

Pressure Booster System

Hyamat SVP

From series 2015w13

Installation/Operating Manual



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Installation/Operating Manual Hyamat SVP

Original operating manual

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Glossary

Accumulator

Pressure losses may occur in the piping downstream of the pressure booster system as a result of losses due to leakage. The accumulator serves to compensate for pressure losses and minimises the frequency of starts of the pressure booster system.

Certificate of decontamination

A certificate of decontamination is enclosed by the customer when returning the product to the manufacturer to certify that the product has been properly drained to eliminate any environmental and health hazards arising from components in contact with the fluid handled.

Dry running protection

Dry running protection devices prevent the pump from being operated without the fluid to be handled, which would result in pump damage.

Energy-saving mode

Setting designed to avoid the energetically inefficient operation of a pump at minimum water consumption.

Filling the accumulator

Function to fill a (discharge-side) accumulator; it prevents pump sets from starting if only a very small amount of water (e.g. caused by leakage) is required.

Manual mode

Direct operation on the power supply network, independently of the control unit.

PumpDrive

KSB frequency inverter mounted on the pump set.

Switchgear and controlgear assembly

Control cabinet with one or several control units / switchgears and electrical equipment.

1 General

1.1 Principles

This operating manual is valid for the type series and variants indicated on the front cover.

The operating manual describes the proper and safe use of this equipment in all phases of operation.

The name plate indicates the type series, the main operating data and the serial number. The serial number uniquely describes the product and is used as identification in all further business processes.

In the event of damage, immediately contact your nearest KSB service facility to maintain the right to claim under warranty.

1.2 Software changes

The software has been specially created for this product and thoroughly tested. Making changes or additions to the software or parts of the software is prohibited. This does not, however, apply to software updates supplied by KSB.

1.3 Installation of partly completed machinery

To install partly completed machinery supplied by KSB refer to the sub-sections under Servicing/Maintenance.

1.4 Target group

This operating manual is aimed at the target group of trained and qualified specialist technical personnel. (⇒ Section 2.3, Page 10)

1.5 Other applicable documents

Table 1: Overview of other applicable documents

Document	Contents
Sub-supplier product literature	Operating manuals, logic diagram and other product literature of accessories and integrated machinery components

1.6 Symbols

Table 2: Symbols used in this manual

Symbol	Description
✓	Conditions which need to be fulfilled before proceeding with the step-by-step instructions
▷	Safety instructions
⇒	Result of an action
⇔	Cross-references
1. 2.	Step-by-step instructions
	Note Recommendations and important information on how to handle the product

1.7 Key to safety symbols/markings

Table 3: Definition of safety symbols/markings

Symbol	Description
 DANGER	DANGER This signal word indicates a high-risk hazard which, if not avoided, will result in death or serious injury.
 WARNING	WARNING This signal word indicates a medium-risk hazard which, if not avoided, could result in death or serious injury.
 CAUTION	CAUTION This signal word indicates a hazard which, if not avoided, could result in damage to the machine and its functions.
	General hazard In conjunction with one of the signal words this symbol indicates a hazard which will or could result in death or serious injury.
	Electrical hazard In conjunction with one of the signal words this symbol indicates a hazard involving electrical voltage and identifies information about protection against electrical voltage.
	Machine damage In conjunction with the signal word CAUTION this symbol indicates a hazard for the machine and its functions.

2 Safety



All the information contained in this section refers to hazardous situations.

In addition to the present general safety information the action-related safety information given in the other sections must be observed.

2.1 General

- This operating manual contains general installation, operating and maintenance instructions that must be observed to ensure safe operation of the system and prevent personal injury and damage to property.
- Comply with all the safety instructions given in the individual sections of this operating manual.
- The operating manual must be read and understood by the responsible specialist personnel/operators prior to installation and commissioning.
- The contents of this operating manual must be available to the specialist personnel at the site at all times.
- Information and markings attached directly to the product must always be complied with and kept in a perfectly legible condition at all times. This applies to, for example:
 - Flow direction arrow
 - Markings for connections
 - Name plate
- The operator is responsible for ensuring compliance with all local regulations not taken into account.

2.2 Intended use

- The pressure booster system must only be operated within the operating limits described in the other applicable documents.
- Only operate pressure booster systems which are in perfect technical condition.
- Do not operate partially assembled pressure booster systems.
- The pressure booster system must only handle the fluids described in the product literature of the respective design variant.
- Never operate the pressure booster system without the fluid to be handled.
- Observe the information on minimum flow rates specified in the product literature (to prevent overheating, bearing damage, etc).
- Observe the maximum flow rates indicated in the data sheet or product literature (to prevent overheating, cavitation damage, bearing damage, etc).
- Do not throttle the flow rate on the suction side of the pressure booster system (to prevent cavitation damage).
- Consult the manufacturer about any other modes of operation not described in the product literature.

2.3 Personnel qualification and personnel training

- All personnel involved must be fully qualified to install, operate, maintain and inspect the product this manual refers to.
- The responsibilities, competence and supervision of all personnel involved in transport, installation, operation, maintenance and inspection must be clearly defined by the operator.
- Deficits in knowledge must be rectified by means of training and instruction provided by sufficiently trained specialist personnel. If required, the operator can commission the manufacturer/supplier to train the personnel.
- Training on the pressure booster system must always be supervised by specialist technical personnel.

2.4 Consequences and risks caused by non-compliance with this manual

- Non-compliance with these operating instructions will lead to forfeiture of warranty cover and of any and all rights to claims for damages.
- Non-compliance can, for example, have the following consequences:
 - Hazards to persons due to electrical, thermal, mechanical and chemical effects and explosions
 - Failure of important product functions
 - Failure of prescribed maintenance and servicing practices
 - Hazard to the environment due to leakage of hazardous substances

2.5 Safety awareness

In addition to the safety information contained in this operating manual and the intended use, the following safety regulations shall be complied with:

- Accident prevention, health regulations and safety regulations
- Explosion protection regulations
- Safety regulations for handling hazardous substances
- Applicable standards, directives and laws

2.6 Safety information for the operator/user

- Fit protective equipment (e.g. contact guards) supplied by the operator for hot, cold or moving parts, and check that the equipment functions properly.
- Do not remove any protective equipment (e.g. contact guards) during operation.
- Eliminate all electrical hazards. (In this respect refer to the applicable national safety regulations and/or regulations issued by the local energy supply companies.)
- If shutting down the pump does not increase potential risk, fit an emergency-stop control device in the immediate vicinity of the pump (set) during pump set installation.

2.7 Safety information for maintenance, inspection and installation

- Modifications or alterations of the pressure booster system are only permitted with the manufacturer's prior consent.
- Use only original spare parts or parts authorised by the manufacturer. The use of other parts can invalidate any liability of the manufacturer for resulting damage.
- The operator ensures that maintenance, inspection and installation are performed by authorised, qualified specialist personnel who are thoroughly familiar with the manual.
- Carry out work on the pressure booster system during standstill only.
- The pump casing must have cooled down to ambient temperature.
- Pump pressure must have been released and the pump must have been drained.
- When taking the pressure booster system out of service always adhere to the procedure described in the manual.
- Decontaminate pressure booster systems which handle fluids posing a health hazard.
- As soon as the work has been completed, re-install and/or re-activate any safety-relevant and protective devices. Before returning the product to service, observe all instructions on commissioning.
- Make sure the pressure booster system cannot be accessed by unauthorised persons (e.g. children).
- Prior to opening the device, pull the mains plug and wait for at least 10 minutes.

2.8 Unauthorised modes of operation

Always observe the limits stated in the product literature.

The warranty relating to the operating reliability and safety of the pressure booster system supplied is only valid if the equipment is used in accordance with its intended use. (⇒ Section 2.2, Page 9)

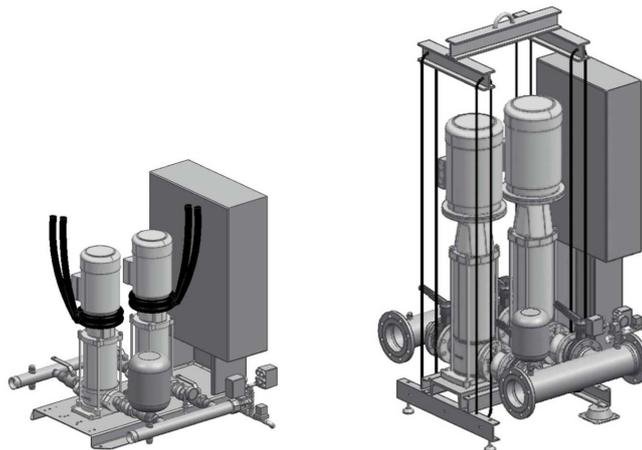
3 Transport/Temporary Storage/Disposal

3.1 Checking the condition upon delivery

1. On transfer of goods, check each packaging unit for damage.
2. In the event of in-transit damage, assess the exact damage, document it and notify KSB or the supplying dealer and the insurer about the damage in writing immediately.

3.2 Transport

	 DANGER
	<p>Pressure booster system tipping over Risk of injury by falling pressure booster system!</p> <ul style="list-style-type: none"> ▷ Never suspend the pressure booster system by its power cable. ▷ Observe the applicable local accident prevention regulations. ▷ Observe the information on weights, centre of gravity and fastening points. ▷ Use suitable and permitted transport equipment, e.g. crane, forklift or pallet truck. ▷ To transport the pressure booster system, suspend it from the lifting tackle as illustrated.



Movitec 2, 4, 6, 10, 15

Movitec 25, 40, 60, 90

Fig. 1: Attaching the lifting equipment to the system and transporting the system

- ✓ Transport equipment/lifting equipment suitable for the corresponding weight has been selected and is available.
1. Remove the packaging. Remove the caps from the connection openings.
 2. Check for any in-transit damage.
 3. Transport the pressure booster system to the place of installation.
 4. Detach the pressure booster system from the pallet using a suitable tool.
 5. Attach the pressure booster system to the lifting equipment as illustrated.
 6. Lift it off the wooden skids. Dispose of the wooden skids.
 7. Carefully place down the pressure booster system at the site of installation.

3.3 Storage/preservation

	<p style="background-color: #FFD700; margin: 0;">CAUTION</p> <p>Damage during storage due to frost, moisture, dirt, UV radiation or vermin Corrosion/contamination of pressure booster system!</p> <p>▸ Store the pressure booster system in a frost-proof room. Do not store outdoors.</p>
	<p style="background-color: #FFD700; margin: 0;">CAUTION</p> <p>Wet, contaminated or damaged openings and connections Leakage or damage of the pressure booster system!</p> <p>▸ Only open the openings of the pressure booster system at the time of installation.</p>

If commissioning is to take place some time after delivery, we recommend that the following measures be taken when storing the pressure booster system:

Store the pressure booster system in a dry, protected room where the atmospheric humidity is as constant as possible.

Table 4: Ambient conditions for storage

Ambient condition	Value
Relative humidity	50 % maximum
Ambient temperature	0 °C to +40 °C

- Frost-free
- Well-ventilated

3.4 Return to supplier

1. Drain the pressure booster system as per operating instructions.
2. Always flush and clean the pressure booster system, particularly if it has been used for handling noxious, explosive, hot or other hazardous fluids.
3. If the pressure booster system has handled fluids whose residues could lead to corrosion damage in the presence of atmospheric humidity or could ignite upon contact with oxygen, the pressure booster system must also be neutralised and treated with anhydrous inert gas to ensure drying.
4. Always complete and enclose a certificate of decontamination when returning the pressure booster system. (⇒ Section 12, Page 80)
Always indicate any safety and decontamination measures taken.

	<p style="background-color: #0070C0; color: white; margin: 0;">NOTE</p> <p>If required, a blank certificate of decontamination can be downloaded from the following web site: www.ksb.com/certificate_of_decontamination</p>
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3.5 Disposal

	 WARNING
	<p>Fluids handled, consumables and supplies which are hot and/or pose a health hazard</p> <p>Hazard to persons and the environment!</p> <ul style="list-style-type: none"> ▸ Collect and properly dispose of flushing fluid and any fluid residues. ▸ Wear safety clothing and a protective mask if required. ▸ Observe all legal regulations on the disposal of fluids posing a health hazard.

1. Dismantle the pressure booster system.
Collect greases and other lubricants during dismantling.
2. Separate and sort the pump materials, e.g. by:
 - Metals
 - Plastics
 - Electronic waste
 - Greases and other lubricants
3. Dispose of materials in accordance with local regulations or in another controlled manner.

Electrical or electronic equipment marked with the adjacent symbol must not be disposed of in household waste at the end of its service life.

Contact your local waste disposal partner for returns.

If the used electrical or electronic equipment contains personal data, the operator is responsible for deleting it before the equipment is returned.



4 Description

4.1 General description

- Pressure booster system

4.2 Product information as per Regulation No. 1907/2006 (REACH)

For information as per chemicals Regulation (EC) No 1907/2006 (REACH), see <http://www.ksb.com/reach>.

4.3 Designation

Example: Hyamat SVP 4 / 0408 / 1,2 - 3,5

Table 5: Designation key

Code	Description
Hyamat	Type series
SVP	All pump sets are variable speed versions.
4	Number of pump sets
04	Pump size
08	Number of stages
1,2	Minimum inlet pressure [bar]
3,5	Maximum usable inlet pressure [bar]

4.4 Name plate

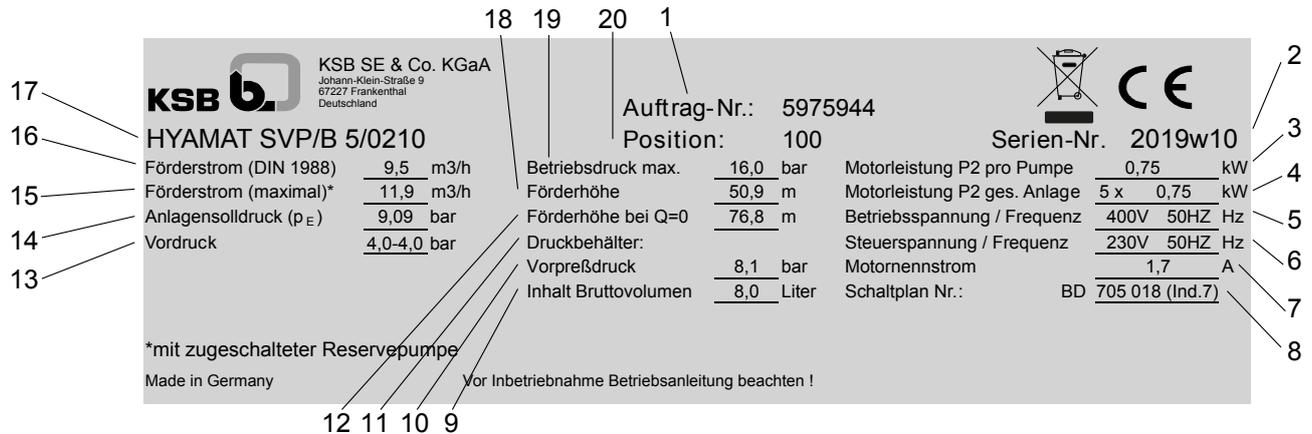


Fig. 2: Name plate (example)

1	Order number	11	Accumulator
2	Production year and production week	12	Head at Q = 0
3	Motor power P2, per pump set	13	Inlet pressure
4	Motor power P2, overall pressure booster system	14	System setpoint pressure
5	Operating voltage, frequency	15	Maximum permissible flow rate
6	Control voltage, frequency	16	Flow rate (to DIN 1988)
7	Nominal current of pump set	17	Type series
8	Circuit diagram	18	Head
9	Gross vol. content	19	Maximum operating pressure
10	Pre-charge pressure	20	Order item number

4.5 Design details

Design

- Fully automatic pressure booster package system
- Baseplate-mounted
- Two to six vertical high-pressure centrifugal pumps with variable speed control
- Hydraulic components made of stainless steel / brass
- 1 check valve and 1 shut-off valve per pump set to DIN / DVGW
- Discharge-side, direct-flow membrane-type accumulator, approved for drinking water
- Pressure gauge
- Pressure transmitter on the discharge side
- Design and function as per EN 806-2, DIN 1988-500

Pressure booster system with Movitec 2B, 4B, 6B, 10B and 15B:

- Anti-vibration pads per pump

Pressure booster system with Movitec 25B, 40B, 60B and 90B:

- Level-adjustable feet and rubber pads (supplied but not fitted)

Installation

- Stationary dry installation

Drive

- High-efficiency, magnet-less KSB SuPremE motor
- Efficiency class IE4/IE5 to IEC TS 60034-30-2:2016

Automation

- Control unit (IP54 enclosure)
- Control panel (display, keys, LEDs, service interface)
- Frequency inverter
- Transformer for control voltage
- Motor protection switch per pump
- Lockable master switch (repair switch)
- Pressure transmitter on the discharge side
- Circuit diagram to VDE and parts list for electric parts
- Terminal strip/terminals with identification for all connections
- Connection for analog or digital dry running protection equipment
- Remote ON/OFF input
- Field bus connection (optional)

4.6 Configuration and function



Fig. 3: Illustration of pressure booster system

1	Control unit	4	High-pressure centrifugal pump
2	Control cabinet	5	Manifold
3	Motor with variable speed system	6	Baseplate

Design The fully automatic pressure booster system is equipped with two to six vertical variable speed high-pressure centrifugal pumps (4) for pumping the fluid handled to the consumer installations in the set pressure range.

Function A microprocessor control unit (1) controls and monitors two to six high-pressure pumps (4). Each pump set is operated on a motor-mounted variable speed system (frequency inverter) and controlled by the control unit so as to ensure a constant discharge pressure of the pressure booster system. As the demand increases or decreases, peak load pumps are started and stopped automatically.

As soon as the demand increases again after one pump set has been stopped, another pump set which has not been in operation before is started up. When the last pump set has been stopped and the demand increases again, the next pump set in line is started up. The stand-by pump is also included in the alternating cycle. The actual pressure is measured by means of an analog pressure gauge (pressure transmitter) which is monitored by integrated broken wire detection (4-20 mA). In the standard setting, the pressure booster system starts up and stops automatically. The pump sets are started and stopped as a function of demand. Variable speed control reduces the frequency of starts of the pump sets in parallel operation. If a pump set fails while in operation, the next pump set is started up immediately. If the demand drops towards 0, the pressure booster system slowly runs down to the stop point. A fault message can be transmitted via volt-free contacts, e.g. to a control station. The operating status is displayed via LEDs.

4.7 Noise characteristics

The pressure booster system is available with different numbers and sizes of pumps. For the noise characteristics refer to the operating manual of the pump set. To calculate the expected total sound pressure level, add*** a defined value*** to the individual pump set's expected sound pressure level.

Table 6: Values for calculating the total expected sound pressure level

Number of pump sets	Value
	dB(A)
2	+ 3
3	+ 4.5
4	+ 6
5	+ 7
6	+ 7.5

Example Pressure booster system with 4 pump sets (value + 6 dB(A))

Single pump = 48 dB(A)

48 dB(A) + 6 dB(A) = 54 dB(A)

The expected total sound pressure level of 54 dB(A) may develop when all 4 pump sets are running under full-load conditions.

4.8 Scope of supply

Depending on the model, the following items are included in the scope of supply:

Pressure booster system

- Two to six vertical high-pressure centrifugal pumps
- Discharge-side, direct-flow membrane-type accumulator, approved for drinking water
- 1 check valve and 1 shut-off valve per pump set to DIN / DVGW
- Pressure transmitter on the discharge side
- Pressure gauge
- Powder-coated / epoxy resin-coated steel baseplate

For Movitec 2B, 4B, 6B, 10B and 15B:

- With oval flange/round flange
- Pumps mounted on the baseplate with anti-vibration mounts

For Movitec 25B, 40B, 60B and 90B:

- With round flange
- Pressure booster system with level-adjustable feet and rubber pads (supplied but not fitted)

Control unit

- IP54 enclosure
- Control panel (display, keys, LEDs, service interface)
- Transformer for control voltage
- Motor protection switch per pump
- Lockable master switch (repair switch)
- Terminal strip/terminals with identification for all connections
- Circuit diagram and list of electric components
- Connection for analog or digital dry running protection equipment
- Remote ON/OFF input

4.9 Dimensions and weights

For dimensions and weights refer to the outline drawing.

5 Installation at Site

5.1 Checks to be carried out prior to installation

	<div style="background-color: #f4a460; padding: 5px;">⚠ WARNING</div> <p>Installation on mounting surfaces which are unsecured and cannot support the load</p> <p>Personal injury and damage to property!</p> <ul style="list-style-type: none"> ▷ Use a concrete of compressive strength class C12/15 which meets the requirements of exposure class X0 to EN 206-1. ▷ The mounting surface must have set and must be completely horizontal and even. ▷ Observe the weights indicated.
	<div style="background-color: #0070c0; color: white; padding: 5px;">NOTE</div> <p>The anti-vibration mounts provide adequate insulation against solid-borne noise.</p>
	<div style="background-color: #0070c0; color: white; padding: 5px;">NOTE</div> <p>Do not install pressure booster systems next to sleeping or living quarters.</p>

Before beginning with the installation check the following:

- All structural work required has been checked and prepared in accordance with the dimensions in the outline drawing.
- The pressure booster system can be operated on the power supply network according to the data on the name plate. (⇒ Section 4.4, Page 15)
- The place of installation is frost-free.
- The place of installation can be locked.
- The place of installation is well-ventilated.
- A suitably dimensioned drain connection (e.g. leading to a sewer) is available.
- If expansion joints are used, take note of its creep resistance. Expansion joints must be easily replaceable.

5.2 Installing the pressure booster system

	<p style="background-color: #f4a460; padding: 2px;">⚠ WARNING</p> <p>Top-heavy pressure booster system Risk of personal injury by pressure booster system tipping over!</p> <ul style="list-style-type: none"> ▷ Pressure booster systems awaiting final installation must be secured against tipping over. ▷ Firmly anchor the pressure booster system.
	<p style="background-color: #0070c0; color: white; padding: 2px;">NOTE</p> <p>To prevent the transmission of piping forces and solid-borne noise, installing expansion joints with length-limiters is recommended.</p>

- ✓ The pressure booster system’s packaging has been removed.
- ✓ A suitable installation site has been selected that meets the requirements.
- ✓ Sufficient clearance in all directions is provided for servicing work.
 1. Mark out the anchoring holes on the floor as shown in the outline drawing.
 2. Drill the holes (max. diameter: 12 mm).
 3. Insert plug fixings of appropriate size.
 4. Place the pressure booster system in its correct installation position.
 5. Use suitable bolts to firmly anchor the pressure booster system.

5.3 Mounting the accumulator

	CAUTION
	<p>Dirt in the pressure booster system Damage to the pump sets!</p> <p>▷ Clean the accumulator before filling it.</p>

✓ The original operating manual of the pressure booster system is on hand.

1. Mechanically and electrically connect the accumulator in accordance with the original operating manual supplied.

5.4 Connecting the piping

	CAUTION
	<p>Air pockets in suction line Pressure booster system cannot prime!</p> <p>▷ Lay the pipe with a continuously rising slope.</p>

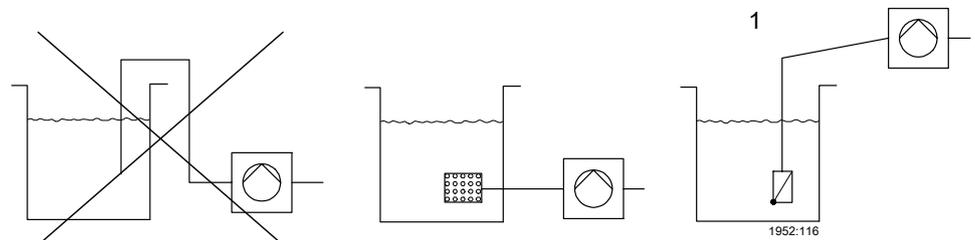


Fig. 4: Correct piping connection

1	Suction lift operation
---	------------------------

1. Install the piping without transmitting any stresses and strains.
2. Connect the piping to the distribution lines on the inlet side and discharge side.

5.4.1 Fitting an expansion joint (optional)

	<p>⚠ DANGER</p>
	<p>Sparks and radiant heat Fire hazard!</p> <ul style="list-style-type: none"> ▸ Take suitable precautions to protect the expansion joint if any welding work is carried out.
	<p>CAUTION</p>
	<p>Leaking expansion joint Flooding of installation room!</p> <ul style="list-style-type: none"> ▸ Do not apply any paint to the expansion joint. ▸ Keep the expansion joint clean. ▸ Regularly check for cracks or blisters, exposed fabric or other defects.

- ✓ Sufficient clearance in all directions is provided for checking the expansion joint.
- ✓ The expansion joint is not insulated along with the pipeline insulation.
 1. The expansion joint has a length limiter with solid-borne sound insulation.
 2. Install the expansion joint in the piping free of twist or distortion. Never use the expansion joint to compensate for misalignment or mismatch of the piping.
 3. Evenly tighten the bolts crosswise. The ends of the bolts must not protrude from the flange.

5.4.2 Fitting the pressure reducer (optional)

	<p>NOTE</p>
	<p>A pipe length of approximately 600 mm must be provided on the inlet side to accommodate a pressure reducer, if necessary.</p>
	<p>NOTE</p>
	<p>A pressure reducer must be installed if the inlet pressure fluctuation is too high for the pressure booster system to operate as intended or if the total pressure (inlet pressure and shut-off head) exceeds the design pressure.</p>

The inlet pressure (p_{inl}) varies between 4 and 8 bar. A minimum pressure gradient of 5 m is required for the pressure reducer to function properly. This means that the pressure reducer must be mounted 5 m higher than the pressure booster system. The pressure drops by about 0.1 bar per metre of height difference. Alternatively, the pressure reducer can be subjected to a pressure of 0.5 bar.

Example $p_{inl} = 4 \text{ bar}$

Minimum pressure gradient = 5 m \pm 0.5 bar

Downstream pressure: 4 bar - 0.5 bar = 3.5 bar.

- ✓ A minimum pressure gradient of 5 m is available.
 1. Install the pressure reducer in the pipe on the inlet side.

5.5 Electrical connection

	<p>⚠ DANGER</p> <p>Electrical connection work by unqualified personnel Danger of death from electric shock!</p> <ul style="list-style-type: none"> ▷ Always have the electrical connections installed by a trained and qualified electrician. ▷ Observe regulations IEC 60364.
	<p>⚠ WARNING</p> <p>Incorrect connection to the mains Damage to the mains network, short circuit!</p> <ul style="list-style-type: none"> ▷ Observe the technical specifications of the local energy supply companies.
	<p>NOTE</p> <p>Installing a motor protection device is recommended.</p>
	<p>NOTE</p> <p>If a residual current device is installed, observe the operating manual for the frequency inverter.</p>

Lightning protection

- Electrical installations must be protected against overvoltage (compulsory since 14 December 2018) (see DIN VDE 0100-443 (IEC60364-4-44:2007/A1:2015, modified) and DIN VDE 0100-534 (IEC 60364-5-53:2001/A2:2015, modified). Whenever modifications are made to existing installations, retrofitting a surge protective device (SPD) in accordance with VDE is mandatory.
- A maximum cable length of 10 metres should not be exceeded between the surge protective device (usually type 1, internal lightning protection) installed at the service entrance and the equipment to be protected. For longer cables, additional surge protective devices (type 2) must be provided in the sub-distribution board upstream of the equipment to be protected or directly in the equipment itself.
- The associated lightning protection concept must be provided by the operator or by a suitable provider commissioned by the operator. Surge protective devices can be offered for the control units on request.

Wiring diagram

The wiring diagrams are located in the control cabinet, which is where they must be stored.

The product literature of the switchgear and controlgear assembly supplied with the system includes a list of the electrical components installed. When ordering spare parts for electrical components, always indicate the number of the wiring diagram.

Terminal assignment

For the terminal assignment refer to the wiring diagram.

5.5.1 Sizing the power cable

Determine the cross-section of the power cable based on the total rated power required.

5.5.2 Connecting the pressure booster system

- ✓ The pressure booster system can be operated on the power supply network in accordance with the data on the name plate. (⇒ Section 4.4, Page 15)
- ✓ The wiring diagram is available.
 1. Connect terminals L1, L2, L3, PE and N in accordance with the wiring plan.
 2. Connect the potential equalisation conductor on the baseplate to the terminal with the earthing symbol.

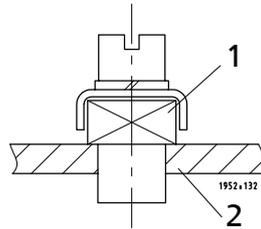


Fig. 5: Connecting the potential equalisation conductor

1	Earthing terminal	2	Baseplate
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3. Connect the remote ON/OFF input. (⇒ Section 5.5.3, Page 25)
4. Connect the dry running protection device. (⇒ Section 5.5.4, Page 25)
5. Connect the fire alert. (⇒ Section 5.5.5, Page 25)
6. Ambient temperature monitoring device (optional) (⇒ Section 5.5.6, Page 26) and/or connecting (⇒ Section 5.5.7, Page 26) the digital inputs.

5.5.3 Connecting the remote ON/OFF input

1. Establish the connection in accordance with the wiring diagram.

5.5.4 Connecting the dry running protection device

- ✓ The original operating manual of the dry running protection device is on hand.
 1. Fit the dry running protection device in accordance with the supplied original operating manual. Connect it in the control unit in accordance with the supplied original operating manual.

5.5.5 Connecting the fire alert

1. Establish the connection in accordance with the wiring diagram.

5.5.6 Connecting the ambient temperature monitoring device (optional)

- ✓ The original operating manual of the Pt1000 temperature sensor is on hand.
 1. Fit temperature sensor Pt1000 in a suitable place in the installation room in accordance with the original operating manual.
 2. Establish the connection in accordance with the wiring diagram.

5.5.7 Connecting the digital inputs (optional)

1. Establish the connection in accordance with the wiring diagram.
- ⇒ Establish the remote reset, setpoint changeover and functional check run functions via the WSD inputs 1 to 3.

6 Commissioning/Start-up/Shutdown

6.1 Commissioning/Start-up

6.1.1 Prerequisites for commissioning/start-up

	CAUTION
	<p>Pump set running dry Damage to the pump set/pressure booster system!</p> <ul style="list-style-type: none"> ▷ Use dry running protection. If the dry running protection terminal is disabled by means of a bridge, the operator shall assume responsibility for any dry running that might occur.

Ensure that the following requirements are met prior to commissioning/start-up:

- The pressure booster system has been properly connected to the electric power supply and is equipped with all protection devices.
- All relevant VDE standards and/or regulations applicable in the country of use are complied with.
- The dry running protection device has been installed. (⇒ Section 5.5.4, Page 25)

6.1.2 Priming and venting the pressure booster system

	CAUTION
	<p>Foreign matter in the piping Damage to the pumps/pressure booster system!</p> <ul style="list-style-type: none"> ▷ Before commissioning/starting (or even test running) the pressure booster system, make sure that there is no foreign matter in the pressure booster system or piping.

	CAUTION
	<p>Operation without the fluid to be handled Damage to the pump sets!</p> <ul style="list-style-type: none"> ▷ Prime the pressure booster system with the fluid to be handled.

	NOTE
	<p>Prior to its delivery, the pressure booster system will be tested hydraulically with water and then drained again. For technical reasons the presence of some residual water is unavoidable.</p> <p>Prior to commissioning/start-up observe EN 806. After prolonged standstill periods, flushing or professional disinfection is recommended. For extensive or branched piping systems, flushing the pressure booster system can be restricted to a limited area.</p>

	NOTE
	<p>Minor leakage of the mechanical seals during commissioning is normal and will cease after a short period of operation.</p>

Have commissioning carried out by specialist KSB staff.

- ✓ The original operating manual of the pump set is on hand.
- ✓ The pipe unions between the pump set and the piping have been re-tightened.
- ✓ The flange bolting has been checked for firm seating.

- ✓ The cooling air inlet openings and cooling air outlet openings on the motor are unobstructed.
- ✓ All shut-off valves are open.
- ✓ The pre-charge pressure of the accumulator has been checked. (⇒ Section 8.4, Page 45)
- ✓ The minimum flow rate has been observed. (⇒ Section 6.2.5, Page 31)
 1. Set the master switch to “0”; unlock all motor protection switches (if applicable).
 2. Provide connection to power supply.
 3. Open the vent plugs on the pump set in accordance with the supplied original operating manual for the pump set.
 4. Slowly open the inlet-side shut-off valve and prime the pressure booster system until the fluid to be handled escapes through the vent holes.
 5. Close and slightly tighten the pump vent plugs.
 6. Switch on all motor protection switches.
 7. If fitted, set the manual-0-automatic selector switches to automatic.
 8. Switch on the master switch.
 9. Open the discharge-side valve.
 10. When all pump sets are running, loosen the vent plugs again to let any remaining air escape.
 11. Re-tighten the vent plug.
 12. Check that the pump sets are running smoothly.
 13. Close the discharge-side valve in order to verify whether the pump sets reach the maximum shut-off head.
 14. Open the discharge-side valve.
 15. Set the dry running protection device. (⇒ Section 6.1.3, Page 28)

6.1.3 Setting the dry running protection device

Dry running protection devices are available in the form of pressure switches, pressure transmitters or flow monitors. The dry running protection devices are set to the values specified in the order. If the settings do not match the site data, adjust the settings for dry running protection.

Pressure switch

- ✓ The original operating manual of the pressure switch is on hand.
 1. Undertake settings in accordance with the operating manual of the pressure switch.

Table 7: Recommended settings for pressure switches

Stop pressure	Start-up pressure
0.5 bar below p_{inl}	0.2 bar below p_{inl}

Pressure transmitter

1. Undertake settings via parameters 3-5-15 and 3-5-16. (⇒ Section 7.5, Page 37)

Table 8: Recommended settings for pressure transmitters

Stop pressure	Start-up pressure
0.5 bar below p_{inl}	0.2 bar below p_{inl}

Flow monitor

The start-up pressure is not adjustable via the flow monitor.

If no flow is detected on the suction side and the pressure on the pressure side drops below the set value, the flow monitor stops the pressure booster system (lack of water). To reset the dry running protection, set at least one pump set to manual mode.

1. Set the stop pressure via parameters 3-5-17. (⇒ Section 7.5, Page 37)
2. Reset dry running protection. (⇒ Section 8.5, Page 46)

Table 9: Recommended flow monitor settings

Stop pressure	Start-up pressure
0.5 bar below p_{set}	-

6.1.4 Start-up

	NOTE
	The pressure booster system is factory-set to the data indicated on the name plate.

Standard design

- ✓ The pressure booster system has been primed and vented.
(⇒ Section 6.1.2, Page 27)
- 1. Switch on the master switch.
- ⇒ The green LED lights up and signals the system's readiness for operation.

Additional instruments

- ✓ The pressure booster system has been primed and vented.
(⇒ Section 6.1.2, Page 27)
- 1. Set the manual-0-automatic selector switch to automatic.
- ⇒ The green LED lights up and signals the system's readiness for operation.

6.1.5 Checklist for commissioning/start-up

Table 10: Checklist

Steps to be carried out	Action	Done
1	Read the operating manual.	
2	Compare the power supply data against the name plate data.	
3	Check the earthing system/take measurements.	
4	Check the mechanical connection to the water mains. Re-tighten the flange and pipe unions.	
5	Prime and vent the pressure booster system from the inlet side.	
6	Check the inlet pressure.	
7	Check whether all cables are firmly connected to the terminals inside the control unit.	
8	Compare the settings of the motor protection switches with the name plate data and re-adjust if necessary.	
9	Check the start-up pressure and the stop pressure; re-adjust if necessary.	
10	Test the proper function of the dry running protection equipment. If not fitted, make a relevant note in the commissioning report.	
11	After the pump sets have been running for 5 to 10 minutes, vent them again.	
12	Set all switches to automatic.	
13	Check the pre-charge pressure.	
14	Enter any deviations from the name plate or order documentation in the commissioning report.	
15	Complete the commissioning report together with the operator/user and instruct the operator/user as to the function of the unit.	

6.2 Operating limits

	⚠ DANGER
	<p>Non-compliance with operating limits Damage to the pump set!</p> <ul style="list-style-type: none"> ▷ Comply with the operating data indicated in the data sheet. ▷ Avoid operation against a closed shut-off element. ▷ Never operate the pump set outside the limits specified below.
	⚠ DANGER
	<p>Non-compliance with operating limits for the fluid handled Explosion hazard!</p> <ul style="list-style-type: none"> ▷ Never use the pump to handle different fluids which might react chemically with each other. ▷ Never use the pump to handle a flammable fluid with a fluid temperature above the ignition temperature.

6.2.1 Frequency of starts

To prevent high temperature increases in the motor and impermissible loads on the pump, motor, seals and bearings, do not exceed a certain number of starts per hour. See original operating manual of the pump sets.

6.2.2 Ambient conditions

Observe the following parameters and values during operation:

Table 11: Permissible ambient conditions

Ambient condition	Value
Ambient temperature	0 °C to +40 °C
Relative humidity	50 % maximum

6.2.3 Maximum operating pressure

	CAUTION
	<p>Permissible operating pressure exceeded Damage to connections and seals!</p> <ul style="list-style-type: none"> ▷ Never exceed the operating pressure specified in the data sheet.

The maximum operating pressure equals 16, 25 or 40 bar, depending on the design variant. See name plate. (⇒ Section 4.4, Page 15)

6.2.4 Fluid handled

6.2.4.1 Permissible fluids to be handled

- Clean fluids not chemically or mechanically aggressive to the pump materials
- Drinking water
- Service water
- Cooling water

6.2.4.2 Fluid temperature

Table 12: Temperature limits of the fluid handled

Permissible fluid temperature	Value
Maximum	+70 °C 25 °C to DIN 1988 (DVGW) ¹⁾
Minimum	0 °C

6.2.5 Minimum flow rate

Table 13: Minimum flow rate per pump in manual mode

Size	Minimum flow rate per pump
	[l/h]
Movitec 2B	200
Movitec 4B	400
Movitec 6B	600
Movitec 10B	1100
Movitec 15B	1600
Movitec 25B	2800
Movitec 40B	4600
Movitec 60B	6100
Movitec 90B	8500

6.3 Shutdown

6.3.1 Shutdown

Standard design

1. Set the master switch to 0.

Additional instruments

1. Set manual-0-automatic selector switch to 0.

6.3.2 Measures to be taken for shutdown

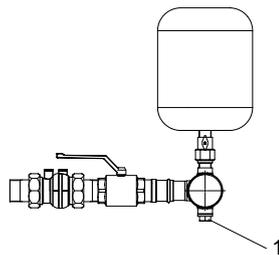


Fig. 6: Venting and draining the accumulator

1	Vent plug
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✓ The pressure booster system has been switched off. (⇒ Section 6.3.1, Page 31)

1. Open vent plug 1 at the accumulator.
⇒ The pressure booster system is being vented and drained.
2. Close vent plug 1 at the accumulator.

1) Applies to the handling of water (Germany only)

7 Operation

	CAUTION
	<p>Incorrect operation Water supply is not assured!</p> <p>▷ Make sure to comply with all local regulations, particularly the EC Machinery Directive and the EC Directive on Low-Voltage Equipment.</p>

The pressure booster system is factory-set to the start-up pressure and stop pressure indicated on the name plate. Changes and restorations can be made via the control panel. (⇒ Section 7.7, Page 39)

7.1 Control panel

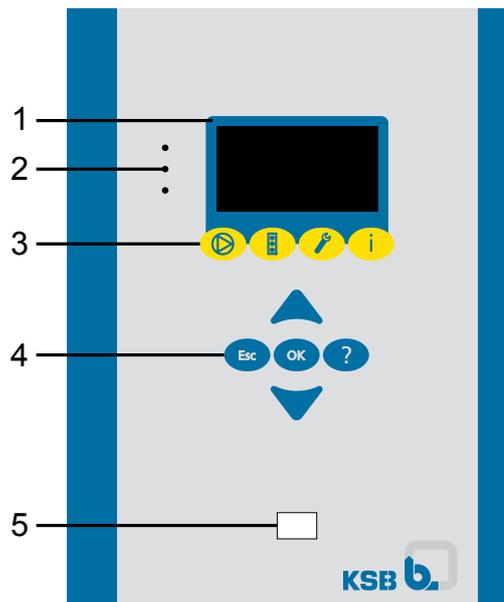


Fig. 7: Control panel

1	Display
2	LED display
3	Function keys
4	Navigation keys
5	Service interface

7.1.1 Display

The display contains the following information:

Parameter No./pump	Access level
Current selection	
Parameter information	
Date, time	

Fig. 8: Display elements

Table 14: Display elements and description

Display element	Description
Parameter No./pump	Shows the number of the parameter or pump selected The parameter No. indicates the path through the menu levels.
Current selection	Shows the current parameter in plain text
Parameter information	List of selectable parameters/parameter information
Level	Shows the current access level (⇒ Section 7.4, Page 36)
Date, time	Shows the set date and time

7.1.2 LEDs

The LED provides information on the operating status.

Table 15: LED description

LED	Description
Green	Trouble-free operation
Yellow	One or more warnings are active.
Red	One or more alerts are active.

7.1.3 Function keys

You can use the menu keys to access the elements at the first menu level directly.

Table 16: Assignment of menu keys

Key	Menu
	Operation
	Diagnosis
	Settings
	Information

7.1.4 Navigation keys

For navigating through the menus and confirming settings:

Table 17: Control unit: Navigation keys

Key	Description
	Direction keys: <ul style="list-style-type: none"> ▪ Move up/down in the menu options ▪ Increase/decrease a numerical value ▪ Scroll up or down
	Escape key: <ul style="list-style-type: none"> ▪ Cancel an entry without saving it. ▪ Move up one menu level.
	OK key: <ul style="list-style-type: none"> ▪ On the start display: Open the quick menu. ▪ Confirm settings. ▪ Confirm a menu selection. ▪ When entering numbers: Go to the next digit.
	Help key: <ul style="list-style-type: none"> ▪ Displays a help text for each selected menu option.

7.1.5 Service interface

The service interface allows a PC/notebook to be connected via an RS232 cable. The service interface serves to parameterise and update the control unit.

7.2 Menu structure

Table 18: Menu overview

Main menu	Key	Submenu	Menu display
➔	Operation 	➔ General	<ul style="list-style-type: none"> ▪ System pressure ▪ System load % ▪ RDP switch present/not present ▪ Inlet pressure ▪ Level content % ▪ Level height m ▪ Ambient temp. ▪ Digital inputs
		➔ Pumps	<ul style="list-style-type: none"> ▪ Operating mode of pumps ▪ Display pump load ▪ Display thermal protection
		➔ Time and statistics	<ul style="list-style-type: none"> ▪ Operating hours ▪ Service interval ▪ Current min. pump runtime
➔	Diagnosis 	➔ General	<ul style="list-style-type: none"> ▪ Display messages ▪ Show history ▪ Acknowledge faults ▪ Clear history
➔	Settings 	➔ Control panel	<ul style="list-style-type: none"> ▪ Basic settings ▪ CAN configuration ▪ Service interface ▪ Logo
		➔ Control unit	<ul style="list-style-type: none"> ▪ Login ▪ Service
		➔ System configuration	<ul style="list-style-type: none"> ▪ Number of pumps ▪ Configuration suction side ▪ Configuration operating mode
		➔ System settings	<ul style="list-style-type: none"> ▪ Suction side ▪ Discharge side ▪ Configuration of frequency inverter
		➔ Pressure configuration	<ul style="list-style-type: none"> ▪ Configuration setpoint ▪ Configuration dry running protection
		➔ Timer settings	<ul style="list-style-type: none"> ▪ Functional check run ▪ Alternative setpoint
		➔ Time/date	
		➔ Program outputs	
➔ Messages			
➔ Main menu			
➔	Information 	➔ Control module	<ul style="list-style-type: none"> ▪ Serial number ▪ Material number ▪ Firmware ▪ Parameter set ▪ Hardware version

7.3 Quick menu

The Quick Menu allows access to the main parameters which may be required for adapting the pressure booster system to site conditions. Press OK to call up the Quick Menu from the start screen.

- PIN
- Proportional constant
- Integral constant
- Differential constant
- Setpoint
- Bandwidth
- Accumulator pressure
- Delta P correction (dynamic pressure compensation)
- High pressure alert
- Low pressure alert
- Minimum runtime
- Start delay
- Stop delay
- RDP delay
- High/low alert delay

7.4 Access levels

Various access levels have been defined to prevent unintentional or unauthorised access to the pressure booster system parameters.

- "Standard" level** Unless users log on to one of the other access levels, they will only have limited access to parameters.
- "Customer" level** Access level for expert users.
This level enables access to all the parameters required for commissioning. You must enter the password under (3-2-1-1) Login to gain access.
"C" is displayed.
If password protection is deactivated via parameter 3-2-1-2, this access level becomes the "Standard" access level.
The password is "7353".
- "Service" level** Access level for service personnel.
You must enter the password under (3-2-1-1) Login to gain access.
"S" is displayed.
- "Factory" level** Access level for the manufacturer only.
"F" is displayed.

	NOTE
	If no keys are pressed for ten minutes, the system will automatically return to the "Standard" access level.

7.5 Displaying and changing parameters

The parameter numbers reflect the navigation path of the menu. The first digit indicates the first menu level directly accessible via the four function keys.

Parameter list: (⇒ Section 10.3, Page 54)

Table 19: Example: Displaying and changing parameter 3-5-1 (setting setpoint)

-	<p>Step 1: Logging in</p> <ol style="list-style-type: none"> 1. Log in at Customer level (entering password). (⇒ Section 7.4, Page 36) ⇒ "C" is displayed.
	<p>Step 2: Accessing menu</p> <ol style="list-style-type: none"> 1. Press function key Settings (menu level 3-1). ⇒ 3-1 is displayed.
	<p>Step 3: Navigating</p> <ol style="list-style-type: none"> 1. Press direction key until 3-5 is displayed. 2. Press OK to confirm selection. ⇒ 3-5-1 is displayed.
	<p>Step 4: Changing the parameter value</p> <ol style="list-style-type: none"> 1. To change the parameter value, press OK a second time. 2. To change the numerical value, press the direction key. ⇒ Changes are made from left to right. The bar above the entry displays the value currently being entered in relation to the value range.
	<p>Step 5: Confirming value</p> <ol style="list-style-type: none"> 1. Press OK to confirm changed value. ⇒ The cursor moves to the next position (second position from the left).
	<p>Step 6: Confirming value</p> <p>✓ The parameter value has been successfully changed.</p> <ol style="list-style-type: none"> 1. Press OK to save new parameter values.
	<p>Step 7: Leaving the parameter menu</p> <ol style="list-style-type: none"> 1. To leave the parameter menu, press ESC several times. ⇒ The main display is shown. ⇒ The new setpoint is active.

7.6 Displaying and acknowledging warning and alert messages

The LED signals warning messages (yellow) and alert messages (red) and connects the messages to the relay outputs. The messages can be viewed and acknowledged in the menu.

Fault messages: (⇒ Section 10.4, Page 76)

Table 20: Displaying and acknowledging fault messages

	<p>Step 1: Accessing menu</p> <ol style="list-style-type: none"> 1. Press function key Diagnosis (menu level 2-1). <ul style="list-style-type: none"> ⇒ 2-1-1 is displayed (displaying messages). ⇒ The current fault message is displayed.
	<p>Step 2: Displaying fault message.</p> <ol style="list-style-type: none"> 1. To display the fault message, press OK. <ul style="list-style-type: none"> ⇒ 2-1-2 is displayed (showing history). ⇒ Further information on the fault message is displayed.
	<p>Step 3: Reading out further information on the fault message.</p> <ol style="list-style-type: none"> 1. Press the direction key to read out further information on the fault message. <ul style="list-style-type: none"> ⇒ <i>Fault message</i> ⇒ <i>Fault occurred: date and time</i> ⇒ <i>Fault acknowledged: date and time</i> ⇒ <i>Fault dismissed: date and time</i>
	<p>Step 4: Remediating and acknowledging a fault.</p> <ul style="list-style-type: none"> ✓ The displayed fault has been remedied. <ol style="list-style-type: none"> 1. To acknowledge the fault message, press OK. <ul style="list-style-type: none"> ⇒ 2-1-3 is displayed (acknowledging faults). 2. Re-start the pressure booster system by switching it on and off via the master switch (reset). <ul style="list-style-type: none"> ⇒ All alerts are acknowledged at the same time. Resetting alerts causes the system to re-start.
	<p>Step 5: Clearing history (optional).</p> <ul style="list-style-type: none"> ✓ Logged in at Service level. <ol style="list-style-type: none"> 1. To delete fault history, press OK. <ul style="list-style-type: none"> ⇒ 2-1-4 is displayed (deleting history).
	<p>Step 6: Leaving menu.</p> <ol style="list-style-type: none"> 1. To leave menu, press ESC several times. <ul style="list-style-type: none"> ⇒ The main display is shown.

7.7 Saving and restoring settings

Saving settings

- ✓ Logged in at Customer level.
- 1. Call up parameter 3-2-2-4 (saving customer settings).
- 2. Position cursor on OK and press OK.

Restoring settings

Restoring factory settings

- ✓ Logged in at Customer level.
- 1. Call up parameter 3-2-2-1 (factory settings).
- 2. Position cursor on RESET OK and press RESET OK.
- ⇒ Resets the pressure booster system's values and settings to factory-set defaults.

Resetting to saved settings

- ✓ Logged in at Customer level.
- 1. Call up parameter 3-2-2-3 (customer settings).
- 2. Position cursor on RESET OK and press RESET OK.
- ⇒ Resets to settings saved on site.

Resetting to default settings

- ✓ Logged in at Factory level (for manufacturers only).
- 1. Select parameter 3-2-2-6 (default settings).
- 2. Position cursor on OK and press OK.
- ⇒ The control unit is reset to the pressure booster system type. No settings for pressure, dry running protection, etc.

7.8 Operating modes

7.8.1 Manual mode

Manual mode is reserved for emergencies. Continuous manual operation would lead to waste of energy and water and cause the fluid handled and/or the pump set to overheat. The pump sets can be switched to manual mode depending on the design of the pressure booster system.

- **Standard design:** By making the appropriate settings at the display, one of the pump sets is operated directly on mains power for 10 seconds, independently of the control unit. After the 10 seconds the pump set is stopped automatically.
- **Design with supplementary equipment:** By selecting the appropriate setting via the manual-0-automatic selector switch, available as supplementary equipment, every pump set is operated directly on the mains, independently of the control unit.

7.8.2 Energy-saving mode

	<p style="background-color: #FFD700; padding: 5px;">CAUTION</p> <p>Hunting (excessive starting/stopping) of pressure booster system Damage to the pumps!</p> <ul style="list-style-type: none"> ▸ Only activate the energy-saving mode if a sufficiently sized accumulator is fitted on the discharge side.
	<p style="background-color: #0070C0; color: white; padding: 5px;">NOTE</p> <p>No recommendation can be given for the parameters of the energy-saving mode. The values depend on the system installed and can only be defined at the operational pressure booster system installed on site.</p>

In conjunction with a very large discharge-side accumulator, the energy-saving mode ensures that the pressure booster system runs at an energy-efficient operating point when required to supply very small amounts of water. If a very small amount of water is consumed, the pressure booster system fills the downstream accumulator and stops. Any small water volumes required can then be supplied from the accumulator.

- ✓ The accumulator has been filled. (⇒ Section 7.9.1, Page 41)
 - ✓ Logged in at Service level.
1. Close the discharge-side shut-off valve slowly until only a single pump set is left running and delivering a small amount of water.
 2. Read and record the pump load in parameter 1-1-2.
 3. Activate parameter 3-5-4 (charging accumulator).
 4. Set parameter 3-11-1 (energy-saving mode) to ON.
 5. Set parameter 3-11-2 (direct OFF) to ON.
The setting OFF (*flow detection*) should only be selected for difficult site conditions and by an expert. (⇒ Section 7.9.2, Page 41)
 6. Enter the pump load value in parameter 3-11-3 (stop speed %).
 7. Set parameter 3-11-4 (time Direct OFF) to define the time period the pump is to keep on running in order to charge the accumulator before stopping.
 8. Adjust parameters 3-11-3 and 3-11-4 until the required stopping behaviour is obtained.

7.9 Functions

7.9.1 Filling the accumulator

The energy-saving mode prevents the pump sets from starting if only a very small amount of water (e.g. caused by leakage) is required. The required fluid can be supplied from the accumulator (discharge-side accumulator).

(⇒ Section 7.8.2, Page 40)

✓ Logged in at Service level.

1. Select parameter 3-5-4 (charging accumulator).
2. Accumulator filling (setting setpoint).
3. Select parameter 3-11-4 (time Direct OFF).
4. Set the time period the pump is to keep on running in order to fill the accumulator before stopping.
⇒ The accumulator is being filled.
5. Set the setpoint to 0.
⇒ The function is disabled.

7.9.2 Setting flow detection

When one pump set is operated, the control unit checks the quantity of the fluid handled.

The pump set's speed is slightly lowered within a configurable time interval. If the actual value is within the bandwidth, the control unit triggers the filling of the accumulator and stops the pump set.

Setting the time interval

✓ Logged in at Service level.

1. Call up parameter 3-4-3-5-2 (time flow rate).
2. Set time [seconds].

Setting the bandwidth

✓ Logged in at Service level.

1. Call up parameter 3-4-3-5-1 (bandwidth flow rate).
2. Set the setpoint [%].

7.9.3 Setting the frequency inverter failure response

The pressure booster system's response to a potential frequency inverter failure can be set at the control unit. In the standard setting, the control unit will switch the system to mains operation if the frequency inverter fails. If the automatic switchover function performed by the pressure booster system is not required, this can be set accordingly from parameter 3-12.

7.9.4 Setting Delta P (dynamic pressure compensation function)

The dynamic pressure compensation function is a dynamic flow rate-dependent set value re-adjustment. The system responds to decreasing flow rates by automatically increasing the set value to compensate the pressure losses in the piping.

Activating Delta P

✓ Logged in at Customer level.

1. Select parameter 3-5-10 (Delta Pdynamic pressure compensation).
2. Set setpoint.

7.9.5 Remote ON/OFF

The remote ON/OFF connection is an NC contact. When this contact is open, all pumps in operation switch off in succession after a configurable stop delay. A warning message is output (yellow LED). When this contact is closed, the pump sets start up again in line with demand. The warning message is cleared.

7.9.6 Fire alert

The fire alert connection is an NC contact. When the contact is open, all pumps are switched off in succession after a configurable start delay. An alert (red LED) is output. In this case, the dry running protection and/or remote ON/OFF functions, if enabled, are ignored.

When the contact closes, the pump sets will stop depending on demand. The alert is cleared.

7.9.7 Setting the ambient temperature monitoring device (optional)

If the configurable ambient temperature value is exceeded, a warning message is output. The ambient temperature can be read on the display.

The ambient temperature monitoring device cannot be used in combination with digital inputs for remote reset, setpoint changeover and functional check run.

- ✓ The temperature sensor Pt1000 is fitted and electrically connected.
(⇒ Section 5.5.6, Page 26)

1. Call up parameter 3-3-4 (WSD).
2. Set the water flow detection on the accumulator to TEMPERATURE.
3. Call up parameter 3-4-4-3 (ambient temperature).
4. Set the temperature [°C].

7.9.8 Enabling digital inputs (optional)

	NOTE
	This function cannot be used in conjunction with ambient temperature monitoring.

- ✓ The accumulator's water flow detection (WSD) function is deactivated.
- ✓ Logged in at Service level.

1. Call up parameter 3-3-4 (WSD).
2. Set water flow detection on accumulator to OFF.

⇒ WSD inputs 1 to 3 are available.

The following functions can be assigned via the digital inputs:

- Remote reset
 - Activated by pulse to terminals.
- Setpoint changeover (see parameter 3-5-9)
 - Activated by closing the contact, de-activated by opening the contact.
- Functional check run
 - Pulse-activated.

8 Servicing/Maintenance

8.1 General information/safety regulations

	<p>⚠ DANGER</p> <p>Unintentional start-up of pressure booster system Danger to life!</p> <ul style="list-style-type: none"> ▷ De-energise the pressure booster system for any repair work or servicing work. ▷ Ensure that the pressure booster system cannot be re-energised unintentionally.
	<p>⚠ WARNING</p> <p>Improper lifting/moving of heavy assemblies or components Personal injury and damage to property!</p> <ul style="list-style-type: none"> ▷ Use suitable transport devices, lifting equipment and lifting tackle to move heavy assemblies or components.
	<p>⚠ WARNING</p> <p>Unqualified personnel performing work on the pressure booster system Risk of personal injury!</p> <ul style="list-style-type: none"> ▷ Always have repair and maintenance work performed by specially trained, qualified personnel.
	<p>CAUTION</p> <p>Incorrectly serviced pressure booster system Function of pressure booster system not guaranteed!</p> <ul style="list-style-type: none"> ▷ Regularly service the pressure booster system. ▷ Prepare a maintenance schedule for the pressure booster system, with special emphasis on lubricants, shaft seals and pump couplings.

The operator ensures that maintenance, inspection and installation are performed by authorised, qualified specialist personnel who are thoroughly familiar with the manual.

- Observe the safety instructions and information.
- For any work on the pump (set) observe the operating manual of the pump (set).
- In the event of damage you can always contact KSB- KSB Service .
- A regular maintenance schedule will help avoid expensive repairs and contribute to trouble-free, reliable operation with a minimum of maintenance expenditure and work.
- Never use force when dismantling and reassembling the equipment.

8.2 Inspection contract

For all inspection work and servicing work to be carried out at regular intervals we recommend taking out the KSB inspection contract. Contact your service partner for details.

8.3 Servicing/Inspection

8.3.1 Supervision of operation

	CAUTION
	<p>Increased wear due to dry running Damage to the pump set!</p> <ul style="list-style-type: none"> ▷ Never operate the pump set without liquid fill. ▷ Never close the shut-off element in the suction line and/or supply line during pump operation.
	CAUTION
	<p>Impermissibly high temperature of fluid handled Damage to the pump!</p> <ul style="list-style-type: none"> ▷ Prolonged operation against a closed shut-off element is not permitted (heating up of the fluid). ▷ Observe the temperature limits in the data sheet and in the section on operating limits.

While the pump is in operation, observe and check the following:

- If activated, check the functional check run.
- Measure the actual start-up pressure and stop pressure of the pump sets with a pressure gauge. Compare the values with the specifications on the name plate.
- Compare the pre-charge pressure of the accumulator with the recommended data. (⇒ Section 8.4, Page 45)
- Check the rolling element bearings for running noises.
Vibrations, noise and an increase in current input occurring during unchanged operating conditions indicate wear.
- Monitor the functions of auxiliary connections, if any.

8.3.2 Maintenance schedule

Table 21: Overview of maintenance work

Maintenance interval	Servicing/maintenance work
At least once a year	Check the pump sets for smooth running and the mechanical seal for integrity.
	Check the shut-off elements, drain valves and check valves for proper functioning and tightness.
	If fitted, clean the strainer in the pressure reducer.
	If fitted, check the expansion joints for any wear.
	Verify the pre-charge pressure. Check the accumulator for integrity. (⇒ Section 8.4, Page 45)
	Check the automatic switching functionality.
	Check the cut-in levels and cut-out levels.
Check the inflow, inlet pressure, dry running protection, flow monitoring and pressure reducer.	

8.4 Setting the pre-charge pressure

	<p>WARNING</p> <p>Wrong gas Danger of poisoning! ▷ Use only nitrogen to charge the accumulator.</p>
	<p>CAUTION</p> <p>Pre-charge pressure too high Damage to the accumulator! ▷ Observe the manufacturer's product literature (see name plate or operating manual of the accumulator).</p>

The accumulator's pre-charge pressure (p) must be lower than the set start-up pressure (p_E) of the pressure booster system.

The best storage volumes are achieved with the following settings (mean value):

- Value 0.9 at start-up pressure > 3 bar
- Value 0.8 at start-up pressure < 3 bar

Example 1 $p_E = 5$ bar

$$5 \text{ bar} \times 0.9 = 4.5 \text{ bar}$$

With a start-up pressure of 5 bar the pre-charge pressure of the accumulator must be 4.5 bar.

Example 2 $p_E = 2$ bar

$$2 \text{ bar} \times 0.8 = 1.6 \text{ bar}$$

With a start-up pressure of 2 bar the pre-charge pressure of the accumulator must be 1.6 bar.

Checking the pre-charge pressure

1. Close the shut-off elements fitted underneath the membrane-type accumulator.
2. Drain the membrane-type accumulator via the drain valve.
3. Remove and store the protective cap of the membrane-type accumulator valve.
4. Check the pre-charge pressure using suitable equipment (e.g. tyre pressure gauge).
5. Fit the protective cap of the membrane-type accumulator valve.

Filling the membrane-type accumulator

1. Remove and store the protective cap of the membrane-type accumulator valve.
2. Add nitrogen through the valve.
3. Fit the protective cap of the membrane-type accumulator valve.

8.5 Resetting dry running protection

If no flow is detected on the suction side and the pressure on the pressure side drops below the set value, the flow monitor stops the pressure booster system (lack of water). Depending on the system design, dry running protection must be reset manually.

Pressure switch and pressure transmitter If dry running protection devices are available in the form of pressure switches or pressure transmitters, the system is reset automatically (self-reset).

Flow monitor To reset the dry running protection, set at least one pump set to manual mode.

Resetting via manual-0-automatic selector switch

1. Set the manual-0-automatic selector switch to manual for approx. 10 seconds.

Resetting via frequency inverter

- ✓ The original operating manual of the frequency inverter is on hand.
1. Set the pump set to manual mode for approx. 10 seconds via the frequency inverter's control unit. See the original operating manual of the frequency inverter.

9 Trouble-shooting

	<p>! WARNING</p>
	<p>Improper work to remedy faults Risk of injury!</p> <p>▷ For any work performed to remedy faults, observe the relevant information given in this instruction manual and/or in the product literature provided by the accessories manufacturer.</p>
	<p>NOTE</p>
	<p>Prior to commissioning and maintenance work during the warranty period, consultation with KSB Service is required. Non-compliance with this instruction will lead to forfeiture of any and all rights to claims for damages.</p>

If problems occur that are not described in the following table, consultation with the KSB service is required.

- A Pumps fail to start in automatic mode or cut out shortly after start-up. Lack of water is indicated.
- B Pressure booster system does not start up.
- C Pumps running but not delivering water.
- D Insufficient delivery of pressure booster system.
- E Discharge-side pressure too low.
- F Discharge-side pressure too high.
- G Leakage at mechanical seal.
- H One/several pumps/motors overheated.
- I Motor protection switch(es) triggered. Warning LED lit.
- J Pump(s) do(es) not stop.
- K Pumps start too often (more than 30 starts per pump and hour).
- L One/several pumps/motors overheated.

Table 22: Trouble-shooting

A	B	C	D	E	F	G	H	I	J	K	L	Possible cause	Remedy ²⁾
-	-	X	X	-	-	-	X	-	X	-	-	Pumps / piping not vented and/or primed	Vent and/or prime.
X	X	X	X	X	-	-	X	-	-	X	-	Shut-off valves fully or partially closed	Check and open if necessary.
X	-	-	X	X	-	-	-	-	X	X	-	Strainer clogged (inlet-side pressure reducer)	Clean.
X	-	-	X	X	X	-	-	-	X	X	-	Inlet-side pressure reducer set incorrectly	Check and adjust if required.
-	-	X	X	X	-	-	X	X	X	X	-	Check valve in bypass line defective	Replace.
X	X	-	-	-	-	-	-	-	-	-	-	Inlet-side shut-off valve closed	Check and open if necessary.
-	X	-	-	-	-	-	X	-	X	-	-	Discharge-side shut-off valve closed or defective	Check and open if necessary.
X	-	-	X	X	-	-	X	-	X	X	-	Inlet pressure lower than stated in the purchase order	Contact the manufacturer.
-	X	-	-	-	X	-	-	-	-	-	-	Inlet pressure higher than stated in the purchase order	Contact the manufacturer.
-	-	-	-	X	-	-	-	-	X	-	-	Start-up pressure set too high	Check setting.

2) Release the pump set pressure and disconnect the pump set from the power supply before performing work on pressure-retaining parts.

A	B	C	D	E	F	G	H	I	J	K	L	Possible cause	Remedy ²⁾
-	X	-	-	X	X	-	X	-	X	-	X	Pressure transmitter set incorrectly or defective	Check setting.
-	-	-	-	-	-	-	X	-	-	X	X	Pre-charge pressure of the accumulator too low	Restore nitrogen cushion.
-	-	-	-	-	-	-	X	-	-	X	X	Defective accumulator	Check integrity. Replace if necessary.
-	-	-	-	-	-	X	-	-	-	-	-	Defective mechanical seal	Replace.
X	-	-	-	-	-	-	X	-	X	-	-	Suction-side pressure transmitter/ pressure switch set incorrectly or defective.	Check setting.
-	-	X	X	X	-	-	X	X	X	X	-	Defective check valve	Check. Replace sealing element if necessary.
-	-	-	-	X	-	-	-	X	X	-	X	Water extraction higher than stated in the purchase order	Contact the manufacturer.
-	X	-	-	-	-	-	-	X	-	-	X	Motor protection switch triggered or set incorrectly / pump seized	Compare setting with the motor's rating plate data.
-	-	-	-	-	-	-	-	-	-	X	-	Delay setting too short	Check setting.
-	X	-	-	-	-	-	-	-	-	-	-	Mains supply interrupted	Check. Remedy defect if applicable. Check fuse.
-	X	-	-	-	-	-	-	-	-	-	-	Control current fuse tripped (control cabinet)	Determine cause and reset.
-	X	-	-	-	-	-	-	X	-	-	-	Main fuse on (owner-supplied) distribution board loose or blown; fuses possibly too small or too fast	Check fuses and replace as necessary. Measure the motor current.
-	-	-	-	-	-	-	-	X	-	-	-	Intermittent voltage fluctuations	Press reset key and fault acknowledgement key.
-	X	-	-	-	-	-	-	-	-	-	-	Phase failure	Check individual phases. Replace fuse if necessary.
X	-	-	-	-	-	-	-	-	-	-	-	Inlet tank empty and/or float switch defective/disconnected	Check. Remedy defect if applicable.

10 Related Documents

10.1 General assembly drawings with list of components

10.1.1 Hyamat SVP with Movitec 2, 4, 6, 10, 15

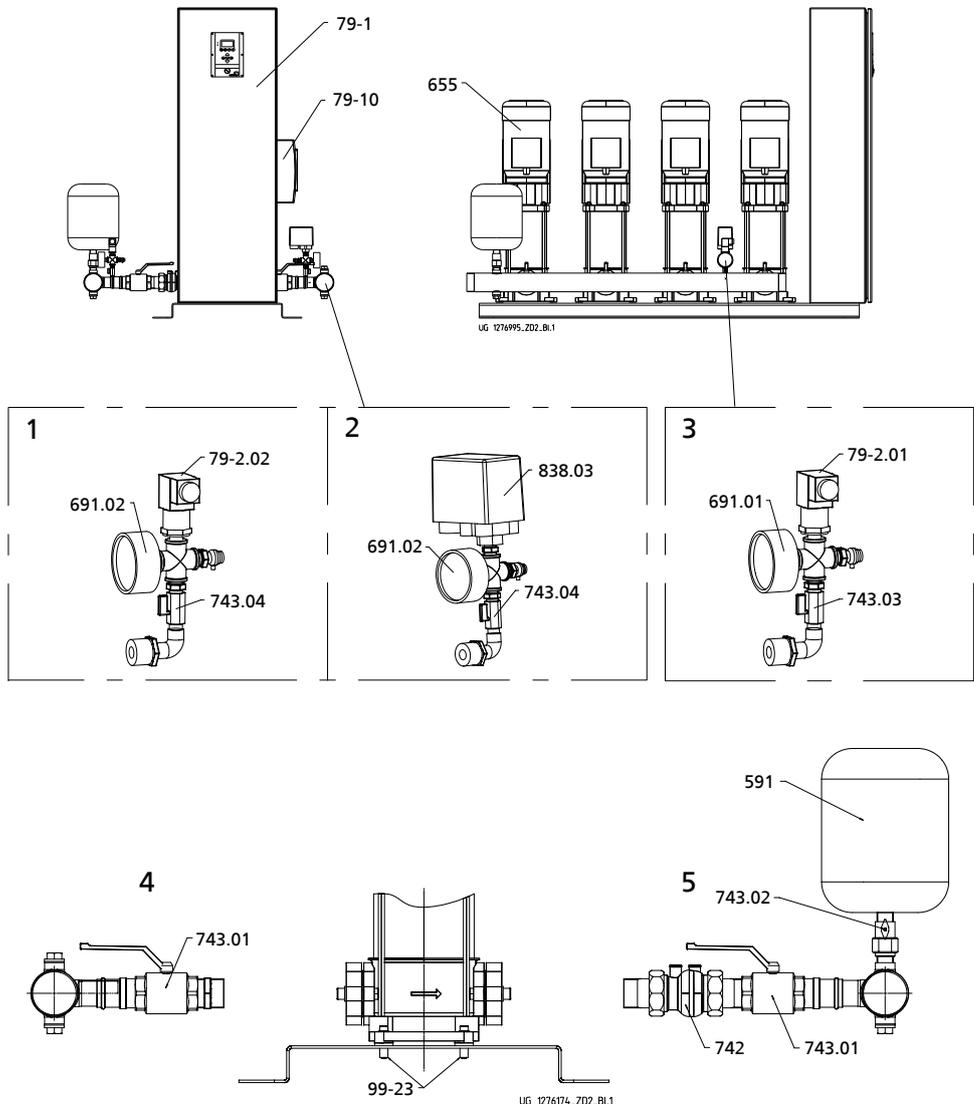


Fig. 9: General assembly drawing of Hyamat SVP with Movitec 2, 4, 6, 10, 15

1	Option: pressure transmitter
2	Option: pressure switch
3	Standard version: pressure transmitter
4	Pump connection, suction side
5	Pump connection, discharge side

Table 23: List of components

Part No.	Description	Ident. No.
591	Accumulator	01 079 764
655	Pumps, see Spare Parts Programme	On request
691.01	Pressure gauge, indication 0 - 16 bar	00 401 413
691.02	Pressure gauge, indication 0 - 10 bar	00 401 414
742	Lift check valve 1 (Movitec 2, 4)	01 149 253
742	Lift check valve 1 $\frac{1}{4}$ (Movitec 6)	01 149 254
742	Lift check valve 1 $\frac{1}{2}$ (Movitec 10)	01 149 255
742	Lift check valve 2 (Movitec 15)	01 149 256
743.01	Ball valve G 1 (Movitec 2, 4)	01 057 427
743.01	Ball valve G 1 $\frac{1}{4}$ (Movitec 6)	01 057 428
743.01	Ball valve G 1 $\frac{1}{2}$ (Movitec 10)	01 057 429
743.01	Ball valve G 2 (Movitec 15)	01 057 430
743.02	Ball valve for accumulator	01 079 765
743.03	Ball valve G $\frac{1}{4}$	00 410 125
743.04	Ball valve G $\frac{1}{4}$	00 410 125
79-2.01	Transmitter 0 - 16 bar	01 133 639
79-2.02	Transmitter 0 - 10 bar	01 133 638
79-2.02	Transmitter 0 - 1 bar	01 533 184
838.03	Pressure switch 0 - 11 bar	01 034 231
903	Set of screw plugs	On request
99-23	Installation set per pump	18 040 627

10.1.2 Hyamat SVP with Movitec 25, 40, 60, 90

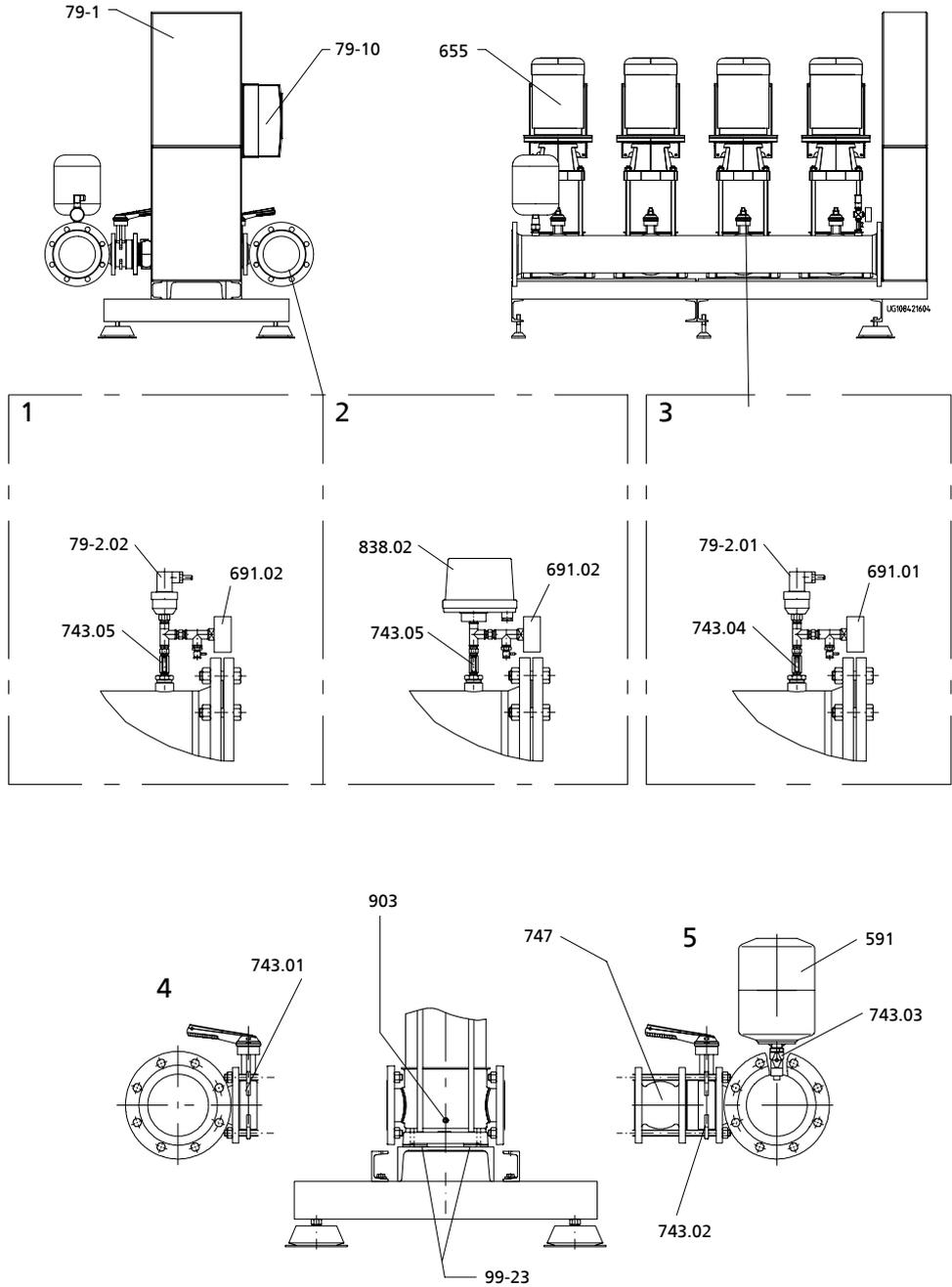


Fig. 10: General assembly drawing of Hyamat SVP with Movitec 25, 40, 60, 90

1	Option: pressure transmitter
2	Option: pressure switch
3	Standard version: pressure transmitter
4	Pump connection, suction side
5	Pump connection, discharge side

Table 24: List of components

Part No.	Description	Ident. No.
591	Accumulator	01 079 764
655	Pumps, see Spare Parts Programme	On request
691.01	Pressure gauge, indication 0 - 16 bar	00 401 413
691.02	Pressure gauge, indication 0 - 10 bar	00 401 414
743.01	Butterfly valve DN 65 (Movitec 25)	42 087 766
743.01	Butterfly valve DN 80 (Movitec 40)	42 087 767
743.01	Butterfly valve DN 100 (Movitec 60, 90)	42 087 768
743.02	Butterfly valve DN 65 (Movitec 25)	42 087 766
743.02	Butterfly valve DN 80 (Movitec 40)	42 087 767
743.02	Butterfly valve DN 100 (Movitec 60, 90)	42 087 768
743.03	Ball valve for accumulator	01 079 765
743.04	Ball valve G $\frac{1}{4}$	00 410 125
743.05	Ball valve G $\frac{1}{4}$	00 410 125
747	Swing check valve DN 65 (Movitec 25)	40 984 470
747	Swing check valve DN 80 (Movitec 40)	40 984 471
747	Swing check valve DN 100 (Movitec 60, 90)	40 984 472
79-2.01	Transmitter 0 - 16 bar	01 133 639
79.2.02	Transmitter 0 - 10 bar	01 133 638
79-2.02	Transmitter 0 - 1 bar	01 533 184
79-1	Control unit for 3 pumps	18 041 018
79-1	Control unit for 6 pumps	18 041 019
838.02	Pressure switch 0 - 11 bar	01 034 231
903	Set of screw plugs	On request
99-23	Installation set per pump	18 040 654

10.2 Flow diagram

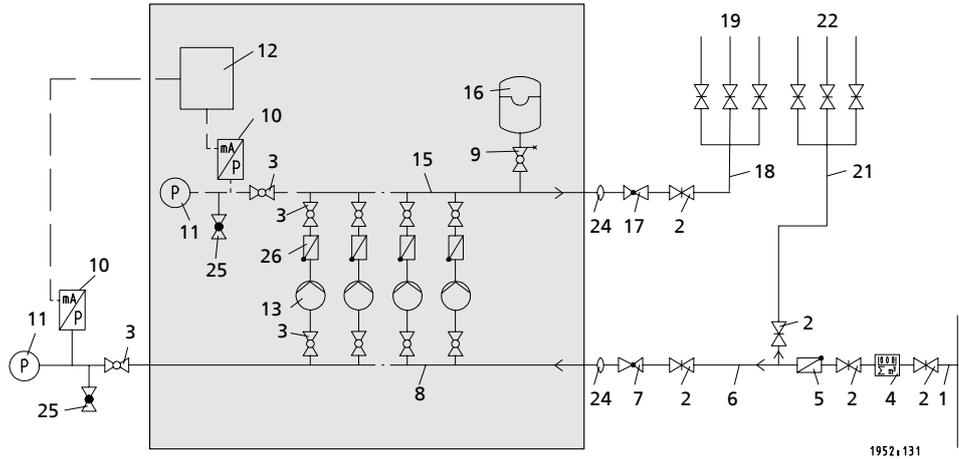
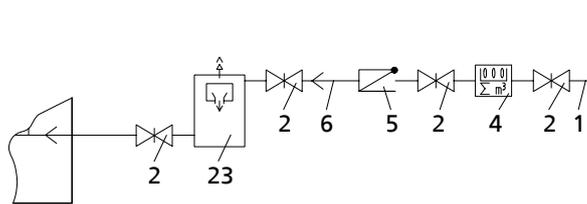


Fig. 11: Flow diagram for direct connection (grey box: KSB's scope of supply)



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Fig. 12: Flow diagram for indirect connection

Number	Description
1	Mains water supply
2	Shut-off element
3	Ball valve
4	Water meter
5	Check valve
6	Distribution line, inlet side
7	Pressure reducer, inlet side
8	Inlet line
9	Shut-off elements
10	Pressure transmitter
11	Pressure gauge
12	Control unit
13	Pump with drain and vent valve
15	Discharge line
16	Accumulator, discharge side
17	Pressure reducer, discharge side
18	Distribution line downstream of pressure booster system
19	Consumer lines downstream of pressure booster system
21	Consumer lines upstream of pressure booster system
22	Distribution line upstream of pressure booster system
23	Inlet tank with float valve and level monitor
24	Expansion joint
25	Drain valve
26	Swing check valve

10.3 Parameter list

Table 25: Overview of parameters

Parameter	Description	Factory setting	Possible settings	Min. value	Max. value	Read access right	Write access right
1	Operation <i>Display of operating mode</i>	-	-	-	-	Everybody	Nobody
1-1	System <i>General operating status indicators</i>	-	-	-	-	Everybody	Nobody
1-1-1	System pressure <i>Displaying the measured system pressure</i>	-	-	-	-	Everybody	Nobody
1-1-2	System load <i>Displaying the total pump load in percent</i>	-	-	-	-	Everybody	Nobody
1-1-3	RDP switch <i>Detection of dry running protection via pressure switch is activated/ deactivated.</i>	-	Not available, available	-	-	Everybody	Nobody
1-1-4	Inlet pressure <i>Displaying the suction-side pressure</i>	-	-	-	-	Everybody	Nobody
1-1-5	Level content in % <i>Displaying the water level in inlet tank in percent</i>	-	-	-	-	Everybody	Nobody
1-1-6	Level height <i>Displaying the water level in the inlet tank</i>	-	-	-	-	Everybody	Nobody
1-1-7	Ambient temp. (WSD) <i>Displaying the measured ambient temperature if water flow detection is available</i>	-	-	-	-	Everybody	Nobody
1-1-8	Digital inputs <i>Displaying the status of the digital inputs</i>	-	-	-	-	Service	Service
1-1-9.2	Position suppl.valve <i>Position of supply valve</i>	Open	Open, closed	-	-	Everybody	Nobody
1-1-9.1	Position suppl.valve <i>Position of proportional supply valve 0 % ... 100 %</i>	0	0...100	0	100	Everybody	Nobody
1-1-10	Power down speed <i>Calculated stop speed if zero-flow detection is activated in energy-saving mode</i>	-	-	-	-	Service	Nobody
1-1-14	WSD pulses tank 1 <i>Water flow detection, number of fills in tank 1</i>	0	-	-	-	Everybody	Nobody

Parameter	Description	Factory setting	Possible settings	Min. value	Max. value	Read access right	Write access right
1-1-15	WSD pulses tank 2 <i>Water flow detection, number of fills in tank 2</i>	0	-	-	-	Everybody	Nobody
1-1-16	WSD pulses tank 3 <i>Water flow detection, number of fills in tank 3</i>	0	-	-	-	Everybody	Nobody
1-2	Pumps <i>Pump-relevant status information</i>	-	-	-	-	Everybody	Nobody
1-2-1	Operating mode <i>Setting the operating mode for each individual pump</i>	-	-	-	-	Everybody	Everybody
1-2-1.1.1	Pump number <i>Entering the pump number for which the operating mode is configured</i>	1	1.. 3	1	3	Everybody	Everybody
1-2-1.2.1	Operating mode <i>Displaying the operating status of the pump</i>	1	Automatic, manual On (10 s), manual Off	-	-	Everybody	Everybody
1-2-2	Pump load <i>Displaying the pump load</i>	-	-	-	-	Everybody	Nobody
1-2-3	Thermal fail. flags <i>Bit-based display of status of all thermal fault inputs</i>	-	Not tripped Tripped	-	-	Service	Nobody
1-2-4	Running hours pump <i>Displaying the operating hours per pump</i>	-	-	-	-	Everybody	Nobody
1-2-5	Number of pumpstarts <i>Displaying the number of starts per pump</i>	-	-	-	-	Customer	Nobody
1-3	Time and statistics <i>Operating times and statistics</i>	-	-	-	-	Everybody	Nobody
1-3-1	Act runtime Op hours <i>Operating hours of the system</i>	0	-	-	-	Everybody	Nobody
1-3-2	Time to service <i>Time to next service interval</i>	0	-	-	-	Everybody	Nobody
1-3-3	Act Minimum Runtime <i>Current minimum pump runtime in seconds</i>	-	-	-	-	Everybody	Nobody
2	Diagnosis <i>Monitoring and diagnosis</i>	-	-	-	-	Everybody	Nobody
2-1	General <i>General monitoring functions</i>	-	-	-	-	Everybody	Nobody

Parameter	Description	Factory setting	Possible settings	Min. value	Max. value	Read access right	Write access right
2-1-1	Active Messages <i>Current messages for all available warnings/alerts</i>	-	-	-	-	Everybody	Customer
2-1-2	History <i>History of all warnings/alerts</i>	-	-	-	-	Everybody	Nobody
2-1-3	Acknowledge All <i>All messages are acknowledged</i>	-	-	-	-	Everybody	Everybody
2-1-4	Clear History <i>Deleting the message history</i>	-	-	-	-	Service	Service
3	Settings <i>Settings</i>	-	-	-	-	Everybody	Nobody
3-1	HMI <i>Control panel</i>	-	-	-	-	Everybody	Nobody
3-1-1	Basic settings <i>Basic settings for control panel</i>	-	-	-	-	Everybody	Nobody
3-1-1-1	Language <i>Language settings</i>	English	English, German, Dutch, French, Turkish	-	-	Everybody	Everybody
3-1-1-4	Contrast <i>Contrast</i>	13	5.. 20	5	20	Everybody	Everybody
3-1-1-2	Backlight <i>Configuring the illumination time of the display</i>	-	-	-	-	Everybody	Everybody
3-1-1-2-1	Mode <i>Illumination type of system display</i>	Timer-based	Always on, timer-based	-	-	Everybody	Everybody
3-1-1-2-2	Backlight Time <i>System display: setting the illumination time in seconds</i>	600	10.. 999	10	999	Everybody	Service
3-1-1-3	Displayed units <i>Selecting the units shown on the display. The measured values are converted in the device.</i>	-	-	-	-	Everybody	Nobody
3-1-1-3-1	Pressure <i>Units of measured pressure values</i>	kPa	kPa, bar, PSI, feet, mwc	-	-	Everybody	Service
3-1-1-3-2	Height <i>Units of tank fill level</i>	cm	cm, m	-	-	Everybody	Service
3-1-1-3-3	Temperature <i>Units of water flow detection temperature</i>	°C	°C, °F	-	-	Everybody	Service

Parameter	Description	Factory setting	Possible settings	Min. value	Max. value	Read access right	Write access right
3-1-2	Fieldbus <i>Field bus settings</i>	-	-	-	-	Nobody	Nobody
3-1-2-1	Fieldbus Type <i>Type of connected field bus module</i>	No module	No module, Profibus, Modbus	-	-	Nobody	Nobody
3-1-4	Logo <i>Setting the logo displayed</i>	-	-	-	-	Service	Nobody
3-1-4-1	Logo <i>Selecting the logo displayed</i>	No logo	KSB logo, dp logo, no logo	-	-	Service	Service
3-2	Device <i>Device-specific settings</i>	-	-	-	-	Everybody	Nobody
3-2-1	Login <i>Login</i>	-	-	-	-	Everybody	Nobody
3-2-1-1.1	PIN <i>Entering the user level and password</i>	-	-	-	-	Everybody	Nobody
3-2-1-1.1.1	Access Level <i>Selecting the login level</i>	User level	User level, service level, factory level	-	-	Everybody	Everybody
3-2-1-1.1.2	PIN acceptance <i>Prompt to enter PIN</i>	-	0.. 9999	0	9999	Everybody	Everybody
3-2-1-1.2	PIN <i>Entering the user level and password</i>	-	-	-	-	Factory	Nobody
3-2-1-1.2.1	Access Level <i>Selecting the login level</i>	User level	User level, service level, factory level, development level	-	-	Factory	Factory
3-2-1-1.2.2	PIN acceptance <i>Prompt to enter PIN</i>	-	0.. 9999	0	9999	Factory	Factory
3-2-1-2	Login required <i>Password entry required</i>	Yes	No, yes	-	-	Customer	Customer
3-2-2	Service <i>Service settings</i>	-	-	-	-	Customer	Nobody
3-2-2-1	Factory setting <i>Factory-set defaults</i>	-	Reset ok, no set available	-	-	Customer	Customer
3-2-2-2	Reset Srv Interval <i>Resetting the service interval</i>	-	OK, failed	-	-	Service	Service
3-2-2-3	Customer setting <i>Loading locally saved settings</i>	-	Reset ok, no set available	-	-	Customer	Customer
3-2-2-4	Save custom. setting <i>Saving the customer settings</i>	-	-	-	-	Customer	Customer
3-2-2-5	Save factory setting <i>Saving the factory settings</i>	-	-	-	-	Factory	Factory

Parameter	Description	Factory setting	Possible settings	Min. value	Max. value	Read access right	Write access right
3-2-2-6	Default setting <i>Resetting to default settings</i>	-	-	-	-	Service	Service
3-2-2-6.1.1	Reset default param. <i>Resetting to default settings</i>	default	Default, Hyamat K, Hyamat V, Hyamat SVP, HyaEco VP	-	-	Service	Service
3-2-2-7	Edit Pump Opera. hrs <i>Editing pump operating hours</i>	-	-	-	-	Service	Service
3-2-2-7.1.1	Pump number <i>Number of pump</i>	1	1.. 6	1	6	Service	Service
3-2-2-7.2.1	Hours <i>Hours</i>	0	0.. 500000	0	500000	Service	Service
3-2-2-7.2.2	Minutes <i>Minutes</i>	0	0.. 59	0	59	Service	Service
3-2-2-7.2.3	Seconds <i>Seconds</i>	0	0 59	0	59	Service	Service
3-2-2-8	Reset Sys. Oper. hrs <i>Resetting the operating hours</i>	-	OK, failed	-	-	Service	Service
3-2-3	Factory Test <i>Factory test</i>	-	-	-	-	Factory	Nobody
3-2-3-1	Factory Test <i>Factory test</i>	-	-	-	-	Factory	Factory
3-2-3-1.1.1	Test result <i>Test result</i>	Failed	Failed, passed	-	-	Factory	Factory
3-3	Configuration <i>System configuration</i>	-	-	-	-	Everybody	Nobody
3-3-1	Number of pumps <i>Maximum number of pumps used in system</i>	3	1.. 6	1	6	Everybody	Service
3-3-2	Inlet <i>General configuration, suction side</i>	Pressure switch	Pressure switch, pressure sensor, water flow detection, inlet tank/gate valve, inlet tank/ proportional valve	-	-	Everybody	Service
3-3-3	Discharge <i>General configuration, discharge side</i>	Cascade	Cascade (without frequency inverter), 1 jockey, 2 jockeys, floating frequency inverter, frequency inverter per pump	-	-	Everybody	Service

Parameter	Description	Factory setting	Possible settings	Min. value	Max. value	Read access right	Write access right
3-3-4	WSD <i>Configuring the water flow detection for the tank</i>	Off	Off, 1 tank, 2 tanks, 3 tanks, 1 tank + temp., 2 tanks + temp., 3 tanks + temp., temperature	-	-	Everybody	Service
3-3-5	Leakage detection <i>Activating leakage monitoring</i>	Off	On, off	-	-	Everybody	Service
3-3-6	MPO Functionality <i>Synchronous operation</i>	Off	Off, on	-	-	Service	Service
3-3-7	PumpMode int/ext <i>Setting for pump mode via HMI (internal) or switch (external))</i>	Internal	Internal, external	-	-	Everybody	Service
3-4	System settings <i>Parameterisation of system</i>	-	-	-	-	Everybody	Nobody
3-4-1	Inlet <i>Suction-side parameterisation</i>	-	-	-	-	Everybody	Nobody
3-4-1-1	Sensor press. 4 mA <i>Analog measured value at 4 mA, suction side</i>	0	-100.. 1000	-100	1000	Everybody	Service
3-4-1-2	Sensor press. 20 mA <i>Analog measured value at 20 mA, suction side</i>	1000	0.. 9999	0	9999	Everybody	Service
3-4-1-3	Damp. Time Inlet <i>Damping time for smoothing measured value to compensate for measurement peaks</i>	200	100.. 2000	100	2000	Factory	Factory
3-4-1-4	Level config <i>Configuring inlet tank control</i>	-	-	-	-	Everybody	Service
3-4-1-4-1	0% level <i>Minimum water level at which no air enters into tank, in percent, from upper edge of inlet nozzle</i>	0	0.. 99	0	99	Everybody	Service
3-4-1-4-2	100% level <i>Maximum water level of inlet tank, in percent, from upper edge of inlet nozzle</i>	200	0.. 999	0	999	Everybody	Service
3-4-1-4-3	Sensor level <i>Distance of sensor positioned above tank floor to tank floor, in centimetres</i>	0	-100.. 999	-100	999	Everybody	Service

Parameter	Description	Factory setting	Possible settings	Min. value	Max. value	Read access right	Write access right
3-4-1-4-4	Low level shut down <i>System stop when dry running level reached</i>	10	0.. 99	0	99	Everybody	Service
3-4-1-4-5	Low level reset <i>Resetting the system when defined dry running level is reached</i>	15	0.. 99	0	99	Everybody	Service
3-4-1-4-6	Critical water level <i>Threshold of critical water level in inlet tank</i>	30	0.. 99	0	99	Everybody	Service
3-4-1-4-7	High water level <i>Threshold of high water level in inlet tank</i>	105	0.. 199	0	199	Everybody	Service
3-4-1-4-8	Threshold <i>1 or 2 extra signalling relay contacts for switching thresholds</i>	-	-	-	-	Everybody	Service
3-4-1-4-8-1	Threshold 1 ON <i>Inlet tank level for relay 1 energised in percent</i>	50	0...199	0	199	Everybody	Service
3-4-1-4-8-2	Threshold 1 OFF <i>Inlet tank level for relay 1 de-energised in percent</i>	50	0...199	0	199	Everybody	Service
3-4-1-4-8-3	Threshold 2 ON <i>Inlet tank level for relay 2 energised in percent</i>	40	0...199	0	199	Everybody	Service
3-4-1-4-8-4	Threshold 2 OFF <i>Inlet tank level for relay 2 de-energised in percent</i>	40	0...199	0	199	Everybody	Service
3-4-1-4-9	Supply valve ON/OFF <i>Position of inflow gate valve for filling inlet tank</i>	-	-	-	-	Everybody	Nobody
3-4-1-4-9-1	Level 1 open <i>Level for opening gate valve to start filling inlet tank</i>	70	0.. 99	0	99	Everybody	Service
3-4-1-4-9-2	Level 1 closed <i>Level for closing gate valve to stop filling inlet tank</i>	90	0.. 99	0	99	Everybody	Service
3-4-1-4-9-3	Level 1A open <i>Second level (timer-based) for opening gate valve to start filling</i>	40	0.. 99	0	99	Everybody	Service
3-4-1-4-9-4	Level 1A closed <i>Second level (timer-based) for closing gate valve to stop filling</i>	60	0.. 99	0	99	Everybody	Service

Parameter	Description	Factory setting	Possible settings	Min. value	Max. value	Read access right	Write access right
3-4-1-4-10	Supply valve prop. <i>Use of a proportional valve to fill inlet tank</i>	-	-	-	-	Everybody	Nobody
3-4-1-4-10-1	Level setpoint 1 <i>Level in inlet tank at which valve is completely closed</i>	80	0.. 99	0	99	Everybody	Service
3-4-1-4-10-2	Level setpoint 1A <i>Second level (timer-based) in inlet tank at which valve is completely closed</i>	40	0.. 99	0	99	Everybody	Service
3-4-1-4-10-3	Hysteresis <i>Setting the hysteresis for fully open valve</i>	15	0.. 99	0	99	Everybody	Service
3-4-1-4-10-4	Sample time <i>Measurement cycle for measuring to control proportional valve</i>	10	0.. 99	0	99	Everybody	Service
3-4-1-4-10-5	Analog output <i>Configuring the analog output</i>	4-20mA	4 - 20 mA, 0 - 20 mA	-	-	Everybody	Service
3-4-1-5	Auto. Setpoint Redu. <i>Automatic setpoint reduction in case of inlet pressure drop</i>	-	-	-	-	Everybody	Nobody
3-4-1-5-1	ASR function <i>Automatic setpoint reduction in case of inlet pressure drop</i>	Off	Off, on	-	-	Everybody	Service
3-4-1-5-2	Switch on point <i>Re-start point</i>	200	100.. 400	100	400	Everybody	Service
3-4-1-5-3	Inlet Set point <i>Entering the minimum inlet pressure setpoint</i>	100	0.. 400	0	400	Everybody	Service
3-4-1-5-4	Switch off point <i>Stop point</i>	90	0.. 100	0	100	Everybody	Service
3-4-1-5-5	Proportional const. <i>Proportional constant of PID controller</i>	3	0.. 10	0	10	Everybody	Service
3-4-1-5-6	Integral time <i>Integral constant of PID controller</i>	1	0.. 60	0	60	Everybody	Service
3-4-1-5-7	Differential time <i>Differential constant of PID controller</i>	0	0.. 99	0	99	Everybody	Service
3-4-1-5-9	Switch On time <i>Time to pump start</i>	5	0.. 60	0	60	Service	Service
3-4-1-5-10	Switch Off time <i>Time to pump stop</i>	5	0.. 60	0	60	Service	Service
3-4-2	Discharge <i>Discharge-side parameterisation</i>	-	-	-	-	Everybody	Service

Parameter	Description	Factory setting	Possible settings	Min. value	Max. value	Read access right	Write access right
3-4-2-1	Sensor press. 4 mA <i>Analog measured value at 4 mA, discharge side</i>	0	-100.. 1000	-100	1000	Everybody	Service
3-4-2-2	Sensor press. 20 mA <i>Analog measured value at 20 mA, discharge side</i>	1000	0.. 9999	0	9999	Everybody	Service
3-4-2-3	Pumps ON sensor fail <i>Number of pumps started up in the event of a sensor failure on the discharge side</i>	0	0.. 3	0	3	Everybody	Service
3-4-2-4	Max power <i>Limitation of maximum system power (n x 100 %, n = number of pumps)</i>	600	0.. 600	0	600	Everybody	Service
3-4-2-5	Max power ext. oper. <i>Limitation of maximum system power for operation on emergency power</i>	600	0.. 600	0	600	Everybody	Service
3-4-3	Variable freq. drive <i>Configuring the frequency inverters</i>	-	-	-	-	Everybody	Nobody
3-4-3-1	Communication <i>Configuring the communication protocol for the frequency inverter</i>	None	None, analog 4 - 20 mA, analog 0 - 20 mA, PumpDrive 1, PumpDrive 2, Danfoss VLT 2800, Danfoss MicroDrive, Danfoss AquaDrive	-	-	Everybody	Service
3-4-3-2	Proportional const. <i>Proportional constant of PID controller</i>	3	0.. 100	0	100	Everybody	Service
3-4-3-3	Integral time <i>Integral constant of PID controller</i>	1	0.. 60	0	60	Everybody	Service
3-4-3-4	Differential time <i>Differential constant of PID controller</i>	0	0.. 99,99	0	99,99	Everybody	Service
3-4-3-9	VFD Ramp-Up <i>Configuring the start ramp for frequency inverters in seconds</i>	3	0,1.. 999	0,1	999	Everybody	Service
3-4-3-10	VFD Ramp-Down <i>Configuring the stop ramp for frequency inverters in seconds</i>	3	0,1.. 999	0,1	999	Everybody	Service
3-4-3-11	VFD min. frequency <i>Configuring the minimum frequency for frequency inverters in Hz</i>	30	0.. 50	0	50	Everybody	Service
3-4-3-12	VFD max. frequency <i>Configuring the maximum frequency for frequency inverters in Hz</i>	50	30.. 140	30	140	Everybody	Service

Parameter	Description	Factory setting	Possible settings	Min. value	Max. value	Read access right	Write access right
3-4-3-13	P nominal of VFD <i>Nominal power of frequency inverters</i>	1500	0.. 100000	0	100000	Everybody	Service
3-4-3-14	U nominal of VFD <i>Nominal voltage of frequency inverters</i>	400	0.. 500	0	500	Everybody	Service
3-4-3-15	F nominal of VFD <i>Nominal frequency of frequency inverters</i>	50	50.. 50	50	50	Everybody	Service
3-4-3-16	I nominal of VFD <i>Nominal amperage of frequency inverters</i>	4	0.. 450	0	450	Everybody	Service
3-4-3-17	RPM nominal of VFD <i>Nominal speed of frequency inverters</i>	2880	0.. 10000	0	10000	Everybody	Service
3-4-3-20	Motor Speed Unit <i>Motor speed unit</i>	rpm	rpm, Hz	-	-	Everybody	Service
3-4-3-21	Digital I/P 33 func. <i>Selecting the digital input</i>	No function	No function, coasting stop inv.	-	-	Everybody	Service
3-4-3-22	Digital I/P 29 func. <i>Selecting the digital input</i>	No function	No function, jog function, jog function	-	-	Everybody	Service
3-4-3-23	Jog frequency <i>Speed in manual mode</i>	50	30.. 50	30	50	Everybody	Service
3-4-3-24	Jog ramp time <i>Ramp time</i>	5	0,04.. 3600	0,04	3600	Everybody	Service
3-4-3-25	Coasting select <i>Selecting the manual mode</i>	Digital and bus	Digital input, bus, digital and bus, digital or bus	-	-	Everybody	Service
3-4-3-26	Start select <i>Selecting the start signal</i>	Digital and bus	Digital input, bus, digital and bus, digital or bus	-	-	Everybody	Service
3-4-3-27	Slip Compensation <i>Slip compensation</i>	0	-400.. 399	-400	399	Everybody	Service
3-4-3-5	No flow detection <i>Accuracy with which a minimum flow is detected (procedure for stopping the pumps)</i>	-	-	-	-	Everybody	Service
3-4-3-5-1	No flow bandwidth <i>Bandwidth of flow detection</i>	6	0.. 50	0	50	Service	Service
3-4-3-5-2	No flow time <i>Flow detection time in seconds</i>	16	0.. 60	0	600	Service	Service
3-4-3-5-3	No flow step <i>Step height of flow detection in percent</i>	1	1.. 50	1	50	Service	Service

Parameter	Description	Factory setting	Possible settings	Min. value	Max. value	Read access right	Write access right
3-4-3-5-4	No flow max. power <i>Flow detection is active below this pump load in percent</i>	100	0.. 100	0	100	Service	Service
3-4-4	WSD settings <i>Configuring water flow detection</i>	-	-	-	-	Everybody	Nobody
3-4-4-1	Nbr of refreshments <i>Number of water replacement cycles</i>	30	0.. 99	0	99	Everybody	Service
3-4-4-2	Refresh time span <i>Duration of water replacement procedure in hours</i>	24	0.. 999	0	999	Everybody	Service
3-4-4-3	Average room temp. <i>Measured average ambient temperature</i>	25	0.. 50	0	50	Everybody	Service
3-4-4-4	Room temp. time span <i>Duration of ambient temperature measurement in hours</i>	24	0.. 999	0	999	Everybody	Service
3-4-5	MPO settings <i>Configuring the multiple pump operation functions</i>	-	-	-	-	Everybody	Customer
3-4-5-1	High Load Profile <i>Characteristic of pump</i>	Cubic	Linear, cubic	-	-	Customer	Develop
3-4-5-2	Rated Freq <i>Rated frequency of pump</i>	50	45.. 50	45	50	Everybody	Service
3-4-5-3	Switch On Freq. <i>Start frequency of pump</i>	49	31.. 50	31	50	Everybody	Service
3-4-5-4	Switch Off Freq. <i>Stop frequency of pump</i>	31	30.. 49	30	49	Everybody	Service
3-4-5-5	Cubic setting <i>Cubic setting</i>	-	-	-	-	Everybody	Service
3-4-5-5-1	Power 1 <i>Power 1 of pump</i>	2	0.. 100	0	100	Everybody	Service
3-4-5-5-2	Power 2 <i>Power 2 of pump</i>	2	0.. 100	0	100	Everybody	Service
3-4-5-6	Linear setting <i>Linear setting of pump</i>	-	-	-	-	Everybody	Service
3-4-5-6-1	Power 1 <i>Power 1 of pump</i>	2	0.. 100	0	100	Everybody	Service
3-4-5-6-2	Power 2 <i>Power 2 of pump</i>	2	0.. 100	0	100	Everybody	Service
3-4-5-6-3	Power 3 <i>Power 3 of pump</i>	2	0.. 100	0	100	Everybody	Service
3-4-5-6-4	Power 4 <i>Power 4 of pump</i>	2	0.. 100	0	100	Everybody	Service

Parameter	Description	Factory setting	Possible settings	Min. value	Max. value	Read access right	Write access right
3-4-5-7	Motor settings <i>Motor settings</i>	-	-	-	-	Everybody	Nobody
3-4-5-7-1	Rated Motor Power <i>Rated power of motor as per name plate</i>	2	0.. 110	0	110	Everybody	Service
3-4-5-7-2	Rated Motor Speed <i>Rated speed of motor as per name plate</i>	1450	300.. 3600	300	3600	Everybody	Service
3-4-5-7-3	Rated Freq <i>Rated frequency of motor as per name plate</i>	50	45.. 50	45	50	Everybody	Service
3-4-5-7-4	Rated Current <i>Rated current of motor as per name plate</i>	10	0,1.. 999	0,1	999	Everybody	Service
3-4-5-7-5	Rated Cosphi <i>Rated cos phi of motor as per name plate</i>	1	0,1.. 0,99	0,1	0,99	Everybody	Service
3-4-5-8	Pump parameters <i>Pump settings</i>	-	-	-	-	Everybody	Nobody
3-4-5-8-1	Rated Pump Speed <i>Rated speed of pump for rated H/Q characteristic curve</i>	2900	300.. 3600	300	3600	Everybody	Service
3-5	Pressure <i>Configuring the system pressure</i>	-	-	-	-	Everybody	Nobody
3-5-1	Set point <i>Entering the pressure setpoint (system pressure)</i>	400	0.. 1000	0	1000	Everybody	Customer
3-5-3	Bandwidth <i>Bandwidth within which the frequency inverters remain at the same, constant speed independent of pressure.</i>	5	0.. 999	0	999	Everybody	Customer
3-5-4	Accumulation press. <i>Procedure for increasing pressure in the accumulator before the system stops</i>	30	0.. 999	0	999	Everybody	Customer
3-5-5	Max.set point <i>Limit value for maximum setpoint</i>	1000	400.. 1000	400	1000	Everybody	Service
3-5-9	Adapt. setpoint <i>Date/time-based alternative setpoint</i>	400	0.. 1000	0	1000	Everybody	Customer
3-5-10	Delta p <i>Dynamic pressure compensation Quadratic function for correcting the setpoint</i>	0	-999.. 999	-999	999	Everybody	Customer

Parameter	Description	Factory setting	Possible settings	Min. value	Max. value	Read access right	Write access right
3-5-11	High pressure alarm <i>Upper limit value for maximum system pressure</i>	1000	400.. 1000	400	1000	Everybody	Customer
3-5-12	High pressure action <i>Parameter for selecting action in case of excessively high system pressure (stop pumps or output message only)</i>	Stop pumps	Stop pumps, message only	-	-	Everybody	Customer
3-5-13	Low pressure alarm <i>Lower limit value for minimum system pressure</i>	0	0.. 400	0	400	Everybody	Customer
3-5-14	Low pressure action <i>Parameter for selecting action in case of excessively low system pressure (stop pumps or output message only)</i>	Stop pumps	Stop pumps, message only	-	-	Everybody	Customer
3-5-15	Shut down RDP <i>Minimum suction-side pressure limit for dry running protection</i>	20	0.. 80	0	80	Everybody	Customer
3-5-16	Reset RDP <i>Suction-side pressure for re-start following dry running occurrence</i>	80	20.. 999	20	999	Everybody	Customer
3-5-17	Press. Flow Control <i>Lack-of-water fault is set if setpoint minus pressure defined is undershot.</i>	100	0.. 1000	0	1000	Everybody	Service
3-6	Timer settings <i>Configuring the time parameters</i>	-	-	-	-	Everybody	Nobody
3-6-1	Opt. pump starts /h <i>Entering the optimal pump starts per hour. The pump runtime is adjusted automatically.</i>	10	0.. 99	0	99	Everybody	Service
3-6-2	Min. run time <i>Limit for minimum runtime of pump</i>	180	0.. 999	0	999	Everybody	Customer
3-6-3	Min. run time corr. <i>Correction value for minimum runtime of pump</i>	10	0.. 99	0	99	Everybody	Service
3-6-4	Max. run time <i>After the time has lapsed, the system switches over to the next pump.</i>	86400	0.. 604800	0	604800	Everybody	Service
3-6-5	Start delay <i>Start delay of pumps if pressure remains below setpoint</i>	1	0.. 999	0	999	Everybody	Service
3-6-6	Stop delay <i>Stop delay of pumps if pressure remains at setpoint</i>	1	0.. 999	0	999	Everybody	Service

Parameter	Description	Factory setting	Possible settings	Min. value	Max. value	Read access right	Write access right
3-6-8	RDP delay <i>Stop delay following detection of dry running occurrence</i>	10	0.. 999	0	999	Everybody	Service
3-6-9	High/low alarm delay <i>Time window for suppressing alerts when system pressure is exceeded/ undershot</i>	60	10.. 999	10	999	Everybody	Service
3-6-10	WSD 1 pulse length <i>Water flow detection 1, length of pulse in seconds</i>	4	0.. 99	0	99	Everybody	Service
3-6-11	WSD 2 pulse length <i>Water flow detection 2, length of pulse in seconds</i>	4	0.. 99	0	99	Everybody	Service
3-6-12	WSD 3 pulse length <i>Water flow detection 3, length of pulse in seconds</i>	4	0.. 99	0	99	Everybody	Service
3-6-13	Sys. start up delay <i>Start delay following re-start</i>	10	0.. 32	0	32	Service	Service
3-7	Time/Date <i>Date and time</i>	-	-	-	-	Everybody	Nobody
3-7-1	Date <i>Setting the date</i>	-	-	-	-	Everybody	Customer
3-7-1.1.1	Year <i>Setting the year</i>	...	1970.. 2099	1970	2099	Everybody	Customer
3-7-1.1.2	Month <i>Setting the month</i>	1	1.. 12	1	12	Everybody	Customer
3-7-1.1.3	Day <i>Setting the day</i>	1	1.. 31	1	31	Everybody	Customer
3-7-2	Time <i>Setting the time</i>	-	-	-	-	Everybody	Customer
3-7-2.1.1	Time <i>Setting the time in the format HH:MM:SS</i>	0	0.. 86399	0	86399	Everybody	Customer
3-7-3	Check run mode <i>Basic setting for forced start (check run)</i>	Interval	Off, digital input, interval, day-based, week-based	-	-	Everybody	Customer
3-7-4	Check run interval <i>Interval-controlled forced start (check run); the pumps are started at fixed, defined intervals.</i>	86400	0.. 1000000	0	1000000	Everybody	Service

Parameter	Description	Factory setting	Possible settings	Min. value	Max. value	Read access right	Write access right
3-7-5	Check run at <i>Day-controlled forced start (check run); the pumps are started at a defined time</i>	-	-	-	-	Everybody	Customer
3-7-5.1.1	Hours <i>Hours for daily forced start (check run)</i>	0	0.. 23	0	23	Everybody	Customer
3-7-5.1.2	Minutes <i>Minutes for daily forced start (check run)</i>	0	0.. 59	0	59	Everybody	Customer
3-7-6	Check run at <i>Weekly forced start (check run): at a defined time on specific days</i>	-	-	-	-	Everybody	Customer
3-7-6.1.1	Hours <i>Weekly forced start (check run): at a defined time (hours) on specific days</i>	-	0.. 23	0	23	Everybody	Customer
3-7-6.1.2	Minutes <i>Weekly forced start (check run): at a defined time (minutes) on specific days</i>	-	0.. 59	0	59	Everybody	Customer
3-7-6.1.3	Day <i>Weekly forced start (check run): at a defined time on a specific day</i>	Sunday	Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday	-	-	Everybody	Customer
3-7-7	Check run duration <i>Specifying the duration of the forced start (check run)</i>	30	0.. 30	0	30	Everybody	Service
3-7-9	Date adapt level On <i>The alternative fill level is activated in accordance with day(s)/month(s).</i>	-	-	-	-	Everybody	Customer
3-7-9.1.1	Month adapt level On <i>Entering the month in which the alternative fill level is activated.</i>	Off	Off, January, February, March, April, May, June, July, August, September, October, November, December	-	-	Everybody	Customer

Parameter	Description	Factory setting	Possible settings	Min. value	Max. value	Read access right	Write access right
3-7-9.1.2	Day adapt level On <i>Entering the day on which the alternative fill level is activated</i>	1	1.. 31	1	31	Everybody	Customer
3-7-10	Date adapt level Off <i>Entering the date on which the alternative fill level is deactivated</i>	-	-	-	-	Everybody	Customer
3-7-10.1.1	Month adapt lev Off <i>Entering the month in which the alternative fill level is deactivated</i>	Off	Off, January, February, March, April, May, June, July, August, September, October, November, December	-	-	Everybody	Customer
3-7-10.1.2	Day adapt level Off <i>Entering the day on which the alternative fill level is deactivated</i>	1	1.. 31	1	31	Everybody	Customer
3-7-11	Maintenance interval <i>Configuring the maintenance interval for the system in days</i>	0	0.. 3000	0	3000	Service	Service
3-7-8	Clock adapt setp. <i>Alternative setpoint to take effect based on time</i>	-	-	-	-	Everybody	Nobody
3-7-8-1	Adaptation mode <i>Configuring the alternative setpoint to take effect on a daily or weekly basis</i>	Off	Off, weekly, daily	-	-	Everybody	Customer
3-7-8-2	Change on/off times <i>The alternative pressure setpoint is activated/deactivated.</i>	-	-	-	-	Everybody	Customer
3-7-8-2.1.1	Hours adapt setp.ON <i>Entering the hours when the alternative pressure setpoint is activated</i>	0	0.. 23	0	23	Everybody	Customer
3-7-8-2.1.2	Min adapt setp.ON <i>Entering the minutes when the alternative pressure setpoint is activated</i>	0	0.. 59	0	59	Everybody	Customer

Parameter	Description	Factory setting	Possible settings	Min. value	Max. value	Read access right	Write access right
3-7-8-2.1.3	Hours adapt setp.OFF <i>Entering the hours when the alternative pressure setpoint is deactivated</i>	0	0.. 23	0	23	Everybody	Customer
3-7-8-2.1.4	Min adapt setp.OFF <i>Entering the minutes when the alternative pressure setpoint is deactivated</i>	0	0.. 59	0	59	Everybody	Customer
3-7-8-3	Select day of week <i>Entering the weekday on which the alternative pressure setpoint is activated</i>	Sunday	Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday	-	-	Everybody	Customer
3-7-8-4	Change on/off times <i>Entering the weekday on which the alternative pressure setpoint is deactivated</i>	-	-	-	-	Everybody	Customer
3-7-8-4.1.1	Hours adapt setp.ON <i>Entering the hours when the alternative pressure setpoint is activated</i>	0	0.. 23	0	23	Everybody	Customer
3-7-8-4.1.2	Min adapt setp.ON <i>Entering the minutes when the alternative pressure setpoint is activated</i>	0	0.. 59	0	59	Everybody	Customer
3-7-8-4.1.3	Hours adapt setp.OFF <i>Entering the hours when the alternative pressure setpoint is deactivated</i>	0	0.. 23	0	23	Everybody	Customer
3-7-8-4.1.4	Min adapt setp.OFF <i>Entering the minutes when the alternative pressure setpoint is deactivated</i>	0	0.. 59	0	59	Everybody	Customer
3-8	Definable I/O <i>Programming inputs/outputs</i>	-	-	-	-	Service	Service
3-8-1	Inputs <i>Inputs</i>	-	-	-	-	Service	Nobody

Parameter	Description	Factory setting	Possible settings	Min. value	Max. value	Read access right	Write access right
3-8-1-1	Input 1 <i>Configuration of input 1</i>	None	None, forced start (check run), alt. setpoint, leakage, remote acknowledgement, bypass valve, emergency power	-	-	Service	Service
3-8-1-2	Input 2 <i>Configuration of input 2</i>	None	None, forced start (check run), alt. setpoint, leakage, remote acknowledgement, bypass valve, emergency power	-	-	Service	Service
3-8-1-3	Input 3 <i>Configuration of input 3</i>	None	None, forced start (check run), alt. setpoint, leakage, remote acknowledgement, bypass valve, emergency power	-	-	Service	Service
3-8-2	Outputs <i>Outputs</i>	-	-	-	-	Service	Nobody
3-8-2-1	Output 1 (P4) <i>Configuration of output 1</i>	None	None, threshold 1, threshold 2, supply valve, bypass valve, lack of water	-	-	Service	Service
3-8-2-2	Output 2 (P5) <i>Configuration of output 2</i>	None	None, threshold 1, threshold 2, supply valve, bypass valve, lack of water	-	-	Service	Service

Parameter	Description	Factory setting	Possible settings	Min. value	Max. value	Read access right	Write access right
3-8-2-3	Output 3 (P6) <i>Configuration of output 3</i>	None	None, threshold 1, threshold 2, supply valve, bypass valve, lack of water	-	-	Service	Service
3-8-2-4	Output 4 (FR4) <i>Configuration of output 4</i>	None	None, threshold 1, threshold 2, supply valve, bypass valve, lack of water	-	-	Service	Service
3-8-2-5	Output 5 (FR5) <i>Configuration of output 5</i>	None	None, threshold 1, threshold 2, supply valve, bypass valve, lack of water	-	-	Service	Service
3-8-2-6	Output 6 (FR6) <i>Configuration of output 6</i>	None	None, threshold 1, threshold 2, supply valve, bypass valve, lack of water	-	-	Service	Service
3-8-2-7	Opert./Fail. Relay <i>System operational / fault message relay</i>	Off	Off/on	-	-	Service	Service
3-9	Messages <i>Messages</i>	-	-	-	-	Service	Nobody
3-9-1	Message Settings <i>List of all alerts</i>	-	-	-	-	Service	Service
3-9-1.1.1	failure id <i>Fault ID</i>	-		-	-	Service	Service
3-9-1.2.1	Traffic Light <i>Assignment of fault as warning or alert</i>	Red	Green, amber, red	-	-	Service	Service
3-9-1.2.2	Fault on Hold <i>Without/with automatic reset (re-start)</i>	Off	Off, on	-	-	Service	Service
3-10	Root menu <i>Configuring the main menu</i>	-	-	-	-	Customer	Nobody
3-10-1.1	Root Menu Settings <i>List of all main menu elements</i>	-	-			Customer	Everybody
3-10-1.2	Root Menu Settings <i>List of all main menu elements</i>	-	-	-	-	Develop	Develop

Parameter	Description	Factory setting	Possible settings	Min. value	Max. value	Read access right	Write access right
3-10-1.2.1	rootmenu selection <i>Root menu selection</i>	1	1.. 65	1	65	Develop	Develop
3-10-1.2.1	Traffic Light <i>Assignment of fault as warning or alert</i>	Off	Off, on	-	-	Develop	Develop
3-11	Energy Saving Mode <i>Energy-saving mode</i>	-	-	-	-	Service	Nobody
3-11-1	Energy Saving Mode <i>Energy-saving mode</i>	Off	Off, on	-	-	Service	Service
3-11-2	direct off <i>Energy-saving mode is carried out without zero-flow detection function.</i>	Off	Off, on	-	-	Service	Service
3-11-3	Power down speed % <i>Calculated stop speed if zero-flow detection is activated in energy-saving mode (in %)</i>	30	1.. 99	1	99	Service	Service
3-11-4	time direct off <i>Time after which the energy-saving mode is carried out without the zero-flow detection function</i>	5	0.. 9999	0	9999	Service	Service
3-14	By Pass Valve <i>Bypass valve</i>	-	-	-	-	Everybody	Service
3-14-1	Valve Function <i>Activating/deactivating the valve function</i>	Off	Off, forced start (check run), Pt1000, digital input	-	-	Everybody	Service
3-14-2	Open delay <i>Delay time that lapses before valve is opened</i>	2	0.. 20	0	20	Everybody	Service
3-14-3	Close delay <i>Delay time that lapses before valve is closed</i>	2	0.. 20	0	20	Everybody	Service
3-14-4	Temperature <i>Temperature above which the valve is opened</i>	20	0.. 40	0	40	Everybody	Service
3-14-5	Flush Time <i>Time window in which the valve is opened</i>	120	10.. 600	10	600	Everybody	Service
3-14-6	Attempts in 24Hrs <i>Valve opening frequency before an alert is displayed</i>	2	1.. 5	1	5	Everybody	Service
3-14-7	Min. open time <i>Minimum opening time of valve</i>	2	0.. 20	0	20	Everybody	Service

Parameter	Description	Factory setting	Possible settings	Min. value	Max. value	Read access right	Write access right
3-15	Fieldbus <i>Field bus settings</i>	-	-	-	-	Customer	Nobody
3-15-1	Profibus <i>Profibus settings</i>	-	-	-	-	Customer	Nobody
3-15-1-1	PB Slave Address <i>Profibus slave address</i>	126	1.. 255	1	255	Customer	Customer
3-15-2	Modbus <i>Modbus settings</i>	-	-	-	-	Customer	Nobody
3-15-2-1	MB Slave Address <i>Modbus slave address</i>	247	1.. 247	1	247	Customer	Customer
3-15-2-2	Baudrate <i>Baud rate</i>	192	9600,192	-	-	Customer	Customer
4	Info <i>Information</i>	-	-	-	-	Everybody	Nobody
4-1	Device <i>Control module (CM)</i>	-	-	-	-	Everybody	Nobody
4-1-1	Serial Number <i>Serial number of control module</i>	-	-	-	-	Everybody	Nobody
4-1-2	Parameter Set <i>Version of the control panel parameter set</i>	0	-	-	-	Everybody	Everybody
4-2	IO Info <i>IO information on internal communications unit</i>	-	-	-	-	Everybody	Nobody
4-2-1	IO Serial Number <i>IO information on serial number of internal communications unit</i>	-	-	-	-	Everybody	Nobody
4-2-2	IO FW-Version <i>IO information on firmware of internal communications unit</i>	-	-	-	-	Everybody	Nobody
4-2-3	IO FW-Revision <i>IO information on revision of internal communications unit</i>	-	-	-	-	Everybody	Nobody
4-2-4	IO HW-Revision <i>IO information on hardware of internal communications unit</i>	-	-	-	-	Everybody	Nobody
4-3	HMI Info <i>IO information on HMI</i>	-	-	-	-	Everybody	Everybody
4-3-1	HMI Serial Number <i>IO information on serial number of HMI</i>	-	-	-	-	Everybody	Nobody
4-3-2	HMI FW-Version <i>IO information on firmware of HMI</i>	-	-	-	-	Everybody	Nobody

Parameter	Description	Factory setting	Possible settings	Min. value	Max. value	Read access right	Write access right
4-3-3	HMI FW-Revision <i>IO information on revision of HMI</i>	-	-	-	-	Everybody	Nobody
4-3-4	HMI HW-Revision <i>IO information on hardware of HMI</i>	-	-	-	-	Everybody	Nobody
4-4	Profibus Info <i>Information on Profibus used</i>	-	-	-	-	Everybody	Everybody
4-4-1	PB FW-Version <i>Information on firmware of Profibus</i>	-	-	-	-	Everybody	Nobody
4-4-2	PB FW-Revision <i>Information on firmware of Profibus</i>	-	-	-	-	Everybody	Nobody
4-4-3	PB HW-Revision <i>Information on hardware of Profibus</i>	-	-	-	-	Everybody	Nobody
4-5	Modbus Info <i>Information on Modbus used</i>	-	-	-	-	Everybody	Everybody
4-5-1	MB FW-Version <i>Information on firmware of Modbus</i>	-	-	-	-	Everybody	Nobody
4-5-2	MB FW-Revision <i>Information on revision of Modbus</i>	-	-	-	-	Everybody	Nobody
4-5-3	MB HW-Revision <i>Information on hardware of Modbus</i>	-	-	-	-	Everybody	Nobody
5	Quickmenu <i>Information on quick menu</i>	-	-	-	-	Everybody	Nobody

10.4 Fault messages

Table 26: Overview of fault messages

Fault message	Description	Type of message	
		Warning	Alert
Failure PT. Dis.	Fault, discharge-side pressure sensor	-	✗
Sys. press.to low	System pressure below minimum pressure	-	✗
Sys press.to high	System pressure above maximum pressure	-	✗
No water	Insufficient fluid or insufficient inlet pressure on suction side	-	✗
Maintenance req.	Service interval exceeded	✗	-
More pumps fail	Multiple pump faults	-	✗
No refresh tank 1	Insufficient water replacement, tank 1	-	✗
No refresh tank 2	Insufficient water replacement, tank 2	-	✗
No refresh tank 3	Insufficient water replacement, tank 3	-	✗
Aver temp to high	Average temperature of water flow detection too high	-	✗
Curr temp to high	Current temperature of water flow detection too high	✗	-
Temp. Fail. Pump 1	Fault (temperature, motor protection switch, etc.), pump 1	✗	-
Temp. Fail. Pump 2	Fault (temperature, motor protection switch, etc.), pump 2	✗	-
Temp. Fail. Pump 3	Fault (temperature, motor protection switch, etc.), pump 3	✗	-
Temp. Fail. Pump 4	Fault (temperature, motor protection switch, etc.), pump 4	✗	-
Temp. Fail. Pump 5	Fault (temperature, motor protection switch, etc.), pump 5	✗	-
Temp. Fail. Pump 6	Fault (temperature, motor protection switch, etc.), pump 6	✗	-
Failure valve	Fault, suction-side valve	✗	-
Inlet sensor fail	Fault, suction-side pressure sensor or level sensor	✗	-
High water level	Water level in inlet tank too high	-	✗
Crit. water level	Water level in inlet tank too low	✗	-
Low water level	Water level in inlet tank low (lack of water)	-	✗
Comm. Error FC 1	Communication not possible, frequency inverter 1	✗	-
Comm. Error FC 2	Communication not possible, frequency inverter 2	✗	-
Comm. Error FC 3	Communication not possible, frequency inverter 3	✗	-
Comm. Error FC 4	Communication not possible, frequency inverter 4	✗	-
Comm. Error FC 5	Communication not possible, frequency inverter 5	✗	-
Comm. Error FC 6	Communication not possible, frequency inverter 6	✗	-
incor. check sum F1	Communication fault, frequency inverter 1	✗	-
incor. check sum F2	Communication fault, frequency inverter 2	✗	-
incor. check sum F3	Communication fault, frequency inverter 3	✗	-
incor. check sum F4	Communication fault, frequency inverter 4	✗	-
incor. check sum F5	Communication fault, frequency inverter 5	✗	-
incor. check sum F6	Communication fault, frequency inverter 6	✗	-
Temp. sensor fail	Fault, temperature sensor of water flow detection	✗	-
24V out of range	Internal 24 V voltage outside permissible range	✗	-
5V out of range	Internal 5 V voltage outside permissible range	✗	-
3V out of range	Internal 3 V voltage outside permissible range	✗	-
External off	External command for pressure booster system stop active	✗	-
Fire alarm	External fire alert command for starting all pumps active	-	✗

Fault message	Description	Type of message	
		Warning	Alert
Br. Wire Sens.dis	Fault, discharge-side pressure sensor	-	X
Br. Wire Sens.Inl	Fault, suction-side pressure sensor	-	X
Fail. several FCs	Fault, several frequency inverters	-	X
Leakage	Leak detected	-	X
Eeprom HW Error	EEPROM data not saved due to hardware problems	-	X
Manual off Pump 1	Pump 1 switched off (independent of automatic mode)	X	-
Manual off Pump 2	Pump 2 switched off (independent of automatic mode)	X	-
Manual off Pump 3	Pump 3 switched off (independent of automatic mode)	X	-
Manual off Pump 4	Pump 4 switched off (independent of automatic mode)	X	-
Manual off Pump 5	Pump 5 switched off (independent of automatic mode)	X	-
Manual off Pump 6	Pump 6 switched off (independent of automatic mode)	X	-
Manual On Pump 1	Pump 1 in manual mode (independent of automatic mode)	X	-
Manual On Pump 2	Pump 2 in manual mode (independent of automatic mode)	X	-
Manual On Pump 3	Pump 3 in manual mode (independent of automatic mode)	X	-
Manual On Pump 4	Pump 4 in manual mode (independent of automatic mode)	X	-
Manual On Pump 5	Pump 5 in manual mode (independent of automatic mode)	X	-
Manual On Pump 6	Pump 6 in manual mode (independent of automatic mode)	X	-
More Pumps off	Several pumps switched off (independent of automatic mode)	X	-
Internal Failure P1	Internal fault, frequency inverter 1	X	-
Internal Failure P2	Internal fault, frequency inverter 2	X	-
Internal Failure P3	Internal fault, frequency inverter 3	X	-
Internal Failure P4	Internal fault, frequency inverter 4	X	-
Internal Failure P5	Internal fault, frequency inverter 5	X	-
Internal Failure P6	Internal fault, frequency inverter 6	X	-
Mains Failure P1	Power supply fault, frequency inverter 1	X	-
Mains Failure P2	Power supply fault, frequency inverter 2	X	-
Mains Failure P3	Power supply fault, frequency inverter 3	X	-
Mains Failure P4	Power supply fault, frequency inverter 4	X	-
Mains Failure P5	Power supply fault, frequency inverter 5	X	-
Mains Failure P6	Power supply fault, frequency inverter 6	X	-
Over voltage P1	DC link voltage too high, frequency inverter 1	X	-
Over voltage P2	DC link voltage too high, frequency inverter 2	X	-
Over voltage P3	DC link voltage too high, frequency inverter 3	X	-
Over voltage P4	DC link voltage too high, frequency inverter 4	X	-
Over voltage P5	DC link voltage too high, frequency inverter 5	X	-
Over voltage P6	DC link voltage too high, frequency inverter 6	X	-
Under voltage P1	DC link voltage too low, frequency inverter 1	X	-
Under voltage P2	DC link voltage too low, frequency inverter 2	X	-

Fault message	Description	Type of message	
		Warning	Alert
Under voltage P3	DC link voltage too low, frequency inverter 3	X	-
Under voltage P4	DC link voltage too low, frequency inverter 4	X	-
Over voltage P5	DC link voltage too low, frequency inverter 5	X	-
Over voltage P6	DC link voltage too low, frequency inverter 6	X	-
Overload Failure P1	Overload, frequency inverter 1	X	-
Overload Failure P2	Overload, frequency inverter 2	X	-
Overload Failure P3	Overload, frequency inverter 3	X	-
Overload Failure P4	Overload, frequency inverter 4	X	-
Overload Failure P5	Overload, frequency inverter 5	X	-
Overload Failure P6	Overload, frequency inverter 6	X	-
Brake resistor P1	Braking resistor fault, frequency inverter 1	X	-
Brake resistor P4	Braking resistor fault, frequency inverter 2	X	-
Brake resistor P3	Braking resistor fault, frequency inverter 3	X	-
Brake resistor P4	Braking resistor fault, frequency inverter 4	X	-
Brake resistor P5	Braking resistor fault, frequency inverter 5	X	-
Brake resistor P6	Braking resistor fault, frequency inverter 6	X	-
Temp. Failure P1	Temperature too high, frequency inverter 1	X	-
Temp. Failure P2	Temperature too high, frequency inverter 2	X	-
Temp. Failure P3	Temperature too high, frequency inverter 3	X	-
Temp. Failure P4	Temperature too high, frequency inverter 4	X	-
Temp. Failure P5	Temperature too high, frequency inverter 5	X	-
Temp. Failure P6	Temperature too high, frequency inverter 6	X	-
ATM Failure P1	Automatic motor adaptation fault, frequency inverter 1	X	-
ATM Failure P2	Automatic motor adaptation fault, frequency inverter 2	X	-
ATM Failure P3	Automatic motor adaptation fault, frequency inverter 3	X	-
ATM Failure P4	Automatic motor adaptation fault, frequency inverter 4	X	-
ATM Failure P5	Automatic motor adaptation fault, frequency inverter 5	X	-
ATM Failure P6	Automatic motor adaptation fault, frequency inverter 6	X	-
Flushing	Flushing procedure active	X	-
Valve opened oftenly	Several flushing procedures carried out	X	-
Circuit Fail. FC1	Short circuit fault/earth fault, frequency inverter 1	X	-
Circuit Fail. FC2	Short circuit fault/earth fault, frequency inverter 2	X	-
Circuit Fail. FC3	Short circuit fault/earth fault, frequency inverter 3	X	-
Circuit Fail. FC4	Short circuit fault/earth fault, frequency inverter 4	X	-
Circuit Fail. FC5	Short circuit fault/earth fault, frequency inverter 5	X	-
Circuit Fail. FC6	Short circuit fault/earth fault, frequency inverter 6	X	-
Ext. Power Operation	Emergency power mode active; maximum system load limited	X	-
Setpoint Reduction	Setpoint reduced due to drop in inlet pressure	X	-
Factory Test	No test carried out in factory	-	X
MPO Failure	Fault in VP mode, synchronous operation	X	-
ASR Shutdown	Cancellation of automatic setpoint reduction	-	X

11 EU Declaration of Conformity

Manufacturer: **KSB SE & Co. KGaA**
Johann-Klein-Straße 9
67227 Frankenthal (Germany)

The manufacturer herewith declares that the product:

Hyamat K, Hyamat V, Hyamat SVP, Hyamat SVP Eco

KSB order number:

- is in conformity with the provisions of the following Directives as amended from time to time:
 - Pump set: EC Machinery Directive 2006/42/EC
 - Pump set: Electromagnetic Compatibility Directive 2014/30/EU

The manufacturer also declares that

- the following harmonised international standards have been applied:
 - ISO 12100
 - EN 809
 - EN 60204-1
- Applied national technical standards and specifications, in particular:
 - DIN 1988-500

Person authorised to compile the technical file:

Name
Function
Address (company)
Address (street, No.)
Address (post or ZIP code, city) (country)

The EU Declaration of Conformity was issued in/on:

Place, date

.....³⁾.....

Name
Function
Company
Address

3) A signed, legally binding EU Declaration of Conformity is supplied with the product.

12 Certificate of Decontamination

Type:

Order number/

Order item number⁴⁾:

Delivery date:

Applications:

Fluid handled⁴⁾:

Please tick where applicable⁴⁾:



Corrosive



Oxidising



Flammable



Explosive



Hazardous to health



Seriously hazardous to health



Toxic



Radioactive



Bio-hazardous



Safe

Reason for return⁴⁾:

Comments:

.....

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

We herewith declare that this product is free from hazardous chemicals, biological and radioactive substances.

For mag-drive pumps, the inner rotor unit (impeller, casing cover, bearing ring carrier, plain bearing, inner rotor) has been removed from the pump and cleaned. In cases of containment shroud leakage, the outer rotor, bearing bracket lantern, leakage barrier and bearing bracket or intermediate piece have also been cleaned.

For canned motor pumps, the rotor and plain bearing have been removed from the pump for cleaning. In cases of leakage at the stator can, the stator space has been examined for fluid leakage; if fluid handled has penetrated the stator space, it has been removed.

- 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 effected in accordance with the relevant legal provisions.

.....
Place, date and signature

.....
Address

.....
Company stamp

4) Required fields

13 Commissioning Report

The pressure booster system specified below has been commissioned today by the undersigned, authorised KSB Service who created this report.

Pressure booster system details

Type series
 Size
 Serial number
 Order No.

Purchaser/place of installation

Purchaser	Place of installation
Name
Address
.....

Operating data For further data refer to the wiring diagram.

Start-up pressure p_E bar
 Inlet pressure monitoring $p_{inl} - x$
 (setting of inlet pressure switch)
 Stop pressure p_A bar
 Inlet pressure p_{inl} [bar]
 Pre-charge pressure
 of accumulator $p_{pre-charge}$ [bar]

The operator or operator's representative herewith confirms to have received instructions on how to operate and service the pressure booster system. The relevant circuit diagrams and operating instructions have been handed over.

Non-conformities found during commissioning	Deadline for remedial action
Non-conformity 1
.....
.....
.....

Name of KSB representative	Name of purchaser or representative
Place	Date

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