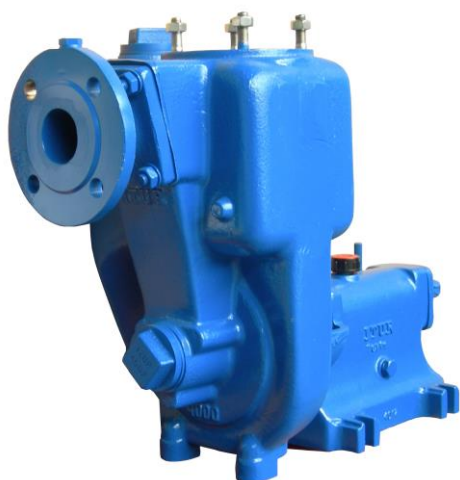


Self-Priming Pumps



AU



AU MONOBLOC

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.



Please remember that this Manual must be kept close to the motor pump group.

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EC DECLARATION OF CONFORMITY 36

(Directive 2006/42/EC ANNEX IIA) 36

PUMP SERIES: AU 36

1 General items

Note

This KSB ITUR equipment 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 equipment and the ways it can be applied.

It contains important instructions to operate the equipment 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 equipment. 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 indications 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

All instructions in this manual which may involve personal hazard if not complied with are indicated with a general hazard sign.



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 connections identifications

These must be complied with, 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 company.

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.

If flammable fluid, it must be ensured at all times that the pump is full of liquid, so that there is never an explosive zone 0 inside it. In addition, the parts subjected to pressure must be of ductile material

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.



If the liquid is fuel, the pump frame pieces are constructed from ductile material and the impact test described in EN 13463-1 has been passed.



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 2014/34/EU.

Individual pieces supplied as spare parts must be originals, supplied and checked by KSB ITUR

3 Transport and storage

3.1 Transport and handling

Note

Improper handling of equipment and / or its individual elements can severely damage the paint or protective coating of them, and can lead to premature oxidation of the surfaces and shorten the operating life of equipment.



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 in the drawing; if it is not, and the equipment cannot be handled safely, please contact KSB ITUR.



Danger to life from falling parts! The pump (or parts) could slip out of the suspension arrangement. Stay at safety distance from the parts during transport.

Note

Do not remove the equipment from their transport pallets until final installation is to take place. Once disassembled, the equipment should be kept in **horizontal position for transport**, and never supported or hold by its ends.



When 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.



Remember that the equipment must never be lifted using only the eyebolts or lifting lugs of each element (e.g. by means of eyebolts of motor and pump) because they are designed for the individual transport of the element. Never lift or transport the pump or the equipment by the free end of the shaft. It is also important not to use the pump and pipe flanges either joining elements (e.g. couplings)



Use proper lifting straps or slings. These (out of scope of supply) must not bear against sharp edges and corners. If the equipment is to be lifted using straps or slings, these must always be run underneath the motor and pump support.

Note

In line with previous recommendations, do not use transport elements or means that can damage paint or protective coating of the equipment and components. That it is not advised the use of chains and

similar items to wrap pump, columns and other components. We also discourage the use of hooks.

3.2 Provisional storage/Conservation

The equipment and its components must be stored indoors, in a clean, dry place, away from vibrations and where relative humidity is as constant as possible.

Note

All caps or covers of piping connections must be installed to prevent dirt and other materials get into the equipment. Do not remove them until it is required during the installation of equipment!



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

If commissioning does not take place immediately after delivery, it is advisable to store equipment and its components taking following measures:

Short term storage (less than 6 months)

- Inspect the protective coating or painted surfaces. If any deficiency is to be seen, proceed to repair it. If repainting needed consult KSB ITUR for the characteristics of the paint.
- It is necessary to protect with preservation products the low alloy parts (e.g. grey casting, nodular casting, etc...) in contact with liquid. Preservation products available on the sector market can be used, in line with the manufacturer's instructions on application and disposal.
- The shiny (mechanised) parts and surfaces of the equipment and elements must be protected from corrosion using silicone-free grease or oil.
- Turn shaft by hand (at least once a month)

Long term storage (exceeding 6 months)

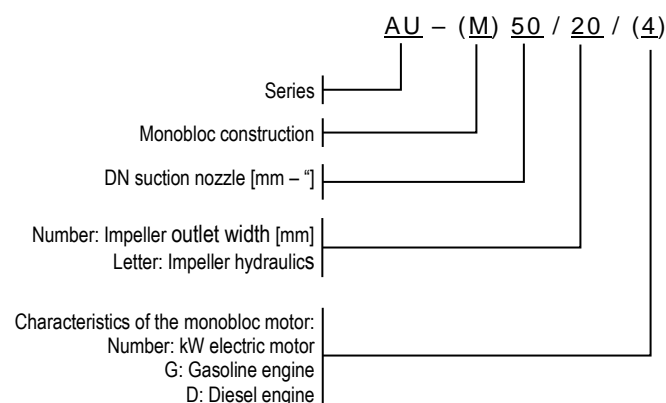
Consult KSB ITUR.

4 Group description

4.1 General description

Horizontal centrifugal self-priming pump for the pumping of neutral or aggressive liquids, clean liquids or liquids with solids in suspension.

4.2 Denomination



4.3 Form of construction

Pump casing with axial suction and radial discharge. Semi-open single-stage impeller.

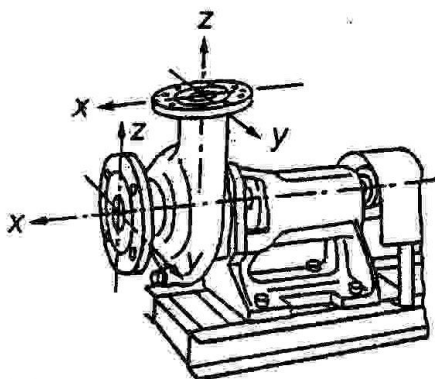
The monobloc (M) construction has a rigid coupling.

The non-monobloc construction has a flexible coupling.

Bearings: The monobloc (M) construction does not have friction bearings. The non-monobloc construction has oil or grease lubricated bearings, depending on the size of the pump.

Shaft sealing: Mechanical seal.

4.4 Forces and moments permitted in the nozzles



SIZE PUMP	CAST IRON OR BRONZE CASING (1)											
	SUCTION						DISCHARGE					
	FORCES [N]			MOMENTS [N.m]			FORCES [N]			MOMENTS [N.m]		
	F _x	F _y	F _z	M _x	M _y	M _z	F _x	F _y	F _z	M _x	M _y	M _z
AU-1,5	THREADED CONNECTIONS, DO NOT ADMIT STRESSES											
AU-2												
AU-3												
AU-50	330	300	270	280	200	230	300	270	330	280	200	230
AU-65	420	370	340	300	220	240	370	340	420	300	220	240
AU-80	500	450	410	320	230	260	450	410	500	320	230	260
AU-100	670	600	540	350	250	290	600	540	670	350	250	290
AU-150	1000	900	810	500	350	410	900	810	1000	500	350	410
AU-200	1340	1200	1080	650	460	530	1200	1080	1340	650	460	530

(1) FOR NODULAR CAST, CARBON STEEL OR STAINLESS STEEL CASING, MULTIPLY THESE VALUES BY 2.0

5 Installation

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 should check with a specialist in the design of castings, pipes, wells, etc. to supplement and interpret the information provided by KSB ITUR and to ensure proper operation.

5.1 Check before assembly

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

The slab upon which the equipment is to be positioned must have completely set.

The concrete used must be of sufficient resistance (minimum X0) to allow functional assembly in line with DIN-1045.

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.

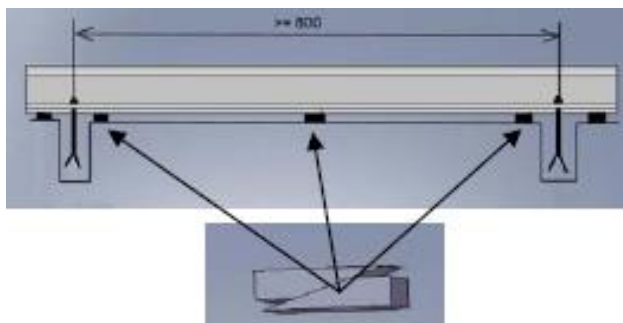
Do not connect the suction and discharge nozzles until the equipment is completely installed on its base and the cement has completely set.

5.2 Group positioning

5.2.1 Groups with horizontal base frame

5.2.1.1 Base frame with bent sheet

Levelling



Place wedges on both sides of the anchor pins if the base frame does not include levelling screws.

When the distance between anchor pins is over 800 mm, use levelling wedges in the middle, both on the sides and at the front.

Use a spirit level to level the equipment. Use wedges to alter the height at different points. The maximum deviation permitted is 0.2 mm/m.

The separation between the two coupling halves must be maintained.



All equipment supplied on a transport bench (forklift truck, carriage, etc) should be secured using the envisaged attachment device or brake. Ask KSB ITUR for the specific instructions manual for your transport bench if you do not have one already. (See annex 9.2)

Cementing

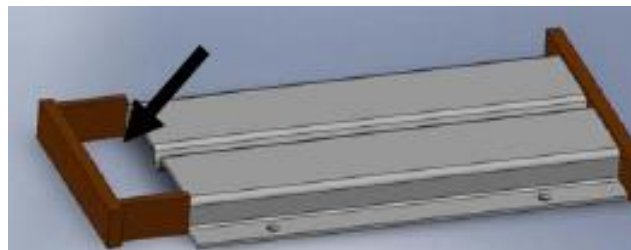
Pour an initial layer of mortar cement into the orifices of the bolts, contacting throughout the periphery with the base of the

base frame. Once the mortar cement has set, tighten the anchor pins in a balanced manner.

Connect the suction and discharge nozzles to the installation and proceed with an initial alignment of the equipment.

Proceed to fill the lower part, or the cavities between the base frame profiles, with concrete.

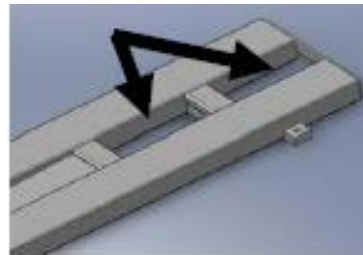
When using folded steel base frames, make a small mould in the front and rear part.



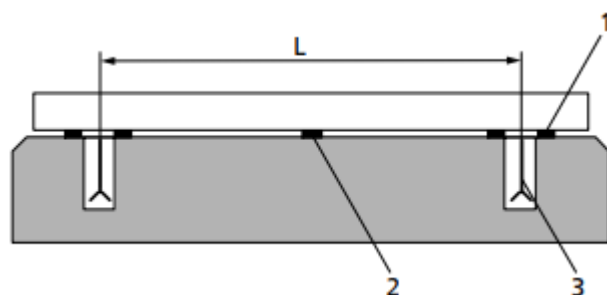
The concrete must be of minimum contraction, normal granulometry, with a water/cement ratio (W/C Ratio) of ≤ 0.5 . It is necessary to use additives which improve fluidity for correct filling.

We recommend treating the concrete in line with DIN-1045.

In order to carry out the final alignment, wait until the installation is ready and at operation temperature.



5.2.1.2 Base frame with u profile



Fitting the shims

L	Bolt-to-bolt distance	1	Shim
3	Shim if (L) > 800 mm	2	Foundatin bolt

Check that the foundation has the required strength and characteristics. In addition, it has been prepared in accordance with the dimensions given in the outline drawing/general arrangement drawing.

- Position the pump set on the foundation and level it with the help of a spirit level placed on the shat and discharge nozzle. Permissible deviation: 0.2 mm/m
- Use sims (1) hor height compensation, if necessary.

Note

Always fit shims, if any, immediately to the left and right of the foundation bolts (3) between the baseplate/foundation frame and the foundation. For a bolt-to-bolt distance (L) > 800 mm fit additional shims (2) halfway between the bolt holes.

All shims must lie perfectly flush.

3. Insert the foundation bolts (3) into the holes provided.
4. Use concrete to set the foundation bolts (3) into the foundation.
5. Wait until the concrete has set firmly, then level the baseplate.
6. Tighten the foundation bolts (3) evenly and firmly.

For baseplate more than 400 mm wide grouting the baseplate with low-shrinkage concrete is recommended.

5.2.2 Pump-motor alignment

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

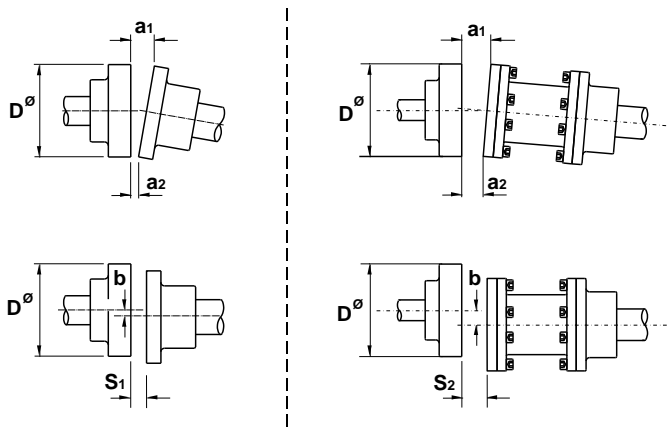


The coupling may produce a source of ignition or high temperature in the event of incorrect operation. The coupling must be classified as non-electric equipment with at least the same type of area and temperature as the pump. It is necessary to follow the instructions in the coupling manual which is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

When the supply includes the complete group (pump – motor), the equipment has been aligned at factory, although, due to transport and to the anchoring to the casting, the equipment should be realigned before proceeding with start-up.

The correct alignment of the standard KSB ITUR coupling involves correcting any possible errors of parallelism and concentricity using metal wedges in the motor.

Use appropriate instruments to carry out the following measurements in 4 positions offset 90° between the faces of the coupling:



DØ [mm]	a1-a2 and b maximums [mm]			S1 [mm]	S2 [mm]
	0-1500 [rpm]	1500-3000 [rpm]	3000-4000 [rpm]		
58-140	0.20	0.15	0.10	4	5
160-225	0.30	0.20	0.15	6	
250-280	0.35	0.30	---	8	

Note: For other types of coupling, see their instructions manual.

Note

The equipment must always be aligned after mounting and preparing for start up, check that the assembly can rotate freely when operated by hand

5.2.3 Monobloc groups

Levelling

Use a spirit level to level the equipment. Use wedges to alter the height at different points. The maximum deviation permitted is 0.2 mm/m.

Pump - motor alignment

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.
- The motor shaft should easily enter the pump shaft (or bushing). If it is not, do not force assembly as this will damage the motor bearings. Check the alignment between both shafts and repair or replace them as necessary.

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 4.4 (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 convenience of installing foot valves when the pump is working in suction or retention when loaded, along with seal valves, will depend on the type of installation.

The thermal expansions of the pipes must be compensated with suitable measures, in order not to exceed the maximum stresses 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 speeds will be:

- Speed in the discharge pipe: from 2 to 3 m/s
- Speed in the suction pipe: from 1 to 2 m/s



Exceeding the admitted stresses 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 discharge 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. We recommend using an oversized sieve filter in suction in order

to prevent dirt larger than that permitted by the pump from coming in.

If hoses are fitted, these must be firmly in place before proceeding with start-up or during operation, in order to prevent any possible whiplash as a result of the pressure generated by the pump.

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 data sheet, 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.

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.

When using clean fluids, the cooling of the mechanical seal is by way of the recirculation of the pumping fluid (it is not necessary to inject exterior fluid).

Note

Auxiliary pipes are designed exclusively to support internal stresses due to the pressure of the circulating fluid, to which end it is forbidden to subject them to additional exterior stresses (e.g. for 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 and the factory plate, 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.

If the baseplate is not within the scope of supply of KSB ITUR, do not paint either the support surfaces of the pump feet or of

the motor in order to ensure a good conductivity between the pump and the earth of the electric motor.

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.



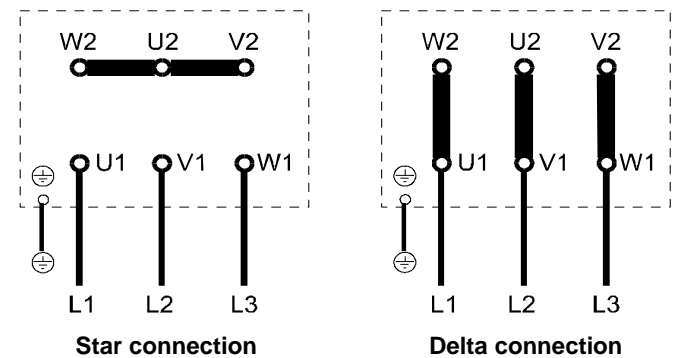
The motor may produce a source of ignition or high temperature in the event of incorrect operation. For this reason, the motor must be classified with at least the same type of zone and temperature as the pump. It is necessary to follow the instructions in the motor manual which is included with the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

Connection in single speed motors

Direct start-up:

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

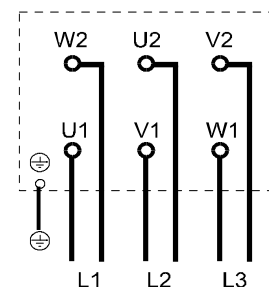
The voltage and the connection, e.g. 400 VY, 240 VD is stamped on the motor plate. This means that the motor can connect at 400 volts in star connection (Y) or at 240 volts in delta connection (D).



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 passage from star to delta takes place quickly. Prolonged time 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 shutting down. 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.

The incorrect rotation of the pump may lead to the incorrect operation of the seal and the heating of its faces. For this reason, correct rotation direction must be ensured using the arrow shown on the pump, with the pump completely filled with liquid and properly vented.

5.5 Non electric motors

Shall fulfil all that may be applicable to non electric material and follow the instructions stated in their specific instructions manual.

Likewise in the case of internal combustion engine refer to the instructions of the engine manual for recommendations for safe gas exhaust and air supply required in the installation room.

6 Start-up

Before starting up, both the pump and the mechanical seal process pipes, where appropriate, must be completely filled with liquid.

It is necessary to prevent the formation of explosive atmosphere within the frame and the seal housing. Although there are interior evacuation conducts which remove the possibility of the air becoming blocked, it is necessary to fully vent the pump and its process pipes, when fitted, before starting up.

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 factory plate concur with the type of current and the mains voltage in the place of installation.

Follow the indications described in the motor manual.

6.1 First start-up

The pump cannot operate with a closed discharge 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 halt when it occurs.

6.1.1 Lubricant

Monobloc pumps do not have friction bearings, meaning they do not require lubricant.

BEARINGS:

Lubricated with grease. PUMP WITHOUT GREASE NIPPLES: The pump bearings are closed on both sides and have lifetime lubrication. Lubricant is not required.

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.

Note

Pumps lubricated with oil: The pump leaves the factory without oil in the bearings support. Once installed, proceed to fill it. See lubricant in section 7.2.2.

See section 7.2.2 to know the type of lubrication of each pump

FRICION BEARINGS:

Lubricated with pumping fluid If the pumped fluid is clean (without particles in suspension) and non-aggressive, the friction bearings are lubricated with the pumped fluid. Lubricant is not required.

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

The pump must be primed before starting up for the first time or following a long period of inactivity. To do this:

EQUIPMENT IN LOAD:

1. Disconnect the voltage from the motor or batteries.
2. Close the suction valve and the discharge valve.
3. Remove the venting plug located in the casing or open a discharge pipe vent (before the check valve).
4. Partially open the suction valve until the liquid overflows through the vent.
5. Close the vent.
6. Fully open the suction valve.
7. Check the rotation direction of the pump.
8. Fully open the discharge valve.

EQUIPMENT IN SUCTION

1. Disconnect the voltage from the motor or batteries.
2. Close the discharge valve.
3. Remove the venting plug located in the casing or open a discharge pipe vent (before the check valve).
4. Pour the liquid to be pumped through the vent until it overflows.
5. Close the vent.
6. Check the rotation direction of the pump.
7. Fully open the discharge valve.

The priming should be checked in subsequent start-ups.

Shaft sealing

Packing: The gland nuts must be gently tightened (by hand). The gland must form a right angle to the shaft. There should be a larger leak after filling the pump and before starting up.

Mechanical seal: The mechanical seal does not require maintenance. Check that there are no leaks.

6.1.3 Final control

Make the final check of the group alignment in accordance with 5.2. 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 guard 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 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 completely open and the discharge valve partially closed. Once the pump has reached its service speed and the suction air has been eliminated, regulate the operation point using the discharge valve.

If the electric motor guard is triggered when starting up, close the discharge 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 necessary 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 m^3/h

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

Ce : Specific heat of the fluid in $J/kg^\circ C$.

Pe : Specific weight of the fluid in kg/m^3

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.

6.1.5 Shutdown

Close the discharge pipe valve.

If there is anti-return in discharge with counterpressure, leave the discharge valve open.

- Shutdown the motor. Check that shutdown is normal.
- In prolonged periods of non-operation, close the suction pipe valve and the auxiliary connection valves.
- In suction pumps using a low vacuum tank, the supply of liquid must also be maintained at the shaft seal whilst the pump remains shutdown.
- 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 shutdown, it must remain on standby for service, start up at regular intervals for around 5 minutes (see also 7.2):

- 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 indicated 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

6.2.2 Temperature of the liquid to be pumped



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.

6.2.3 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.

6.2.4 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.

6.2.5 Maximum pump speed

In order to protect the pump from over speed, the maximum rotation speed shall be that shown on the name plate engraved in the pump- If the speed shall not be indicated in the name plate it is necessary to consult with KSB ITUR.

If eventually it would be wished to perform the pump at higher speed, it is necessary to consult with KSB ITUR.

6.3 Starting up after storage

If the storage and/or shutting down 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 halted 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 dismounting, ensure that:

 The motor must not be started up involuntarily, and so must be disconnected from the grid (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...)

7.2 Maintenance/inspection

7.2.1 Checking instructions

During the first minutes of operation:

In cases of mechanical seal

- There may be a brief large leak during start up. Should this leak persist, shutdown the group and determine the cause. The causes may be, amongst others, dirt in the pumped area or dry operation due to incomplete discharge of the pump air.

In cases of packing seal:


- There is no leak; immediately loosen the gland to obtain small dripping.
- Excessive fluid leak; leave to settle for 10 minutes; tighten the gland by turning 1/6th and leave for 5 minutes. Repeat the process until between 20 and 60 drops per minute are achieved.

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 monitoring device if the purchaser has so specified.


7.2.2 Lubrication

The type of lubrication of the bearings of the pump depends on its size and construction:

SIZE	Construction	LUBRICATION
AU-M-1,5	Monobloc	Not applicable
AU-M-2	Monobloc	Not applicable
AU-M-3	Monobloc	Not applicable
AU-M-50	Monobloc	Not applicable
AU-1,5	Bearing bracket	Lifelong
AU-2	Bearing bracket	Lifelong
AU-3	Bearing bracket	Lifelong
AU-50	Bearing bracket	Oil
AU-65	Support	Lifelong
AU-80	Bearing bracket	Grease
AU-100	Bearing bracket	Oil
AU-150	Support	Grease
AU-200	Support	Oil

Before lubricating the pump, ensure that:

 The pump is shutdown 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 oil/grease in the bearing support may lead to a lack of lubrication of the Shaft seal rings, 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 oil/grease level in the bearings support.

BEARINGS:

Lubricated with grease. PUMP WITHOUT GREASE NIPPLES:

The pump has special bearings, with dual closure and grease in the interior, capable of working without outer grease maintenance. The pump does not, therefore, have grease nipples in the support.

Note Special attention must be paid to the type of bearing when this is replaced, which must be of the same type (2RS).

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 4000 hours of operation or once a year (whatever may occur first). Check re-lubrication quantity in each greaser in the attached chart

Pump size	AMOUNT OF GREASE [g]
AU-80	6
AU-150	25

Grease change (re-filling)

Change grease after approx. 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 approx. 75% of the free space in the bearing and approx 40% of the free space at bearing cover.

Type of grease:

We recommend using lytic-based lubrication grease with antioxidant additives, of consistency 2, in line with DIN-51502 K2K.

Pumps lubricated with oil

The pump leaves the factory without oil in the bearings support. Once installed, proceed to fill it.

Oil filling

- Release the support upper cap.
- Pour oil through this orifice until the level is between the minimum and maximum marks of the control dipstick.
- Replace the upper cap. (Rest of pumps)

Oil change

Proceed to first oil change after 300 hours of operation. For subsequent changes oil should be changed every 8000 hours of operation (or once every year, whatever may occur first). If the environment is dusty, humid or aggressive, this change should be carried out more often.

- Before changing the oil, start up the pump in order to fluidify it.
- Release the upper filling cap and the lower drainage cap.
- Empty the support oil and let it drain off.
- Replace the lower cap and proceed to fill as indicated in the preceding section.

Oil chart

Oil recommended for normal use (bearing temperature up to +70°C), in line with the operation revolutions and the size of the pump (ISO-VG oil grade is shown)

Pump size	≤1500 rpm	≤2000 rpm	≤3000 rpm	≤3600 rpm	Oil quantity [l]
AU-50	ISO VG100	ISO VG100	ISO VG68	ISO VG68	0,42
AU-100	ISO VG100	ISO VG100	ISO VG68	ISO VG68	0,65
AU-200	ISO VG100	ISO VG68	---	---	1,0

The lubrication oil must always be clean and at its appropriate level, in order to avoid high temperatures on the bearings support. To this end, it is essential to follow the instructions on oil change and regular checks of the oil level.

Check with your oil supplier when a temperature outside of the indicated margins is reached, or when the environmental temperature is going to be less than -5°C.

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 Dismounting

7.4.1 Fundamental instructions/observations

Note

Before dismounting, ensure the pump cannot be started up.

The suction and discharge valves must be closed.

The pump frame must have returned to environmental temperature.

The pump frame must be depressurised and emptied.

Comply with all safety measures in accordance with 7.1. When working on the motor, also take into account the rules and instructions of the manufacturer.

7.4.2 Tubular coupling guards

When dismounting, follow the chapters on assembly but in reverse order.

7.4.3 Coupling

1.- Remove the coupling guard

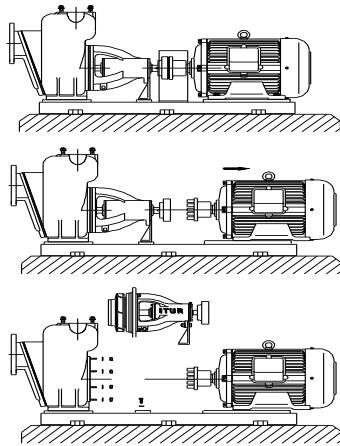
2.- Uncouple the pump from the motor, as indicated:

2.1.- COUPLING WITHOUT DISTANCER. Release the motor attachment bolts and remove the motor along with the male coupling.

2.2.- COUPLING WITH DISTANCER. Release the coupling attachment screws and remove the distancer pipe. Separate the male coupling.

3.- If the pump needs to be repaired, release the casing/cover attachment screws, along with those of the rear support foot.

4.- 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.



7.4.4 Mechanical seal

- Dismount in reverse order to assembly.

Note

For the correct operation of the seal it is necessary to:

- Take great care when cleaning the different parts of the mechanical seal, especially the contact faces. Never use lubricant on the contact faces, use only clean water with a cloth specifically for cleaning optical devices.
- Not damage the O-rings during assembly.
- Not turn the mechanical seal while dry.

7.4.5 Pump

It is necessary to dismount practically the entire pump in order to extract the bearings, shaft, etc.

To do this, observe the attached sectional plan.

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

For monobloc construction:

- Dismount the installation pump.
- Release the nuts of the pump casing and remove afterwards the pump casing from the assembly cover-pedestal with motor.
- Pay special attention to the pump casing, since it does not have stability and must be properly supported.
- Once the pump casing is removed, wear plate (if it is supplied with) is to be seen inside the pump casing.
- Unthread the impeller nut or the impeller itself, and extract it. Mechanical seal is accessible at this moment.
- Extract the mechanical seal (see point 7.4.4)
- Release and extract the casing cover.
- Release the rigid coupling (coupling fastener) and remove the pump shaft (except for version with gasoline engine, in this case there is one single shaft, motor's one).

For construction with flexible coupling:

- Remove the coupling guard and then the coupling as described in point 7.4.2 and point 7.4.3 (when fitted).
- Extract the support - cover, including the moving parts. The wear plate is accessible at this moment (when fitted).
- Release the impeller nut and extract it.
- Extract the mechanical seal (see point 7.4.4)

- Release and extract the casing cover.
- Remove the shaft thrower (when fitted) and release the support covers.
- Extract the shaft with the bearings, by hitting the pump end with a plastic hammer.

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.

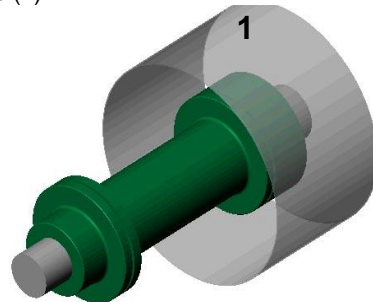


Regularly check the correct state of the thrower, and replace in the event of deterioration.

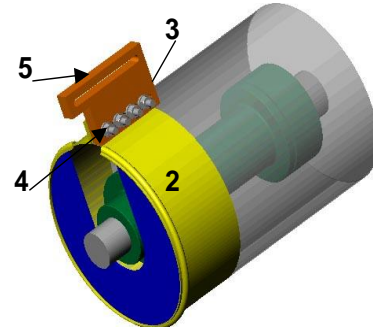
7.5 Assembly

7.5.1 Tubular coupling guards

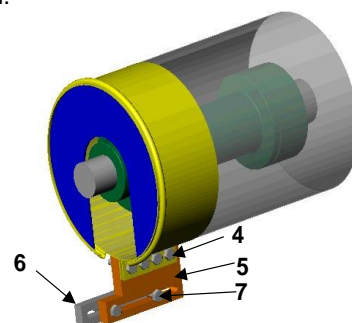
1. Install the distancer cylinder and seal using the clamps (1)



2. Position the side cover (2) leaving the rims (3) in the upper section
3. Join the side cover (2) with the fastening screws (4) to the lifting plate (5). The screws should not be fully tightened at this moment. If there is no lifting plate, mount the assembly plate and place the screws through the threaded orifices.



4. Without tightening the screws (4) completely, turn the equipment around the shaft.
5. Adjust the length of the covers so the shaft and the attachment are fully covered.
6. Secure the lifting plate (5) to its support (6) using the corresponding screws (7). If there is no lifting plate, the locking screws (4) are longer and also fulfil this function.



7. Finish tightening the locking screws (4).

7.5.2 Coupling

1.- Mount the pump (when it has been dismantled) and tighten the casing - cover attachment nuts.

2.- Couple the pump to the motor, as indicated:

2.1.- COUPLING WITHOUT DISTANCER. Position the motor in place, introducing the male coupling. Position the pins, but DO NOT tighten them until alignment is complete.

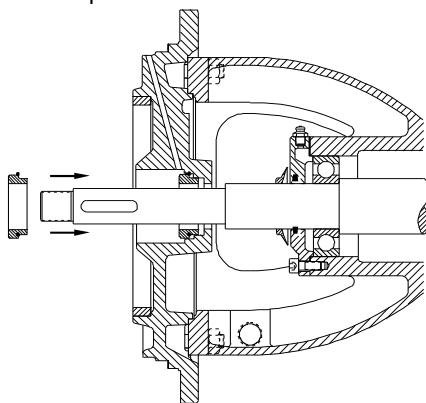
2.2.- COUPLING WITH DISTANCER. Mount the male coupling, introducing the teeth in the rubber plugs located in the female coupling. Mount the intermediate pipe and secure it using the screws, both to the plate and to the male coupling.

3.- Align the coupling (see point 5.2 of this manual)

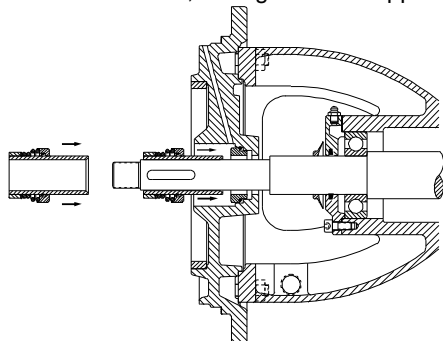
4.- Mount the coupling guard.

7.5.3 Mechanical seal

- Mount the fixed part of the mechanical seal.



- Mount the rotating part of the seal on the shaft sleeve, taking care not to damage the o-ring. Attach it to the shaft sleeve (where appropriate) with separation bushing, and introduce it in the shaft, through to the stopper.



- Mount the impeller until it comes into contact with the shaft sleeve.
- Firmly tighten the impeller nuts.
- Finish mounting the pump.

7.5.4 Pump

Mount the pump in reverse order to when dismantling (see point 7.4.5)

For monobloc construction.

Note

It is of great importance the correct axial adjustment of the impeller. This is to say, proper adjustment of clearance between impeller blades and

wear plate (or to pump casing if it is not fitted with wear ring.). This clearance has to be between 0,15 and 0,35 mm..

Once the pump mounted and before tightening the coupling fastener, gently move the pump shaft to non-motor side until the impeller touches the wear plate (if fitted) or pump casing (if no wear plate is fitted) . Then move back slightly pump shaft to the motor side until clearance stated in over paragraph is reached. Finally tighten the coupling fastener to fix the position.



A non-existent clearance would cause high friction between the wear plate and the impeller, while excessive clearance would increase the liquid recirculation, with consequent loss of hydraulic performance of the pump.

Additional observations:

- All the joints intervening in the dismantling of the pump must be renewed.
- Use the bearings (320) indicated.
- Do not forget to correctly position the thrower (507) through the window of the cover (161).

Note

- Check the correct location of pieces, especially the seals and impellers, and tighten the impeller nuts as shown in the chart in point 7.5.6.



- Do not forget to position all the safety and protection elements, such as coupling guards, before starting up the equipment.

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.

7.5.5 Tightening torque of the screws/nuts

ISO Metric thread	Steel	Stainless steel
	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	500
M27	1050	750
M30	1420	1000

7.5.6 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)	400/411/412	1	2	5
Mechanical seal	433	1	2	3
Wear plate(if fitted)	135		1	2
Antifriction bearing (set)	320/321		1	2
Shaft seal ring (set)	421		1	2
Thrower	507 (*)		1	2
Shaft sleeve	523 (*)		1	2
Coupling bush (set)	860		1	2
Impeller nut	922		1	2
Circlip (set)	932		1	2
Parallel key (set)	940		1	2
Pump shaft(s) (set)	210			1
Impeller	230			1
Coupling	840			1

(1) Amounts recommended for a continuous service pump.

(*) Certain pump sizes won't carry this piece

7.7 Preventative maintenance

N°	DESCRIPTION OF THE OPERATION TO BE CARRIED OUT	PROCEDURE	REGULARITY	CONSEQUENCE
1	Check for mechanical seal leaks	Visual inspection	Weekly	16
2	Check the support oil level	Visual inspection	Weekly	13, 14
3	Check for leaks between the casing and the cover	Visual inspection	Monthly	15
4	Check for leaks between flanges	Visual inspection	Monthly	15
5	Check for grease or oil leaks	Visual inspection	Monthly	3, 13, 14
6	Check for heating of the bearings	With thermocouple	Quarterly	2, 5, 12
7	Check tightness of connecting bolts for motor/base frame, pump/base frame, cover/casing, support/support supplement, flanges/casing	Manually	Twice a year	17
8	COMPLETE PUMP CHECK	Checking and dismantling the pump. See point 7 of the manual	Yearly	1, 3, 4, 6, 7, 9, 10, 12, 13, 14
9	Check for wear of the impeller and rings	Dismount casing, visual inspection	Yearly	
10	Check for wear of the shaft and bearings	Dismount support visual inspection	Yearly	
11	Change the rubber coupling bushes	See point 7.4.3 and 7.5.2 of the manual	Yearly	
12	Check functional characteristics loss	Instrument reading	In accordance with use	Check the installation, 8
13	Refill the support oil or grease	See point 7.2.2 of the manual	See point 7.2.2 of the manual	
14	Change the oil or grease of the bearings	See point 7.2.2 of the manual	Oil see point 7.2.2. Grease Twice a year	
15	Change the joints	Manually	Every time they are removed	
16	Change the mechanical seal	See point 7.4.4 and 7.5.3 of the manual	When leaks are detected	
17	Check and align the coupling	See point 5.2 of the manual	Twice a year and every time they are dismantled	

8 Trouble-shooting

The pump does not move the fluid

| The pump does not eliminate the suction air

| | Insufficient pressure or flow

| | | Excessive absorbed power

| | | Excessive vibrations and noise

| | | Excessive bearing housing/bracket temperature

| | | Leakage through the mechanical seal

| | | Quick deterioration of wear plate

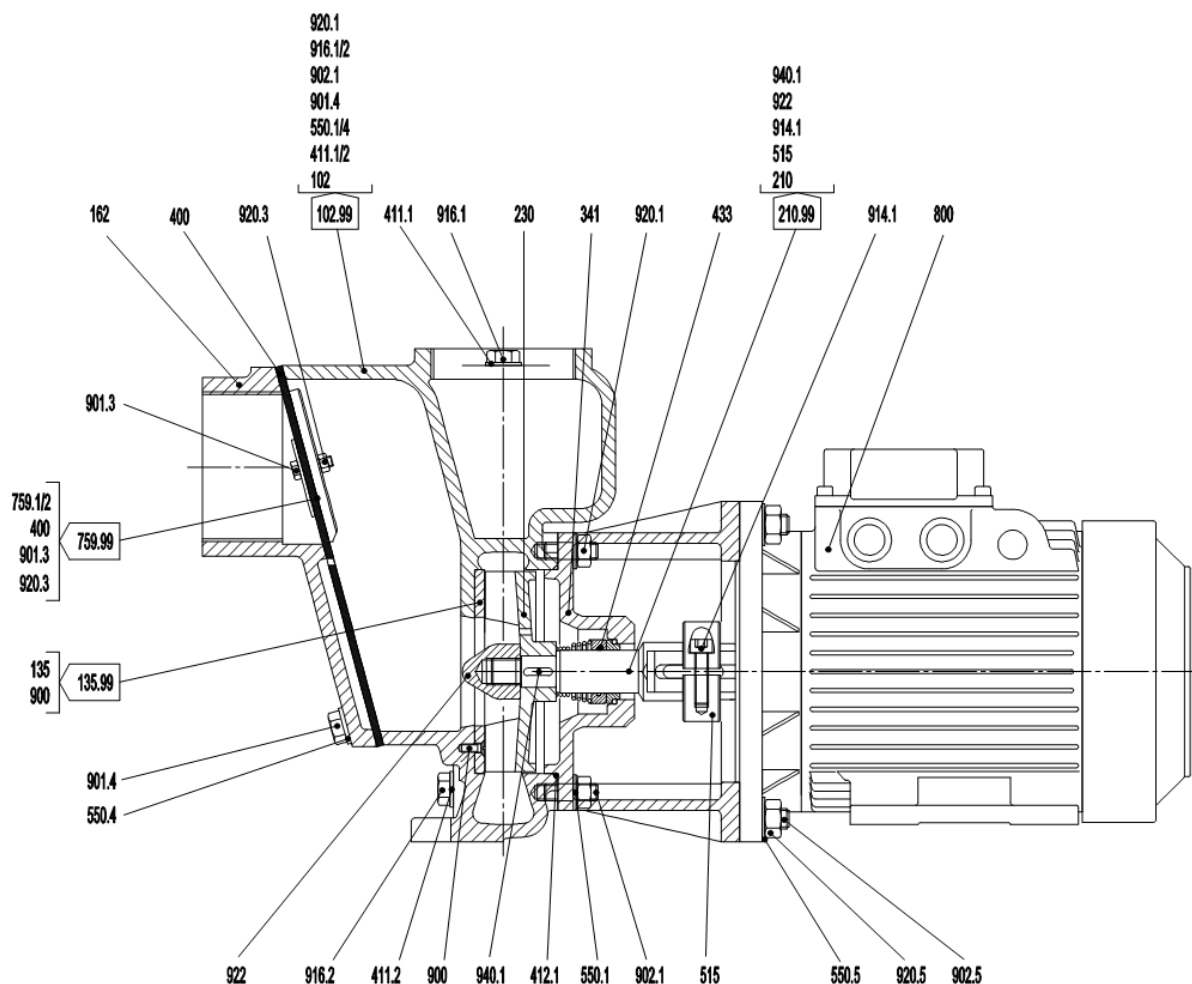
										Cause	Solution
x		x								Suction or discharge valves closed or poorly regulated	Open the suction valve or search for work point with the discharge valve
x										Incorrect rotation direction	Change the motor connections
x	x									Air comes in through the suction pipe,	Check the seal tightness of the pipe
x										Pump or suction pipe poorly primed	Correctly prime the pipe by positioning vent connections in the highest points
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										Formation of air pockets in the piping	Fit a vent/purge valve before the check valve
		x								Rotation speed incorrect	Measure the speed, check the motor drive power supply voltage
	x									There is no liquid in the pump	Immediately shut down the pump and prime it.
	x									The suction clapper does not close	Check the state of seals and clapper holder
	x									Internal recirculation connection blocked	Remove the blockage. Dismount the inspection point or cover in the suction side and clean.
x		x								Poorly primed	Prime the pump again
		x								Air comes in through the sealing system	Dismount the seal system and check it, or check the seal tightness.
		x		x				x		Impeller obstructed, deteriorated or imbalanced	Dismount the impeller, and inspect, balance or change it.
		x		x						Wear plate deteriorated or incorrectly assembled	Dismount the wear plate and change it
		x								Counter pressure too high	Increase the rotation speed. If this is not possible, a larger impeller or larger pump needs to be assembled. Please ask.
			x							Liquid viscosity or density greater than normal.	Reduce the design point or change the motor
			x	x	x			x		Poor alignment between the pump and motor	Align the coupling
			x							Obstruction inside the pump, impeller or nozzles	Dismount the pump and clean
			x							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 discharge valve
			x	x	x					Ball bearings deteriorated, poorly assembled, poorly lubricated or excessively lubricated.	Change them, check assembly, lubricate them or drain oil out of the support.
			x							Excessive contact in rotating parts	Dismount the pump and check its elements are correctly assembled
				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	Reinforce the pipes and level the equipment
				x						Lack of rigidity in the foundations or anchor bolts loose	Make new foundations or tighten the bolts
						x				Poorly assembled coupling, without suitable separation between its two parts	Check the coupling
								x		Very deteriorated mechanical seal, seal spring broken or without elasticity, poorly assembled seal, or joints broken, deformed or without elasticity.	Dismount and replace the seal, or dismount, review damage and change as appropriate.
		x								Pipe obstruction	Clean the pipes
								x		Re-changeable sleeve scratched or deteriorated	Dismount and change the sleeve

9 Annexes

9.1 Cross drawing

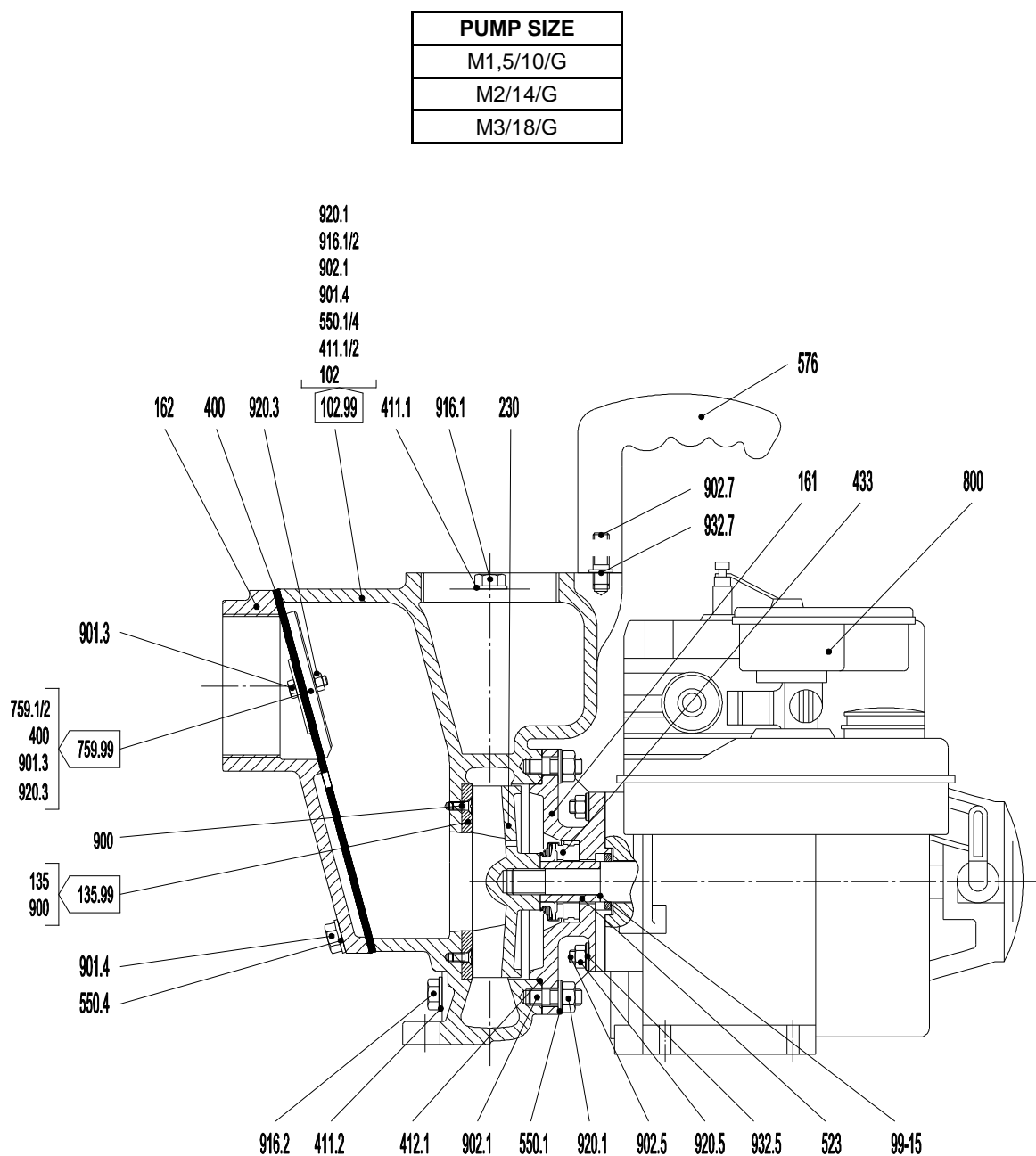
	CROSS DRAWING											
AU MONOBLOC PUMP SIZE	1	2	3	4	5	6	7	8	9	10	11	12
M1,5/10	X	X (G)										
M2/14	X	X (G)										
M3/18	X	X (G)	X (D)									
M50/20				X								
M50/25				X	X (D)							
AU PUMP SIZE	1	2	3	4	5	6	7	8	9	10	11	12
1,5/10						X						
2/14						X						
3/18						X						
50/20							X					
50/25							X					
65/10								X				
65/18								X				
80/15									X			
80/22									X			
100/30										X		
150/25											X	
150/35											X	
150/45											X	
200/40												X
200/55												X
200/68												X

PUMP SIZE
M1,5/10
M2/14
M3/18



Ref.	Denomination
102	Volute casing
135	Wear plate
162	Suction cover
210	Shaft
230	Impeller
341	Motor stool
400	Gasket
411	Joint ring
412	O-ring
433	Mechanical seal
515	Taper lock ring

Ref.	Denomination
550	Washer
759	Valve plate
900	Countersunk head screw
901	Hexagon head screw
902	Stud
914	Hexagon socket head cap screw
916	Plug
920	Hexagon nut
922	Impeller nut
940	Parallel key
550	Washer

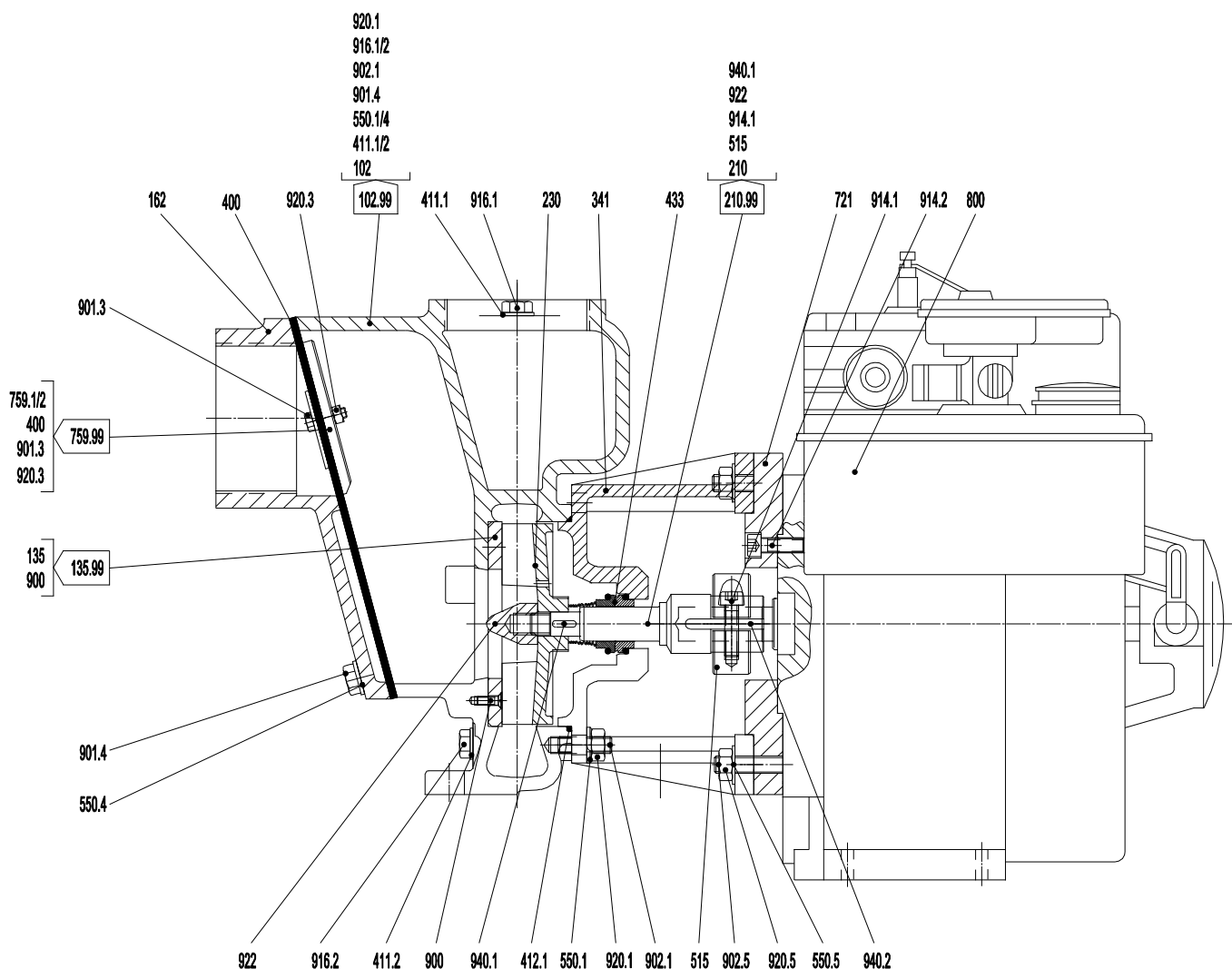


Ref.	Denomination
102	Volute casing
135	Wear plate
161	Casing cover
162	Suction cover
230	Impeller
400	Gasket
411	Joint ring
412	O-ring
433	Mechanical seal
523	Shaft sleeve
550	Washer

Ref.	Denomination
576	Handle
759	Valve plate
800	Motor
900	Countersunk head screw
901	Hexagon head screw
902	Stud
916	Plug
920	Hexagon nut
932	Spring lock washer
99-15	Strip

PUMP SIZE

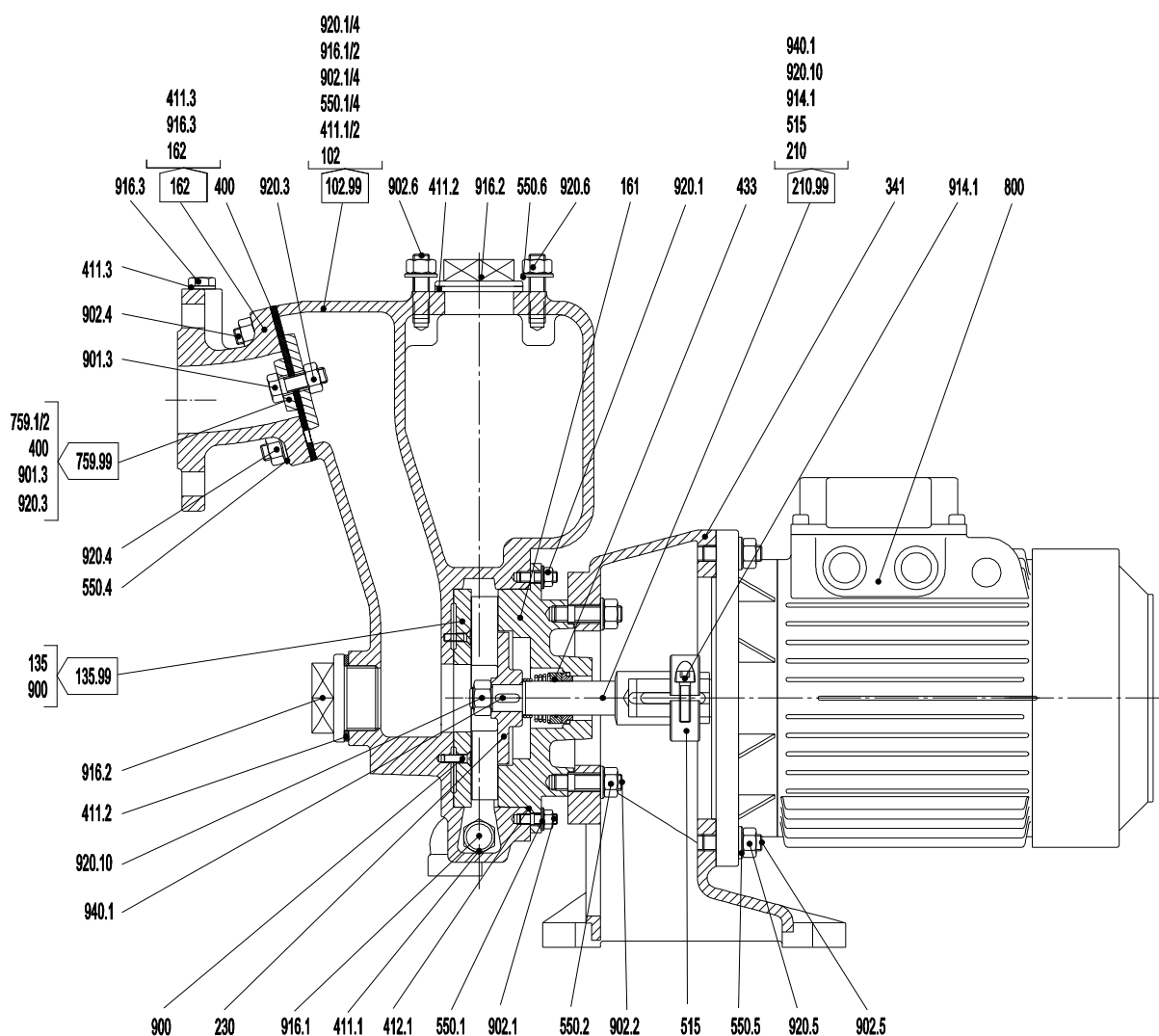
M3/18/D



Ref.	Denomination
102	Volute casing
135	Wear plate
162	Suction cover
210	Shaft
230	Impeller
341	Motor stool
400	Gasket
411	Joint ring
412	O-ring
433	Mechanical seal
515	Taper lock ring
550	Washer

Ref.	Denomination
721	Taper piece
759	Valve plate
800	Motor
900	Countersunk head screw
901	Hexagon head screw
902	Stud
914	Hexagon socket head cap screw
916	Plug
920	Hexagon nut
922	Impeller nut
940	Parallel key

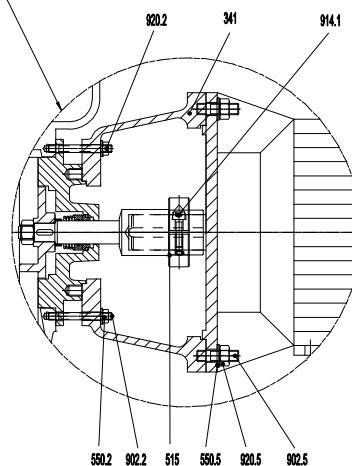
PUMP SIZE	
M50/20	M50/25



Ref.	Denomination
102	Volute casing
135	Wear plate
161	Casing cover
162	Suction cover
210	Shaft
230	Impeller
341	Motor stool
400	Gasket
411	Joint ring
412	O-ring
433	Mechanical seal

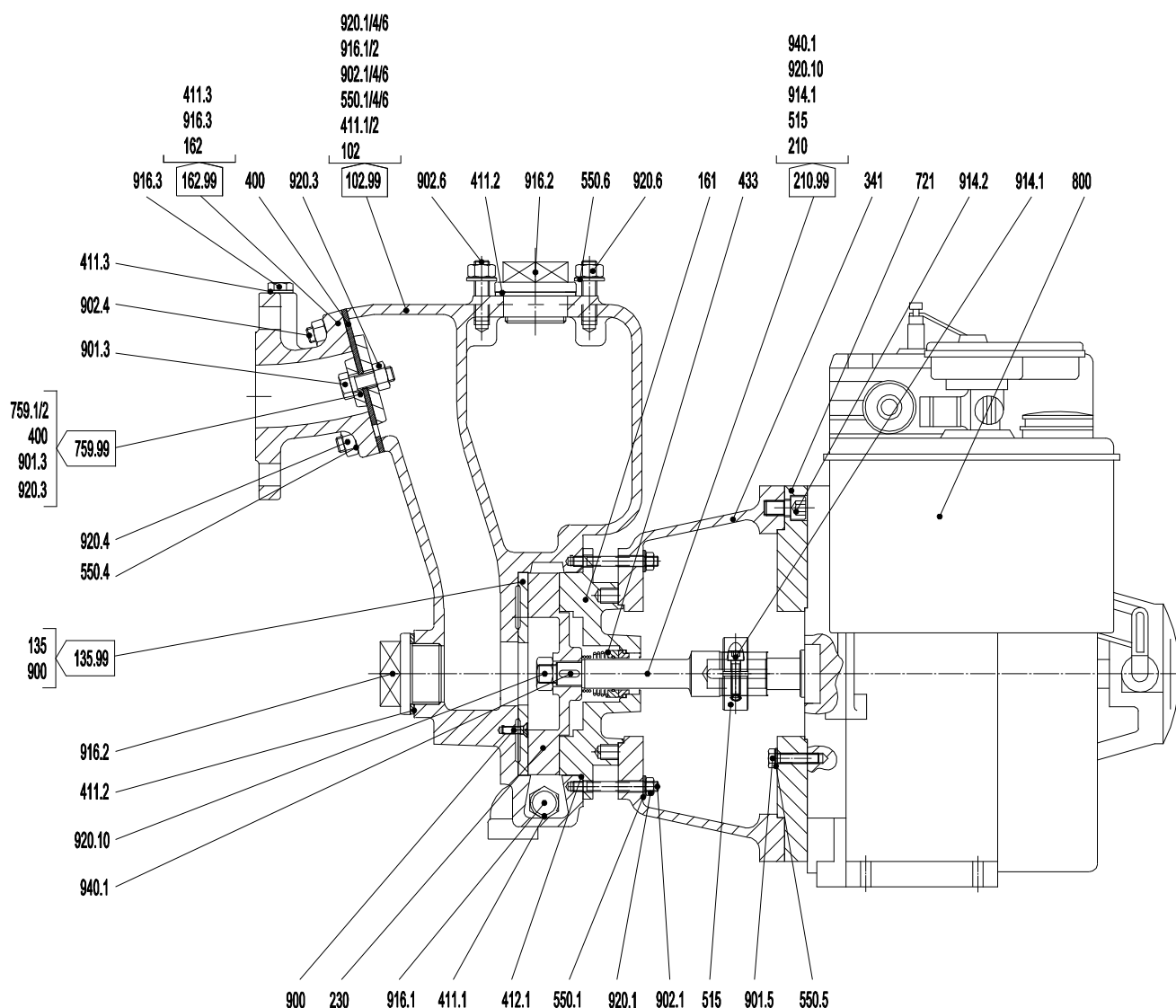
Ref.	Denomination
515	Taper lock ring
550	Washer
759	Valve plate
900	Countersunk head screw
901	Hexagon head screw
902	Stud
914	Hexagon socket head cap screw
916	Plug
920	Hexagon nut
940	Parallel key

DETALLE ESPECIFICO DE LINTERNA MOTOR PARA CARCASAS 132
SPECIFIC DETAIL FOR MOTOR STOOL WITH 132 FRAMES



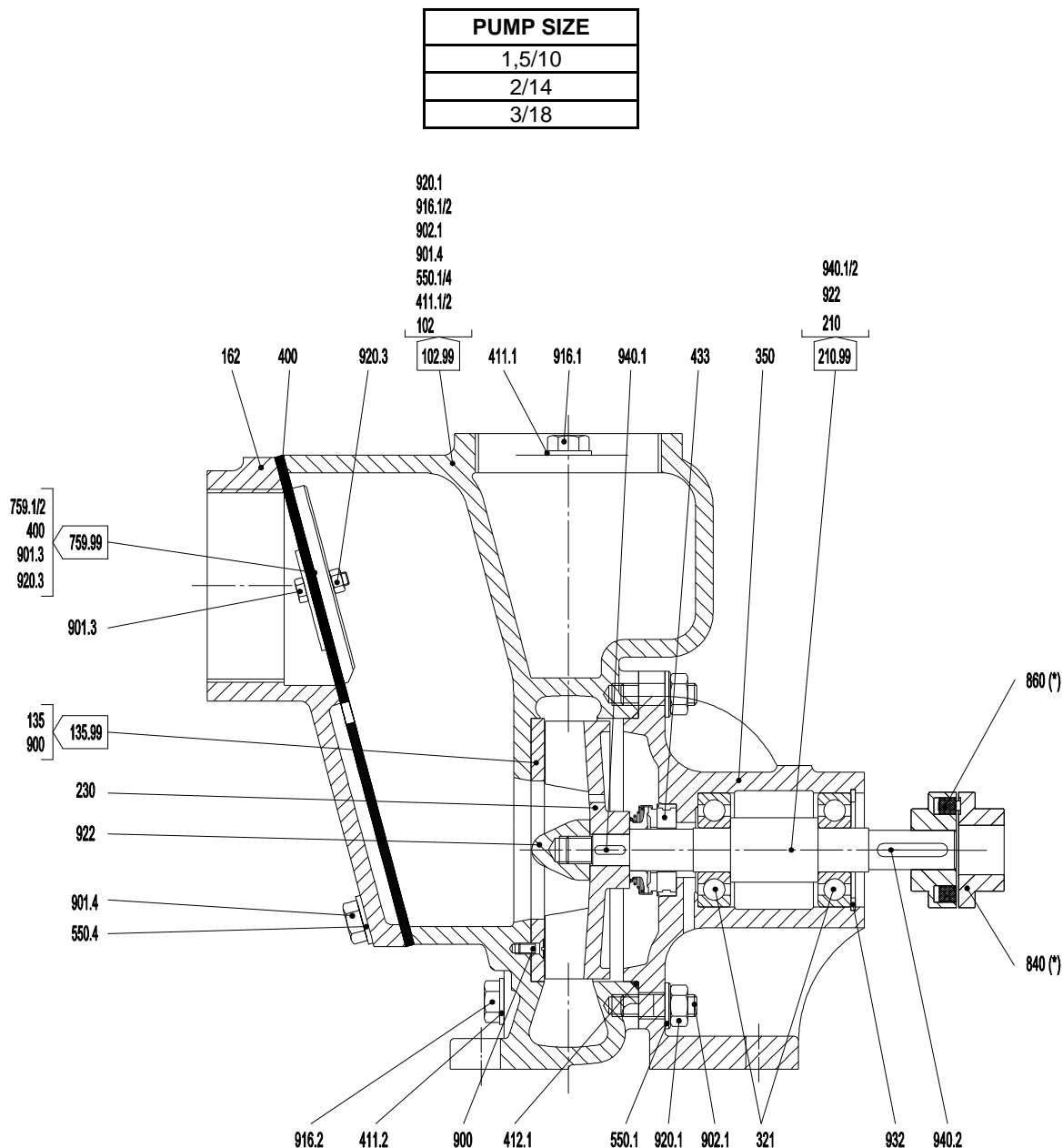
PUMP SIZE

M50/25/D



Ref.	Denomination
102	Volute casing
135	Wear plate
161	Casing cover
162	Suction cover
210	Shaft
230	Impeller
341	Motor stool
400	Gasket
411	Joint ring
412	O-ring
433	Mechanical seal
515	Taper lock ring

Ref.	Denomination
550	Washer
721	Taper piece
759	Valve plate
800	Motor
900	Countersunk head screw
901	Hexagon head screw
902	Stud
914	Hexagon socket head cap screw
916	Plug
920	Hexagon nut
940	Parallel key



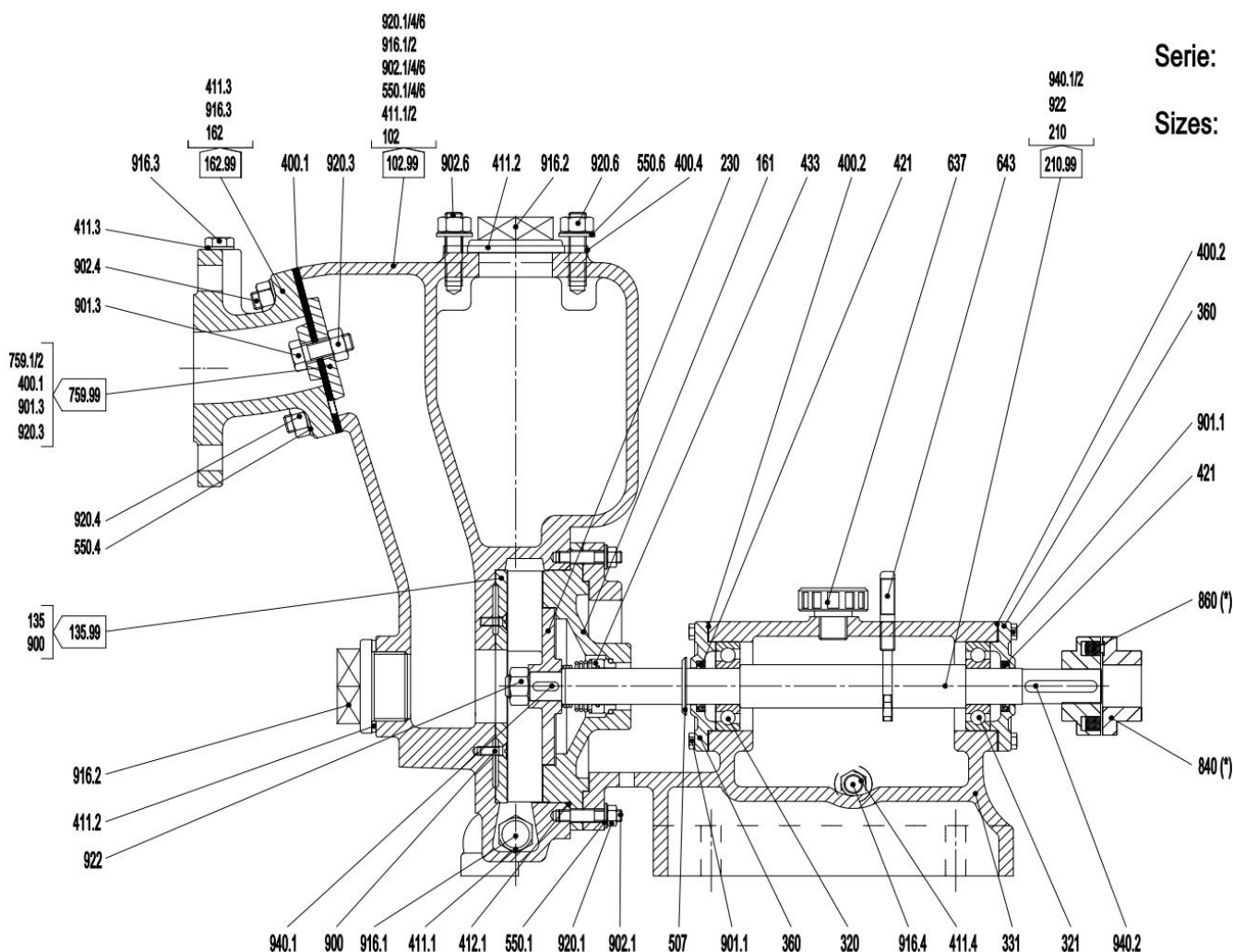
Ref.	Denomination
102	Volute casing
135	Wear plate
162	Suction cover
210	Shaft
230	Impeller
321	Deep groove ball bearing
350	Bearing housing
400	Gasket
411	Joint ring
412	O-ring

Ref.	Denomination
433	Mechanical seal
550	Washer
759	Valve plate
900	Countersunk head screw
901	Hexagon head screw
902	Stud
916	Plug
920	Hexagon nut
922	Impeller nut
932	Circlip

PUMP SIZE	
50/20	50/25

Serie:

Sizes:

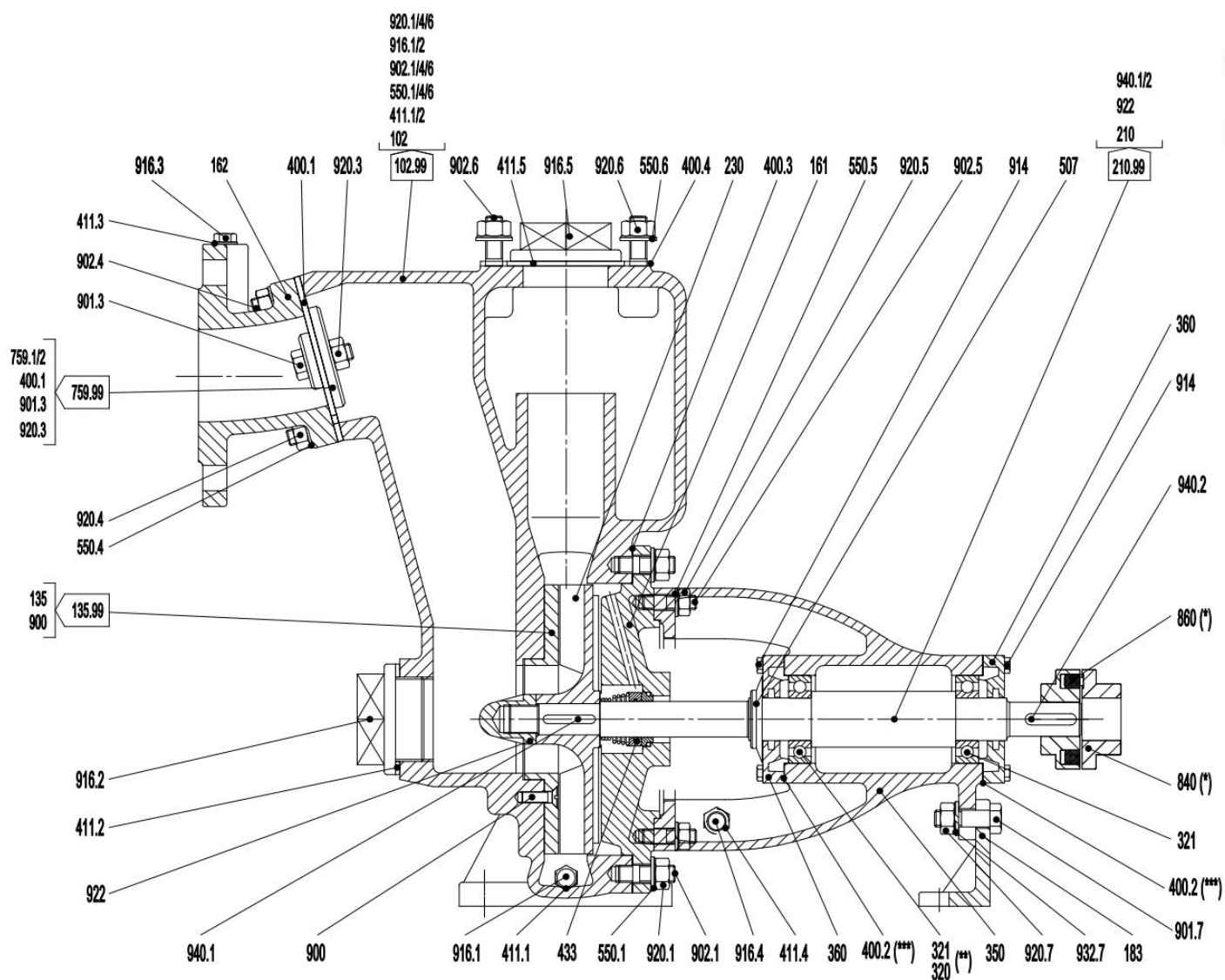


Ref.	Denomination
102	Volute casing
135	Wear plate
161	Casing cover
162	Suction cover
210	Shaft
230	Impeller
320	Angular contact ball bearing
321	Deep groove ball bearing
331	Bearing pedestal
360	Bearing cover
400	Gasket
411	Joint ring
411	Gasket
412	O-ring

Ref.	Denomination
433	Mechanical seal
507	Thrower
550	Washer
637	Oil filler plug
643	Oil dipstick
759	Valve plate
900	Countersunk head screw
901	Hexagon head screw
902	Stud
916	Plug
920	Hexagon nut
922	Impeller nut
940	Parallel key

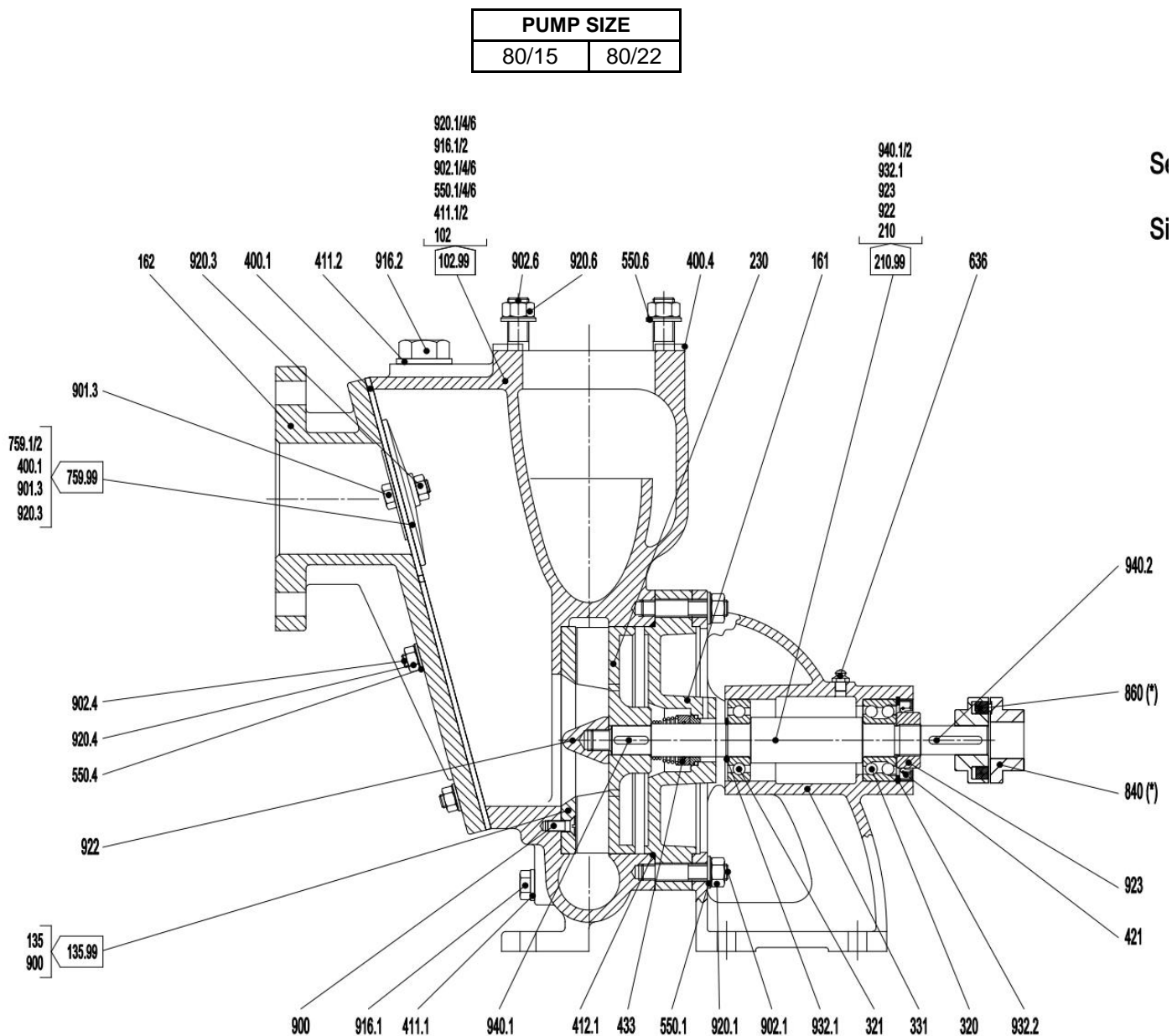
PUMP SIZE

65/10 65/18



Ref.	Denomination
102	Volute casing
135	Wear plate
161	Casing cover
162	Suction cover
183	Support foot
210	Shaft
230	Impeller
321	Deep groove ball bearing
350	Bearing housing
360	Bearing cover
400	Gasket
411	Joint ring
433	Mechanical seal

Ref.	Denomination
507	Thrower
550	Washer
759	Valve plate
900	Countersunk head screw
901	Hexagon head screw
901	Hexagon head bolt
902	Stud
914	Hexagon socket head cap screw
916	Plug
920	Hexagon nut
922	Impeller nut
932	Spring lock washer

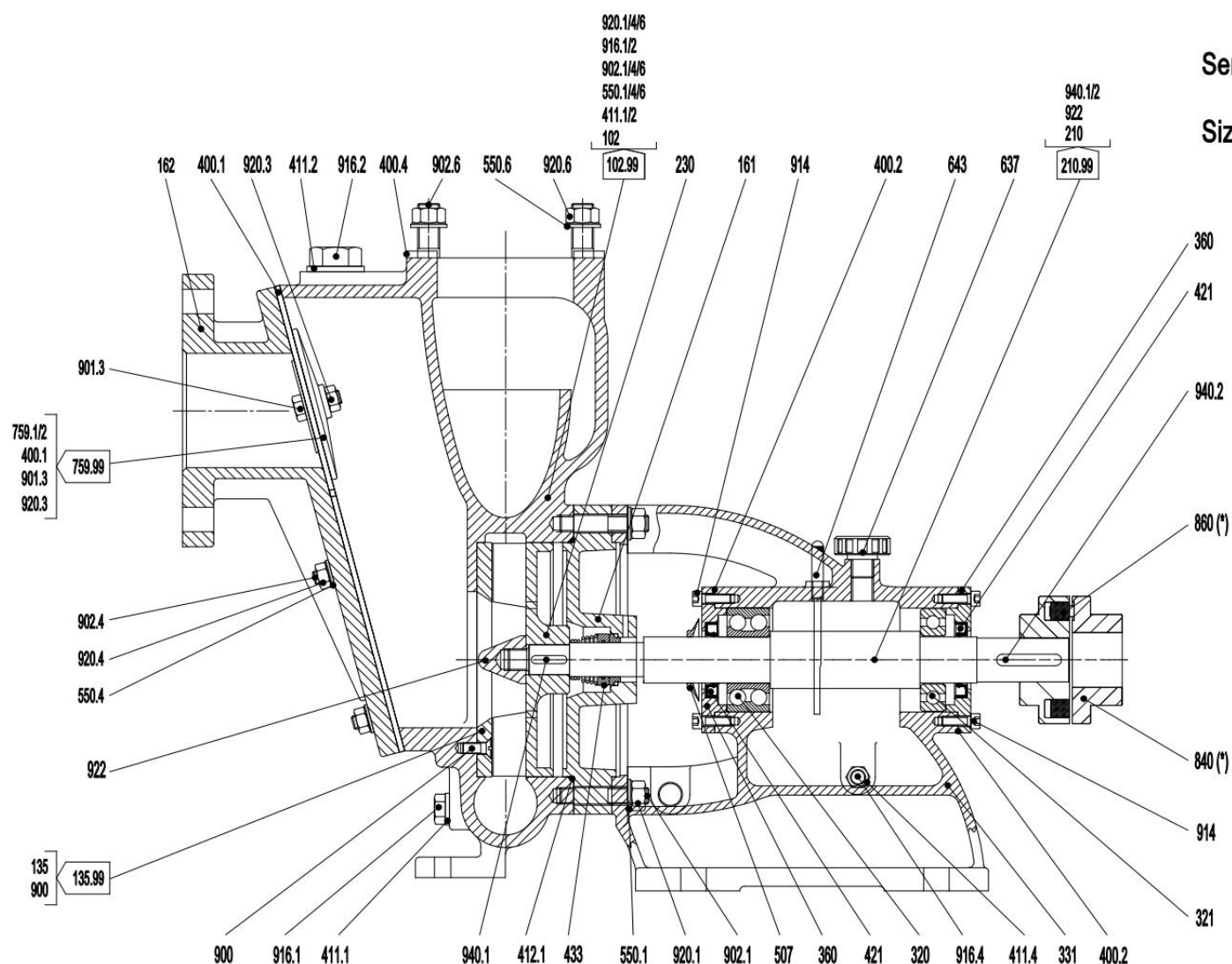


Ref.	Denomination
102	Volute casing
135	Wear plate
161	Casing cover
162	Suction cover
210	Shaft
230	Impeller
320	Angular contact ball bearing
321	Deep groove ball bearing
331	Bearing pedestal
400	Gasket
411	Joint ring
412	O-ring
421	Radial lip seal

Ref.	Denomination
433	Mechanical seal
550	Washer
636	Grease nipple
759	Valve plate
900	Countersunk head screw
901	Hexagon head screw
902	Stud
916	Plug
920	Hexagon nut
922	Impeller nut
923	Bearing nut
932	Circlip
940	Parallel key

PUMP SIZE

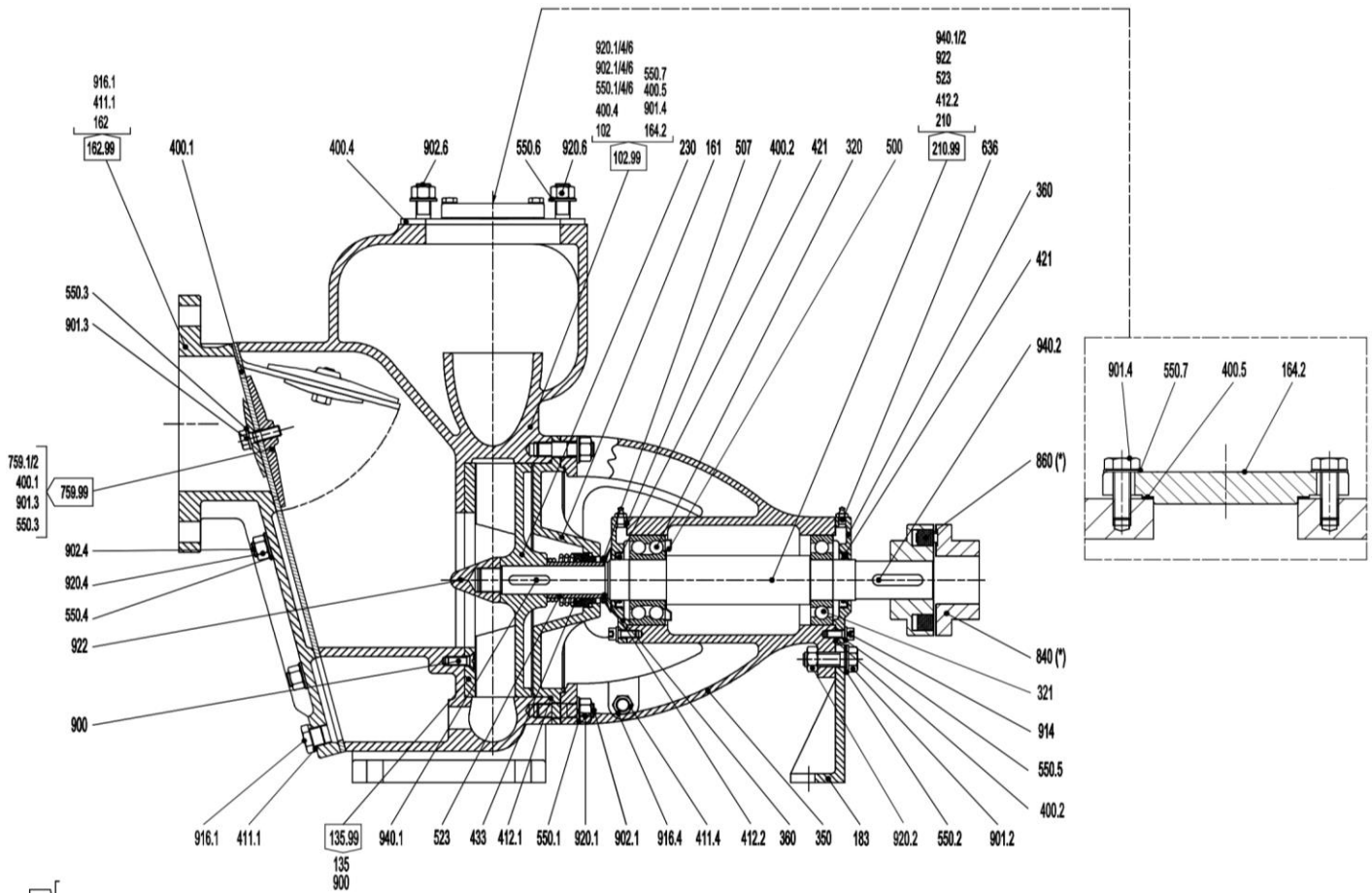
100/30



Ref.	Denomination
102	Volute casing
135	Wear plate
161	Casing cover
162	Suction cover
210	Shaft
230	Impeller
320	Angular contact ball bearing
321	Deep groove ball bearing
331	Bearing pedestal
360	Bearing cover
400	Gasket
411	Joint ring
412	O-ring
421	Rotary shaft lip type seal

Ref.	Denomination
433	Mechanical seal
507	Thrower
550	Washer
637	Oil filler plug
643	Oil dipstick
759	Valve plate
900	Countersunk head screw
901	Hexagon head screw
902	Stud
914	Hexagon socket head cap screw
916	Plug
920	Hexagon nut
922	Impeller nut
940	Parallel key

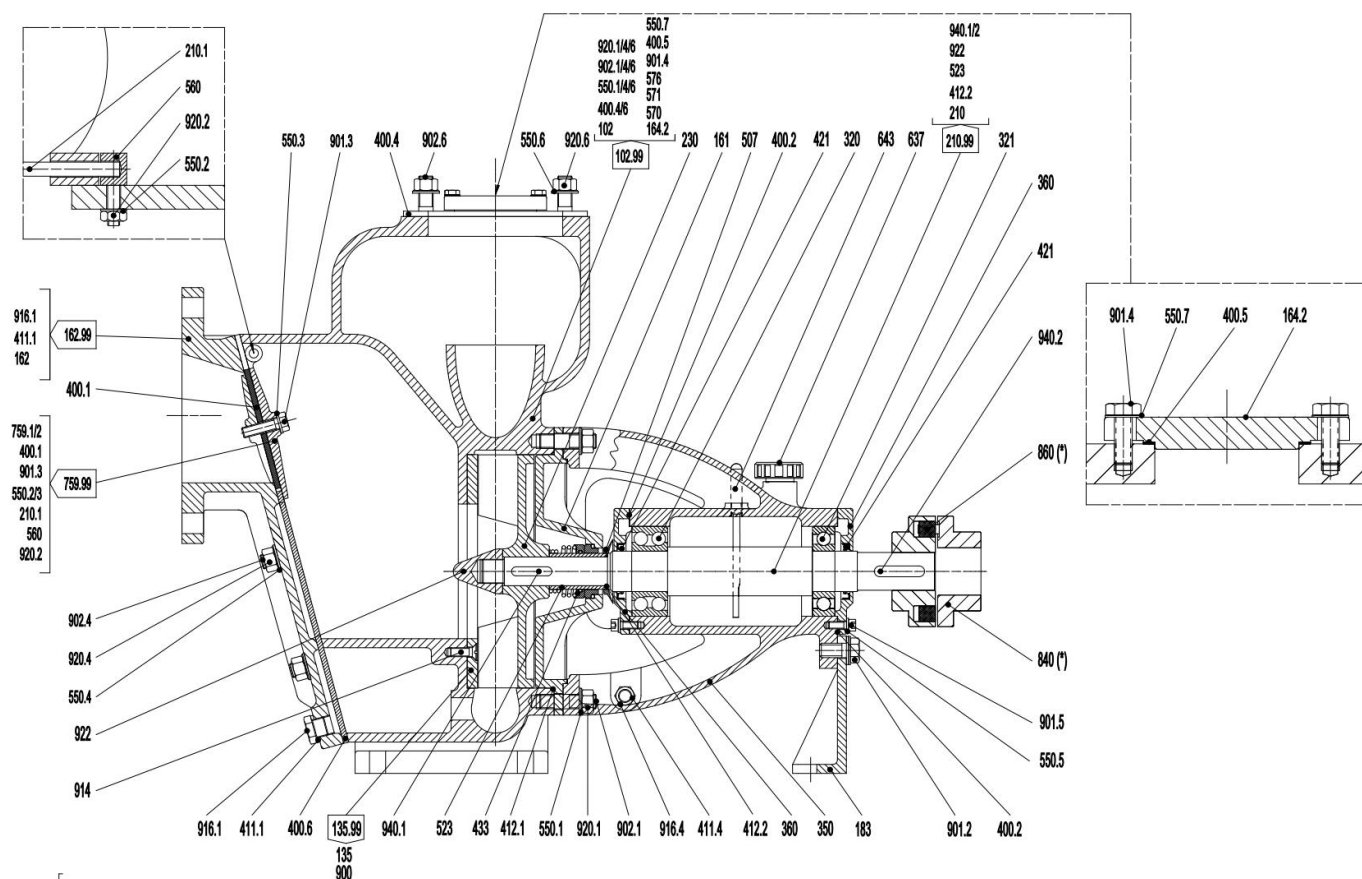
PUMP SIZE		
150/25	150/35	150/45



Ref.	Denomination
102	Volute casing
135	Wear plate
161	Casing cover
162	Suction cover
164	Inspection cover
183	Support foot
210	Shaft
230	Impeller
320	Angular contact ball bearing
321	Deep groove ball bearing
350	Bearing housing
360	Bearing cover
400	Gasket
411	Joint ring
412	O-ring
421	Rotary shaft lip type seal
433	Mechanical seal
500	Nilos ring

Ref.	Denomination
507	Thrower
523	Shaft sleeve
550	Washer
636	Grease nipple
759	Valve plate
900	Countersunk head screw
901	Hexagon head screw
901	Hexagon head bolt
902	Stud
914	Hexagon socket head cap screw
916	Plug
920	Hexagon nut
922	Impeller nut
940	Parallel key

PUMP SIZE	
200/40A	200/40B
200/55A	200/55B
200/68A	200/68B

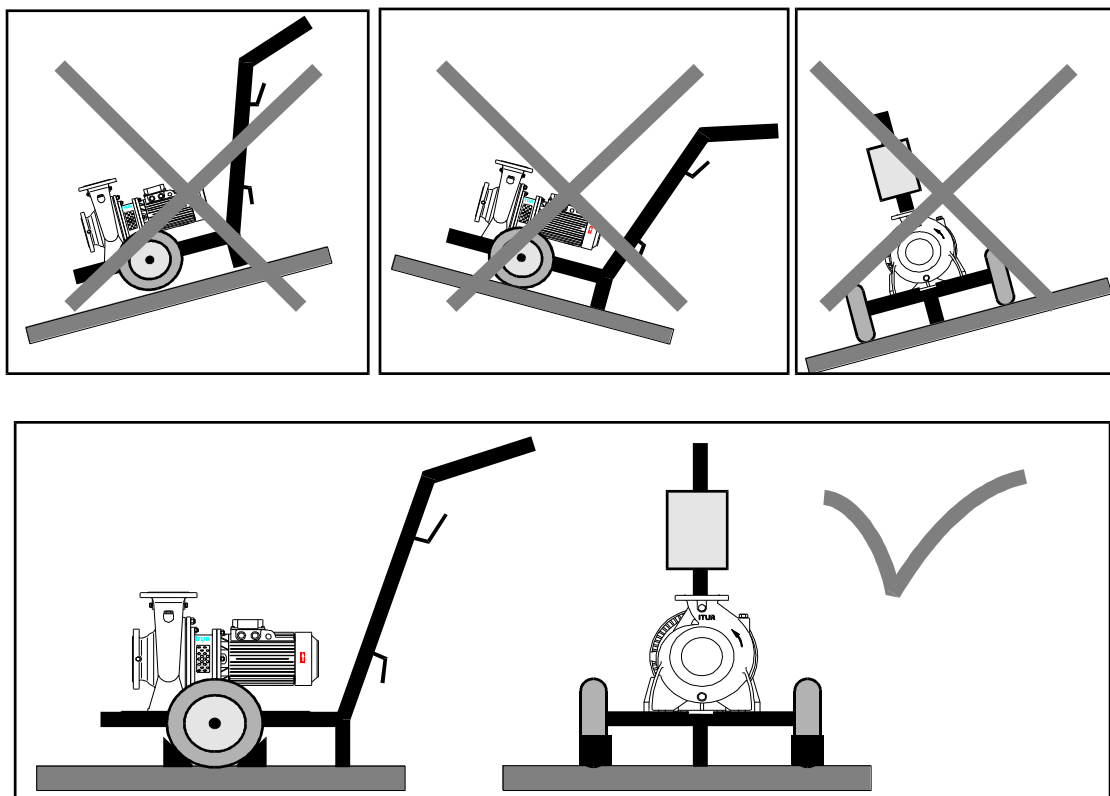


Ref.	Denomination
102	Volute casing
135	Wear plate
161	Casing cover
162	Suction cover
164	Inspection cover
183	Support foot
210	Shaft
230	Impeller
320	Angular contact ball bearing
321	Deep groove ball bearing
350	Bearing housing
360	Bearing cover

Ref.	Denomination
400	Gasket
411	Joint ring
412	O-ring
421	Rotary shaft lip type seal
433	Mechanical seal
507	Thrower
523	Shaft sleeve
550	Washer
560	Pin
637	Oil filler plug
643	Oil dipstick
759	Valve plate

Ref.	Denomination
901	Hexagon head screw
901	Hexagon head bolt
902	Stud
914	Hexagon socket head cap screw
916	Plug
920	Hexagon nut
922	Impeller nut
940	Parallel key

9.2 Trolley-mounted pumps



9.2.1 Warnings

The instructions in this annex must be used along with the corresponding pump instructions.

All the instructions in this manual should be followed, especially those regarding operation safety and handling of the equipment.

We reserve the right to make technological innovation modifications.

9.2.2 Start-up

Before starting up the equipment, check that it is completely stable and that the wheels are locked in place using locking wedges. These locking wedges are not supplied by KSB ITUR and should therefore be provided by the customer.

The surface upon which the wheels are placed must be flat, non-sloping and clean in order to prevent any displacement.

If operation is by way of an electric motor with a pluggable connection, check that the circuit breaker or operation selector is in shutdown position before connecting to the grid.

The start-up instructions in the pump and motor manuals must be followed.

9.2.3 Maintenance

Apart from the particular instructions on maintenance of the pump and motor, it is only necessary to regularly check the lubrication, and the state and correct attachment of the wheels to the shaft.

9.2.4 Safety



All the instructions in the pump instructions manual on safe operation and handling of the equipment must be followed.

In particular, in order to prevent the equipment from moving and creating a hazard, it should ALWAYS be positioned on a flat, non-sloping surface, with locking wedges preventing any movement.

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Type

Order number/ Order item number*)

Delivery date

Field of application

Fluid handled*)

Please tick where applicable*)


☐ radioactive

☐ explosive

☐ corrosive

☐ toxic

☐ harmful

☐ bio-hazardous

☐ highly flammable

☐ safe

Reason for return*)

Comments

The pump/accessories have been carefully drained, cleaned and decontaminated inside and outside prior to dispatch/placing at your disposal.

On sealless pumps the rotor has been removed from the pump for clearing.

- ☐ No special safety precautions are required for further handling.
- ☐ The following safety precautions are required for flushing fluids, fluid residues and disposal

.....

.....

We confirm that the above data and information are correct and complete and that dispatch is affected in accordance with the relevant legal provisions.

.....
Place, date and signature

.....
Address

.....
Company stamp

*) Required fields

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: AU

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: ISO 12100, EN 809

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

Zarautz, 28.11.2019

Post Head of Product Management
and Product Development

Name Yolanda Isusquiza



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