pipes and accessories should be independently supported near the pump so that when the flanges bolts are tightened, no strain will be transmitted to the pump casing. It is usually advisable to increase the size of both suction and delivery pipes at the pump nozzles in order to decrease the loss of head from friction and for the same reason piping should be arranged with as minimum bends as possible, as these should be made with a long radius wherever possible. The pipe lines should be free from scales, welding residuals etc., and have to be mounted in such a way that they can be connected to suction and delivery flanges without any stress on the pump. Adequate supports should be given to pipe lines so that the weight of the pipe lines does not fall on the pump. The use of minimum number of the bends and other fittings will minimise the frictional losses.

VACUUM EQUALIZING LINE (AND LIQUID LINE) (SEE FIGURE 3)

If the pump draws from a system under vacuum an equalizing pipe must be carried from the highest point of the suction line, however, as close to the suction flange of the pump as possible, to the top of the feed tank to deep gas bubbles that might have been entrapped in the flow from entering the pump. The line should be fitted with an isolating valve which should be closed only for maintenance work on the pumpseet.

Apply sealing liquid (external sealing) to the shaft sealing cage to prevent entry of air in the case of pumps with packed stuffing box. It is convenient to tap the sealing liquid from the delivery line above the non-return valve.

STUFFING BOXES AND PACKING

Stuffing boxes should be carefully cleaned and the packing placed in them. Be sure that sufficient packing is placed at the back of the water seal cage. If the water to be pumped is dirty or gritty, sealing water should be piped to the Stuffing boxes from clean outside source of supply in order to prevent damage to the packing and shaft. In placing the packing, each packing ring should be cut to the proper length so that the ends come together but do not overlap. The succeeding rings of packing should not be pressed too tight as it may result in burning the packing and cutting the shaft. If the stuffing box is not properly packed, friction in stuffing box prevents turning the rotor by hand. On starting the pump, it is good to have the packing slightly loose without causing an airleak, and if it seems to leak, instead of putting too much pressure on the gland, put some heavy oil in the stuffing box until the pump works properly and then gradually tighten up the gland.

Te packing should be occasionally changed.

BALL BEARINGS

Correct maintenance of ball bearings is essential. The bearing manufacturers give the following as a guide to relubrication periods under normal condition.

- ^a Three mnonthly when on continuous duty.
- ^a Six monthly when on eight-hour per day duty.

The bearings and housings should be completely cleaned and recharged with fresh grease after 2500 hours or the nearset pump overhaul time.

STARTING

Be sure that the driver rotates in the proper direction as indicated by a direction arrow on the pump casing.

RUNNING

On account of its simple construction, the centrifugal pump requires practically no attention while running. Lubrication of the bearings and manipulation of the glands are the only things that need attention from the operator.

STUFFING BOXES

Do not tighen the glands excessively. A slight dripping of water from the stuffing boxes when pump is running keeps packing in good condition.

- 2.1 For preparing foundation, installation, alignment and general maintenance etc., the instructions given above must be followed carefully.
- 2.2 When the vaccum pump is to be used for creating vacuum, the suction branch should be connected to the equipment in which vacuum is to be created and discharge branch left open to the atmosphere through water separator, if provided. The layout of this type, which is required for priming of big pumps, is shown below.
- 2.3 When the vacuum pump is to be used as a compressor, the suction branch should be left open to the atmosphere and dicharge branch through suitable filter or separator, be connected to the equipment where compressed air is required.
- 2.4 The service water connection should be made after installing the pump. The service water details are given in the 'Technical Data'.

3. OPERATION

3.1 Before Starting the Pump check the following :

- 3.1.1 The pump rotates freely by hand.
- 3.1.2 Open the cock of service water connection.
- 3.1.3 The direction of rotation of motor corresponds to the direction of rotation of pump.
- 3.1.4 Stuffing box packing is properly tightened.
- 3.1.5 The bearings are lubricated if not done earlier.

3.2 During running the pump, check the following and regulate if necessary :

- 3.2.1 The pump is running smoothly.
- 3.2.2 The flow of service water is uninterrupted.

- 3.2.3 Leakage through stuffing box is normal. There should be leakage of 60/80 drops per minute.
- 3.2.4 The bearings are not getting heated up excessively.
- 3.2.5 Power consumption is within the limit.
- 3.2.6 Ensure that there is no mechanical friction.
- 3.2.7 Stop the pump immediately, if any defects are noticed. Do not start the pump unless defects are rectified.

3.3 During Stopping the Pump

3.3.1 Stop the motor.

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- 3.3.2 Stop the service water.
- 3.3.3 If the pump is not required to be operated for long time, then drain the casing completely.

4. TECHNICAL DATA

4.1 Direction of Rotation

The pump rotates in anticlockwise direction when viewed from driving-end of the pump. Pump with clockwise rotation can be supplied against order.

4.2 Ball Bearing (Driving & Non-Driving End.)

For DV-40 pump - SKF 6307 or equivalent For DV-50 pump - SKF 6307 or equivalent

4.3 Recommended Grease for Bearing Lubrication

Hindustan Petroleum	-	NATRA 3 OR LITHON 3.
Caltex	-	STARFAK 3
Indian Oil	-	SERVOGEM3

4.4 Re-greasing period

The bearings are initially packed with grease, sufficient for operation for approximately 1000 running hours. The bearings should be re-greased after every 1000 working hours.

Quantity of grease - 20 gm per bearing

4.5 Stuffing-box Packing Specifications

DV-40 pump - 9.5 sq. x 1050 mm long on each side DV-50 pump - 9.5 sq. x 1050 mm long on each side Arrangement 2 + L + 3

4.6 Gasket Packing for Casing

0.4 mm thick paper (This thickness may have to be changed to adjust the lateral clearances between the rotor and the casings).

4.7 Lateral Clearances

The lateral clearances between the rotor and the port plate must be within 0.2 to 0.3 mm. With the increase in clearances there will not be effective formation of water ring.

4.8 'o' -ring specifications for both type pumps 42 mm ID x 4 mm dia. (Thickness)

4.9 Service Water Details

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	DV-40	DV-50
Quantity	15 lits/min	35 lits/min
Max. temp.	30° C	30º C
Pressure	0.2 to 0.5 kg/cm ²	0.2 to 0.5 kg/cm ²

4.10 Tools Required

Spanners	Size M-10 / M-12
Allen Key	3 mm & 4 mm

5. MAINTENANCE

Preventive maintenance schedule is the periodical checks and precautions by which possibilities of failure and break down are made remote.

5.1 Daily Checks :

- 5.1.1 Vacuum gauge readings
- 5.1.2 Bearing Temperature
- 5.1.3 Leakage through stuffing box
- 5.1.4 Leakage through stuffing box
- 5.1.5 Noise and vibration
- 5.1.6 Constant flow of service water.

5.2 Periodical Maintenance

- 5.2.1 Replenish the grease,
- 5.2.2 Change the stuffing box packing
- 5.2.3 Check the alignment of pumpsets.
- 5.2.4 Calibrate the measuring instruments.
- 5.2.5 Check the service water connection for pressure and leakage.

6.0 OVERHAULING

With normal daily operating spell the pump will be due for overhaul after about 5000 working hours. This work should be done by skilled personnel.

6.1 Dismantling

(Please refer to cross-sectional assembly drawing).

- 6.1.1 Remove delivery and suction pipe connections and sealing water connections and other accessories. Drain the service water by removing drain plug.
- 6.1.2 Take out the pump from base plate and keep it on clean dry surface.
- 6.1.3 Loosen the gland nuts and take out split glands DE & NDE (229).

- 6.1.4 Remove the pump half coupling (390) with the help of puller.
- 6.1.5 Remove the bearing cover DE (270) by loosening the hex. screws.
- 6.1.6 Remove the bearing housing DE (240). Ball bearing DE (460) will come out along with it. Take out the bearing DE.
- 6.1.7 Take out liquid deflector DE (236) and clamping plate (224).
- 6.1.8 Remove tie bars.
- 6.1.9 Pull out the stuffing box cover DE (220) alongwith port plate. Give appropriate support under DE side shaft.
- 6.1.10 Remove the port plate DE (465) from stuffing box cover and gland packings (430). Collar for gland packing (228) and lantern ring (227).
- 6.1.11 Loosen the bearing cover NDE (271).
- 6.1.12 Unscrew the bearing nut (335) and remove washer (625).
- 6.1.13 Take out the sub-assembly of NDE side stuffing box cover alongwith housing DE (240). Shaft with rotor and sleeve will also separate.
- 6.1.14 Take out the port plate NDE (465).
- 6.1.15 Separate out bearing housing NDE (240) from stuffing box cover by loosening the nuts.
- 6.1.16 Remove gland packing (430), lantern ring (227), Collar for st. Box (228) from stuffing box cover (220).
- 6.1.17 Remove ball bearing NDE (260).
- 6.1.18 Unscrew the shaft sleeve nut DE (334.1), Take out 'O'-ring (525) and shaft sleeve DE (310).
- 6.1.19 Remove the rotor (163) and take out rotor key (325).
- 6.1.20 Remove liquid deflector NDE (236), shaft sleeve nut NDE (334.2), 'O'- ring (525) and shaft sleeve NDE (311). This will complete the dismantling procedure.

6.2 Assembly:

As the parts on both DE & NDE side are symmetrical, care should be taken while fitting the parts that arrow-heads marked on each part are in anticlockwise direction when seen from driving end.

Before assembling, all the parts should be thoroughly cleaned in petrol or kerosene to remove the dirt rust etc. After cleaning all the parts should be thoroughly checked for wear and should be replaced, if necessary.

- 6.2.1 Apply grease to mating surfaces.
- 6.2.2 Fix the rotor key (325) on shaft (180).
- 6.2.3 Fit the shaft sleeve NDE (311), 'O' ring (525) and shaft sleeve nut NDE (334.2).
- 6.2.4 Put the Collar for stuffing box cover (228) and clamping plate (224). Mount the liquid deflector NDE (236).

- 6.2.5 Push the ball bearing NDE (260) in the bearing housing NDE.
- 6.2.6 Fit this bearing housing sub-assembly on shaft at NDE side.
- 6.2.7 Put the washer (625) and tighten the bearing nut (335).
- 6.2.8 Fix the bearing cover NDE (271).
- 6.2.9 Place the paper packing (511) in stuffing box cover NDE and fit the port plate NDE. Care should be taken that passage holes are properly matched and arrowhead is on rotor side.
- 6.2.10 Hold the shaft with bearing housing NDE vertically and insert the NDE stuffing box cover with portplate. Tighten the nuts of bearing housing NDE and stuffing box cover.
- 6.2.11 Mount the rotor (163) The arrow head on rotor and port plate should be in same direction.
- 6.1.12 Check the clearance between rotor and port plate with the help of feeler gauges. The clearance should be 0.2. to 0.3 mm. For adjusting the clearance make use of shaft sleeve nut NDE (334.2).
- 6.1.13 Put paper packing (519) on port plate and push the rotor casing (130). The passages of rotor casing and port plate should match.
- 6.2.14 Fit the shaft sleeve DE (310), 'O' ring (525) and shaft sleeve nut DE (334.1).
- 6.2.15 After tightening the shaft sleeve nut DE, once again check the clearance between rotor and port plate on NDE side.
- 6.2.16 Insert the tie bar from NDE side.
- 6.2.17 Put the paper packing (511) in st. box cover DE and fit the port plate DE. Arrow heads should be in same direction.
- 6.2.18 Fit the stuffing box cover DE on rotor casing and tighten the tie-bars. Tilt the assembly to rest it on the foot of rotor casing.
- 6.2.19 Put the disc for stuffing box cover clamping plate. Mount the liquid deflector DE.
- 6.2.20 Fit the ball bearing DE (260) in the bearing housing.
- 6.2.21 Mount the bearing housing DE on shaft and tighten the nuts of stuffing box cover and bearing housing.
- 6.2.22 Fix the bearing cover DE (270). Fit the pump half coupling (390).
- 6.2.23 Pack the gland packings and lantern rings on both sides. Fit the glands.
- 6.2.24 Fix all the accessories and align the pump with motor. The type, size and machine number of pump, for which the spares are required, must be specified while ordering spares for pumps. so as to ensure corect supply.



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7. PARTLIST

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New Part No.	Name of the Part	Material Std. Fitted	Qty. Reqd.
130	Rotor Casing	C.I.	1
*163	Rotor	Bronze	1
*180	Pump Shaft for Direct Drive	Steel	1
220	Stuffing Box Cover DE & NDE	C.I.	2
224	Clamping Plate for Split-Gland DE & NDE	Steel	2
227	Lentern Ring in Two Halves DE & NDE	C.I.	2
228	Collar for Stuffing Box, DE & NDE	Steel	2
229	Gland Two Halves DE & NDE	C.I.	2
236	Liquid Deflector, DE & NDE	C.I.	2
240	Bearing Housing DE & NDE	C.I.	2
*260	Ball Bearing DE SKF-6307 or Eq.	Steel	1
*260	Ball Bearing NDE SKF-6307 or Eq.	Steel	1
270	Bearing Cover DE (Coupling Side)	C.I.	1
271	Bearing Cover, NDE	C.I.	1
*310 & 311	Shaft Sleeve, DE & NDE (Under stuffing box)	C.I.	2
321	Key for coupling	Steel	1
325	Key for Rotor and Shaft Sleeve	Steel	1
334.1	Shaft Sleeve Nut, Driving End R.H. Threads	Bronze	1
*334.2	Shaft Sleeve Nut N.D.E. L.H. Threads	Bronze	1
335	Bearing Nut NDE	Steel	1
390	Flexible Coupling Pump Half	C.I.	1
391	Flexible Coupling Driver Half	C.I.	1
*403	Rubber Star	Rubber	1
*430	Stuffing Box Packing DE & NDE	Champion style 3116	2 sets
441	Grease Nipple DE & NDE	Steel	2
*465	Port Plate for Rotor Casing & Stuffing Box Cover	C.I.	2
	DE & NDE		
490	Companion Flange, Suc. Side	C.I.	1
490	Companion Flange, Del. Side	C.I.	1
*511	Gasket Packing (Port Plate & Stuffing Box Cover)	Paper	2
*519	Gasket Packing (Rotor Casing and Port Plate)	Paper	4
*525	Rubber 'O' ring for Shaft Sleeve & Shaft Sleeve Nut	Rubber	2
625	Washer for bearing nut	Steel	1

*Recommended spares for two-year normal working.

8. INTERCHANGEABILITY CHART

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New Part No.	Name of the Part	DV- 40	DV-50
130	Rotor Casing	1	2
163	Rotor	1	2
180	Pump Shaft for Direct Drive	1	2
220	Stuffing Box Cover DE & NDE	1	1
224	Clamping Plate for Split-Gland DE & NDE	1	1
227	Lentern Ring in Two Halves DE & NDE	1	1
228	Collar for Stuffing Box, DE & NDE	1	1
229	Gland Two Halves DE & NDE	1	1
236	Liquid Deflector, DE & NDE	1	1
240	Bearing Housing DE & NDE	1	1
260	Ball Bearing DE SKF-6307 or Eq.	1	1
260	Ball Bearing NDE SKF-6307 or Eq.	1	1
270	Bearing Cover DE (Coupling Side)	1	1
271	Bearing Cover, NDE	1	1
310 & 311	Shaft Sleeve, DE & NDE (Under stuffing box)	1	1
321	Key for Coupling	1	2
325	Key for Rotor and Shaft Sleeve	1	1
334.1	Shaft Sleeve Nut, Driving End R.H. Threads	1	1
334.2	Shaft Sleeve Nut N.D.E. L.H. Threads	1	1
335	Bearing Nut NDE	1	1
390	Flexible Coupling Pump Half	1	1
391	Flexible Coupling Driver Half	1	1
403	Rubber Star	1	1
430	Stuffing Box Packing DE & NDE	1	1
441	Grease Nipple DE & NDE	1	1
465	Port Plate for Rotor Casing & Stuffing Box Cover	1	1
	DE & NDE	1	2
490	Companion Flange, Suc. Side	1	2
490	Companion Flange, Del. Side	1	1
511	Gasket Packing (Port Plate & Stuffing Box Cover) 1	1
519	Gasket Packing (Rotor Casing and Port Plate)	1	1
525	Rubber 'O' ring for Shaft Sleeve & Shaft Sleeve N	lut 1	1
625	Washer for bearing nut	1	1

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*Same numbers in the same horizontal line represent interchangeable part.

Product range manufactured by Kirloskar Brothers Limited, Dewas

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

For details contact the dealer

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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 :_____





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Enriching Lives

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