

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 equipment.



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

Index


1 GENERAL ITEMS	3	7 MAINTENANCE/CONSERVATION	9
2 SAFETY	3	7.1 GENERAL INSTRUCTIONS	9
2.1 MARKING OF WARNINGS IN THIS MANUAL	3	7.2 MAINTENANCE/INSPECTION	9
2.2 PERSONNEL QUALIFICATIONS AND INSTRUCTION	3	7.2.1 <i>Checking instructions</i>	9
2.3 RISKS OF FAILING TO COMPLY WITH THE SAFETY		7.2.2 <i>Lubrication</i>	9
INSTRUCTIONS	3	7.3 EMPTYING/DRAINAGE	9
2.4 CONSCIENTIOUS SAFETY AT WORK	3	7.4 DISMOUNTING	9
2.5 SAFETY INSTRUCTIONS FOR USERS AND SERVICE		7.5 RECOMMENDED SPARE PARTS	10
PERSONNEL	3	7.6 PREVENTATIVE MAINTENANCE	10
2.6 SAFETY INSTRUCTIONS FOR MAINTENANCE, INSPECTION		8 TROUBLE-SHOOTING	11
AND ASSEMBLY WORK	4		
2.7 MODIFICATIONS AND ARBITRARY MANUFACTURE OF			
SPARE PARTS	4		
2.8 UNAUTHORISED OPERATION MODES	4		
3 TRANSPORT AND STORAGE	4		
3.1 TRANSPORT AND HANDLING	4		
3.2 PROVISIONAL STORAGE/CONSERVATION	4		
4 EQUIPMENT DESCRIPTION	4		
4.1 GENERAL DESCRIPTION	4		
4.2 DENOMINATION	4		
4.3 PUMPING MODULE	5		
4.4 ACCUMULATION MODULE	5		
4.4.1 <i>Hydropneumatic accumulator</i>	5		
4.4.2 <i>Galvanised tank</i>	5		
4.5 CONTROL MODULE	5		
4.5.1 <i>Measurement and detection elements</i>	5		
4.5.2 <i>Control panel</i>	5		
4.6 NOISE. PERMITTED LEVELS	5		
5 INSTALLATION	6		
5.1 CHECK BEFORE ASSEMBLY	6		
5.2 GROUP POSITIONING	6		
5.2.1 <i>Groups with horizontal base frame</i>	6		
5.3 PIPE JOINT	7		
5.3.1 <i>Auxiliary connections</i>	7		
5.4 CONTROL PANELS	7		
5.4.1 <i>Panel connection</i>	7		
5.4.2 <i>Rotation direction. Check</i>	7		
6 START-UP	7		
6.1 FIRST START-UP	8		
6.1.1 <i>Lubricant</i>	8		
6.1.2 <i>Filling (priming) of the pump</i>	8		
6.1.3 <i>Regulation of pressure switches (when fitted)</i>	8		
6.1.4 <i>Final check</i>	8		
6.1.5 <i>Start-up</i>	8		
6.2 SERVICE LIMITS	9		
6.2.1 <i>Start-up frequency</i>	9		
6.2.2 <i>Temperature of the liquid to be pumped</i>	9		
6.2.3 <i>Density of the liquid to be pumped</i>	9		
6.3 STARTING UP AFTER STORAGE	9		

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.


 In order to prevent and avoid any possible risks which may affect the safety of people, facilities and the environment, pay special attention to the information contained in the manuals for the pumps which make up this equipment.


 All regulations in the country of use must be borne in mind and complied with.

 Unauthorised changes are forbidden. Always check with KSB ITUR before modifying the equipment.

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.

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

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 installer must ensure that the parts of the machine which may create danger due to heat or cold are protected against accidental contact.
- The contact protections of moving parts (e.g. couplings) must not be removed whilst the machine is in service.
- 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.
- Electrical hazard must be avoided (see details in the specific legislation of the country and/or the electricity 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.

The pump frame must have returned to environmental temperature. It must then be depressurised and emptied of liquid.

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 equipment shutdown procedure described in the instructions manual.

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

All safety and protection devices must be installed and put into operation as soon as work concludes.

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

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 components may terminate any liability for consequences deriving from their use.

2.8 Unauthorised operation modes

The safe service of the supplied equipment 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.

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 factory 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.

 When the equipment is dismantled from its 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 equipment 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 equipment 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 grease or oil.

 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.

4 Equipment description

4.1 General description

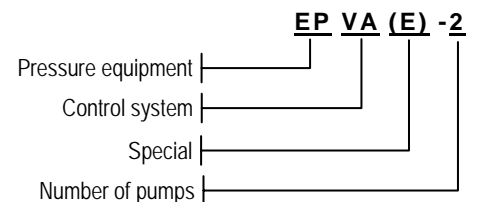
The pressure equipment comprises three main parts:

- Pumping module
- Accumulation module (may be included with the pump module)
- Control module (generally included with the pumping module)

4.2 Denomination

The complete denomination of an item of pressure equipment comprises the denomination of the pumping module plus the denomination of the accumulation module.

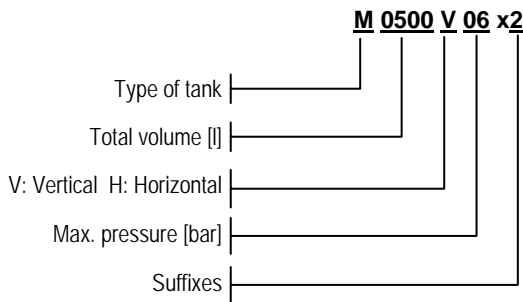
Pumping module denomination



Control system:

- **V** Variator
- **VA** Variator rotating in the n pumps
- **VB** Fixed variator on a pump
- **VP** Variator rotating + pressure switches
- **I** Pressure switches/transducer (series DPV)
- **S** Pressure switches/transducer (series Silen)
- **(E)** Non-standard control system

Accumulation module denomination



Type of tank:

- M:** Hydropneumatic tank (membrane)
- I :** Galvanised boiler with injectors

Suffixes:

- x2 :** Quantity of accumulators
- 3 :** Quantity of injectors per boiler

4.3 Pumping module

Made up of the following elements:

- Electropumps. See the corresponding manual for the characteristics.
- Base frame. Of folded steel or rolled, welded profiles, common to all pumps.
- Impulsion collector. This joins the suction of all the pumps. Mounted on this is a small accessory collector where the measurement elements and control sensors are located.
- Valves. Retainer ball or gate valves positioned in pump suction or impulsion.

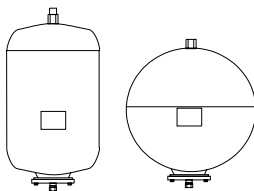
4.4 Accumulation module

The accumulation modules can be of two main types:

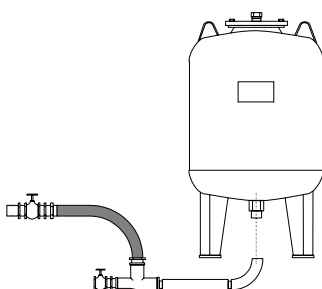
4.4.1 Hydropneumatic accumulator

This is made up of:

- A steel accumulator tank fitted with an elastic membrane of natural non-toxic rubber in the interior.



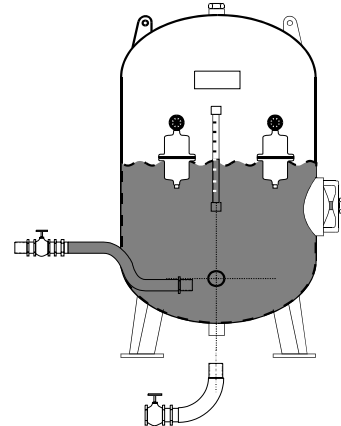
- A connection to the accumulation module and an isolation valve. When fitted with feet, there is also a valve for emptying.



4.4.2 Galvanised tank

This is made up of:

- A galvanised tank.
- Transparent pipe level viewer.
- Tank discharge valve.
- Flexible pipe for connection to the pumping module with its isolation valve.
- Air injection device (**Injectors**). One for each pump, each one with an isolation valve.



4.5 Control module

This includes all the elements used for the measurement of pressure and control of the equipment. This is made up of the following elements:

- Measurement and detection elements.
- Control panel

4.5.1 Measurement and detection elements

Each piece of equipment is supplied with the pressure gauges and pressure transducer or pressure switches necessary for correct operation. Depending on the form of operation, these are as follows:

- Pressure switches. One for each pump.
- Pressure transducer. One in each item of equipment.
- Pressure gauge. One in each item of equipment.

4.5.2 Control panel

This includes a copy of the electrical layout with the numeration inside. The cabling of the different elements is also numbered in line with the diagrams.

All the panels are supplied on a steel support, and are normally connected to the different elements of the equipment.

Note Remember that there are individual instructions manuals for each control panel.

4.6 Noise. Permitted levels

The acoustic pressure level of these pumps is less than 95 dB (A) at 1 m in any operation point within the operation range without cavitation. The acoustic power is less than 105 dB (A).

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 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.



A safety valve should be installed, without the possibility of isolation between it and the hydropneumatic accumulator or tank. If the stamping pressure of the hydropneumatic accumulator or tank is greater than the maximum pressure which may come about in the pump, this should be a spring valve, calibrated a 1 kg/cm² below this pressure. If it is the other way round, it should be a spring valve with a total elevation system, with a sealable pressure regulation safety organ, of Ø, sufficient for the discharge of the flow of all the pumps working at the same time with stamping pressure minus 0.3 kg/cm² below this pressure.

Note

The safety valve output must be connected to the suction tank by way of a pipe without valves, dimensioned for the indicated flow to produce load losses of less than 0.3 kg/cm²

5.1 Check before assembly

The group should be installed in an enclosed site but with sufficient ventilation as to prevent the overheating of the environmental temperature and of the motors.

It is also necessary to ensure there is sufficient space between the motors and the walls or other obstacles, in order to allow suitable refrigeration.



If the cabinet is not joined to the electropumps, it should be located with easy access and with hazard-free use.

Connect the earth to the base frame, switchboard and the electric motor (where available).

Follow the cabling instructions in line with the layouts included with the switchboards.

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.

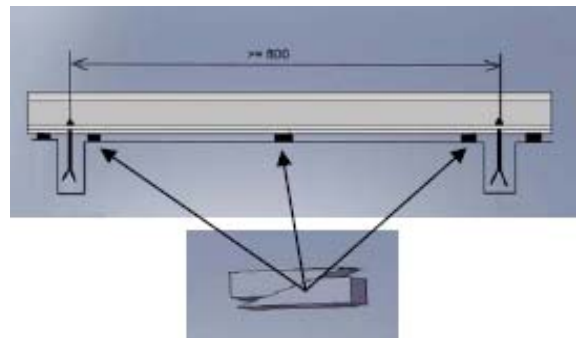
If the anchor pins are to be placed in existing holes, place the anchor pins in their orifices, suspended from the equipment.

Do not connect the suction and impulsion 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

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.

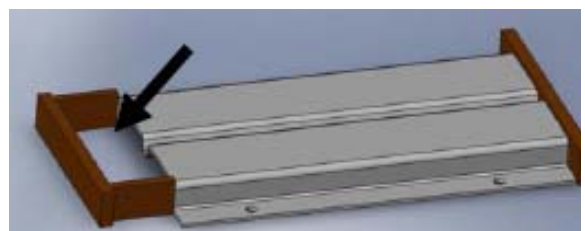
The separation between the two coupling halves must be maintained.

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 impulsion 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.

Pump-motor alignment

Note

In order to make the alignment, see the instructions in the corresponding manual for each pump.

5.3 Pipe joint

The position of the flanges must be totally parallel in order to minimise strain in the pump necks, which may lead to deformation or misalignment. The screws or bolts must pass easily through the holes of the flanges. Do not forget to place seals at the joints.

Note Do not use the equipment as a support point for the installation. Use independent reinforcements to support the weight and strain of the pipes.

We recommend using anti-vibration sleeves between the output of the general collector and the fire grid.

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.).


5.4 Control panels


The control panels are usually supplied secured to the base frame. Sometimes, given the size of the equipment, the panels are supplied on an independent support which needs to be duly secured.


Note The control panels must be levelled once installed in their final location.

5.4.1 Panel connection

The control panels are normally supplied connected to the different elements they govern. Nevertheless, all the input terminals are numbered, as are the connection cables, in line with the layouts available inside the control panels.

 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 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.

5.4.2 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.


6 Start-up

Start-up shall be carried out when all the necessary mechanical, hydraulic, electrical and pneumatic connections are complete.

Checks in pumps

Note See the pump instructions manual in order to carry out the checks.


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.

Anticipate the separation necessary between the motor and the walls for there to be suitable refrigeration.

Note Follow the indications described in the motor manual.

Checks in the panel

 When making the electrical connection, it is essential to 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.

Before making any connection to the line, check the following points:

- Check that the input and output connections correspond to that shown in the diagram.
- Reset all the interior relays which have triggered.
- Do not modify the regulation of the relays, as this may produce failures in the motors.
- Check the correct attachment of all the elements, especially the cut-outs and the connections, which may have become loose during transport.
- Place all the selectors in position 0 or STOP.

General checks

- Check all the connections to external devices (pressure switches, sensors, etc.)
- Check that, with the exception of the valves to empty the tanks, all the others are completely open.
- Ensure that the hydropneumatic accumulators are properly pressurised (0.2 kg/cm² less than the lower start-up pressure), where fitted.
- Check the correct positioning of all the tank accessories.

6.1 First start-up

6.1.1 Lubricant

Note

The pumps which make up the pressure equipment do not normally require lubrication. See the manual corresponding to each pump for confirmation.

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. Remove the venting plug located in the casing or open a discharge pipe vent (before the check valve).
3. Close the discharge 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

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

6.1.3 Regulation of pressure switches (when fitted)

The calibration of the pressure switch is done using its connection and disconnection nuts.

As a general rule the following can be applied:

For the equipment pumps:

First pump

Disconnection at the required pressure plus 0.5 bar.

Connection at the disconnection pressure minus 1 bar or, the lowest adjustable differential in the pressure switch, provided this is over 1 bar.

Other pumps

Disconnection at the disconnection pressure of the previous pump minus 0.3 bar.

Connection at the connection pressure of the previous pump minus 0.3 bar.

Example: If we have pressure equipment formed by three pumps with a required pressure of 5 bar (5 kg/cm²), the regulation of the different pressure switches is as follows:

PRESSURE SWITCH	DISCONNECTION	CONNECTION
1st PUMP	5.5 bar	4.5 bar
2nd PUMP	5.2 bar	4.2 bar
3rd PUMP	4.9 bar	3.9 bar

6.1.4 Final check

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.



All protection items must be in place, and the control panels closed and secured.

6.1.5 Start-up

- The start-up with hydropneumatic accumulator must be carried out with the impulsion and suction valves completely open.
- With galvanised boiler, first close the valve which joins to the group grid and start up the equipment. This will form the first air chamber of the tank, which will subsequently vary until its definitive volume is automatically reached. When opening the grid attachment valve, the equipment is ready for operation.
- To start up, move the pump selector to AUTO position (automatic). If the grid is without pressure at this point, the pumps will begin to work, pressurising it and filling it along with the tank. The pumps will automatically shutdown as the grid is filled or pressurised.
- Due to transport or installation, the equipment governed by pressure switches may not operate at the required point for the equipment, and in consequence the pressure switches need to be calibrated.

Note

- Control the possible leaks which may come about in the grid.

6.2 Service limits

6.2.1 Start-up frequency

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

MOTOR POWER	MAX. START-UPS/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

Note

Never operate the equipment at a temperature higher than that shown in the data sheet and/or factory plate.

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.

6.3 Starting up after storage

If the storage and/or shutting down of the equipment 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.
- Check that there has been no condensation inside the control panel.

After a short storage period, simply turn the pump shaft manually to unlock the rotor equipment and visually check the state of the electrical elements.

- Follow the specific post-short storage instructions in the motor manuals and other items.
- Connect the equipment and the panels in line with the attached diagrams.
- Observe all the steps shown in the "Start-up" section.

Note

If the equipment is to be shutdown for a certain period of time and there is the possibility of freezing temperatures, it is necessary to completely drain the equipment 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...).

Check the equipment in accordance with the pump manuals and the motors, along with the spare parts they need.

Regularly check the regulation of the pressure switches and the air pressure in the hydropneumatic accumulator.

If any accessory is dismantled for maintenance (pressure switch, etc.), it must be correctly mounted again in the original position.

These must be shutdown in order to check the equipment.

7.2 Maintenance/inspection

7.2.1 Checking instructions

During the first minutes of operation:

- Check the pumps to ensure there is no leakage of fluid through the mechanical seal. If this is so, proceed immediately to check and/or repair.
- In the motors, check that the number of start-ups is not excessive, that the intensity consumed does not exceed the nominal value of the plate, and that temperature is normal.
- There are no leaks in the joints and collectors.
- The liquid level is appropriate in the tanks.
- Check that the values indicated by the pressure gauge (and other devices, when fitted) are correct.
- The panels should not show any indication of incorrect operation (pilots, voltage values, etc. products).

7.2.2 Lubrication

Note

The pumps which make up the pressure equipment do not normally require lubrication. See the manual corresponding to each pump for confirmation.

7.3 Emptying/Drainage



The emptying and drainage of equipment used to impel 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

Before dismantling a pump, this should be isolated from the rest of the equipment, both hydraulically and electrically.

Note

See the pump instructions manual in order to dismount.

7.5 Recommended spare parts

See the manual corresponding to each pump.

7.6 Preventative maintenance

Nº	DESCRIPTION OF THE OPERATION TO BE CARRIED OUT	PROCEDURE	REGULARITY	CONSEQUENCE
1	Check leaks	Visual inspection	Monthly	3, 4
2	Check the air pressure/level in the tank	Visual inspection	Monthly	
3	Check the number of start-ups	Visual inspection	Monthly	
4	Check for tightness of joints	Manually	Twice a year	
5	Complete check	Checking and dismantling the pump. See the pump manual	Yearly	1, 2, 3, 4, 6
6	Check functional characteristics loss	Instrument reading	In accordance with use	Check the installation, 5
7	Change the joints or sealing elements	Manually	Every time they are removed	

8 Trouble-shooting

The equipment does not move the fluid

- | Excessive number of start-ups
- | | Insufficient pressure or flow
- | | | Excessive absorbed power
- | | | | Excessive vibrations and noise
- | | | | | Loss of fluid through the mechanical seal
- | | | | | | 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						Pump or suction pipe poorly primed	Correctly prime the pipe by positioning vent connections in the highest points. Prime the pump
x						Air comes in through the suction pipe	Check the seal tightness of the pipe
x	x					Maximum height generated by the pump lower than that required by the installation or 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					Permanent leak of liquid in the installation	Find and seal the leak
	x					Lower consumption than the pump flow	Regulate the impulsion valves
	x					Loss of the air chamber	Check the level or pressure of the chamber and check the recovery system (Injectors...)
		x				Rotation speed incorrect	Measure the speed, check the motor drive power supply voltage
		x				Poorly primed	Refill the pump and pipes and carefully discharge the air.
		x				Air comes in through the sealing system	Dismount the seal system and check it
		x				Pipe obstruction	Clean the pipes
		x	x		x	Impeller obstructed, deteriorated or imbalanced	Dismount the impeller, and inspect, balance or change it.
		x	x			Wear rings deteriorated or incorrectly assembled	Dismount the rings and change them or reinstall them.
			x			Liquid viscosity or density greater than normal.	Reduce the design point or change the motor
			x	x		Pump rotor displaced	Position it in its original position and secure it.
			x			Obstruction inside the pump, impeller or nozzles	Dismount the pump and clean
			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			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	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			Pump cavitation	Improve the suction. Please ask.
			x			Insufficient pipe diameters	Larger diameter pipes, whenever possible
					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	Re-changeable sleeve scratched or deteriorated	Dismount and change the sleeve

WARRANTY

KSB ITUR Spain, S.A. 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 service pumps.

KSB ITUR Spain, S.A. shall not be liable for any direct or indirect damage which the product suffers as a result of defective installation, lack of maintenance, negligent handling, handling by unauthorised personnel, overloading or deficient functions.

The responsibility of KSB ITUR Spain, S.A. shall be limited to the replacement of the defective piece at the earliest opportunity, without this giving any entitlement to claims for liability or compensation.

CERTIFICATE OF COMPLIANCE WITH EC MACHINERY DIRECTIVE

KSB ITUR

P.O. Box 41 – 20800 ZARAUTZ (Gipuzkoa) Spain

PRODUCT UNDER CERTIFICATION.: PRESSURE EQUIPMENT

"EC" DECLARATION OF CONFORMITY

KSB ITUR hereby declares, under its responsibility, that its aforementioned products (when supplied with a motor), to which this Declaration refers, are in line with European Directive 98/37/EC on the approximation laws of the Member States on machinery.

Applied harmonised standards:

EN 292 Part 1, EN 292 Part 2 and EN 809

MANUFACTURER'S DECLARATION

KSB ITUR hereby declares that its aforementioned products (when supplied without a motor) are proposed for incorporation in machinery or assembled with other machines to form machinery covered by Directive 98/37/EC.

Warning is hereby given that the aforementioned products cannot be started up until the machinery in which they are to be incorporated has been declared to conform to the dispositions of the aforementioned Directive.

Applied harmonised standards:

EN 292 Part 1, EN 292 Part 2 and EN 809.

Zarautz, June 2008

Post

Head of Engineering

Name

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