



Vertical pumps for tanks
without friction bearings

Original manual



This manual contains important instructions and warnings. You must read them before mounting, making the electrical connections and starting up. You must also comply with the instructions for the components related to this pump.



You should also remember that it is essential to keep this Manual close to the motor pump equipment.

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1 General

Note

This KSB ITUR pump has been developed in line with state-of-the-art technology, manufactured with great care and put through continuous Quality Control. The present Instructions Manual will provide you with knowledge of the pump and the ways it can be applied.

It contains important instructions to operate the pump appropriately and profitably. It is important to comply with the manual in order to guarantee reliability and a long useful life for the pump, whilst avoiding any possible risks.

This manual does not include any local regulations or any instructions with regards to assembly personnel, which the user shall be responsible for.



This group cannot be used in conditions in excess of those established in the technical documentation with regards to the liquid to be pumped, flow, speed (rpm), density, pressure and temperature, and with regards to the motor power or anything else set out in the instructions manual and contractual documentation. Check with the manufacturer as appropriate.

The factory plate shows the model/size, the main service data and the manufacture number of the pump. Please include these data in any queries, subsequent orders or requests for spare parts.

If you require any additional information or have problems with regards to failures, please contact the nearest KSB ITUR service.

2 Safety

This instructions manual contains fundamental instructions which must be complied with in assembly, service and maintenance. It must be read by assembly personnel, competent technical personnel and users before installing and starting up, and it must be available at all times at the place of location of the machine.

Proceed not only in line with this main safety chapter, but also observing the instructions described in other similarly important safety points.

2.1 Marking of warnings in this manual

The instructions which may involve hazard if not observed are highlighted with the following general symbols:



Safety instructions which may involve a hazard to people and facilities if not complied with in accordance with ISO 7000-0434.



Safety instructions to prevent electrical hazards in accordance with IEC 417-5036.

Note

Safety instructions which may affect the equipment and its operation if not complied with.



Safety instructions to prevent the risk of explosion. Only applicable to groups with ATEX plate, specially designed to satisfy Directive 94/9/EC on the prevention of the risk of explosion.

The details shown directly on the machine, such as:

- Rotation direction arrow
- Fluid connection identifications

These must be observed, and conserved in a manner which ensures they are legible.

2.2 Personnel qualifications and instruction

All Service, Maintenance, Inspection and Assembly personnel must be duly qualified. The terms regarding responsibility, competence and supervision of personnel must be regulated by the user in an exact manner.

Any personnel lacking appropriate know-how must be duly instructed. This preparation can be obtained upon request by the machine user to the manufacturer or supplier of the machine.

Finally, the user must ensure that all personnel have fully understood the content of the instructions manual.

2.3 Risks of failing to comply with the safety instructions

Failure to comply with the safety instructions may lead to risks both for people, the environment and the machine, and may lead to the loss of any entitlement to claims.

In particular, failure to comply may cause the following hazards:

- Failure of important machine/facility functions.
- Failure of the prescribed maintenance and conservation methods.
- Personal hazard resulting from electrical, mechanical or chemical effects.
- Danger to the environment due to escaping noxious products.

2.4 Conscientious safety at work

The safety instructions contained in this Manual must be observed, as must international prescriptions on Health and Safety at Work and any possible Safety Regulations at the workplace of the user.

2.5 Safety instructions for users and service personnel



The operator is responsible for keeping the temperature of the fluid within the pump classification temperature limits.

- The installer must ensure that the parts of the machine which may create danger due to heat or cold are protected against accidental contact. The operator shall check as well that the coupling guard is in place and firmly secured.
- The contact protections of moving parts (e.g. couplings) must not be removed whilst the machine is in service.
- Provide the personnel with protective equipment and make sure it is used.
- Any possible leaks (e.g. through the shaft sealing) of hazardous products must be channelled in such a manner as they do not present any risk to people or the environment, in line with corresponding legislation.
- Follow safety instructions due to use of power. In this respect refer to the applicable national safety regulations and/or regulations issued by the energy supply comp

2.6 Safety instructions for maintenance, inspection and assembly work

The user must ensure that all maintenance, inspection and assembly tasks are carried out by authorised, qualified, specialised personnel who have been sufficiently informed through careful study of the instructions manual.

It is a fundamental principle that any work on the machine must be carried out whilst it is shutdown. It is essential to respect the pump shutdown procedure described in the instructions manual.

When the pump is stopped it is liable to remain under pressure. The pump frame must have returned to environmental temperature. Before dismantling it, it must be depressurised by making drain openings (or air vents) leading to a safe area.

All pumps or motor pumps which pump hazardous materials must be decontaminated.

Connect an earth conductor to the metal casing of the pump or baseplate if the fluid handled is electrostatically charged.

Never connect the earth of the electric welding equipment to pump or baseplate.

As soon as the work is complete, all safety and protection devices must be installed and put into operation.

Before starting up again, all that described in the First Start-Up section must be fulfilled.

Due to the fact that the unit contains small parts such as nuts, screws, etc., whose accidental contact may lead to small cuts on the hands, operators are recommended to use gloves when handling.

The following additional risk-prevention instructions shall be fulfilled:

The pumped liquid may cause injuries, burns, poisoning, etc. It is therefore necessary:

- To check the temperature and amount of leaks occurring at the mechanical seal or packing area. Conduct such leaks to a safe area through a controlled drainage system, specially indicated for the case of break of mechanical seal.
- To take appropriate measures to avoid direct contact with the pumped liquid when it is necessary to prime or fill the pump or unit.
- Before dismantling the pump, if the liquid is toxic or dangerous, it must be decontaminated. For this purpose the unit must be cleaned inside by introducing a cleaning liquid into the pump and emptying it subsequently through the drainage connection. The cleaning liquid must not create hazardous situations and must be compatible with the pump components (CONSULT)
- To take appropriate measures to avoid contact with the pump if liquids are pumped at temperatures over 40°C.
- In the event of a liquid with high steam pressure being used, beware of the danger of explosion due to pressure confinement with the pump stopped. This confinement must be avoided by opening inlet or discharge valves, or by providing a properly conducted air-vent connection in the pump discharge for liquid evacuation.

For rotating parts:

- The pump should never work without its coupling guard in place and firmly secured.
- Do not wear loose or baggy clothing or wear long hair loose near rotation areas to avoid clothes or hair getting caught and causing serious accidents.
- Do not force jammed rotating parts manually when the pump is in operation.

When the pump is joined to considerably long piping, waterhammer may occur when it is stopped. Should this arise, appropriate anti-waterhammer elements must be put in place.

All the safety regulations indicated by the pump drive manufacturer must be observed and complied with.

Inappropriate installation may lead to the unit breaking and consequent risks to persons and/or the environment. It is therefore necessary to:

- Vent the pumps appropriately before operation, checking that the pump is full of liquid.
- Check that the pump discharge and suction valves are fully open and that there is no dirt or foreign bodies in the piping.

Regarding overload conditions:

- Do not exceed the maximum permitted values (temperature, suction pressure, discharge pressure, rpm.) indicated in this instructions manual, offer and technical catalogue.
- Do not exceed the maximum loads permitted on the suction and discharge connections.
- The pumps must only be used in the conditions and with the liquid indicated in the offer and/or order.

An unforeseen failure in the drive power may lead to danger due to spontaneous start-up of the unit; it is up to the customer to take the necessary steps to avoid this.

When the CONTROL SYSTEM is not supplied by KSB ITUR, the customer is responsible for the entire machine complying with the machine safety directive, including these controls

2.7 Modifications and arbitrary manufacture of spare parts

The machine must not be modified or changed without prior agreement from the manufacturer. Only original spare parts and accessories approved by the manufacturer can guarantee safety. The use of other parts invalidates any liability of KSB ITUR for consequential damage..

2.8 Unauthorised operation modes

The safe service of the supplied pump can only be guaranteed through correct use, in line with section 4 of the Instructions Manual. The operation limits established in the Datasheet must not be exceeded under any circumstance.

2.9 Warnings for equipment with marking

 KSB ITUR pumps marked with the ATEX plate are valid for group II category 2 and 3, zones 1, 21, 2 and 22 temperature class as shown on the plate and Conformity Certificate.

 Reliability may be lost through incorrect use, poor connections or any modifications, however small.

 It is necessary to take into account the rules on the connection and use of electrical devices in hazardous

areas, in particular national regulations on installation. Only qualified personnel who are familiar with these rules should handle this type of machine.

 Any repair made by the end user, unless explicitly approved by KSB ITUR, shall release the manufacturer from any liability relating to Directive 94/9/EC. Individual pieces supplied as spare parts must be originals, supplied and checked by KSB ITUR.

3 Transport and storage

3.1 Transport and handling

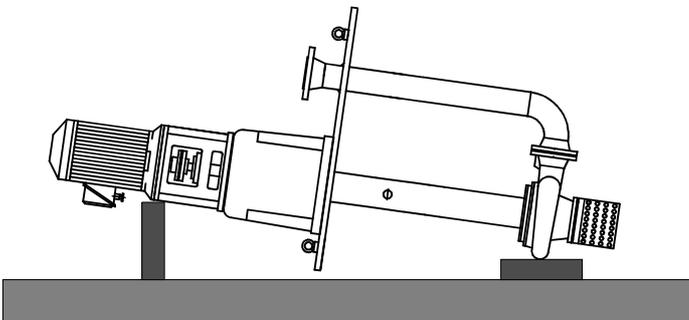
 The transport and handling of the equipment must be carried out using suitable means in line with the weight to be supported. The weight is generally shown on the delivery note or on the data plate. If it is not, and the equipment cannot be handled safely, please contact KSB ITUR.

Remember that the equipment should never be lifted using the ring bolts of each of the elements, e.g. the motor and pump ring bolts, which are exclusively for independent transport.

Note It is also important not to use the pump and pipe flanges or joining elements, e.g. couplings.

Note If the equipment is to be lifted using straps, these must always be run underneath the motor and pump support.

Note Do not position the pump on the filter/suction hood. When positioning the pump outside of the well on the ground, place a wooden plug at the height of the casing, in order to prevent the filter being the support point for the pump.



 When the pumps are dismantled from their transport pallet, suitable means must be used to ensure the stability of the equipment, until it is finally secured at its definitive location.

3.2 Provisional storage/conservation

During provisional storage, it is only necessary to protect with preservation products those low alloy parts in contact with the liquid (e.g. grey cast, nodular cast, etc). Preservation products available on the sector market can be used, in line with the manufacturer's instructions on application and disposal.

The pump, or motor pump, shall be deposited in a dry site where the relative humidity is as constant as possible.

When stored outside, it is necessary to keep the pump/motor pump in an impermeable box, ensuring it does not come into contact with external humidity.

Note Protect the stored product from humidity, dirt, parasites and unauthorised access! All

openings must remain closed, and must not be opened until necessary during assembly!

The shiny (mechanised) parts and surfaces of the pump must be protected from corrosion using silicone-free oil or grease.



The electric motor must be disconnected, the connection cables removed and the terminal box closed with its cover on.

The switchboards must be in vertical position and disconnected.

3.3 Disposal



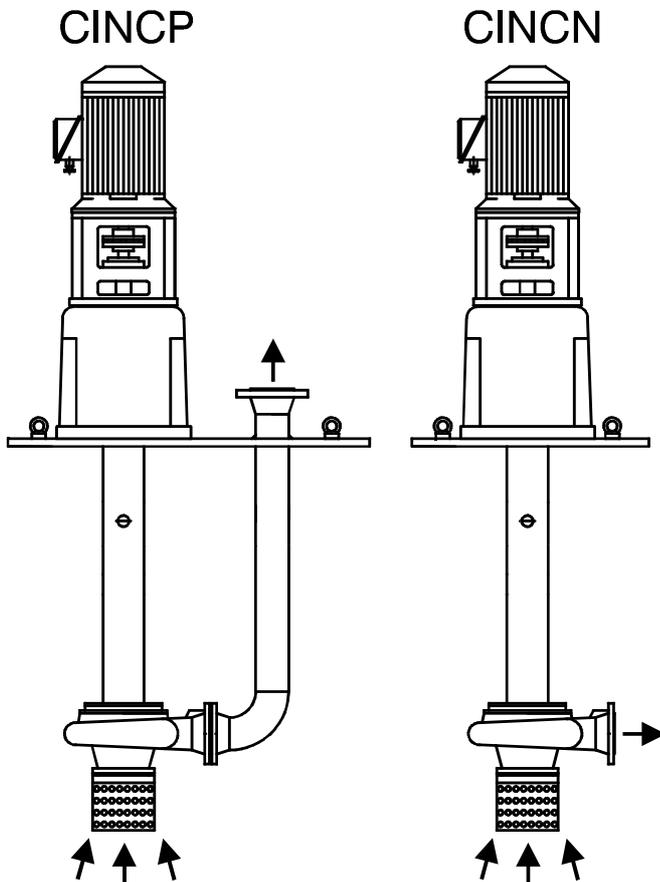
Fluids and supplies posing a health hazard and/or hot fluids and supplies. Hazard to persons and the environment!

- Collect and properly dispose of flushing medium and any residues of the fluid handled.
 - Wear safety clothing and a protective mask, if required.
 - Observe all the legal regulations on the disposal of fluids posing a health hazard.
1. Dismantle the pump (set). Collect greases and other lubricants during dismantling.
 2. Separate and sort the pump materials, e.g. by:
 - Metals
 - Plastics
 - Electronic waste
 - Greases and other lubricants
 3. Dispose of materials in accordance with local regulations or in another controlled manner.

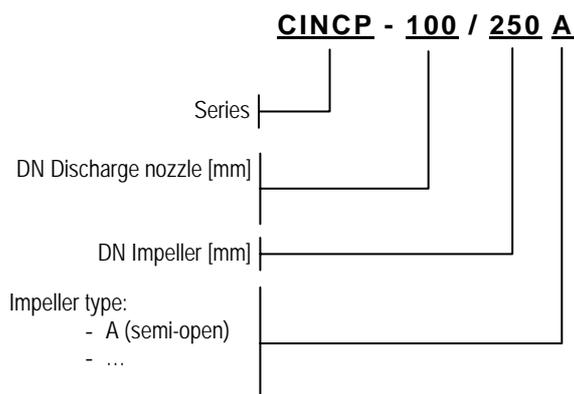
4 Group description

4.1 General description

Vertical centrifugal cantilever pump without friction bearings, designed for wells, ditches and tanks. For neutral or aggressive liquids, both clean and with solid particles.



4.2 Denomination



4.3 Form of construction

Spiral pump casing with axial suction and radial impulsion. Single-stage impeller semi-open. Filter in suction.

The CINCP series has a discharge pipe to the outside of the base plate.

The CINCN series does not have a discharge pipe.

Bearings: Friction bearings are not included. Both series are fitted with bearings: Thrust ballbearings in the upper support and cylindrical roller bearing ballbearings for radial loading in the lower support.

Shaft sealing: The standard sealing system of the shaft is by way of a labyrinth lip seal (consists of deflector protection and labyrinth sealing)

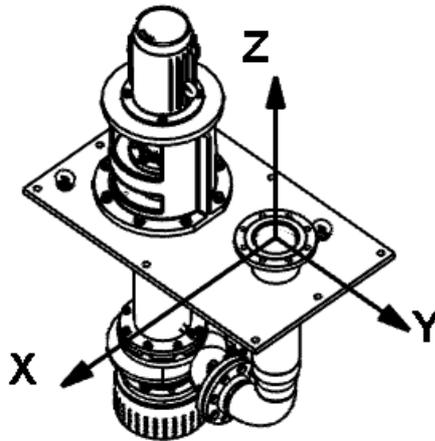
4.4 Noise. Permitted levels

The acoustic pressure level of these pumps is less than 90 dB (A) at 1 m in any operation point within the operation range without cavitation.

4.5 Name plate

			20800 ZARAUTZ SPAIN P.O. Box 41
(a)	Nº	(c)	
(b)			
ITEM	(d)	RPM	(e)
(f)	m ³ /h	(g)	m

a	Year of construction	e	Speed
b	Pump model	f	Flow rate
c	Pump No	g	Head
d	Customer item		

4.6 Forces and moments permitted


Maximum permitted strain in the upper discharge flange, CINCP series exclusively						
DN	Force [N]			Moment [N-m]		
	Fz	Fx	Fy	Mz	Mx	My
32 – 1 ¼"	630	510	540	450	510	660
40 – 1 ½"	750	600	660	540	630	780
50 – 2"	990	810	900	600	690	840
65 – 2 ½"	1260	1020	1110	660	720	900
80 – 3"	1500	1230	1350	690	780	960
100 – 4"	2010	1620	1800	750	870	1050
125 – 5"	2370	1920	2130	900	1140	1260
150 – 6"	3000	2430	2700	1050	1230	1500
200 – 8"	4020	3240	3600	1380	1590	1950
250 – 10"	5010	4050	4470	1890	2190	2670
300 – 12"	6000	4830	5370	2580	2970	3630
350 – 14"	6990	5640	6270	3300	3810	4650
400 – 16"	7980	6450	7170	4140	4770	5820

The CINCN series does not admit any strain on the discharge flange.

5 Installation

The electropump is dispatched totally mounted and prepared for installation and operation (except for the few cases of the motor being dispatched disassembled, as is the case of large, heavy motors).

Note

The design of the pipe systems, anchorings and other installation areas corresponds to other parties. KSB ITUR only offers details and comments as a help, but does not assume any responsibility with regards to the design, assembly and operation of any installation. We recommend that customers check with a specialist in the design of castings, pipes, wells, etc in order to interpret and supplement the information given by KSB ITUR and to ensure correct operation.

5.1 Check before assembly

Before positioning, check that the assembly base is in line with the dimensional plan of the equipment.

The upper surface of the base must be horizontal and flat.

If the anchor pins are to be placed in existing holes, place the anchor pins in their orifices suspended from the pump.

Do not connect the suction and impulsion nozzles until the equipment is completely installed on its base.

5.2 Group positioning

5.2.1 Vertical groups

Levelling

In case of a concrete deck it is recommended to use a sectional steel frame fixed on the deck as supporting surface for the base plate of the group.

For levelling, use a spirit level and put it in the upper side of the pedestal (part Nr. 341).

Make the levelling in both longitudinal and transversal direction to the group. Use wedges to alter the height at different points of the base, if necessary. The maximum deviation permitted is 1 mm/m.

The correct separation between the two coupling halves must be maintained.

Pump - motor alignment

In order to prevent misalignment between the shafts, it is necessary to correctly install, check and maintain the coupling. See the instructions manual for the coupling.



The coupling may produce a source of ignition or high temperature in the event of incorrect operation. The coupling must be classified as non-electric equipment with at least the same type of area and temperature as the pump. It is necessary to follow the instructions in the coupling manual which is included with the pump.

The equipment is aligned at factory, and this alignment must never be lost. The following instructions must be followed when dismantling or returning the motor:

- Check that the flange support surface of the motor support and of the motor itself are perfectly clean and smooth.
- Check the correct separation between the two halves of the coupling.
- Check that the alignment between both shafts is correct by turning the equipment by hand.

5.3 Pipe joint

In no case can the pump be used as a fixed point for the pipes.



The pipe system must at no time exercise force in excess of the values shown in the chart in point 4.6 (due to connection, thermal variation, etc) in the pump.

The short pipes must be of at least the diameter of the pump connections. The diameter of long pipes is, in some cases, determined by economic criteria.

Transition pieces at larger diameters must have an extension angle of around 8°, in order to prevent pressure drops.

The thermal expansions of the pipes must be offset with suitable measurements, in order not to exceed the maximum strains permitted on the pump.

The diameters of the pipes, valves and accessories must be calculated in line with the load losses envisaged in the installation, meaning the fluid impulsion speeds in the pipes will be: from 2 to 3 m/s



Exceeding the admitted strains of the pipes may lead to leaks in the pump and to the fluid escaping. Hazard of death with hot liquids!

When designing the suction piping check that the available NPSH is higher than required NPSH of the pump in order to avoid cavitation in whole admissible operation range.

The suction and impulsion nozzle covers of the pump must be removed before connecting the pipes.

Before starting up a new installation, it is necessary to thoroughly clean the tanks, pipes and accessories by brushing and blowing. Welding material, scales and other impurities are often cast off some time after.

Note

In order to prevent the rotation of the pumps in inverse direction (danger of the impeller breaking out), a retention valve must be placed in the impulsion pipe.

Wet well. Suction conditions

It is not enough to simply submerge the pump in the well until it is primed. We need to pay attention to the suction of the pump, since in this case good suction will depend more on the environment surrounding the pump (physical conditions of the well or sump) than on the pump itself.

An insufficient liquid submergence level may lead to dry operation of the parts of the pump, which in turn leads to the heating of the parts in contact. This circumstance should be avoided, with plant operators manually checking or equipment shutdown devices ensuring that the liquid level in the suction well is never lower than the indicated submergence level.

High suction pressure may overload the bearings and lead to their overheating. This circumstance must be avoided, to which end the suction pressure must not exceed that shown in the datasheet, either through manual control by the operators or through devices which shutdown the equipment in the event of excessive pressure.

The pump must not work without liquid under any circumstance. If this condition may come about, the installation must be fitted with safety devices which prevent the operation of the pump without liquid inside, or have automatic devices to discharge the minimum flow of the pump. See the section on minimum flow.

As a general rule we can make some observations:

- The minimum liquid level in the well must be at the distance indicated in the table in annex 9.2 save for the particular pump plans or datasheets showing higher or lower values for minimum submergence.
- The input of liquid to the well must be carried out gently, without any fluctuation or turbulence which may harm the pump suction, always aiming to achieve the most stable flow possible.
- If several pumps are working in parallel in a single well, they should be at a suitable distance from each other, or precautions should be taken to ensure there is no disturbance which may affect the suction conditions of the pump.



The maximum liquid level must always be below the base plate in order for it not to overflow.



The base plate is not seal tight, meaning vapours may escape through it.

5.3.1 Auxiliary connections

The equipment is normally delivered mounted and ready for immediate operation, with only the hydraulic and exterior electrical connections being necessary.

Note

Auxiliary pipes are designed exclusively to support internal strains due to the pressure of the circulating fluid, to which end it is forbidden to subject them to additional exterior strains (e.g. support, etc).



If the pumping liquid is fuel and the leak can lead to ignition, this contingency should be avoided through constant control of the seal tightness of the auxiliary pipe joints by the plant operator.

5.4 Electrical connection:



The electrical connection must be carried out by a specialist electrician! Applicable regulations must be complied with.

Check the mains voltage available with the factory plate data and choose the appropriate connection.

The technical connection conditions and the conditions of the local energy supply company must be observed when carrying out the connections.

We strongly recommend the use of a safety circuit breaker for the motor and a thermistor associated to a trigger device.

These instructions apply to asynchronous three-phase standard electric motors with a squirrel cage both in horizontal and vertical execution, in IP-23, IP-54 and IP-55 protection grades, with frame sizes of between 56L and 355S, both inclusive, with voltages of 200 to 500 V between phases.

The electric motor as well as whole electric installation shall accomplish with all safety norms that may be applied to it.

Earthing

Before starting up the pump, the earth of the pump, the baseplate or the motor must be connected to an effective earthed point of the installation.

5.4.1 Motor connection



Whilst connecting the cables, ensure it is not possible for voltage to appear.



Check that the earth connection is in line with local regulations.



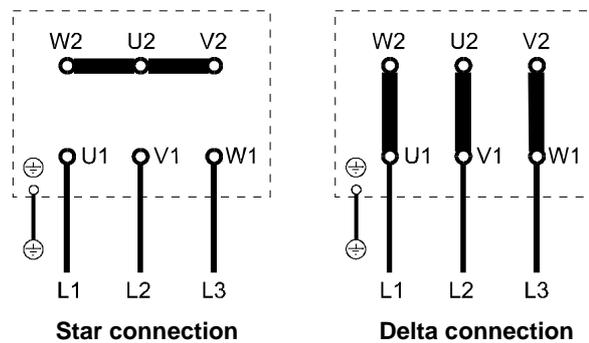
The coupling may produce a source of ignition or high temperature in the event of incorrect operation. For this reason, the motor must be classified with at least the same type of zone and temperature as the pump. It is necessary to follow the instructions in the coupling manual which is included with the pump.

Connection in single speed motors

Direct start-up:

In direct start-up the motor can be used in two different connections:

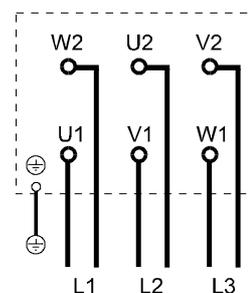
The voltage and the connection, e.g. 400 VY, 240 VD is stamped on the motor plate. This means that the motor can connect at 400 volts in star connection (Y) or at 240 volts in delta connection (D).



Star-delta start-up:

In star-delta start-up, the line voltage must coincide with the voltage shown on the motor for delta start up (D). The six terminals indicated in the following diagram will be connected:

Connection to the star-delta contactor



5.4.2 Time relay adjustment

In the star-delta start-up of three-phase motors, it is necessary to ensure that the switching from star to delta takes place quickly. Prolonged switchover periods will cause damage to the pump.

Time relay adjustment in the star-delta connection:

Motor power	Time adjustment -Y
≤ 30 kW	< 3 sec.
> 30 kW	< 5 sec.

5.4.3 Rotation direction. Check

Note

Check the motor rotation direction by starting up and immediately stopping. The rotation direction must correspond with that shown by the pump arrow located on the pump casing or support. If the rotation direction is not correct, any two phases L1, L2 or L3 of the power cable must be inverted in the motor terminal box.

6 Start up

It is necessary to prevent the formation of explosive atmosphere within the well or tank where the pump is to be installed.

Start-up shall be carried out when all the necessary mechanical, hydraulic, electrical and pneumatic connections are complete. The coupling guard must as well be in place and firmly secured

Motor checks.



When making the electrical connection, ensure the type of current and nominal voltage shown on the motor's data plate concur with the type of current and the mains voltage in the place of installation.

Follow the instructions described in the motor manual.

6.1 First start-up

The pump cannot operate with a closed impulsion valve, as this may lead to overheating of the pumped liquid. If it is necessary to work with the discharge valve closed, a minimum flow relief device is required at the output. This device does not form part of the pump and will be separate from the pump's discharge flange.

Other recommended devices include the constant output orifice plates, constant bypass valves and automatic recirculation valves. If you require further details, please check with KSB ITUR.

The pump cannot work in closed suction valve conditions. If this condition may come about, the plant operator must use a device which detects this condition and forces the pump to stop when it occurs.

6.1.1 Lubricant

BEARINGS:

Lubricated with grease. PUMP WITH GREASE NIPPLES: The pump leaves the factory with the bearings greased for approximately 1000 hours of operation. See lubricant in section 7.2.2.

The bearings must be lubricated with oil/grease in a good state, to which end it is essential to follow the lubrication instructions indicated in 7.2.2

If the bearings support suffers impediments which prevent correct air-cooling, the resulting excess temperature may be excessive for the classification temperature class. For this reason, the support must be kept free of obstacles, thus facilitating natural air cooling.

6.1.2 Filling (priming) of the pump

- Check that the level of liquid in the well is sufficient.
- Turn the pump shaft by hand in order to break any adherence.

Shaft sealing

Packing: The gland nuts must be gently tightened (by hand). The gland must form a right angle to the shaft.

6.1.3 Final control

Make the final check of the group alignment in accordance with 5.2.1. The coupling/shaft must allow easy manual rotation.

Note

Check all the auxiliary connections are correct and functioning.



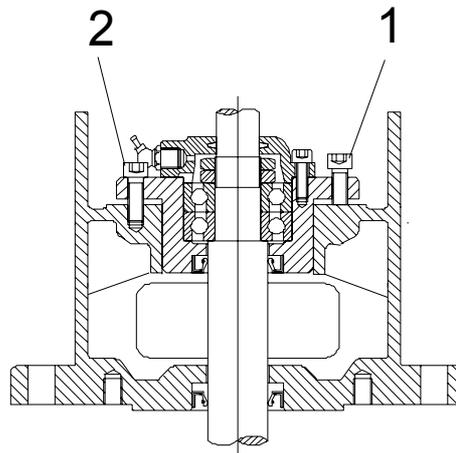
According to the **rules on the prevention of accidents at work**, equipment cannot be started up without protection for the coupling. If the buyer has expressly requested that this protector be excluded from supply, it must be provided by the user.

Before and during the operation of the pump, the coupling guard must be in place and firmly secured. Regularly check this state in order to prevent problems resulting from incorrect positioning or deficient attachment. The coupling guard must be free of any foreign elements.

6.1.4 Impeller adjustment

Turn the pump shaft by hand to check that the rotor is not blocked. Should interior contact in the pump be detected, carry out an axial regulation. To do this:

- Release the attachment screws (2)
- Tighten the adjusting screws (1) to slightly raise the whole moving section.
- Turn the shaft again by hand and check that the rotor rotates freely without any internal contact. If there continues to be contact, tighten a little more using the adjusting screws.
- Tighten the screws (2) to fix the position reached.



Note

If a mechanical seal is used, remove it first before regulating. Please contact us before carrying out this operation.

6.1.5 Start-up

Before starting up the group, check all the sections with regards to chapter 6.

The start-up must be carried out with the suction valve (where fitted) completely open and the impulsion valve partially closed. Once the pump has reached its service speed and the suction air has been eliminated, regulate the operation point using the impulsion valve.

If the electric motor guard is triggered when starting up, close the impulsion valve more until the equipment starts up normally.



The pump must NEVER work with zero flow or flow which is less than the operating minimum, as internal recirculation will cause the fluid to heat up quickly, leading to hazards (including explosion) as a result of the high pressures reached within the frame. Check the minimum flow in the operation curves.

Minimum flow necessary for the pump

The pumps cannot work below the minimum flow specified in the datasheets.

If this condition may come about, the installation must be fitted with safety devices which prevent the operation of the pump without liquid inside, or have automatic devices to discharge the minimum flow of the pump.

For liquids other than water, the minimum flow is determined by the following formula:

$$Q_{min} = \frac{3.600.000 \times Pa}{Pe \times Ce}$$

In which:

Q_{min}: Minimum flow in m³/h.

Pa: Power absorbed by the pump in kW at closed valve.

Ce: Specific heat of the fluid in J/kg*°C.

Pe: Specific weight of the fluid in kg/m³

Maximum flow permitted by the pump

Unless indicated in another datasheet, the maximum flow permitted is 1.1x optimum flow of the pump with the supplied impeller diameter.

6.1.6 Shutdown

Close the impulsion pipe valve.

If there is anti-return in impulsion with counter pressure, leave the impulsion valve open.

- Shutdown the motor. Check that shutdown is normal.
- In prolonged periods of non-operation, close the suction pipe valve (where fitted) and the auxiliary connection valves.
- The pump must be protected from freezing whenever this risk exists, and must be emptied in prolonged periods of non-operation.

If, whilst the pump is in standstill, it must remain on standby for service, start up at regular intervals for around 5 minutes (see also 7.2.1)

- Fire pumps: 1x/month, at minimum.
- Drink-safe water pumps: 1x/48 hours, at minimum.
- Reserve pumps: 1x/week, at minimum (it is best to change the operating pump every day).

The seal tightness and function of the auxiliary connections must be examined during these start-ups.

6.2 Service limits

6.2.1 Switching frequency

In order to prevent abnormally high temperatures and overloading of the motor, pump, coupling, seals, etc, the switching frequencies shown below must not be exceeded:

MOTOR POWER	MAX. SWITCHING / HOUR
Up to 3 kW	20
From 4 to 11 kW	15
From 11 to 45 kW	10
From 45 kW	5



The permitted operation temperature is indicated in the order and in the ATEX conformity declaration. If the pump is to work at a higher temperature or you do not have the data sheet, please ask KSB ITUR.

6.2.2 Density of the liquid to be pumped



The power absorbed by the pump increases in direct proportion to the density of the impelled liquid. In order to prevent overloading in the motor, pump and coupling, this density must not exceed that shown in the order and in the ATEX declaration of conformity.

6.2.3 Viscosity of the liquid to be pumped



The power absorbed by the pump increases with the viscosity of the impelled liquid. In order to prevent overloading in the motor, pump and coupling, this viscosity must not exceed that shown in the order and in the ATEX declaration of conformity.

6.2.4 Maximum pump speed

Para proteger la bomba en sobre velocidad, la máxima velocidad de rotación será indicada en una placa grabada sobre la bomba. Si la velocidad no estuviera indicada en la placa es necesario consultar con KSB ITUR.

Si eventualmente se necesitara hacer funcionar la bomba a más velocidad, será necesario consultar a KSB ITUR.

6.3 Starting up after storage

If the storage and/or shutdown of the pump has been for a prolonged period of time (over 6 months), it is necessary to:

- Check the state of the joints.
- Check the levelling.
- Check all the auxiliary connections.
- Renew the lubrication of the bearings (where fitted).
- Change the packing (when fitted).
- After a short storage period, simply turn the pump shaft manually to unlock the rotor equipment.
- Follow the specific post-storage instructions in the motor manuals and other items.
- Observe all the steps shown in the "Start-up" section.

Note

If the equipment is to be in standstill for a certain period of time and there is the possibility of freezing temperatures, it is necessary to completely drain the pump in order to prevent any deterioration from the freezing of the contained fluid.

7 Maintenance/Conservation

7.1 General instructions

Before dismantling, ensure that:



The motor cannot be operated accidentally, by disconnecting from the electricity supply (e.g. removing cut-outs, unplugging, disconnecting the automatic circuit breaker, etc) or the start-up batteries (disconnect operating energy).



The pump is free of pumped fluid, cleaning it internally with appropriate liquid whenever it is a hazardous fluid (hot, contaminant, inflammable,...)

7.2 Maintenance/inspection

7.2.1 Checking instructions

During the first minutes of operation:

Check that there is no fluid leak through the support or pipe joint. If this is so, proceed immediately to check and/or repair.

After a few hours operation:

Note Check the bearing temperature at the point in the bearing location area. Normal temperature can reach up to 40°C above environmental temperature, but must never exceed 90°C.

Observe the possible anomalies shown in point 8 of this manual.

The reserve pumps should be started up and shutdown once a week, in order to ensure they are always in service conditions.

 The failure of one or both sides of the seal may lead to excess heating. This can be corrected by following the instructions of the seal manufacturer, both with regards to its assembly and the maintenance of the auxiliary seal devices, where appropriate. Alternatively, the pump may be fitted with a surveillance device if the purchaser has so specified.

7.2.2 Lubrication

Before lubricating the pump, ensure that

 The pump is in standstill and cannot be started up accidentally.

 The bearing support temperature is less than 40°C, in order to prevent burns to the hands. To do this, measure the temperature with a thermocouple.

The absence of grease in the bearing support may lead to a lack of lubrication of the lip seals, which will come into dry contact with the shaft. This contact may lead to a high shaft temperature which might cause ignition. To prevent this, regularly check the grease level in the bearings support.

BEARINGS:

Lubricated with grease. PUMP WITH GREASE NIPPLES:

1st re-lubrication

The pump leaves the factory with the bearings greased for approximately 1000 hours of operation. After this time (or one year, whatever may occur first) proceed to first re-lubrication. Check re-lubrication quantity in each greaser in the attached chart

Subsequent re-lubrications

The periodicity for subsequent re-lubrications should be 2000 hours of operation or once a year (whatever may occur first). Check re-lubrication quantity in each greaser in the attached chart

Grease change (re-filling)

Change grease after aprox. 8000 hours of operation or once every two years (whatever may occur first).

For complete grease change it is necessary first to dismantle the bearings and carefully clean their positions in the support in order to remove old grease.

Afterwards proceed to re-filling of grease up to aprox. 75% of the free space in the bearing and aprox 40% of the free space at bearing cover.

Type of grease:

We recommend using lytic-based lubrication grease with antioxidant additives, of consistency 3 in line with DIN-51502 K3K.

Pump size		Grease amount for re-lubrication	Pump size		Grease amount for re-lubrication
32-125	40-125	30 g	40-315	50-315	150 g
32-160	40-160		65-250	80-200	
32-200	40-200		65-315	80-250	
32-250	40-250		100-190	80-315	
50-125	65-125		100-200	80-400	
50-160	65-160		100-250	125-240	
50-200	65-200		100-315	125-250	
50-250	80-160		100-400	125-315	
150-500	250-400	60 g	150-200	125-400	
200-400	250-500		150-250	200-240	
	300-300		150-315	200-250	
	300-350		150-400	200-330	
			250-300		

7.3 Emptying/Drainage

 The emptying and drainage of pumps used to expel liquids which are a health hazard must be carried out in such a way as there is no risk to people or to the environment, in line with legislation. If necessary, use protective clothing and mask.

7.4 Dismantling

7.4.1 Fundamental instructions/observations

Note Before dismantling, ensure the pump cannot be started up.

The suction and impulsion valves must be closed.

The pump frame must have returned to environmental temperature.

The pump frame must be emptied.

Comply with all safety measures in accordance with 7. When working on the motor, also take into account the rules and instructions of the manufacturer.

7.4.2 Coupling

Motor pump coupling

- Release the motor attachment screws and remove the motor along with the male coupling.
- The rubber plugs can then be extracted from the female coupling.
- If you need to release the coupling, use an extractor. Never bang in order to extract, as this may cause serious damage to the bearings.

7.4.3 Pump

For the extraction of ball bearings, shaft, bearings, etc., it is necessary to dismantle the entire pump.

To do this, see the sectional plan and diagram with a breakdown of the attached pieces.

Before dismantling the pump, remove it from its location:

- Release the pins which fix the attachment plate to the support plate of the well.



First check that the lifting clamp bolts are securely in place, as they will be used to lift the equipment. In this position, leave to drain for a few moments to discharge the fluid contained in the pump.

- Lay down or support the equipment on the edge of the attachment plate, supporting the motor to ensure it does not rest on it as a cantilever.

DISMANTLING:

As a general guide to dismount the equipment, follow these steps:

- Release the bolts which join the motor to the support, dismount the motor and extract the coupling as shown in point 7.4.2.
- Release the attachment screws from the upper support cover, and extract this by sliding it along the shaft.
- Release and remove the bearing support nuts.
- Release the screws which secure the bearings box and slide this along the shaft with the bearings.
- Release the upper lantern support.
- Loosen the screws which join the pump to the impulsion pipe, therefore releasing it.
- Release the nuts which join the pump casing cover and separate it. Use extractor screws to separate the casing. It is not necessary to release the suction filter, although we can clean it if the orifices are blocked. At this moment the rubbing plate is accessible in the casing.
- Release the impeller attachment nuts and extract it.
- Release the nuts which attach the cover to the intermediate pipe and extract the cover.
- Release the nuts which join the intermediate pipe to the support, and remove the intermediate pipe.
- Release the deflector keep pin and slide it along the shaft.
- Release the lower bearing cover screws and use a plastic hammer to hit the end of the shaft (motor side), and then take this out with the bearing cover, the lower part of the bearing and the bearing stopper bushing.
- The other part of the bearing will be housed in the lower support, and should only be removed using an extractor.

Pump bearing failure.

Failure of the bearings may cause ignition through increased heat on the surface of the bearings. This can be avoided by using officially approved quality bearings, which are supplied as original spare parts.

7.5 Assembly

7.5.1 Coupling

Motor pump coupling

Note

Proceed in inverse order to assembly. It is not necessary to check the alignment, due to the design of the pump in which the concentricity of the shafts is guaranteed by way of guides between the motor and the pump support.

7.5.2 Pump

Proceed in reverse order to that described above, taking special care:

- When mounting the shaft in the support, take care to ensure it does not tilt and maintains the axial direction with the support.
- To introduce the different elements, use a plastic hammer, banging gently in order to prevent damage to the ball bearings.
- Proceed to lubricate the bearings.
- Do not forget to position new joints. There should be no clearances and the joints should be perfect.
- Use your hand to check that the shaft rotates freely every time a piece is mounted.
- The CINCP series pumps impulsion pipes must take a position perpendicular to the support plate without presenting tensions or deviations from the shaft.



The pump materials have been selected in accordance with the process fluid indicated in the datasheets. If this fluid is modified, check with KSB ITUR that the new fluid is suitable for the pump.

Note

- Check the correct positioning of pieces, especially seals, bushing and impellers.

7.5.3 Tightening torque of the screws/nuts

	Steel	Stainless steel
ISO Metric thread	Tightening Torque in [N·m] (for non-lubricated thread)	
M4	3.1	2.15
M5	6.1	4.25
M6	10.4	7.3
M8	25.2	17.7
M10	49.5	34.8
M12	85.2	59.9
M16	211	148
M20	412	290
M24	710	276
M27	1050	409
M30	1420	554

7.5.4 Tightening torque of the impeller nuts

Metric thread	Tightening Torque in [N·m] (for non-lubricated thread)
M14x1.5	38
M20x1.5	100
M27x1.5	250
M33x1.5	460
M52x1.5	2000

7.6 Recommended spare parts

Piece denomination	Reference N°	Recommended spare parts (1)		
		Start up	2 years	5 years
Joints (set)	---	1	2	5
Wear plate	135		1	2
Bearing (set)	320		1	2
Lip seal (set)	420		1	2
Felt ring	422		1	2
Deflector protection	507		1	2
Shaft sleeve	520		1	2
Coupling flexible (set)	867		1	2
Impeller nut	922		1	2
Key (set)	940		1	2
Pump shaft(s) (set)	211			1
Impeller	230			1
Coupling	840			1

(1) Amounts recommended for a continuous service pump.

7.7 Preventative maintenance

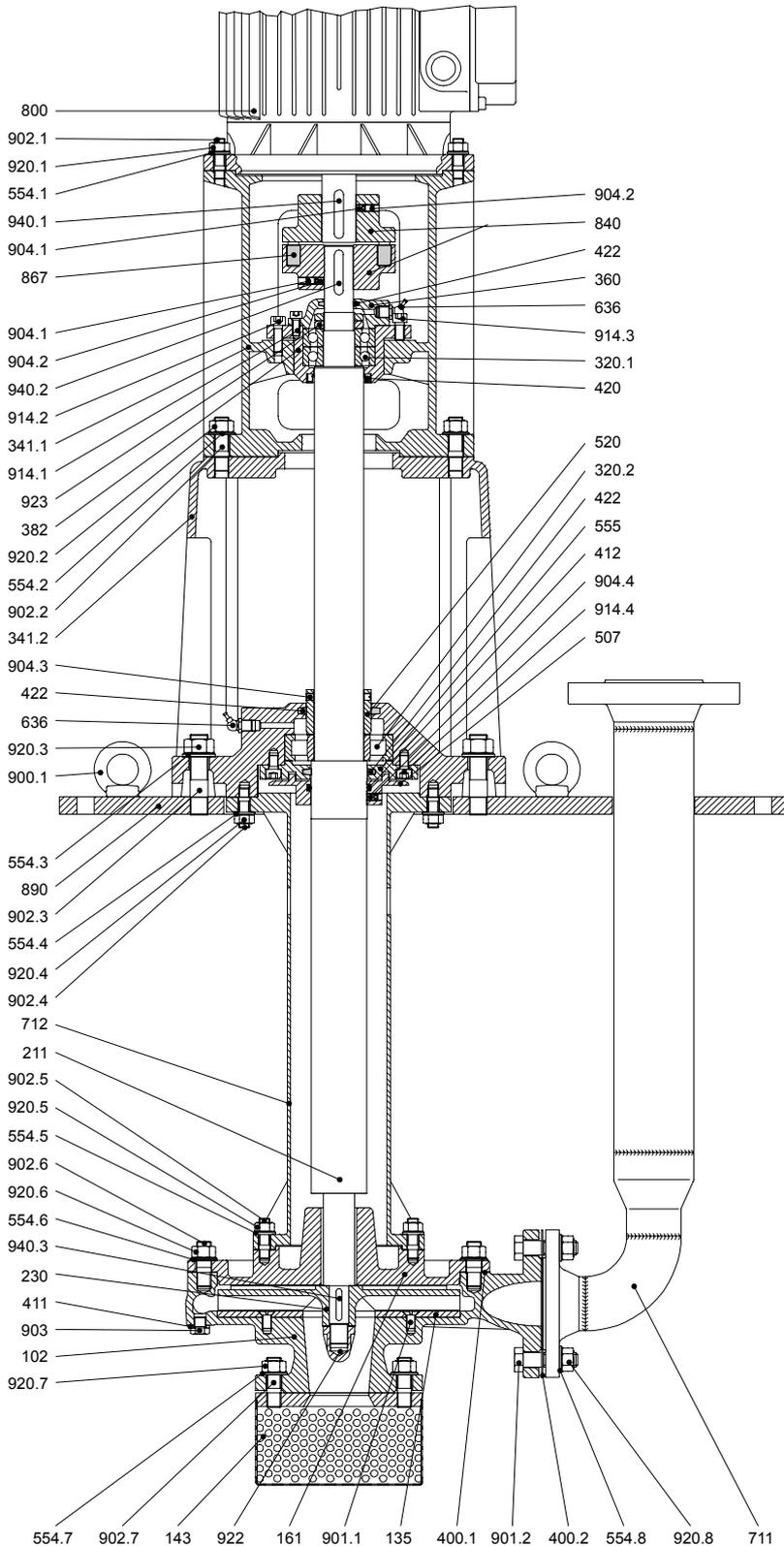
N°	DESCRIPTION OF THE OPERATION TO BE CARRIED OUT	PROCEDURE	REGULARITY	CONSEQUENCE
1	Check for leaks between flanges	Visual inspection	Monthly	12
2	Check for grease leaks	Visual inspection	Monthly	8, 11
3	Check for heating of the bearings	With thermocouple	Quarterly	2,10,11 Dismount the support
4	COMPLETE PUMP CHECK	Checking and dismantling the pump. See point 7 of the manual	Yearly	1,3,5,6,7,10,11, 12.13
5	Check tightness of connecting bolts	Manually	Yearly	
6	Check for wear of the impeller and rings	Dismount casing Visual inspection	Yearly	
7	Check for wear of the shaft, bearings and retaining pins	Dismount support, Visual inspection	Yearly	
8	Change the grease	See point 7.2.2 of the manual	Yearly (1)	
9	Change the rubber coupling plugs	See point 7.4.2 and 7.5.1 of the manual	Yearly	
10	Check functional characteristics loss	Instrument reading	In accordance with use	Check the installation
11	Fill with grease	See point 7.2.2 of the manual	See point 7.2.2	
12	Change the joints	Manually	Every time they are removed	
13	Carry out the axial regulation	See point 6 of the manual	When detecting contact and when dismantling	

(1) If the environment is dusty, humid or aggressive, the grease change should be carried out more often

8 Trouble-shooting

The pump does not move the fluid
 | Insufficient pressure or flow
 | | Excessive absorbed power
 | | | Excessive vibrations and noise
 | | | | Excessive support temperature
 | | | | | Wear rings deteriorate quickly

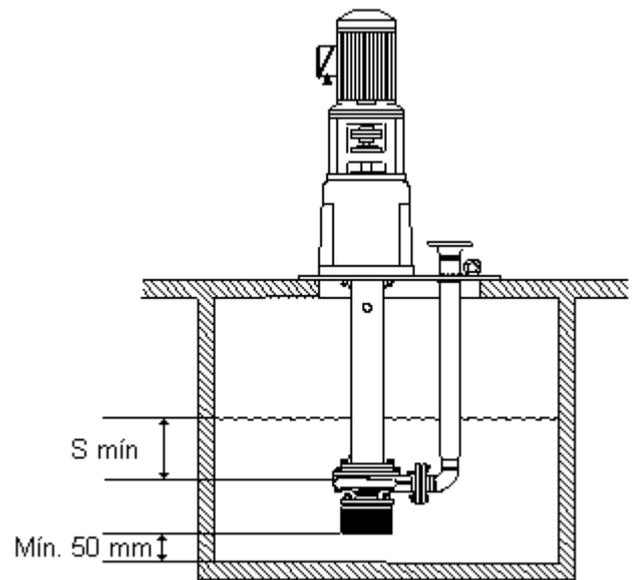
					Cause	Solution
x	x				Suction or impulsion valves closed or poorly regulated	Open the suction valve or search for work point with the impulsion valve
x					Incorrect rotation direction	Change the motor connections
x	x				Pipes, filter or impeller obstructed	Dismount and unblock
x	x		x		Pump not correctly submerged	Check minimum submergence
x	x				Maximum height generated by the pump lower than that required by the installation.	Increase the rotation speed. If this is not possible, a larger impeller or larger pump needs to be assembled. Please ask
	x				Rotation speed incorrect	Measure the speed, check the motor drive power supply voltage
	x		x		Wear rings deteriorated or incorrectly assembled	Dismount and change, or reinstall them
	x				Leaks between the casing and pipes	Dismount and check the joints
	x				Unsuitable installation/disturbances from other pumps	Check with the installer
		x			Liquid viscosity or density greater than normal.	Reduce the design point or change the motor
		x	x	x	Poor motor assembly	Check and clean the pump-motor joint.
		x			Obstruction inside the pump.	Dismount the pump and clean the impeller, inlets, pipe or filter
		x			The real height to be generated by the pump is lower than that of the design point, meaning the flow and power are greater	Partially close the impulsion valve
		x	x	x	Ballbearings deteriorated, poorly assembled or poorly lubricated	Change them, check assembly, lubricate them or adjust them in their support
		x			Excessive contact in rotating parts	Dismount the pump and check its elements are correctly assembled
		x	x	x	Misaligned or deformed shaft	Dismount it and replace it
			x		Loose impeller support nuts	Dismount the pump and tighten them
		x	x	x	Pipe tensions on the pump	Check installation
			x		Lack of rigidity in the foundations or anchor bolts loose	Make new foundations or tighten the bolts
			x		Pump cavitation	Improve the suction. Please ask.
			x	x	Impeller obstructed, imbalanced or deteriorated	Dismount it and inspect it, Balance it or change it
				x	High suction pressure	Please ask

9 Annexes
9.1 Sectional plans
**CINCP
Sectional C-1336**


Ref	Denomination
102	Volute casing
135	Wear plate
143	Suction strainer
161	Pump cover
211	Pump shaft
230	Impeller
320	Bearing
341	Pedestal
360	Bearing cover
382	Bearing support
400	Gasket
411	Circular gasket
412	O-ring
420	Lip seal
422	Felt ring
507	Deflector protection
520	Shaft sleeve
554	Flat washer
555	Labyrinth sealing
636	Grease nipple
711	Discharge pipe
712	Intermediate pipe
800	Motor
840	Coupling
867	Coupling flexible
890	Base plate
900	Screw
901	Hexagonal head screw
902	Bolt
903	Plug
904	Setscrew
914	Allen screw
920	Nut
922	Impeller nut
923	Bearing nut
940	Key

9.2 Minimum submergence chart

Size	Minimum submergence S [mm]
32/125	120
32/160	120
32/200	200
32/250	200
40/125	120
40/160	120
40/200	200
40/250	200
40/315	220
50/125	120
50/160	120
50/200	220
50/250	220
50/315	220
65/125	120
65/160	220
65/200	220
65/250	220
65/315	220
80/160	220
80/200	220
80/250	240
80/315	240
80/400	240
100/190	220
100/200	220
100/250	220
100/315	220
100/400	240
125/240	220
125/250	220
125/315	240
125/400	240
150/200	240
150/240	240
150/250	240
150/315	240
150/400	240
150/500	440
200/240	260
200/250	260
200/330	260
200/400	300
250/300	400
250/400	300
300/300	400
300/350	500



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WARRANTY

KSB ITUR undertakes:

To repair or replace at any of its ASSOCIATED TECHNICAL SERVICE CENTRES or at its factory in Zarautz, free of charge and for a period of 12 months as of the date of dispatch from our warehouses, any product which shows manufacture defects. This warranty will be reduced to 6 months for continuous or permanent operation pumps. This warranty does not include any pieces which are liable to experience deterioration through the envisaged use of the product. The instructions set out in the maintenance and operation manual for the equipment must be fulfilled in order to prevent excessive wear and tear.

Whenever the equipment or pumps supplied by KSB ITUR are to be used prior to installation, in such a manner as they require handling, assembly and adjustment either before or after installation by parties other than KSB ITUR, KSB ITUR shall not be liable for any defects in the equipment following installation unless the purchaser is able to legally prove that these defects existed prior to installation and assembly.

KSB ITUR shall in no case be liable for any direct or indirect damage which the Product may suffer as a result of defective installation, incorrect storage, lack of maintenance, negligent handling, handling by unauthorised personnel, overloading or deficient functions, or for any damages resulting from external influences such as chemical, electrochemical and electrical agents. The responsibility of KSB ITUR is limited in all cases to the replacement, as speedily as possible, of the defective part, without it being in any way liable for other responsibilities or compensation.

EC DECLARATION OF CONFORMITY

(Directive 2006/42/EC ANNEX IIA)

KSB ITUR Spain, S.A., with address in footer

PUMP SERIES: CINCP, CINCN

S/N: 997242000000 000000 - 998000000000 000000

KSB ITUR hereby declares, under its responsibility, that its aforementioned machine, to which this Declaration refers, is in conformity with the applicable provisions of the following Directives:

Machinery: 2006/42/EC

Applied harmonised standards: EN 14121-1, EN 809/A1

The collection of relevant technical documentation will be made in the address in the footer

Zarautz, 29.12.2009

Post Head of Engineering

Name Ángel Fernández



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