



Enriching Lives

**INSTRUCTIONS ON
INSTALLATION,
OPERATION AND
MAINTENANCE FOR
KIRLOSKAR VERTICAL
INLINE PUMP
TYPE - KW - LC**



KIRLOSKAR BROTHERS LIMITED

Established 1888

A Kirloskar Group Company



WARRANTY

We warrant that the pump supplied from us is free from defective material and faulty workmanship. This warranty holds good for a period of 12 months from the date of commissioning the equipment or 18 months from the date of dispatch from our factory, whichever is earlier. Our liability in respect of any complaint is limited to replacing part/parts free of charge ex-works or repairs of the defective part/parts only to the extent that such replacement/repairs are attributable or arise solely from faulty workmanship or defective material.

This warranty holds good only for the products manufactured by us.

KIRLOSKAR BROTHERS LIMITED



CONTENT

Sr. No.	Description	Page No.
1.0	Introduction	04
2.0	General Information & Safety Instructions	06
3.0	Transport Handling and storage Instructions	07
4.0	General Description	09
5.0	Assembly & Installation	10
6.0	Commissioning and Operation	14
6.1	Commissioning	14
6.2	Starting Procedure	15
6.3	During Operations	16
6.4	Periodic Checks	17
6.5	Stopping Procedure	17
7.0	Maintenance & Service	18
7.1	General Instructions	18
7.2	Preparation for Maintenance	19
7.3	Maintenance of Mechanical Seals	19
7.4	Dismantling	20
7.4.1	General	20
7.4.2	Introduction	20
7.4.3	Dismantling Procedure	21
7.4.4	During and after Dismantling	27
7.4.5	Reassembly	28
8.0	Preventive Maintenance	35
8.1	Daily Checks	35
8.2	Periodical Checks	35
8.3	Annual Checks	35
9.0	Corrective Maintenance	37
10.0	Technical Data	37
10.1	Direction of Rotation	37
10.2	Specification for O-ring, Gasket	37
10.3	Pump Shaft Details	38
10.4	Coupling Details	38
10.5	Bearing & Lubrication	38
11.0	Cross Sectional drawing with Part list	39
12.0	Interchangeability Chart	40
13.0	Exploded View	42
14.0	General Outline Dimensions	43
15.0	Faults and Remedial Actions	45
16.0	General Information & Safety	47



INTRODUCTION

1.0 GENERAL

This manual gives the safety, installation, operation & maintenance instructions for Kirloskar make KW-LC series pumps. KW-LC range pumps are long coupled centrifugal pumps for Water pump applications. The pump is coupled with motor through rigid type axially split spacer coupling. The coupling is produced using high tensile aluminium material. The motor is standard vertical flange mounted unless specifically asked to supply as per purchase order specifications. These pumps are manufactured to close tolerances and are having robust construction. However, proper installation, operation and maintenance is equally important to ensure trouble free operation. These instructions should be followed carefully for satisfactory performance of the pumping unit. Only mechanical aspects are dealt within this booklet.

1.1 NOMENCLATURE

KW-LC pumps are identified by their general code. The first two letters (KW) designate the name of the product. The next two digits designates the suction and delivery size and subsequent one letter designates the impeller design and subsequent two letters designates the pump type

Pump sizes covered by this manual are:

Pump Model	Suction size mm	Delivery size mm
KW 04C (LC)	40	40
KW 04J (LC)	40	40
KW 05J (LC)	50	50
KW 06J (LC)	65	65
KW 06K (LC)	65	65
KW 08D (LC)	80	80
KW 08E (LC)	80	80
KW 10C (LC)	100	100
KW 10F (LC)	100	100
KW 10J (LC)	100	100
KW 10K (LC)	100	100
KW 12J (LC)	125	125
KW 12X (LC)	125	125
KW 15X (LC)	150	150
KW 20M (LC)	200	200

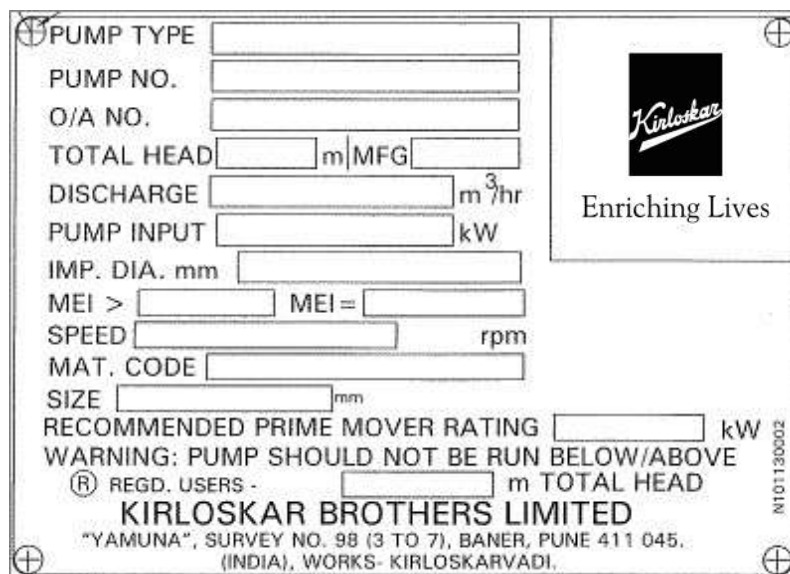


1.2 APPLICATION

KW-LC series pumps are mainly used for water supply, drinking water, cooling water in various industries, circulation of water in HVAC applications, Air-conditioning plants, fire fighting applications.

1.3 NAME PLATE INFORMATION

Every pump has the following nameplate fitted to a motor stool (2900001) provided with necessary identification of the pump and its specific hydraulic characteristics.



The nameplate must not be removed. Loss of this plate could make identification impossible. This in turn could affect safety and cause difficulty in obtaining spare parts.

- 1.4** Components of KW-LC series pumps are highly standardised, and most of the parts are interchangeable.
- 1.5** Pumps when properly installed & given due care in operation & maintenance should operate satisfactorily for a long period.
- 1.6** When the pump is received, it should be inspected & located in dry place before the actual use of pump. The coupling should be rotated once in a month to prevent pitting of bearing surfaces.



2.0 GENERAL INFORMATION & SAFETY INSTRUCTION

The products supplied by **Kirloskar Brothers Ltd** have been designed with safety in mind. Where hazards cannot be eliminated, the risk has been minimised by the use of guards and other design features. Some hazards cannot be guarded against and the instructions below **MUST BE COMPLIED WITH** for safe operation. These instructions cannot cover all circumstances: **YOU** are responsible for using safe working practices at all times.

- 2.1 Kirloskar Brothers Ltd** products are designed for installation in designated areas which are to be kept clean and free of obstructions that may restrict safe access to the controls and maintenance access points.

As stated above a **pump nameplate** is fitted to each unit and **must not be removed**. Loss of this plate could make identification impossible. This in turn could affect safety and cause difficulty in obtaining spare parts. In case of any accidental loss or damage occur, contact **Kirloskar Brothers Ltd.** immediately.

The pump nameplate will include details of the duty condition in terms of capacity and generated head at rated speed. In addition, the nameplate will be stamped with the Minimum Efficiency Index (MEI) based on full diameter of the impeller at the rated speed.

- 2.2** Access to the equipment should be restricted to the personnel responsible for installation, operation and maintenance and they must be trained, adequately qualified and supplied with the appropriate tools for their respective tasks.
- 2.3 Kirloskar Brothers Ltd.** requires that all personnel that are responsible for installation, operation or maintenance of the equipment, have access to and study the product instruction manual **BEFORE** any work is done and that they will comply with all local and industry-based safety instructions and regulations.
- 2.4** Ear defenders should be worn where the specified equipment noise level exceeds locally defined safe levels. Safety glasses or goggles should be worn where working with pressurised systems and hazardous substances. Other personal protection equipment must be worn where local rules apply.
- 2.5** Do **NOT** wear loose or frayed clothing or jewellery that could catch on the controls or become trapped in the equipment.



- 2.6** Check and confirm that the manual is the relevant copy by comparing the product mentioned on the product name plate and product mentioned in manual.
- 2.7** Note any limits to the pump application specified in the contract documentation. Operation of the equipment outside these limits will increase the risk from hazards noted below and may lead to premature and hazardous pump failure.
- 2.8** Clear and easy access to all controls, gauges and dials etc. **MUST** be maintained at all times and Hazardous or flammable materials must **NOT** be stored in pump rooms unless safe areas or racking and suitable containers have been provided.

IMPROPER INSTALLATION, OPERATION OR MAINTENANCE OF THIS KIRLOSKAR BROTHERS LIMITED PRODUCT COULD RESULT IN INJURY OR DEATH.

Within the manual, safety instructions are marked with safety symbols.

Hazard



This symbol refers to general mechanical aspects of safety.

Hazard



This symbol refers to electrical safety symbol

ATTENTION

This symbol gives warning of a hazard to the pump itself, which in turn, could cause a risk to personal safety.

3.0 TRANSPORT HANDLING & STORAGE INSTRUCTION

3.1 TRANSPORT

KW-LC pumps are despatched fully assembled. Pumps are protected against corrosion and packed for transport by normal road, rail and sea carriers



3.2 HANDLING

Crushing Hazard

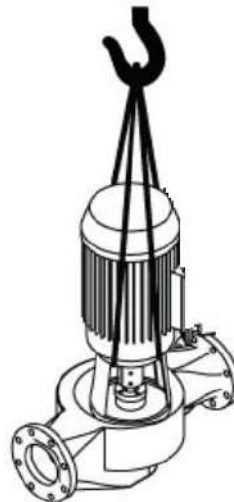


When lifting the pump unit, use lifting equipment having a safe working load rating suitable for the weight specified. Use suitable slings for lifting any pump not provided with lifting points.

The use of suitable forklift truck and four-chain crane sling equipment is recommended but locally approved equipment of suitable rating may be used.

Pumps are usually supplied on pallets for handling by forklift truck, to lift from the pallet the pump should be slung as shown.

Pump weight is shown on the Pump general arrangement drawing.



3.3 STORAGE

3.3.1 Temporary Storage for up to Six Weeks

If the pump is not to be used immediately, it should be stored carefully in a vertical position, in a sheltered, dry location. The proper support shall be given below suction and delivery nozzle so as pump will remain always in vertical position

Additional rust preventative should be applied to all unpainted carbon steel or cast iron parts, and should not be removed until final installation.

3.3.2 Long Term Storage

Shearing Hazard



Do **NOT** place fingers or hands etc. into the suction or discharge pipe outlets and do **NOT** touch the impeller, if rotated this may cause severe injury. To prevent ingress of any objects, retain the protection covers or packaging in place until removal is necessary for installation. If the packaging or suction and discharge covers are removed for inspection purposes, replace afterwards to protect the pump and maintain safety.

For special protection of electric motors, refer to the manufacturers' instructions.

3.3.3 Exposed or Extreme Conditions Storage

For exposed storage or extreme variants in atmospheric or environmental conditions, please refer to **Kirloskar Brothers Limited** for special storage instructions to suit the conditions applicable.

4.0 GENERAL DESCRIPTION

The **Kirloskar Brothers Limited** range of KW-LC Pumps is centrifugal pumps that comply with KBL Pump Manufacturing Standard.

The mechanical assembly comprises an electric motor fitted with pump through spacer type axially split rigid coupling. Impeller of enclosed type and mounted on pump shaft at other end.

The suction and delivery nozzle are cast integral with volute casing. The suction and delivery nozzle are in-line. The suction side casing wear ring is fitted in volute casing and delivery casing wear ring is fitted in casing cover.

The bearing bush is fitted in casing cover. Motor stool is provided to support the motor. Casing cover is sandwiched between volute casing and motor stool.

Pump is provided with mechanical seal which is easily replaceable without disturbing suction and delivery piping as well as without disturbing the motor.

The mounting position is provided on the underneath of the volute casing for attachment to suitable foundation.

Nameplate details are shown on the Motor Stool, full pump specification can be supplied on a data sheet, if requested.



- Notes-** (1) Total Head specified is the Duty Head generated by the pump only.
(2) Suction pressure must be included when assessing the Maximum Working Pressure.

5.0 ASSEMBLY & INSTALLATION

Shearing Hazard



Do **NOT** place fingers or hands etc. into the suction or discharge pipe outlets and do **NOT** touch the impeller, if rotated this may cause severe injury.

5.1 Initial Inspection for Damage

During transport and storage, accidental damage to the pump may have occurred. When the pump is to be installed, or in the event of a handling accident, carefully check that no damage has been sustained by the pump **BEFORE** installation and commissioning.

5.2 Preparation for mounting

Before installation, check that the pump mounting location is suitable for accepting the pump. Refer to Section 8, for details of pump installation dimensions or to a certified General Arrangement Drawing when available.

5.3 Pump Preparation Abrasion and Entrapment Hazard



Do **NOT** touch any moving or rotating parts. Guards are provided to prevent access to these parts, where they have been removed for maintenance purpose, they **MUST** be replaced before operating the equipment.

Remove packaging but leave the flange covers in place, check that impeller rotates freely by hand by turning the shaft / coupling.

5.4 Pump Installation

KW-LC pumps are to be mounted on substantial rigid foundations to reduce vibrations.

5.5 Location

- The pump should be installed as near the liquid source as possible, with the shortest and most direct suction pipe practically.

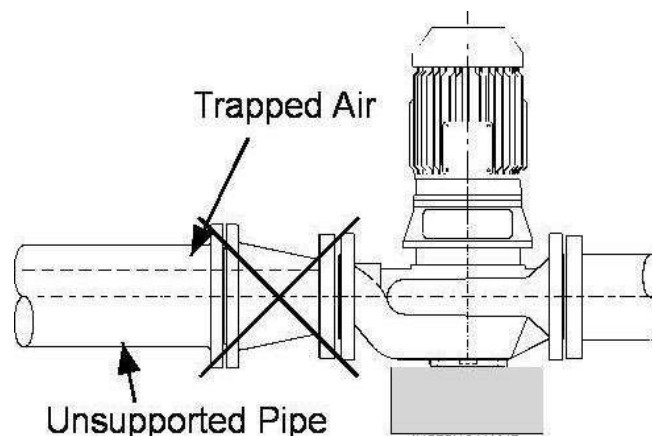


- The pump should be installed with sufficient accessibility for inspection and maintenance. Ample space and head room should be allowed for the use of an overhead crane or hoist sufficiently strong to lift the unit.
- Make sure there is a suitable power source available for the pump driver. If motor driven, electrical characteristics should be identical to those shown on motor data/ name plate.

5.6 Suction Pipe work

The run of suction pipe work must be such that air can **NOT** become trapped where it would be sucked into the pump on starting. The suction pipe size is recommended to be one or two sizes larger than the pump suction branch and reducers if used must be eccentric type to eliminate the possibility of an air pocket being formed.

Bends in the suction pipeline should be as large as possible. The no. of bends shall be minimum. The pipe made as short and as straight as possible and all joints must be fully air tight. If fitting a strainer, it should have a free area of one and a half times the area of the suction pipe.



When pumping water at temperatures above 70°C, care must be taken to ensure that enough pressure is available at the impeller entry to prevent vaporization.

An appropriate fine strainer is recommended to prevent foreign matter from being drawn into the pump. A screen or basket strainer may also be required to hold back larger items. These should be sized to maintain the flow through them to below 2 m/s.

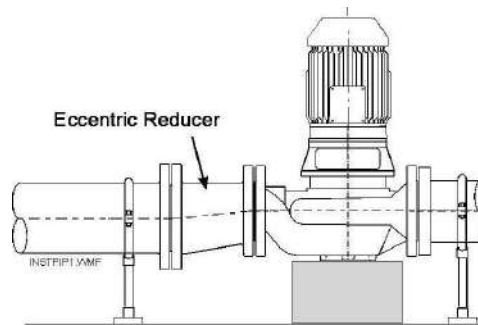
The suction valve can be used to isolate the pump from suction tank for maintenance purpose.

The suction pipe work must be flushed clean to ensure that site debris is not drawn into the pump when it is commissioned.

5.7 Discharge Pipe work

The discharge pipe size should be sized to ensure a flow velocity of 1.5 to 4.5 m/s is not exceeded. This is usually one size larger than the discharge branch. Pipework should be as short and straight as possible to reduce friction head loss.

Preferred Pipework



A non-return valve is usually fitted to prevent the pump from excessive back pressure and reverse rotation and a discharge valve is usually fitted to regulate the flow and allow for inspection and maintenance on the pump.

The suction and discharge pipe work must be independently supported and positioned such that no excessive forces and moments are exerted on the pump flanges.

ATTENTION

Failure to support suction and delivery pipe work may result in distortion of the pump casing, with the possibility of early pump failure.

5.8 Foundations

If pump is grouted in concrete foundation, the pump must be secured to substantial foundations to minimise vibrations. After the pump has run for about 200 hours, the foundation bolt should be checked for tightness.

5.9 Grouting Procedure

Grout compensates for uneven foundation, distributes weight of unit and prevents shifting. Use an approved, non-shrinking grout as follows, after setting and leveling unit.

- Build strong form around foundation to contain grout.
- Soak top of concrete foundation thoroughly, then remove surface water.
- Base plate should be completely filled with grout and, if necessary, drill vent holes to remove trapped air.

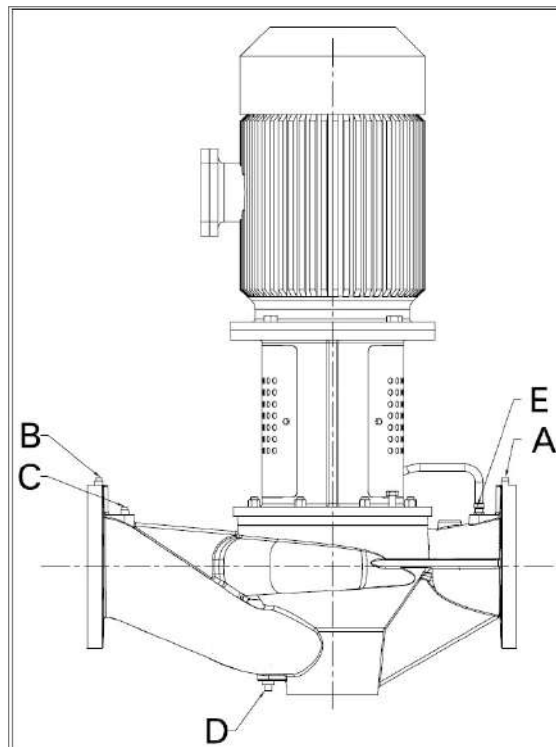


- After grout has thoroughly hardened, check the foundation bolts and tighten if necessary.
- Check the alignment after the foundation bolts are tightened.
- Approximately 14 days after the grout has been poured or when the Grout has thoroughly dried, apply an oil base paint to the exposed edges of the grout to prevent from air and moisture coming in contact with the grout.

5.10 Auxiliary Connections

Auxiliary connections such as Flushing connections to mechanical seal, Pressure Gauge connections at suction and delivery etc are made. Other tapped connections are plugged.

KW-LC series pumps are supplied with NPT tapping connections as standard supplied and it is in inches. Auxiliary connection details for KW-LC series pump are as below:





Sr. No.	Code for Piping connection	Description	Size Of connection NPT
1	A	Gauge connection Discharge Side	1/4"
2	B	Gauge connection Suction Side	1/4"
3	C	Venting connection for pump casing	1/4"
4	D	Pump casing drain	1/2"
5	E	Flushing /Sealing connection	1/4"
6	F	Venting connection for pump casing	1/4"

6.0 COMMISSIONING & OPERATION

6.1 Commissioning checks

These checks must be done after first installation and after pump maintenance that required removal of the rotating assembly.

Abrasion and Entrapment Hazard



Do **NOT** touch any moving or rotating parts. Guards are provided to prevent access to these parts, where they have been removed for maintenance, they **MUST** be replaced before operating the equipment.

Check that the rotating assembly is free to rotate by hand before connecting the power supply. Also check that the piping system has been properly connected with all joints tightened and instrumentation is in position.

ATTENTION

Check that the pump is primed. Pumps should never be run dry as the pumped liquid acts as a lubricant for the close running fits surrounding the impeller and damage will be incurred.

Prime the pump using an ejector, exhauster or vacuum pump. Ensure that entire air is removed, and pump is properly primed so as pump will not run dry since dry running may contribute to premature gland failure.

Connect the electrical supply to the motor. Momentarily switch on motor and check direction of rotation. This should be such that the pump assembly turns clockwise when viewed from the driven end. For three phase electric motors, if direction of rotation is incorrect, disconnect the supply and change over two of three supply wires.



6.2 Starting Procedure

BEFORE A KW-LC PUMP IS STARTED, ALWAYS ENSURE THAT THE SUMP IS FILLED TO THE CORRECT LEVEL WITH LIQUID, AND THAT LEVEL CONTROLS ARE FUNCTIONING CORRECTLY.

Check that the suction valve is open and that the pump is primed.

Open the discharge valve to one quarter open to prevent hydraulic lock from occurring. Switch on the motor and allow it to build up to full operating speed. Slowly open discharge valve until the pump reaches the required duty condition.

Check that the motor is not overloading, unit is not vibrating or excessively noisy, the motor is not overheating, and that the pump is developing the correct flow and head requirements.

If the pump is operating at its normal speed, the pump should be shut down at once if any of the following defects are found:

- a) No liquid delivered.
- b) Not enough liquid delivered.
- c) Not enough pressure.
- d) Loss of liquid after starting.
- e) Vibration.
- f) Motor runs hot.
- g) Excessive noise from cavitation.
- h) Pump overheating.
- i) Leakage through Mechanical seal

Recommended corrective action for these faults is given in Section 7 Faults and Remedial Action.

6.3 During Operation

Hot Surfaces Hazard



Do **NOT** touch surfaces that during normal running will be sufficiently hot to cause injury. These are marked with the **HOT** warning symbol. Note that these surfaces will **remain hot after the pump has stopped**: allow sufficient time for cooling before maintenance.

Be cautious and note that other parts of the pump may become hot if a fault is developing.



Cold Conditions Hazard



Do **NOT** operate water pumps in temperatures below freezing point, without first checking that the pumped fluid is not frozen and the pump is free to turn. Pumps in these environments should be drained down during inactivity and re-primed before starting.

Hazardous Noise



In addition to local or site regulations for noise protection **Kirloskar Brothers Limited** recommend the use of Personal Ear Protection equipment in all enclosed pump rooms and particularly those containing diesel engines. Care must be taken to ensure that any audible alarm or warning signal can still be heard with ear defenders worn.

Hazardous Gases, Mists, Sprays and Leaks



Be aware of the hazards relating to the pumped fluid, especially the danger from inhalation of noxious and toxic gases, skin and eye contact or penetration. Obtain and understand the hazardous substance (COSHH) data sheets relating to the pumped fluid and note the recommended emergency and first aid procedures.

6.4 Periodic Checks

a) Motor Bearings

Check the bearing temperatures do not exceed 70°C as an increase may indicate the early stages of bearing trouble.

b) Noise

Listen for any unusual noise or an increase in normal sound level.

This may result from:

- i) Loose fasteners for guards and other equipment.
- ii) Air trapped in the pump i.e. the pump was not fully primed.
- iii) Cavitation caused by air in the liquid from leaks in the suction pipework.
- iv) Small solids in the liquid.

NOTE - At certain installations or at certain operation points on the pump curve, the noise level 85 dB (or the actual pump specified noise level) can be exceeded.

c) Suction Gauge Reading

If this is higher than normal, investigate and check that valves in the suction pipe work are fully open or that the suction pressure may have increased.



d) Discharge Gauge Reading

If this is lower than normal, check for a leak in the associated pipework or that a valve in the delivery line has been opened when normally it is partially closed.

6.5 Stopping Procedure

Stop the motor then fully close the discharge valve.

7.0 MAINTENANCE & SERVICE

7.1 General Instructions

Kirloskar Brothers Limited KW-LC pumps will provide many years of trouble free service when maintained in accordance with these instructions. In the event of failure of the pump it is recommended that **Kirloskar Brothers Limited** Service Engineer of Authorised Dealer or Service Department is called to investigate and carry out repairs. The following instructions are given to cover the main elements of strip and rebuild but do NOT include instructions for work that MUST be done by an **Kirloskar Brothers Limited-Service** Engineer.

Recommended Maintenance Schedule

Period	Maintenance Required
Weekly	Carry out periodic checks as shown in Section 5.3 and take corrective action as shown in Section 7
Where specified in the motor manufacturer's instructions at the recommended intervals check and lubricate the motor bearings as applicable.	
Half-yearly or After 5000 Hours Running	Check and tighten all holding down bolts if found loose refer to Section for recommended bolt tightening torques.
Each Year	Assess the performance of the pump against the duty specifications and take corrective action as shown in Section 7

The following hazards may arise during maintenance work:

Fluid Pressure Jet Hazards



Check and ensure that the pump operates at below the Maximum Working Pressure specified in the manual or on the pump nameplate and before maintenance, ensure that the pump is drained down.



Hazardous Materials



Wear a suitable mask or respirator when working with packing or gasket components that contain fibrous material, as these can be hazardous when the fibrous dust is inhaled. Be cautious, if other supplier's components have

been substituted for genuine SPP Pumps Ltd parts, these may then contain hazardous materials.

Hazardous Gases, Mists, Sprays and Leaks



Be aware of the hazards relating to the pumped fluid, especially the danger from inhalation of noxious and toxic gases, skin and eye contact or penetration. Obtain and understand the hazardous substance (COSHH) data sheets relating to the pumped fluid and note the recommended emergency and first aid procedures.

BEFORE ATTEMPTING ANY MAINTENANCE ON A PUMP, PARTICULARLY IF IT HAS BEEN HANDLING ANY FORM OF HAZARDOUS LIQUID, ENSURE THAT THE UNIT IS SAFE TO WORK ON. THE PUMP MUST BE FLUSHED THOROUGHLY WITH A SUITABLE CLEANSER TO PURGE AWAY ANY OF THE PRODUCT LEFT IN THE PUMP COMPONENTS. THIS SHOULD BE CARRIED OUT BY THE PLANT OPERATOR AND A CERTIFICATE OF CLEANLINESS OBTAINED BEFORE STARTING WORK. TO AVOID ANY RISK TO HEALTH IT IS ALSO ADVISABLE TO WEAR PROTECTIVE CLOTHING AS RECOMMENDED BY THE SITE SAFETY OFFICER, ESPECIALLY WHEN REMOVING OLD SEALS OR GASKETS THAT MAY BE CONTAMINATED.

7.2 Preparation for Maintenance

Electric Shock & Accidental Starting Hazard



ISOLATE the equipment before any maintenance work is done. Switch off the mains supply, remove fuses, apply lock-outs where applicable and affix suitable isolation warning signs to prevent inadvertent re-connection.

In order to avoid the possibility of maintenance personnel inhaling dangerous fumes or vapours. It is recommended that maintenance work be carried out away from the pump location by removal of the motor and shaft assembly to a suitable maintenance area.

No special tools are required for dismantling and re-assembling, however, it is important to ensure the suitable lifting equipment is available and that the work is carried out in a clean area.



7.3 Maintenance of Mechanical Seals

Periodic maintenance of the seal area is required to restrict excess leakage. The mating rings of mechanical seal along with elastomers or entire mechanical seal should be replaced if excessive leakage occurs. A small amount of leakage is essential to ensure that the seal is lubricated.

7.4 Dismantling

7.4.1 General

If the pump is maintained and serviced regularly, breakdowns that require the pump to be dismantled; should not occur.

If a fault occurs, the cause should be identified before dismantling. Refer to Section 7 - Faults and Remedial Action.

Refer to Section 8 - for the Pump Section Drawing for your pump.

When the pump is being dismantled, parts must be handled with care, to avoid damage by dropping and hammer blows.

Where new joints are made, correct gasket thicknesses and correct size of O-rings must be maintained.

After reassembly the rotating unit must turn easily by hand, otherwise premature pump failure may occur.

7.4.2 Introduction

In general, when pumps are dismantled, inspected and/or replacement parts fitted, the work is undertaken for one of the following reasons.

a) Preventative Maintenance

Because the time for the regular periodic inspection has become due. Planned inspection and maintenance at pre-determined intervals is a sound insurance against a forced shutdown due to a failure at a more inconvenient time.

b) Remedial Maintenance

Perceptible fall off in pump performance affecting capacity and pressure or: wear and failure of mechanical seal or: excessive and continuous vibration with persistent noisy operation.

The extent of dismantling required will depend upon the reasons above.

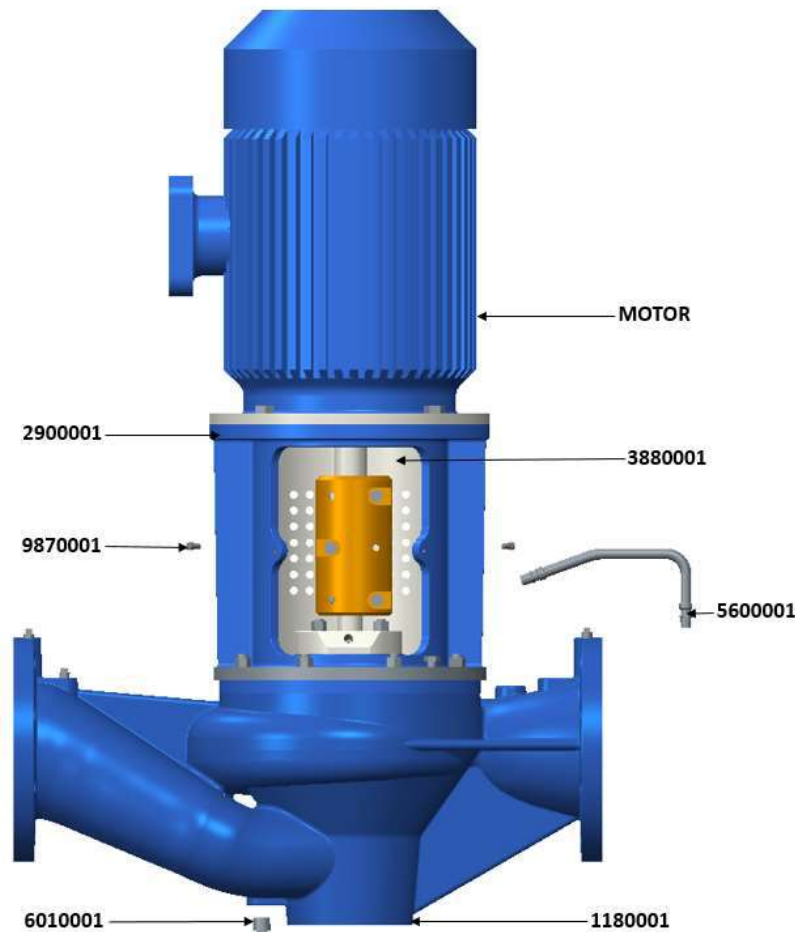
In the case of preventative maintenance, inspections are done at preselected times and the pump usually requires complete dismantling, so that all parts can be cleaned, examined and measured for wear. The extent of dismantling for remedial maintenance will depend upon the cause of failure and need only to reveal the source of the trouble.

When dismantling the pump, the pump casing can remain mounted in the pipework. Tightly shut both the inlet and outlet valves (if fitted) and disconnect any external service connectors.

7.4.3 Dismantling Procedure

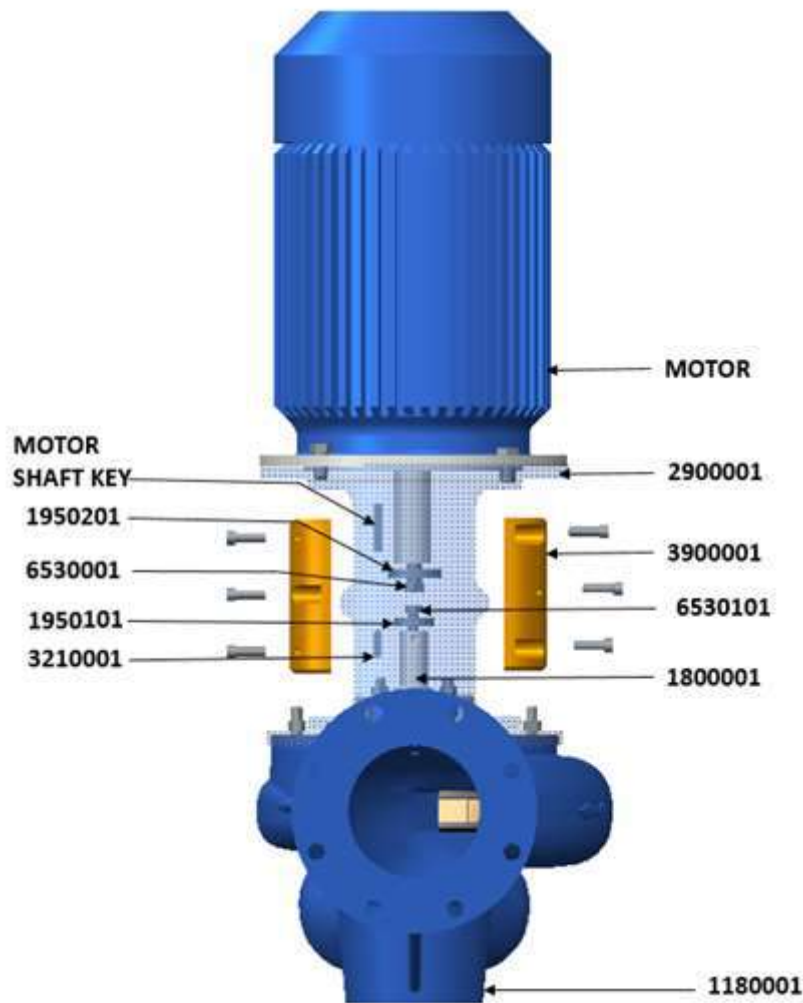
To dismantle pump, proceed in the following sequence:

1. Drain liquid from the pump casing (1180001) by removing plug. (6010001)
2. Unscrew screws (9870001) on motor stool (2900001) to remove mesh guard (3880001)
3. Remove flushing pipe (5600001) connections on Mechanical Seal cover (2310001) and on Pump Casing (1180001)



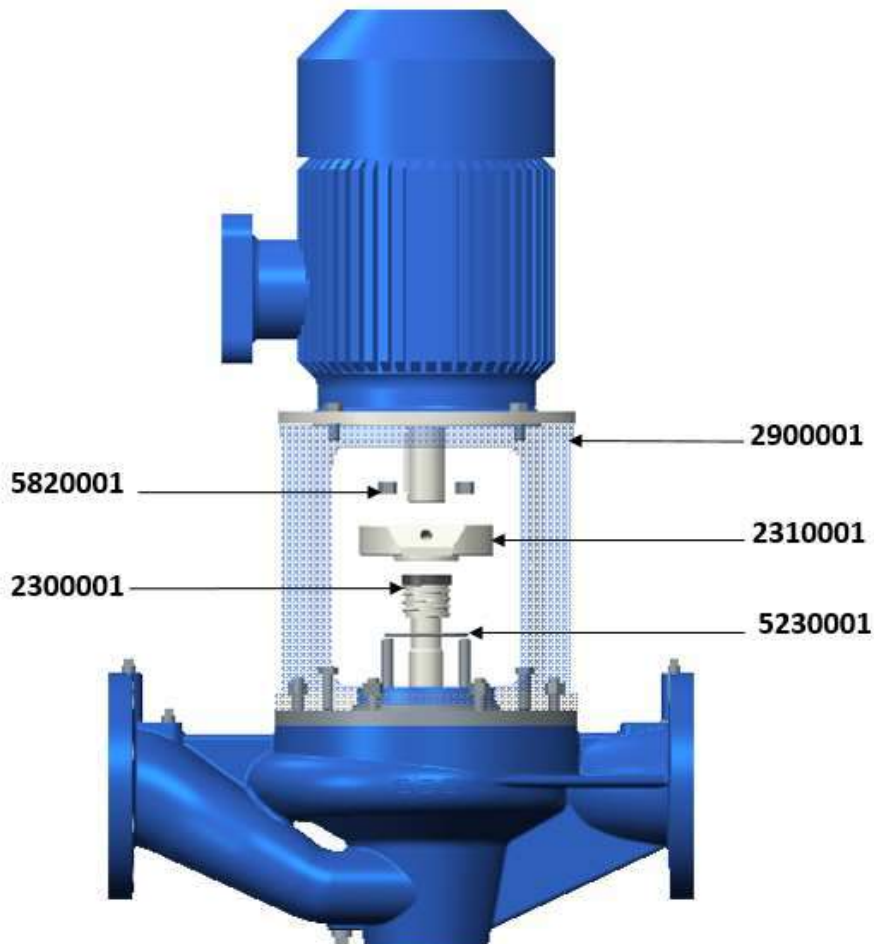
4. Unscrew Hex Socket screws from split rigid coupling (3900001) to dismantle the coupling halves

5. Unscrew screw (6530101) on pump shaft (1800001) from driving end (DS) and remove Spacer (1950101)
6. Unscrew the studs (7340101) on motor stool (2900001) to remove the motor (if motor is required to be removed)
7. Unscrew the screw (6530001) on motor shaft and remover Spacer (1950201) if essential

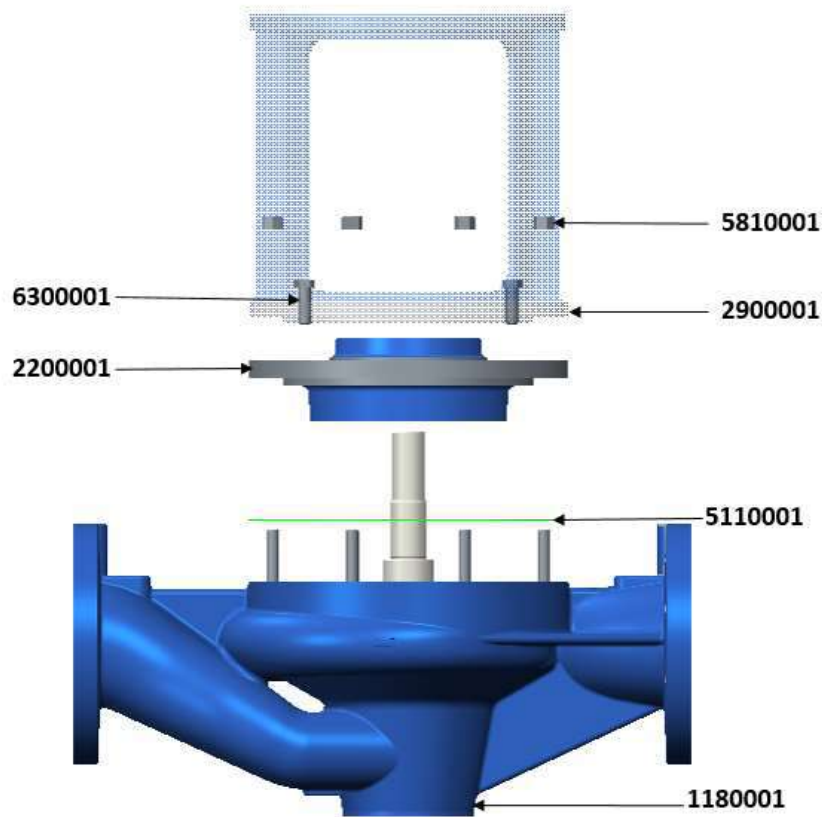


8. Mechanical Seal (2300001) is accessible and can be easily removed without removing motor.
9. Unscrew the screws hex nuts (5820001) on mechanical seal cover (2310001)
10. Remove the mechanical seal cover (2310001) along with mechanical seal stationary seat

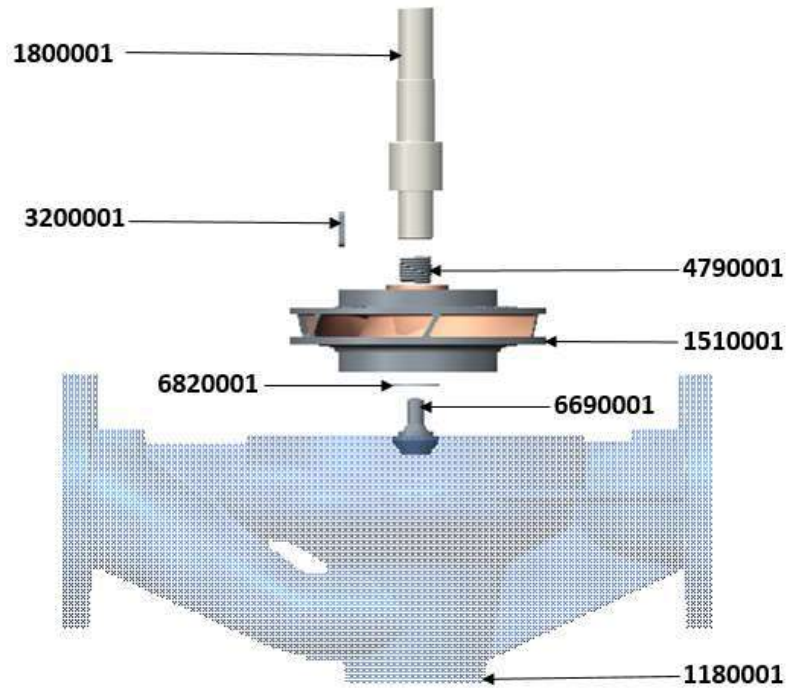
11. Remove the mechanical seal stationary seat from mechanical seal cover (2310001)
12. Remove the rotating unit of mechanical seal (2300001)
13. Remove the O-ring (5230001) from casing Cover (2200001)



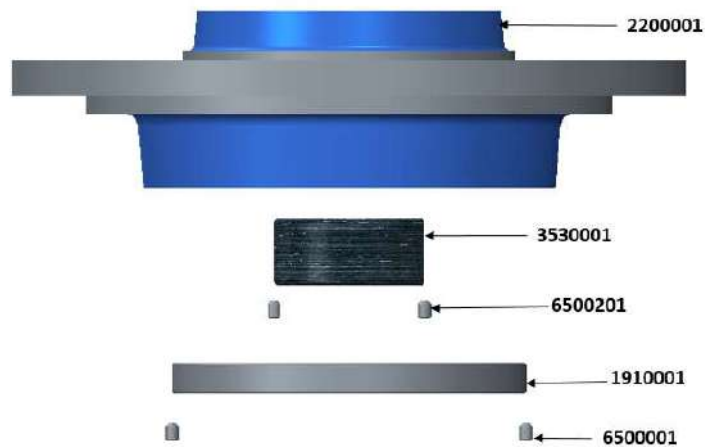
14. Unscrew hex nuts (5810001) on casing cover (2200001) to remove motor stool (2900001)
15. Remove motor stool (2900001) with the help of release screws (6300001)
16. Remove casing cover (2200001) with the help of release screws (6300001)



17. Remove rotating unit i.e. pump shaft (1800001) along with impeller (1510001) & impeller screw (6690001)
18. Unscrew impeller screw (6690001) and from pump shaft (1800001) from impeller side
19. Remove impeller (1510001) with the help of puller from pump shaft
20. Remove impeller key (3200001) on pump shaft
21. Remove the Helicoil insert (4790001) from pump shaft (1800001) end tapping if damaged.

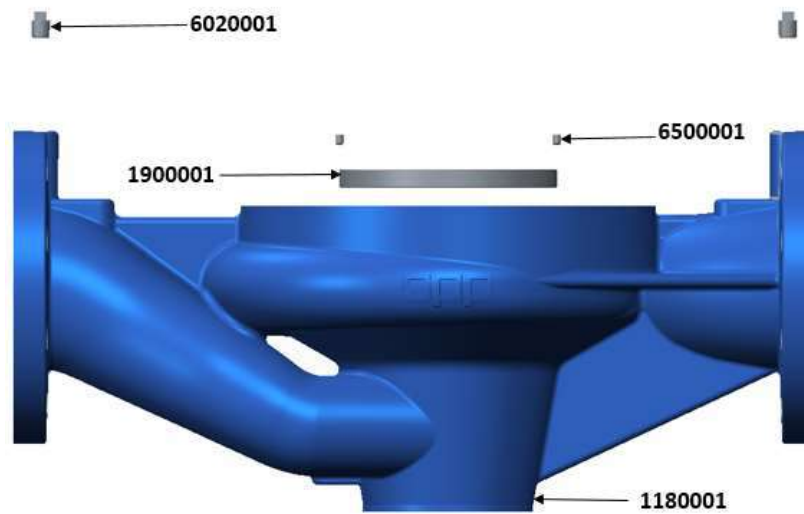


22. Unscrew grub screws (6500201) on casing cover to remove bearing bush (3530001)
23. Remove bearing bush (3530001) from casing cover by soft face mallet or hand pressing from mechanical seal cover side if damaged
24. Unscrew grub screws (6500001) on casing cover to remove casing wear ring (1910001) if damaged.
25. Remove casing wear ring (1910001) from casing cover (2200001)



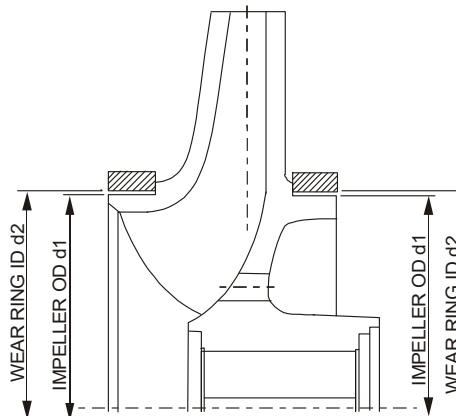


26. Unscrew grub screws (6500001) on pump casing to remove casing wear ring (1900001)
27. Remove casing wear ring (1900001) from pump casing (1180001)
28. Unscrew plugs (6020001) for suction pressure gauge and delivery pressure gauge on pump casing



7.4.4 During and after Dismantling

All parts must be carefully cleaned and checked for wear. Recondition or replace parts where necessary. Wear ring clearances should be checked and wear rings are to be replaced if excessive wear has taken place.





Sr. No.	Pump Model	Wear ring	Impeller dimension		Wearing Ring Dimension		Diametrical Clearance (mm)	
			Max. Ø	Min. Ø	Max. Ø	Min. Ø	Max.	Min.
1	KW04C (LC)	Front / Back	94.731	94.684	95.09	95.036	0.406	0.305
2	KW04J (LC)	Front	84.785	84.63	85.09	85.036	0.46	0.251
		Back	94.731	94.684	95.09	95.036	0.406	0.305
3	KW05J (LC)	Front / Back	99.731	99.684	100.09	100.036	0.406	0.305
4	KW06J (LC)	Front / Back	129.738	129.7	130.106	130.043	0.406	0.305
5	KW06K (LC)	Front / Back	119.731	119.684	120.09	120.036	0.406	0.305
6	KW08D (LC)	Front / Back	124.738	124.7	125.106	125.043	0.406	0.305
7	KW08E (LC)	Front / Back	114.731	114.684	115.09	115.036	0.406	0.305
8	KW10C (LC)	Front / Back	129.738	129.7	130.106	130.043	0.406	0.305
9	KW10J (LC)	Front / Back	144.687	144.649	145.106	145.043	0.457	0.356
10	KW10K (LC)	Front / Back	149.687	149.649	150.106	150.043	0.457	0.356
11	KW10F (LC)	Front / Back	154.687	154.649	155.106	155.043	0.457	0.356
12	KW12J (LC)	Front / Back	154.687	154.649	155.106	155.043	0.457	0.356
13	KW12X (LC)	Front / Back	159.687	159.649	160.106	160.043	0.457	0.356
14	KW15X (LC)	Front / Back	184.637	184.598	185.122	185.05	0.524	0.413
15	KW20M (LC)	Front	214.600	214.500	215.122	215.05	0.622	0.45
		Back	229.600	229.500	230.122	230.05	0.622	0.45

7.4.5 Reassembly

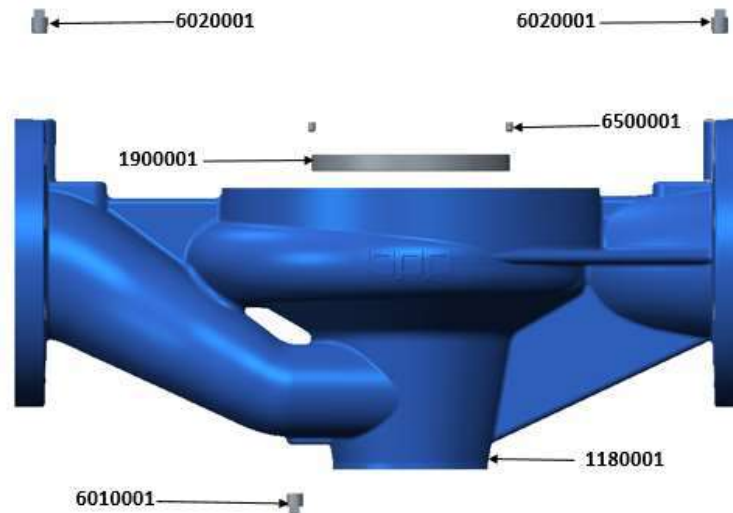
This procedure covers re-assembly of pump after complete dismantling of the pump. Before re-assembly, all the parts should be thoroughly cleaned in kerosene, petrol or benzene to remove the dust, rust, etc. After cleaning, the necessary parts should be replaced.

- 7.4.5.1 The assembly of the pump unit is carried out in the reverse order of dismantling.
- a) Use arbour press while fitting the Bush Bearings. (3530001)

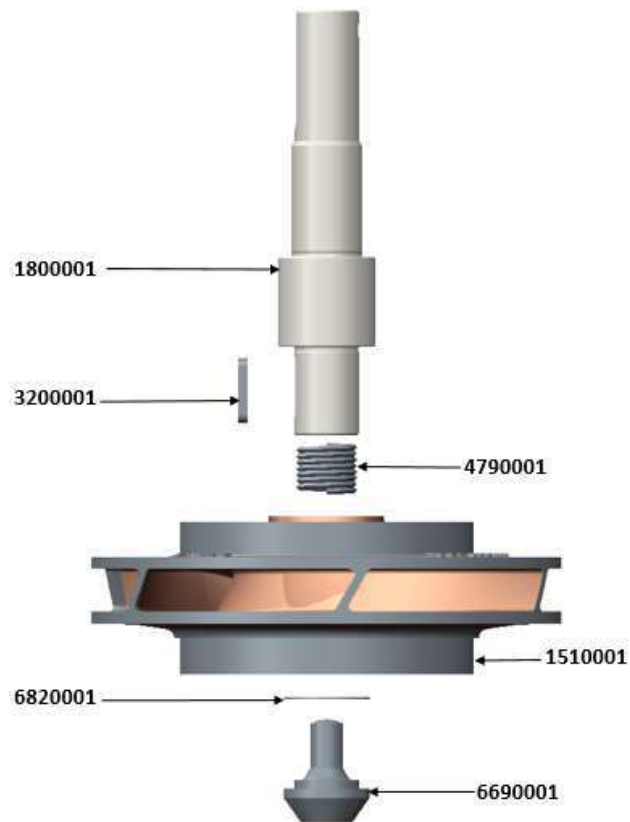
- b) Do not use hammer to fit the bearings. Do not damage the shaft surface specially where it is in contact with mechanical seal and bush bearing.

Ensure that all parts to be fitted are clean and free from burrs, with screw threads and abutting faces clean and free from damage.

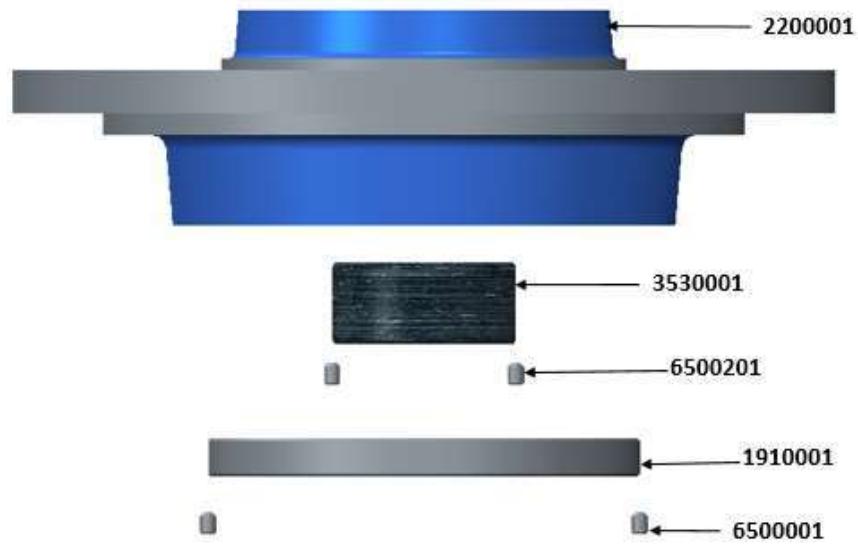
1. Plug the casing drain connection on pump casing
2. Plug the suction gauge connection on pump casing
3. Plug the delivery gauge connection on pump casing
4. Fit the Casing wear ring suction side (1900001) into pump casing (1180001).
5. Fit the grub screws (6500001) to fit casing wear ring to pump casing.



6. Fit the Heli-coil insert (4790001) on pump shaft (1800001) end tapping.
7. Mount the impeller key (3200001) on pump shaft (1800001).
8. Mount impeller (1510001) on the pump shaft (1800001).
9. Place gasket (6820001) for impeller screw from suction side.
10. Tighten the impeller screw (6690001) on pump shaft (1800001) & thus assembly the impeller (1510001) on pump shaft.

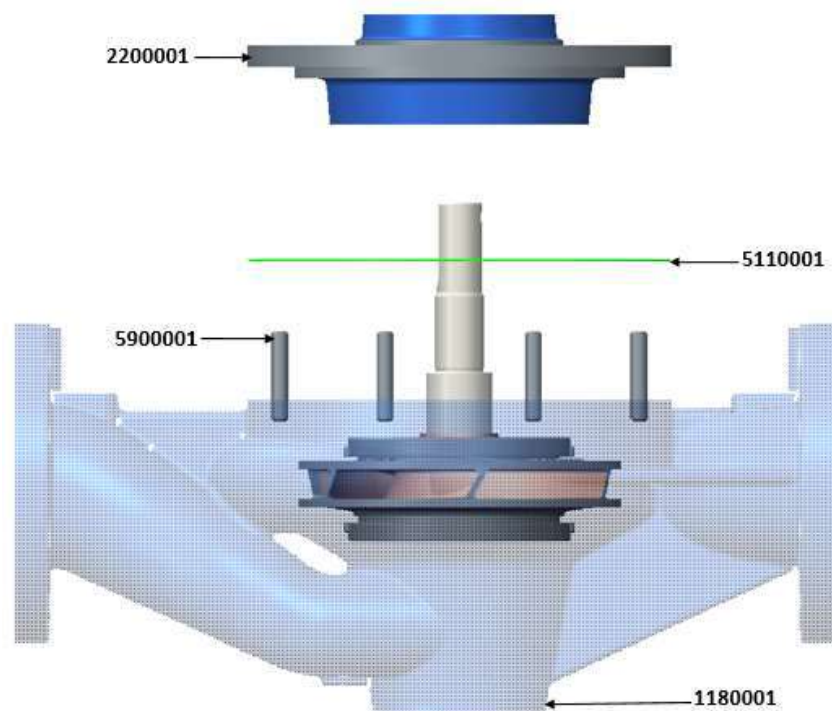


11. Fit the Casing wear ring delivery side (1910001) into casing cover (2200001).
12. Fit the grub screws (6500001) to fit casing wear ring casing cover.
13. Fit bearing bush (3530001) into casing cover.
14. Fit the grub screws (6500201) to fit bearing bush into casing cover.

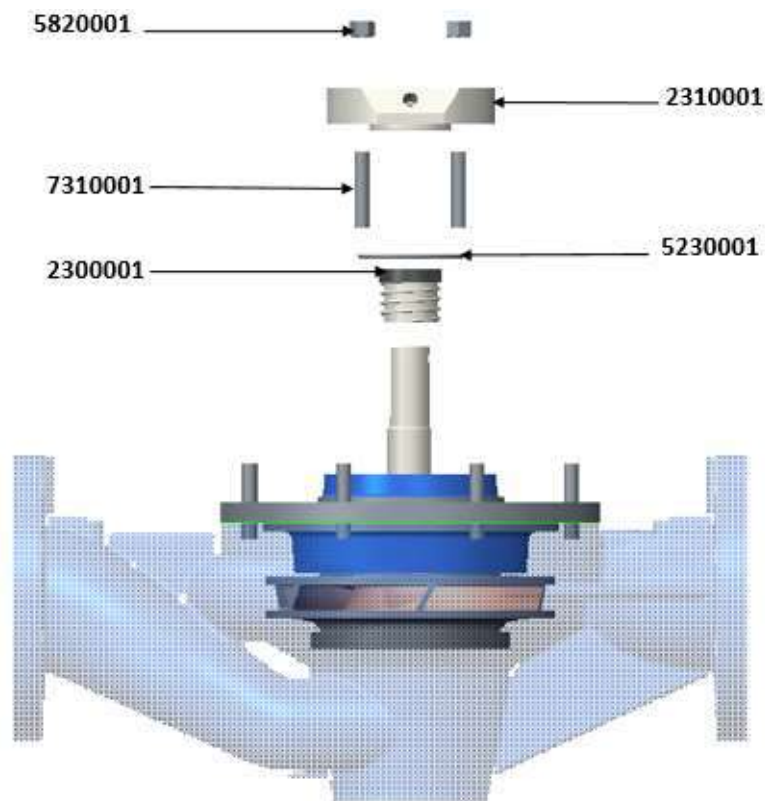


15. Fit the studs (5900001) on pump casing

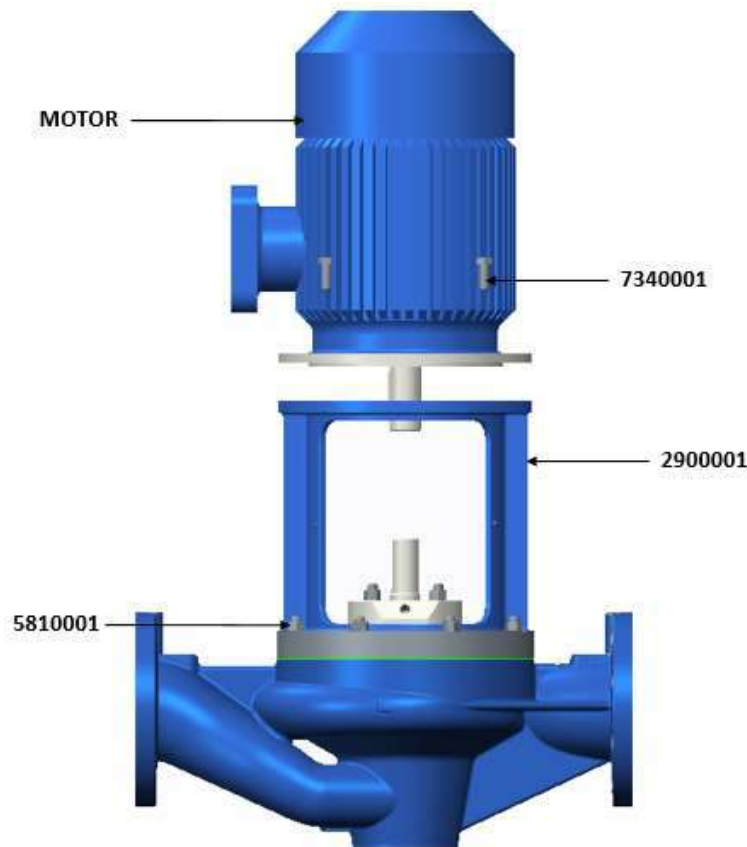
16. Place gasket (5110001) on pump casing (1180001)



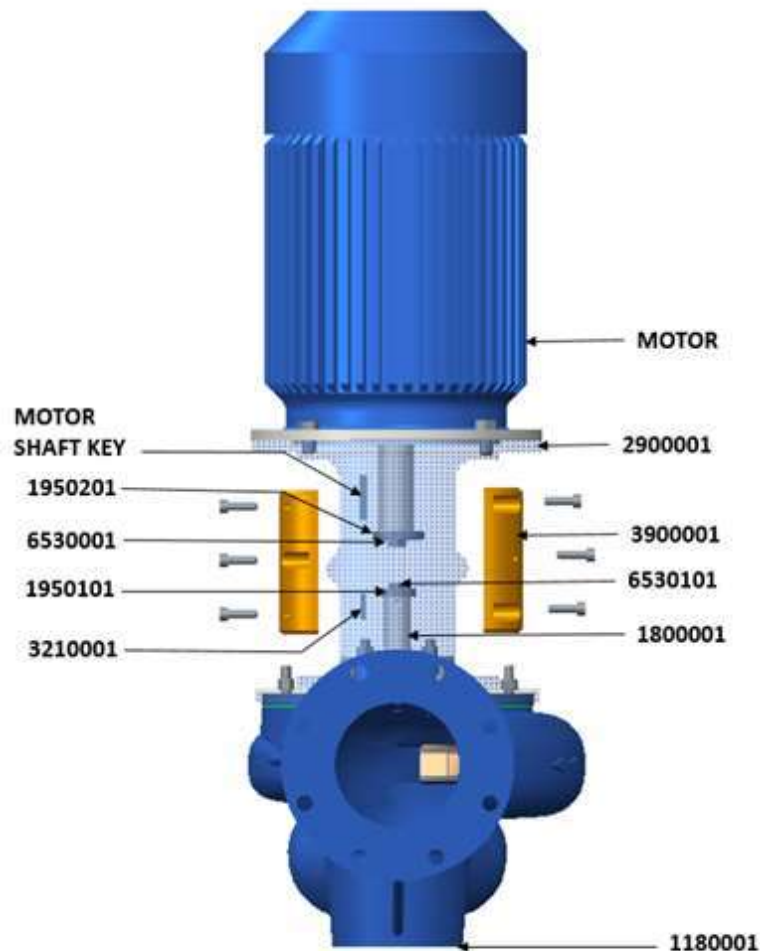
17. Insert pump shaft into casing cover.
18. Fit casing cover along with pump shaft & impeller assembly into pump casing.
19. Fit studs (5900001) on casing cover to fit mechanical seal cover.
20. Insert rotating unit of Mechanical seal on pump shaft
21. Fit stationary mating ring into mechanical seal cover
22. Place O-ring (5230001) between casing cover and mechanical seal cover on casing cover face
23. Insert the mechanical seal cover on pump shaft



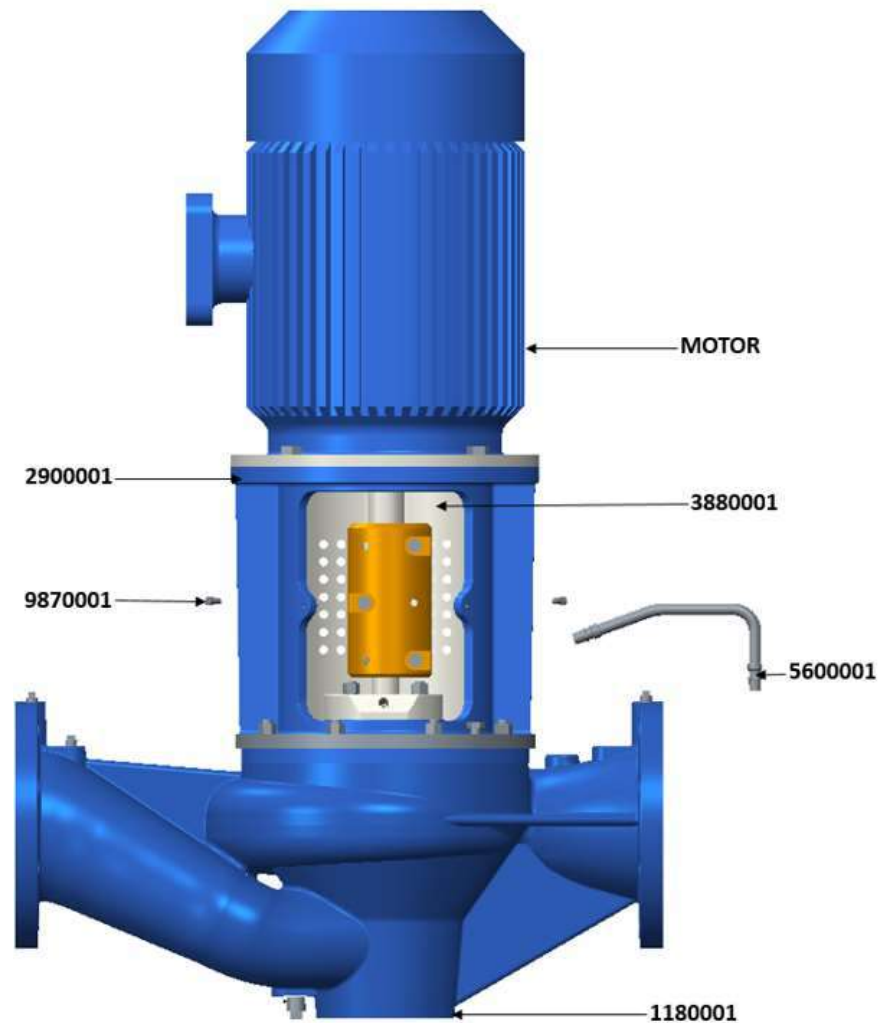
24. Fit Motor stool (2900001) on pump casing. Casing cover will be sandwiched between pump casing and Motor stool.
25. Tighten the Hex nuts to fit the motor stool on pump casing.



26. Fit Spacer for coupling (1950101) with hex screw on pump shaft
27. Fit Spacer for coupling (1950201) with hex screw on motor shaft
28. Place motor on motor stool (2900001)
29. Tighten Hex screws to fit the motor with motor stool.
30. Take one half of coupling in one hand
31. Lift rotating unit upward with the help of tool by another hand and provision of hole on shaft end.
32. Fix the coupling half on pump shaft by locating it in Spacers provided on pump shaft and motor shaft and hold the rotating unit assembly.
33. Take another half of coupling and fix on pump shaft and motor shaft by matching with another half of the coupling.
34. Insert hex socketed screws into holes provided on coupling from one end and tighten with hex screw with hex nut. Four no. of screws are used to fix the coupling. These screws are to be placed from opposite to each other. Two screws from one side and two screws from other side.
35. Thus, rotating unit is located into the coupling.



36. Rotate the rotating unit and ensure the free rotation of the unit.
37. Tighten the mechanical seal cover (2310001) with casing cover with the help of hex nut.
38. Again, rotate the rotating unit and ensure the free rotation of the unit.
39. Take flexible pipe and connect one end on mechanical seal cover and other end on pump casing.
40. Do a hydrostatic pressure test at 5 bar to ensure there is no leakage through mechanical seal.
41. Fit the mesh guard on motor stool from both sides with the help of hex screws.



8.0 PREVENTIVE MAINTENANCE

Preventive maintenance schedule is the periodical checks and precautions by which possibilities of failures and breakdowns are minimized.

8.1 Daily Checks

8.1.1 Periodical record of suction and delivery pressure, discharge quantity (if possible), input to the pump driver (kW or Current, Voltage, Frequency) should be maintained.

8.1.2 Ensure continuous supply of water for flushing to Mechanical Seal during working of pump



8.1.3 Noise and vibrations are the first signs of impending troubles like cavitation, air lock, choking of impeller or casing, failure of coupling and such other operating troubles. The pump performance should therefore be checked for noise and vibrations.

8.2 Periodic Checks

Periodic cycle time is to be decided depending upon the service of the pump. Recommended interval for periodic check is after every 500 working hours.

8.2.1 Temperature of Motor bearings shall be checked, and it is to be ensured that it is within limit.

8.2.2 Check for stuffing box leakage. As pump is with mechanical seal, there should not be product leakage from stuffing box

8.2.3 Ensure Coupling is in good condition

8.2.4 Ensure motor bearings are in good condition

8.2.5 Calibrate the measuring instruments

8.3 Annual Checks

8.3.1 The pump should be overhauled completely to check the clearance and to replace worn-out parts. Clearance between impeller and casing wear rings, clearance between shaft and bearing bush etc are very important. The bearings should be cleaned thoroughly and lubricated as per motor manual.

8.3.2 The effects of liquid handled on pump components should be checked. If abnormal corrosion, erosion is observed, the component should be replaced with that of suitable material.

8.3.3 When Mechanical seal is functioning satisfactorily without leakage, it is not advisable to do preventive maintenance. However, in case of any abnormalities, suggested to check the mechanical seal mating faces, elastomers etc. The instructions are to be followed as per seal manufacturer’s manual.

8.3.4 Ensure that coupling is in good condition. If required, replace spacers for coupling, coupling screws and nuts or entire coupling.



- 8.3.5** Ensure motor bearings are in good conditions.
- 8.3.6** The auxiliary pipelines and functioning of the auxiliary system should be checked. The main pipe also should be checked for scaling, leakage etc.
- 8.3.7** The measuring instruments, gauges etc should be recalibrated.
- 8.3.8** Full running test may be carried out to check whether there is any fault in the performance, in comparison with original performance.
- 8.3.9** Piping supports should be checked so that the pipes do not induce unwanted stresses on the pump.

9.0 CORRECTIVE MAINTENANCE

When investigating trouble with Kirloskar pumps, always remember that pumps have been tested at the factory and are mechanically correct when sent out. Discounting the possibility of damage during transit, most of the trouble in the field is due to faulty installation. Investigation shows that the majority of troubles with centrifugal pumps result from faulty conditions on the suction side.

BREAK DOWN-CAUSE-CHECK POINTS

In case of breakdown, we recommend the location of the fault by referring the table for ‘Break Down Check Points’ given at the end of this manual.

10.0 TECHNICAL DATA

10.1 Direction of rotation

Direction of rotation is clockwise when viewed from driving end.

10.2 Specifications for O-ring & Gasket:

Sr. No	Pump Model	O-ring size ID x Thick.- mm	Casing Gasket ID x OD x Th.- mm
01	KW04C (LC)	65 x 3	183 x 240 x 1
02	KW04J (LC)	65 x 3	250 x 304 x 1
03	KW05J (LC)	65 x 3	217 x 290 x 1
04	KW06J (LC)	65 x 3	224 x 295 x 1
05	KW06K (LC)	65 x 3	278 x 350 x 1
06	KW08D (LC)	65 x 3	196 x 270 x 1
07	KW08E (LC)	65 x 3	250 x 304 x 1
08	KW10C (LC)	76 x 3	183 x 240 x 1
09	KW10F (LC)	76 x 3	338 x 425 x 1

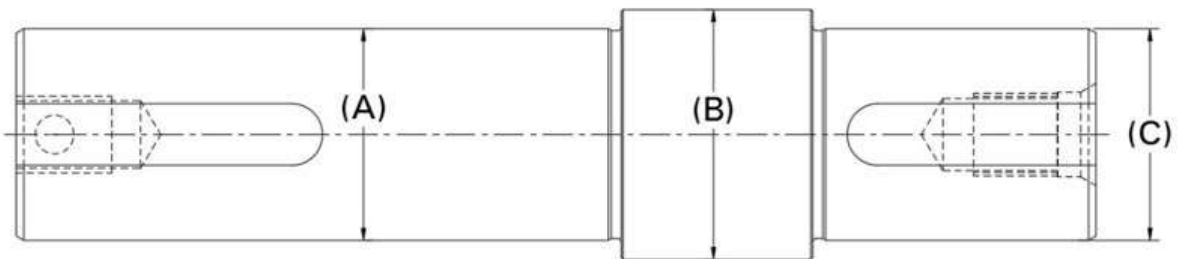


10	KW10J (LC)	76 x 3	250 x 304 x 1
11	KW10K (LC)	76 x 3	285 x 340 x 1
12	KW12J (LC)	76 x 3	250 x 304 x 1
13	KW12X (LC)	76 x 3	290 x 370 x 1
14	KW15X (LC)	76 x 3	284 x 355 x 1
15	KW20M (LC)	100 x 3	407 x 490 x 1

10.3 Pump Shaft Details

The shaft is made of Stainless Steel and accurately machined all over. The shaft is liberally proportioned and will transmit maximum torque / power required by the impeller without any undue strain.

Pump Model	Diameter (A) under coupling mm	Diameter (B) under stuffing box mm	Diameter (C) under Impeller mm
KW04C (LC)	24	38	20
KW04J (LC)	24	38	20
KW05J (LC)	24	38	20
KW06J (LC)	24	38	20
KW06K (LC)	32	48	32
KW08D (LC)	24	38	20
KW08E (LC)	24	38	20
KW10C (LC)	24	38	20
KW10F (LC)	32	48	32
KW10J (LC)	32	48	32
KW10K (LC)	32	48	32
KW12J (LC)	32	48	32
KW12X (LC)	32	48	32
KW15X (LC)	32	48	32
KW20M (LC)	55	65	55



10.4 Coupling Details

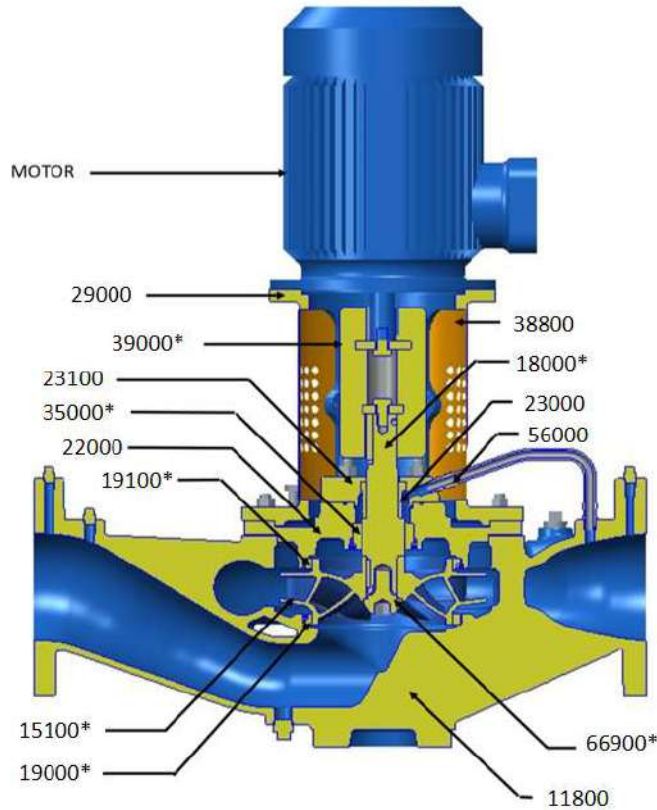
Axially Split spacer type rigid coupling produced in high tensile aluminium material as per manufacturer standard.

10.5 Bearings and Lubrication

There are no separate bearings. The shaft is supported with journal bearing at NDE and Motor bearings through Rigid couplings. The journal bearing is lubricated with pumping media.



11.0 CROSS SECTION DRAWING WITH PART LIST



Part Number and Description

Sr. No.	Part Code	Component Description	Quantity
01	11800	Pump Casing	01 No
02	15100*	Impeller	01 No
03	18000*	Pump Shaft	01 No
04	19000*	Casing Wear Rings – Suction	01 No
05	19100*	Casing Wear Rings – Delivery	01 No
06	19501*	Spacer for coupling - DS	01 No
07	19502*	Spacer for coupling - PS	01 No
08	22000	Casing Cover	01 No
09	23100	Mechanical Seal Cover	01 No
10	29000	Motor Stool	01 No
11	32000*	Key for Impeller	01 No
12	32100*	Key for Coupling	01 No
13	35300*	Bearing Bush / Stuffing box Bush	01 No
14	38800	Mesh Guard for motor stool	01 set
15	39000*	Rigid Spacer coupling	01 set
16	66900*	Impeller Screw	01 No

Note : “*” Recommended two year operational spare parts



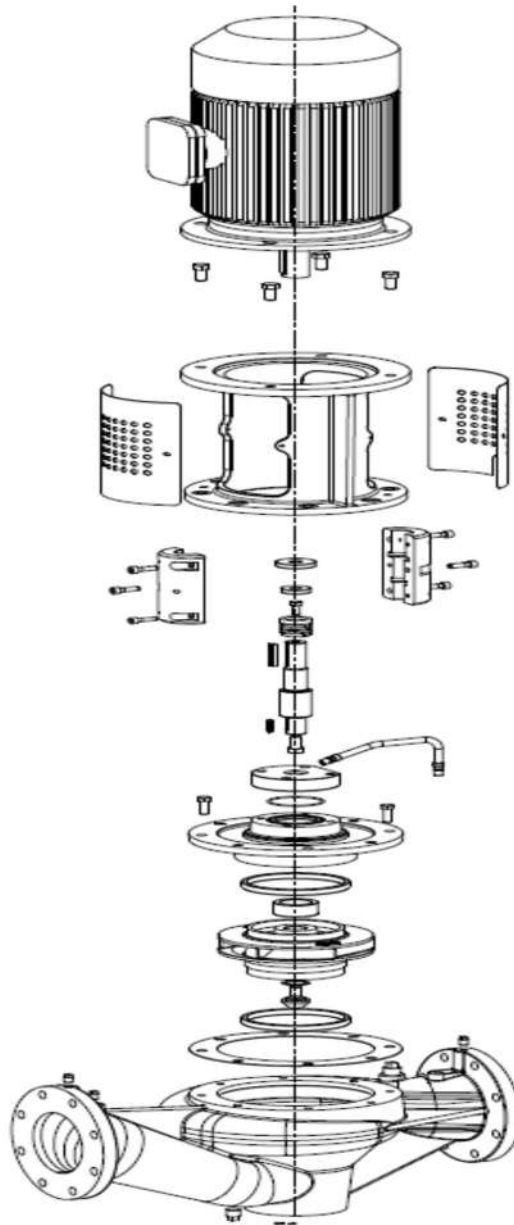
12.0 INTERCHANGEABILITY CHART

Parts standardization is optimized utilizing interchangeable components to cover a very wide performance. This unique feature enables the customer to have a very low spare parts inventory even though he may have many sizes of these pumps

Part CD	Part Description	Qty. per Pump																								
		KW04C (LC), 80 Frame	KW04C (LC), 90S/L Frame	KW04J (LC), 90S/L Frame	KW04J (LC), 100L Frame	KW05J (LC), 80 Frame	KW05J (LC), 90S/L Frame	KW05J (LC), 100L Frame	KW05J (LC), 112M Frame	KW06J (LC), 90L Frame	KW06J (LC), 100L Frame	KW06J (LC), 112M Frame	KW06K (LC), 100L Frame	KW06K (LC), 112M Frame	KW06K (LC), 132S/M Frame	KW08D (LC), 80 Frame	KW08D (LC), 90S/L Frame	KW08D (LC), 100L Frame	KW08D (LC), 112M Frame	KW08E (LC), 100L Frame	KW08E (LC), 112M Frame	KW08E (LC), 132S Frame	KW10C (LC), 90S/90L Frame	KW10C (LC), 100L Frame	KW10C (LC), 112M Frame	
11800	Pump Casing	1	1	1	2	2	3	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	8		
15100	Impeller	1	1	1	2	2	3	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	8		
18000	Pump Shaft	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1		
19000	Wear Ring (SUC)	1	1	1	2	2	3	3	3	4	4	4	8	8	8	5	5	5	6	6	6	7	7	7		
19100	Wear Ring (DEL)	1	1	1	2	2	3	3	3	4	4	4	8	8	8	5	5	5	6	6	6	7	7	7		
19501	Spacer PS	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1		
19502	Spacer DS	1	1	1	2	3	1	2	3	3	2	3	3	3	4	1	2	3	3	3	4	2	3	3		
22000	Casing Cover	1	1	1	2	2	3	3	3	3	4	4	9	9	9	5	5	5	6	6	7	8	8	8		
23000	Mechanical Seal	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1		
23100	Seal Cover	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1		
29000	Motor Steel	1	1	1	2	3	4	4	5	5	6	7	7	12	12	13	8	8	9	9	3	3	10	1	11	11
32000	Key for Impeller	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	
32100	Key for Coupling	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	
35300	Bush Bearing	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	
66900	Impeller Screw	1	1	1	1	1	1	1	1	1	1	1	2	2	2	1	1	1	1	1	1	1	1	1	1	

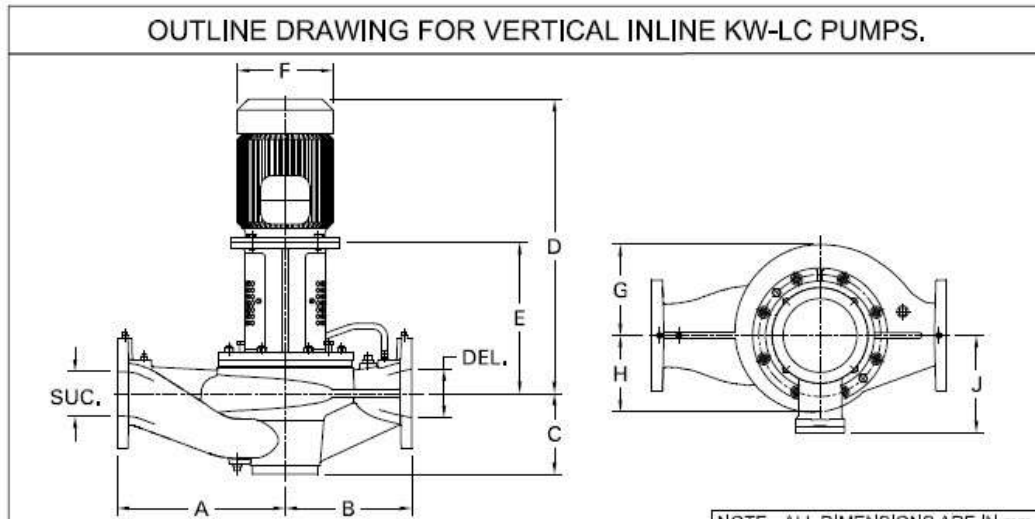
Part CD	Part Description	Qty. per Pump																							
		KW10F (LC), 132S/132M Frame	KW10F (LC), 160M/160L Frame	KW10F (LC), 180M/180L Frame	KW10J (LC), 112M Frame	KW10J (LC), 132S/132M Frame	KW10K (LC), 132M Frame	KW10K (LC), 160M/160L Frame	KW12J (LC), 112M Frame	KW12J (LC), 132S/132M Frame	KW12J (LC), 160M Frame	KW12K (LC), 132S/132M Frame	KW12K (LC), 160M/160L Frame	KW15X (LC), 160M/160L Frame	KW15K (LC), 180M/180L Frame	KW20M (LC), 225S/225M Frame	KW20M (LC), 250M Frame	KW20M (LC), 280S/280M Frame							
11800	Pump Casing	1	9	9	9	10	10	11	11	12	12	12	13	13	14	14	15	15	15						
15100	Impeller	1	9	9	9	10	10	11	11	12	12	12	13	13	14	14	15	15	15						
18000	Pump Shaft	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3						
19000	Wear Ring (SUC)	1	9	9	9	10	10	11	11	9	9	9	12	12	13	13	14	14	14						
19100	Wear Ring (DEL)	1	9	9	9	10	10	11	11	9	9	9	12	12	13	13	14	14	14						
19501	SPACER PS	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	3	3	3						
19502	SPACER DS	1	4	5	5	3	4	4	5	3	4	5	4	5	5	6	7	8							
22000	Casing Cover	1	10	10	10	11	12	14	14	15	15	15	16	16	17	17	18	18	18						
23000	Mechanical Seal	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3						
23100	Seal Cover	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3						
29000	Motor Steel	1	14	15	15	3	10	16	17	18	10	19	20	21	22	22	23	24	24						
32000	Key for Impeller	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3						
32100	Key for Coupling	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3						
35300	Bush Bearing	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3						
66900	Impeller Screw	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3						

13.0 KW-LC EXPLODED VIEW





14.0 GENERAL OUTLINE DIMENSIONS

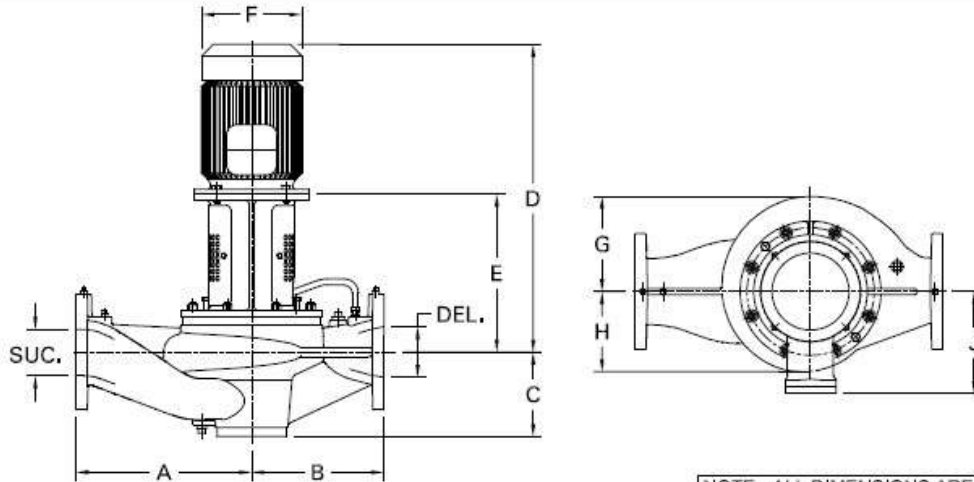


NOTE - ALL DIMENSIONS ARE IN mm.

PUMP MODEL	FRAME SIZES	PUMP OUTLINE DIMENSIONS											PSET Wt. kg
		DEL.	SUC.	A	B	C	D	E	F	G	H	J	
KW04C(LC)	ND 80	40	40	200	175	100	522	295	157	130	130	134	67
	90S	40	40	200	175	100	547	295	174	130	130	140	74
	90L	40	40	200	175	100	572	295	174	130	130	140	75
KW04J(LC)	90S	40	40	245	210	115	572	295	174	170	160	140	74
	90L	40	40	245	210	115	623	295	174	170	160	140	75
	100L	40	40	245	210	115	623	295	195	170	160	157	84
KW05J(LC)	ND80	50	50	245	200	125	531	304	157	170	155	134	81
	90S	50	50	245	200	125	556	304	174	170	155	140	89
	90L	50	50	245	200	125	581	304	174	170	155	140	90
	100L	50	50	245	200	125	581	304	195	170	155	157	98
	112M	50	50	245	200	125	632	304	220	170	155	170	111
KW06J(LC)	90L	65	65	242	225	135	587	310	174	185	160	140	97
	100L	65	65	242	225	135	638	310	195	185	160	157	106
	112M	65	65	242	225	135	638	310	220	185	160	170	118
KW06K(LC)	100L	65	65	305	255	140	668	340	195	200	185	157	129
	112M	65	65	305	255	140	668	340	220	200	185	170	142
	132S	65	65	305	255	140	777	360	260	200	185	206	162
	132M	65	65	305	255	140	777	360	260	200	185	206	173
KW08D(LC)	ND80	80	80	300	235	145	532	305	157	170	145	134	90
	90S	80	80	300	235	145	582	305	174	170	145	140	98
	90L	80	80	300	235	145	582	305	174	170	145	140	99
	100L	80	80	300	235	145	633	305	195	170	145	157	107
	112M	80	80	300	235	145	633	305	220	170	145	170	120
KW08E(LC)	100L	80	80	302	237	140	627	299	195	190	170	157	110
	112M	80	80	302	237	140	627	299	220	190	170	170	123
	132S	80	80	302	237	140	766	349	260	190	170	206	145
	132M	80	80	302	237	140	766	349	260	190	170	206	156
KW10C(LC)	90S	100	100	285	260	165	638	310	174	175	145	140	97
	90L	100	100	285	260	165	638	310	174	175	145	140	98
	100L	100	100	285	260	165	638	310	195	175	145	157	106
	112M	100	100	285	260	165	638	310	220	175	145	170	119



OUTLINE DRAWING FOR VERTICAL INLINE KW-LC PUMPS.



NOTE - ALL DIMENSIONS ARE IN mm.

PUMP MODEL	FRAME SIZES	PUMP OUTLINE DIMENSIONS											PSET Wt. kg
		DEL.	SUC.	A	B	C	D	E	F	G	H	J	
KW10F(LC)	132S	100	100	402	315	195	782	365	260	260	230	206	219
	132M	100	100	402	315	195	782	365	260	260	230	206	230
	160M	100	100	402	315	195	914	395	316	260	230	226	273
	160 L	100	100	402	315	195	914	395	316	260	230	226	293
	180M	100	100	402	315	195	1022	395	354	260	230	265	325
	180L	100	100	402	315	195	1022	395	354	260	230	265	343
KW10J(LC)	112M	100	100	320	245	270	734	317	220	205	170	170	137
	132S	100	100	320	245	270	784	367	260	205	170	206	155
	132M	100	100	320	245	270	784	367	260	205	170	206	166
KW10K(LC)	132S	100	100	320	330	175	778	361	260	220	190	206	177
	132M	100	100	320	330	175	910	391	316	220	190	226	188
	160M	100	100	320	330	175	778	361	260	220	190	206	231
	160 L	100	100	320	330	175	910	391	316	220	190	226	251
KW12J(LC)	112M	125	125	385	290	185	675	347	220	220	185	170	153
	132 S	125	125	385	290	185	784	367	260	220	185	206	174
	132 M	125	125	385	290	185	784	367	260	220	185	206	185
	160M	125	125	385	290	185	916	397	316	220	185	226	230
KW12X(LC)	132S	125	125	400	295	185	785	368	260	225	200	206	188
	132M	125	125	400	295	185	785	368	260	225	200	206	199
	160M	125	125	400	295	185	917	398	316	225	200	226	248
	160L	125	125	400	295	185	917	398	316	225	200	226	268
KW15X(LC)	160M	150	150	410	358	220	917	398	316	245	210	226	271
	160 L	150	150	410	358	220	917	398	316	245	210	226	290
	180M	150	150	410	358	220	1022	395	354	245	210	265	322
	180L	150	150	410	358	220	1022	395	354	245	210	265	340
KW20M(LC)	225S	200	200	650	450	313	1235	461	489	330	290	415	670
	225M	200	200	650	450	313	1198	461	450	330	290	344	670
	250S	200	200	650	450	313	1198	461	450	330	290	344	798
	250M	200	200	650	450	313	1331	461	544	330	290	445	798
	280S	200	200	650	450	313	1331	461	544	330	290	445	933
	280M	200	200	650	450	313	1235	461	489	330	290	415	933



15.0 FAULTS & REMEDIAL ACTIONS

POTENTIAL FAULT OR DEFECT:					
					No liquid delivered.
					Insufficient liquid delivered.
					Liquid delivered at low pressure.
					Loss of liquid after starting.
					Excessive vibration.
					Motor runs hotter than normal.
					Excessive noise from pump cavitation.
PROBABLE CAUSES					
<input type="checkbox"/>					Pump not primed.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			Speed too low.
			<input type="checkbox"/>	<input type="checkbox"/>	Speed too high.
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	Air leak in suction pipework.
	<input type="checkbox"/>	<input type="checkbox"/>			Air leak in mechanical seal.
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Air or gas in liquid.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	Discharge head too high (above rating).
		<input type="checkbox"/>			Suction lift too high.
	<input type="checkbox"/>				Not enough head for hot liquid.
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	Inlet pipe not submerged enough.
	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	Viscosity of liquid greater than rating
			<input type="checkbox"/>		Liquid density higher than rating.
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	Insufficient net inlet head.
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>		Impeller plugged up or blocked.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			Wrong direction of rotation.
	<input type="checkbox"/>	<input type="checkbox"/>			Excessive wear ring clearance.
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		Damaged impeller.
			<input type="checkbox"/>		Rotor binding.
			<input type="checkbox"/>		Defects in motor.
			<input type="checkbox"/>		Voltage and/or frequency lower than rating.
			<input type="checkbox"/>		Foundation not rigid.
			<input type="checkbox"/>	<input type="checkbox"/>	Misalignment of pump and driver.
			<input type="checkbox"/>		Rotor out of balance.
			<input type="checkbox"/>	<input type="checkbox"/>	Shaft bent.
		<input type="checkbox"/>			Impeller too small.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			Air leak in stuffing box



For remedial action refer to the following table

CAUSE	REMEDIAL ACTION
Pump not primed.	Fill pump and suction pipe completely with fluid.
Speed too low.	Check that the motor is correctly connected and receiving the full supply voltage also confirm that the supply frequency is correct.
Speed too high.	Check the motor voltage.
Air leak in suction pipework	Check each flange for suction draught, rectify as necessary.
Air leak in mechanical seal.	Check all joints, plugs and flushing lines, if fitted. Note that prolonged running with air in the mechanical seal will result in damage and failure of the seal.
Air or gas in liquid.	It may be possible to increase the pump performance to provide adequate pumping.
Discharge head too high (above rating).	Check that valves are fully open and for pipe friction losses. An increase in pipe diameter may reduce the discharge pressure.
Suction lift too high.	Check for obstruction of pump inlet and for inlet pipe friction losses. Measure the static lift, if above rating, raise the liquid level or lower the pump.
Not enough head for hot liquid.	Reduce the positive suction head by raising the liquid level.
Inlet pipe not submerged enough.	If the pump inlet cannot be lowered, provide a baffle to smother the inlet vortex and prevent air entering with the liquid.
Liquid density higher than rating.	Refer to SPP Pumps Inc. For guidance to increase the size or power of the motor or engine.
Insufficient net inlet head.	Increase the positive suction head by lowering the pump or raising the liquid level.
Impeller blocked.	Dismantle pump and clean the impeller.
Wrong direction of rotation.	Check driver rotation with the direction arrow on the pump casing.
Excessive wear ring clearance.	Replace the wear rings when the clearance exceeds the maximum tolerances.
Damaged impeller.	Replace if damaged or vanes are eroded.
Rotor binding.	Check for shaft run out, and replace if necessary.
Defects in motor.	Ensure that motor is adequately ventilated. Refer to manufacturer's instructions.
Voltage and/or frequency lower than rating.	If voltage and frequency are lower than the motor rating, arrange for provision of correct supply.
Foundation not rigid.	Ensure that the foundation bolts are tight; check that foundations match SPP Pumps Inc. Recommendations.
Misalignment of pump and driver.	Check shaft run-out and replace if necessary.
Rotor out of balance.	Check impeller for damage, replace as necessary.
Shaft bent.	Check shaft run-out and replace if needed.
Impeller too small.	Refer to Kirloskar Brothers Limited for options to fit a larger impeller.



16.0 GENERAL INFORMATION & SAFETY INSTRUCTIONS

- 1.0 The products supplied by KBL have been designed with safety in mind. Where hazards cannot be eliminated, the risk has been minimized by the use of guards and other design features. Some hazards cannot be guarded against and the instructions below **MUST BE COMPLIED WITH** for safe operation. These instructions cannot cover all circumstances. Installation, operation and maintenance personnel must use safe working practices at all the times.

- 1.1 KBL products are designed for installation in designated areas, which are to be kept clean and free of obstructions that may restrict safe access to the controls and maintenance access points.
A pump duty nameplate is fitted to each unit and must not be removed. Loss of this plate could make identification impossible. This in turn could affect safety and cause difficulty in obtaining spare parts. If accidental loss or damage occurs, contact KBL immediately.

- 1.2 Access to the equipment should be restricted to the person net responsible for installation, operation and maintenance and they must be trained, adequately qualified and supplied with appropriate tools for their respective tasks.

- 1.3 Most accidents involving product operation, maintenance and repair are caused by failure to observe safety rules or precautions. An accident can often be avoided by recognizing potentially situations before an accident occurs. A person must be aware of potential hazard associated in activities of installation, operation and maintenance of equipments.

- 1.4 KBL requires that, all personnel that are responsible for installation, operation or maintenance of the equipment, have access to and study the product instruction manual **BEFORE** any work is done and that they will comply with all local and industry based safety instructions and regulations.

- 1.5 Ear defenders should be worn where the specified equipment noise level exceeds locally defined safe levels. Safety glasses or goggles or face shield should be worn where working with pressurized systems and hazardous substances. Other personal protection equipment must be worn where local rules apply. Wear safety shoes, helmets and cotton overall [Apron] when you enter pump house. Noise level should not exceed 90 dbA and 110 dbA for motor driven and engine driven pumps, respectively.

- 1.6 Do not wear loose clothing or jewelry, which could catch on the controls or become trapped in the equipment.



- 1.7 Read the instruction manual before installation, operation or maintenance of the equipment. Check and confirm that you are referring relevant copy of the manual by comparing pump type on the nameplate and with that on the manual.
- 1.8 Note the “Limits of product application permissible use” specified in the manual. Operation of the equipment beyond these limits will increase the risk from hazards noted below and may lead to premature and hazardous pump failure.
- 1.9 Clear and easy access to all controls, gauges and dials etc must be maintained at all times. Hazardous or flammable materials must not be stored in pump rooms unless safe areas or racking and suitable container have been provided.
- 1.10 Use suitable earthing and tripping devices for electrical equipments.

2. IMPROPER INSTALLATION, OPERATION, MAINTENANCE, LUBRICATION, REPAIR OF THIS KBL PRODUCT COULD RESULT IN INJURY OR DEATH.

If any tool, procedure, work method and operation technique is not recommended by KIRLOSKAR BROTHERS LIMITED is used or followed, it should be ensured that it is a safe for personnel around and others. It should also be ensured that the product will not be damaged or made unsafe by the operation, lubrication and maintenance or repair procedures you choose.

3. SAFETY INSTRUCTIONS WHILE HANDLING AND STORAGE

When lifting the pump, use the lifting points specified on general arrangement drawing, if provided. Use lifting equipment having a safe working load rating suitable for the weight specified. Use suitable slings for lifting pump, which is not provided, with lifting points. The use of forklift truck and chain crane sling equipment is recommended but locally approved equipment of suitable rating may be used. While lifting, the equipment adjusts the center of gravity, so that it is balanced properly.

Do not place fingers or hands etc. into the suction or discharge pipe outlets and do not touch the impeller, if rotated this may cause severe injury. To prevent ingress of any objects, retain the protection covers or packaging in place until removal is necessary for installation. If the packaging or suction and discharge covers are removed for inspection purposes, replace afterwards to protect the pump and maintain safety.



4. SAFETY INSTRUCTIONS WHILE ASSEMBLY & INSTALLATION

Shaft alignment must be checked again after the final positioning of the pump unit and connection to pipework as this may have disturbed the pump or motor mounting positions. If hot liquids [above 80°C] are being pumped, alignment should be checked and reset with the pump and motor at their normal operating temperature. If this is not possible, KBL can supply estimated initial offset figures to suit extreme operating temperatures.

Failure to support suction and delivery pipework may result in distortion of the pump casing, with the possibility of early pump failure.

5. SAFETY INSTRUCTIONS WHILE COMMISSIONING & OPERATION

Never attempt adjustments while the pump is running, unless otherwise specified in the operation, maintenance manual.

Do not touch any moving or rotating parts. Guards are provided to prevent access to these parts, where they have been removed for maintenance they must be replaced before operating the equipment.

Check that pump is primed. Pump should never be run dry as the pumped liquid acts as lubricant for the close running fits surrounding impeller and damage will be incurred.

Failure to supply the stuffing box or mechanical seal with cooling of flush water may result in damage and premature failure of the pump.

Do not touch surfaces, which during normal running will be sufficiently hot to cause injury. Note that these surfaces remain hot after the pump has stopped, allow sufficient time for cooling before maintenance. Be cautious and note that other parts of the pump may become hot if a fault is developing.

Do not operate water pumps in temperatures below freezing point, without first checking that the pumped fluid is not frozen and the pump is free to turn. Pumps in these environments should be drained down during inactivity and re-primed before starting.

In addition to local or site regulations for noise protection, KBL recommend the use of personal ear protection equipment in all enclosed pump rooms and particularly those containing diesel engines. Care must be taken to ensure that any audible alarm or warning signal can be heard with ear defenders worn.



Be aware of the hazards relating to the pump fluid, especially the danger from inhalation of noxious and toxic gases, skin and eye contact or penetration. Obtain and understand the hazardous substance data sheets relating to the pumped fluid and note the recommended emergency and first aid procedures.

6. SAFETY INSTRUCTIONS WHILE MAINTENANCE & SERVICING

Do not attempt repairs of the pump or its accessories which you do not know. Use proper tools.

Before attempting any maintenance on a pump particularly if it has been handling any form of hazardous liquid, it should be ensured that the unit is safe to work on. The pump must be flushed thoroughly with suitable cleaner to purge away any of the product left in the pump components.

This should be carried out by the plant operator and a certificate of cleanliness obtained before starting work. To avoid any risk to health it is also advisable to wear protective clothing as recommended by the site safety officer especially when removing old packing, which may be contaminated.

Isolate the equipment before any maintenance work is done. Switch off the main supply, remove fuses, apply lockouts where applicable and affix suitable isolation warning signs to prevent inadvertent reconnection. In order to avoid the possibility of maintenance personnel inhaling dangerous fumes or vapors locations by removal of bearing housing and shaft assembly to a suitable maintenance area.

Check and ensure that the pump operates at below the maximum working pressure specified in the manual or on the pump nameplate and before maintenance, ensure that the pump is drained down.

Wear a suitable mask or respirator when working with packing and gasket contain fibrous material, as these can be hazardous when the fibrous dust is inhaled. Be cautious, if other supplier’s components have been substituted for genuine KBL parts, these may then contain hazardous materials.

Store all oily rags or other flammable material in a protective container in a safe place. Do not weld or flame cut on pipes/tubes that contents flammable fluids. Clean them thoroughly with nonflammable solvent before welding or flame cutting on them. Use solvent/chemical resistant gloves for hand protection.



Dispose of all wastes like gaskets, gland packing, oil, batteries, packing material etc. in accordance with local regulations. Normally this would involve incineration of liquid waste and controlled landfill of polymerized material.

Adequacy of suitable crane should be checked before lifting the pump/pump components. Also condition of pulleys, chain and lifting shackles should be checked before use.



Enriching Lives

KIRLOSKAR BROTHERS LIMITED

Established 1888

A Kirloskar Group Company

REGISTERED OFFICE : Udyog Bhavan, Tilak Road, Pune – 411002, India. Phone: +91-20-24440770

GLOBAL HEADQUARTERS : "Yamuna", S. No. 98(3 to 7), Baner, Pune – 411045, India. Phone: +91-20-27214444

Email: marketing@kbl.co.in, **Website:** www.kirloskarpumps.com **CIN No.:** L29113PN1920PLC000670

OUR COMPANIES



United Kingdom



U.S.A.



South Africa



India



The Netherlands