Pressure Booster System

Surpresschrom SIC.2 V

From series 2014w33

Installation/Operating Manual

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Installation/Operating Manual Surpresschrom SIC.2 V

Original operating manual

Subject to technical modification without prior notice.

Contents

Glossary

Accumulator

The accumulator serves to compensate for pressure losses in the piping system downstream of the pressure booster system which may be caused by the consumption of small quantities of water. As a result, the frequency of starts of the pressure booster system is minimised.

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.

Charging the accumulator

Option offered by speed-controlled pressure booster systems of filling a discharge-side accumulator before the last pump stops.

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.

IE3

Efficiency class to IEC 60034-30: 3 = Premium Efficiency (IE = International Efficiency)

Manual mode

In manual mode, the pressure booster system is operated directly on mains power, independently of the control unit.

1 General

1.1 Principles

This operating manual is supplied as an integral part of the type series and variants indicated on the front cover. The manual describes the proper and safe use of this equipment in all phases of operation.

The name plate indicates the type series/size, the main operating data and the order number. The series/serial number uniquely identifies the pressure booster system and serves as identification for all further business processes.

In the event of damage, immediately contact your nearest KSB service centre to maintain the right to claim under warranty.
Noise characteristics see

1.2 Installation of partly completed machinery

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

1.3 Target group

This operating manual is aimed at the target group of trained and qualified specialist technical personnel. (⇨ Section 2.4, Page 8)

1.4 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

1.5 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

2 Safety

DANGER

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

2.1 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.

2.2 General

This manual contains general installation, operating and maintenance instructions that must be observed to ensure safe operation of the pressure booster system and prevent personal injury and damage to property.

The safety information in all sections of this manual must be complied with.

This manual must be read and completely understood by the responsible specialist personnel/operators prior to installation and commissioning.

The contents of this manual must be available to the specialist personnel at the site at all times.

Information attached directly to the pressure booster system must always be complied with and be kept in a perfectly legible condition at all times. This applies to, for example:

- Arrow indicating the direction of rotation
- Markings for connections
- Name plate

The operator is responsible for ensuring compliance with all local regulations which are not taken into account in this manual.

2.3 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 information on maximum flow rates specified in the product literature (to prevent overheating, mechanical seal damage, 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.

Prevention of foreseeable misuse

- Never exceed the permissible operating limits (pressure, temperature, etc.) specified in the product literature.
- Observe all safety information and instructions in this manual.

2.4 Personnel qualification and personnel training

All personnel involved must be fully qualified to install, operate, maintain and inspect the machinery this manual refers to.

The responsibilities, competence and supervision of all personnel involved in 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 technical specialist personnel.

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

- Non-compliance with this operating manual 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

2.6 Safety awareness

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

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

2.7 Safety information for the operator/user

- The operator shall fit contact guards for hot, cold and moving parts and check that the guards function properly.
- Do not remove any 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.

2.8 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 is 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.

2.9 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 2.3, Page 8)

3 Software Changes

The software has been specially created for this product and thoroughly tested. It is not allowed to make any changes or additions to the software or parts of the software. Software updates supplied by KSB are excluded from this rule.

4 Transport/Temporary Storage/Disposal

4.1 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.

4.2 Transport

NOTE

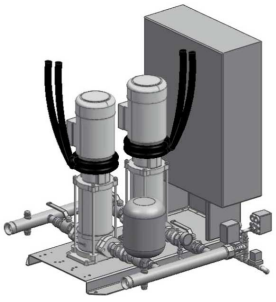
The pressure booster system is mounted on wooden skids and wrapped in plastic foil for shipping and temporary storage. All connecting points are capped.

DANGER

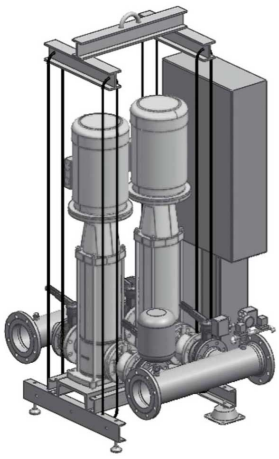
Pressure booster system tilting

Risk of injury by falling pressure booster system!

- Never suspend the pressure booster system by its power cable.
- Observe the applicable local accident prevention regulations.
- Give due attention to the weight data and the centre of gravity.
- Use suitable and permitted transporting equipment, e.g. crane, forklift or elevating platform 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: Transport

✓ The pressure booster system has been checked for in-transit damage.

1. Make sure the transport equipment is suitable for safely carrying the indicated load.
2. Transport the pressure booster system to the place of installation.
3. Attach the pressure booster system to the lifting tackle as shown, lift it off the wooden skids and dispose of the wooden skids.
4. Use suitable lifting equipment to lift the pressure booster system and carefully place it down at the place of installation.

4.3 Storage/preservation

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

CAUTION

Damage during storage due to frost, moisture, dirt, UV radiation or vermin

Corrosion/contamination of pressure booster system!

- ▷ Store the pressure booster system in a frost-proof room. Do not store outdoors.

CAUTION

Wet, contaminated or damaged openings and connections

Leakage or damage of the pressure booster system!

- ▷ Only open the openings of the pressure booster system at the time of installation.

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

4.4 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 13, Page 68)
   Always indicate any safety and decontamination measures taken.

NOTE

If required, a blank certificate of decontamination can be downloaded from the following web site: www.ksb.com/certificate_of_decontamination

4.5 Disposal

⚠ WARNING

Fluids, consumables and supplies which are hot and/or pose a health hazard

Hazard to persons and the environment!

- ▷ Collect and properly dispose of flushing fluid and any residues of the fluid handled.
- ▷ 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.

5 Description

5.1 General description

- Pressure booster system
- Two to six vertical high-pressure centrifugal pumps, one of them with continuously variable speed adjustment

System for ensuring the required supply pressure at the consumer installations.

5.2 Designation

Example: Surpresschrom SIC.2B V 4.2.8 C

Table 4: Designation key

Code	Description
Surpresschrom SIC	Pressure booster system
2B	Design status
V	Control method
4	Pump size
2	Number of pumps
8	Number of stages
C	Types of connection V, C or A

5.3 Name plate

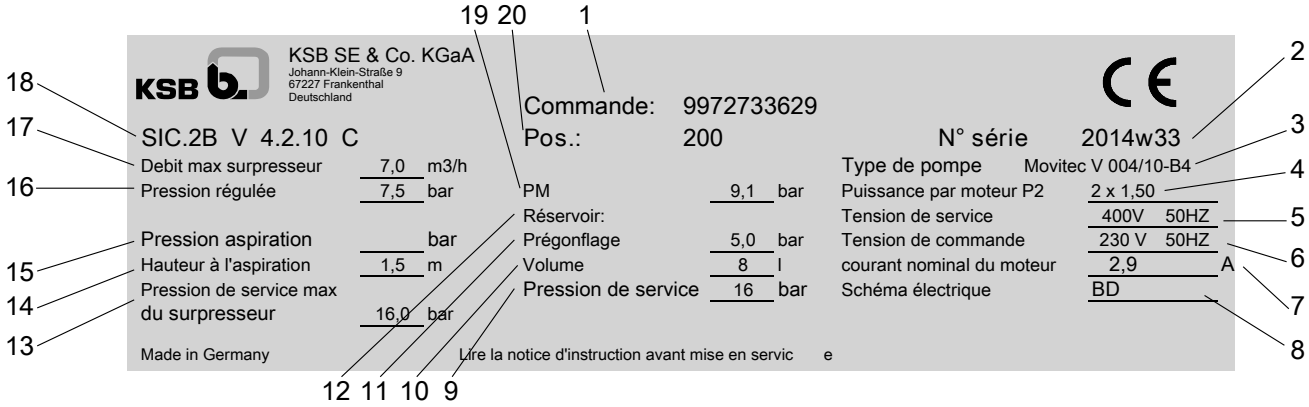


Fig. 2: Name plate Surpresschrom SIC V (example)

1	Order number	2	Serial number
3	Pump size	4	Motor power P2, per pump
5	Operating voltage/frequency	6	Control voltage/frequency
7	Pump current	8	Circuit diagram
9	Operating pressure	10	Gross vol. content
11	Pre-charge pressure	12	Accumulator
13	Maximum operating pressure	14	Suction lift
15	Suction pressure	16	Stop pressure (pStop)
17	Maximum flow rate	18	Type series
19	Head	20	Order item number

Table 5: Key to the serial number

Calendar year	Calendar week
2016	w16

5.4 Design details

Design

- Fully automatic pressure booster package system
- Baseplate-mounted
- Two to six vertical high-pressure centrifugal pumps
- Hydraulic components made of stainless steel / brass
- One check valve (depending on the installation type) and shut-off valves for each pump
- Membrane-type accumulator (direct-flow) to DIN 4807-5 on the discharge side, approved for drinking water
- Pressure gauge for pressure indication
- Pressure transmitter on the discharge side

Systems with Movitec 2B, 4B, 6B, 10B and 15B:

- Anti-vibration pads per pump

Systems with Movitec 25B, 40B, 60B and 90B:

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

Installation

- Stationary dry installation

Drive

- Electric motor
- Efficiency class IE3 to IEC 60034-30

Automation

- Control cabinet IP54
- Pump control and monitoring unit
- Graphical display with operating panel
- LEDs indicating operational availability and fault of the system
- Service interface for connection to a PC
- Transformer for control voltage
- Frequency inverter for speed control of one pump
- Motor protection switch per pump
- Lockable master switch (repair switch)
- Pressure transmitter on the discharge side
- Circuit diagram and list of electric components
- Terminal strip/terminals with identification for all connections
- Connection for analog or digital dry running protection equipment
- External ON/OFF connection
- Field bus connection (optional)
- Volt-free signals for dry running protection, warning and alert as standard
- Volt-free signals for operation and fault per pump, voltage monitoring and phase monitoring (optional)

5.5 Configuration and function

Fig. 3: Surpresschrom SIC.2 V

1	Control unit	2	Control cabinet
3	Pump	4	Manifold
5	Baseplate		

Design

The fully automatic pressure booster system is equipped with two to six vertical high-pressure pumps (3) (one of which is speed-controlled) for pumping the fluid handled to the consumer installations in the set pressure range.

Function
Automatic mode

Two to six pumps (3) are controlled and monitored by a micro-processor control unit (1). One pump is connected to a 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 has been stopped, another pump which has not been in operation before is started up.
When the last (FI-controlled) pump has been stopped and the demand increases again, the next pump in line is started up and operated on the frequency inverter. The stand-by pump is also included in the alternating cycle.
The standard setting is for the pressure booster system to start automatically as a function of pressure; the actual pressure is measured by an analog pressure measuring device (pressure transmitter). The function of this pressure transmitter is monitored (live-zero).
As long as the pressure booster system is in operation, the pumps are started and stopped as a function of demand (standard setting). In this way it is ensured that the individual pumps operate only in line with the actual demand.
The variable-speed pump reduces wear as well as the pumps' frequency of starts in parallel operation. If a duty pump fails, the next pump is started up immediately and a fault is output, which can be reported via volt-free contacts (e.g. to the control station).
If the demand drops towards 0, the pressure booster system slowly runs down to the stop point.
The operating status is displayed via LEDs.

Function
Response to FI fault

The pressure booster system's response to a potential frequency inverter failure can be set at the control unit.
As a standard, the control unit will switch to cascade operation if the frequency inverter fails. All the parameters required for this mode of operation can be set at the control unit.
If automatic switchover to cascade operation is not wanted, parameters can be set for the pressure booster system to stop.

Function
Energy-saving mode

In conjunction with a very large discharge-side accumulator, the energy-saving mode prevents the pressure booster system from running at the least efficient operating point, supplying very small amounts of water.

If very small amounts of water are consumed the pressure booster system only fills the downstream accumulator and stops.
Any small water volumes required can then be supplied from the accumulator.

Function of dynamic pressure compensation

A dynamic flow rate-dependent set value re-adjustment, also called dynamic pressure compensation function, can be activated, if required.
In this mode, the system responds to decreasing flow rates by automatically increasing the set value to compensate the pressure losses in the piping.

Function Manual mode

Depending on the equipment the pressure booster system is supplied with, the pumps can be operated in manual mode in either one or two different ways.
Standard: By making the appropriate settings at the display, one of the pumps can be operated directly via the mains for 10 seconds, independently of the control unit. The pump will then automatically return to OFF mode.
Supplementary equipment: Manual-0-automatic selector switches can be supplied as supplementary equipment. They can be used to operate each pump directly on mains power, independently of the control unit.

In manual mode, a minimum flow (see table below) is essential to prevent the fluid handled and the pump from overheating when no water is consumed at the consumer installations.

Minimum flow for pump in manual mode

Table 6: Minimum flow per pump in manual mode

Pump	Minimum flow per pump in manual mode [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

Example

An open $^{1}/_{2}$-inch tap equals a water consumption of approx. 800 to 1,200 l/h.

Dry running protection (supplementary equipment)

To protect the system from dry running, a range of protective equipment (see Supplementary equipment / Accessories) is available for various installation conditions.
Digital or analog lack-of-water monitoring equipment can be connected to the corresponding terminals.

Field bus connection (supplementary equipment)

For remote monitoring of all system-relevant parameters and connection to a control station the system can optionally be supplied fitted with a field bus module.

5.6 Noise characteristics

Surpresschrom pressure booster systems are available with different numbers and sizes of pumps.
Therefore, the expected total sound pressure level in dB(A) needs to be calculated.
For the expected sound pressure level (noise characteristics) of the individual pumps please refer to the pump's operating instructions.

Calculation example:

Number of pumps	Expected total sound pressure level in dB(A)
Single pump	. . . . . dB(A)
2 pumps, total	+3 dB(A)
3 pumps, total	+4,5 dB(A)
4 pumps, total	+6 dB(A)

Number of pumps	Expected total sound pressure level in dB(A)
5 pumps, total	+7 dB(A)
6 pumps, total	+7.5 dB(A)
Example Single pump	48 dB(A)
4 pumps, total	+6 dB(A)
	54 dB(A)

The total expected sound pressure level of 54 dB(A) for this configuration may develop when all four pumps are running under full-load conditions.
For noise characteristics of the pumps refer to the pumps' operating instructions.
On pressure booster systems with acoustic cladding the expected total sound pressure level is reduced by approx. 7 dB(A).

5.7 Scope of supply and services

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 (standard pumps)
- Hydraulic components made of stainless steel
- One check valve (depending on the installation type) and shut-off valves for each pump
- Membrane-type accumulator on the discharge side, approved for drinking water
- Pressure transmitter on the discharge side
- Pressure indication on pressure gauge
- Powder-coated / epoxy resin-coated steel baseplate
- Pumps fixed to the baseplate on anti-vibration mounts (pump sizes 2, 4, 6, 10 and 15).
- Pressure booster system supplied with level-adjustable feet and rubber pads (supplied, but not fitted; pump sizes 25, 40, 60 and 90).

Control cabinet

- Control cabinet IP 54, EMC interference suppression class B
- Pump control and monitoring unit
- Graphical display with operating panel
- LEDs indicating operational availability and fault of the pressure booster system
- Service interface for connection to a PC
- Frequency inverter
- Transformer for control voltage
- Motor protection switch per pump
- Lockable master switch (repair switch)
- Terminals with identification for all connections
- Circuit diagram and list of electric components
- Connection for analog or digital dry running protection equipment
- External connection ON
- External connection OFF

5.8 Dimensions and weights

For dimensions and weights refer to the outline drawings of the pressure booster system.

5.9 Terminal wiring diagram

For the terminal assignment refer to the circuit diagram.

5.10 Potential equalisation

A terminal marked with the earth symbol is provided on the baseplate for connecting a PE conductor.

Fig. 4: Earth symbol

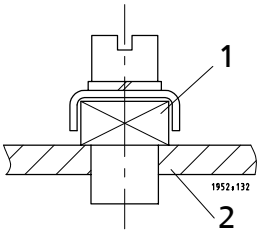


Fig. 5: PE terminal

1	Earthing terminal	2	Baseplate

6 Installation at Site

6.1 Installation

Install pressure booster systems either in the technical equipment room or in a well-ventilated, frost-free, lockable room used for no other purpose. No harmful gases are allowed to enter the place of installation. An adequately sized floor drain (leading to a sewer or equivalent) must be provided.

The pressure booster system is designed for a maximum ambient temperature of 0 °C to +40 °C at a relative humidity of 50 %.

NOTE

Do not install pressure booster systems next to sleeping or living quarters.

The anti-vibration mounting of the pressure booster system provides adequate insulation against solid-borne noise. The systems are also available with acoustic cladding (accessory) to reduce motor noise. If expansion joints (KSB accessory) are used for damping vibrations, their fatigue strength (endurance limit) must be given due consideration. Expansion joints must be installed to allow quick and easy replacement.

6.2 Checks to be carried out prior to installation

Place of installation

⚠ WARNING

Installation on mounting surfaces which are unsecured and cannot support the load

Personal injury and damage to property!

- 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.

NOTE

The anti-vibration mounts of the pressure booster system provide adequate insulation against solid-borne noise.
Thanks to level-adjustable feet (KSB accessory) the pressure booster system can also be installed in a horizontal position on uneven floors.

For pressure booster systems with Movitec 2, 4, 6, 10 and 15, level-adjustable feet are available as accessories.

Pressure booster systems with Movitec 25, 40, 60 and 90 are supplied with separate level-adjustable feet, two of which can be fixed to the floor.

Check the structural requirements.
All structural work required must have been prepared in accordance with the dimensions stated in the outline drawings.

6.3 Installing the pressure booster system

⚠ WARNING

Top-heavy pressure booster system

Risk of personal injury by pressure booster system tilting!

- ▷ Pressure booster systems awaiting final installation must be secured against tipping over.
- ▷ Firmly anchor the pressure booster system.

Remove all packaging before installing the pressure booster system. Connect the pressure booster system's inlet line and discharge line to the corresponding site distribution lines.

NOTE

In order to avoid transmission of piping forces onto the pressure booster system and transmission of solid-borne noise, we recommend installing length-limited expansion joints.

Allow sufficient space for maintenance and repair work.

✓ All structural work required has been checked.

✓ The dimensions of the concrete foundation are correct, and the concrete has set firmly.

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. Set the pressure booster system down in its correct installation position.
5. Use suitable bolts to firmly anchor the pressure booster system.

6.4 Installing the piping

Make sure that piping is installed without transmitting any stresses or strains. The use of length-limited expansion joints (see accessories) is recommended.

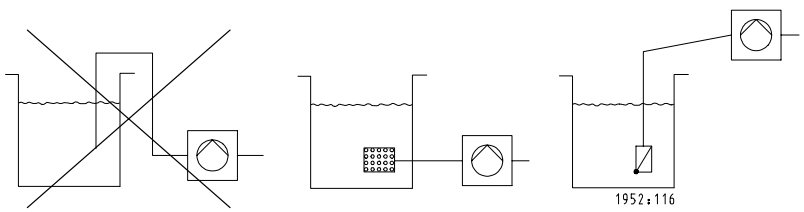
CAUTION

Air pockets in suction line

Pressure booster system cannot prime!

- ▷ Lay piping with a continuously rising slope (as shown).

Suction lift operation



Incorrect Correct

NOTE

For suction lift operation install suitable swing check valves at the suction line ends which are submerged in the fluid handled. Take into account the head losses caused by these swing check valves.
Do not exceed the maximum suction lift of the pumps.

6.4.1 Fitting an expansion joint

DANGER

Sparks and radiant heat

Fire hazard!

- ▷ Take suitable precautions to protect the expansion joint if any welding work is carried out nearby.

CAUTION

Leaking expansion joint

Flooding of installation room!

- ▷ Regularly check for cracks or blisters, exposed fabric or other defects.

✓ The expansion joint has a length limiter with solid-borne sound insulation so as to be able to absorb reaction forces.

1. 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.
2. Tighten the bolts evenly and crosswise during assembly. The ends of the bolts must not protrude from the flange.
3. Do not apply paint to the expansion joint. Protect it from any contact with oil.
4. The position of the expansion joint within the pressure booster system must allow easy access and inspection and it must, therefore, not be insulated along with the piping.
5. Expansion joints are subject to wear.

6.4.2 Installing a pressure reducer

NOTE

A pipe length of approximately 600 mm must be provided on the inlet side to accommodate a pressure reducer, if necessary.

NOTE

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 plus shut-off head) of the pressure booster system exceeds the design pressure.
The maximum pump discharge pressure at zero flow point is reached in manual mode.

A minimum pressure gradient of 5 metres is required for the pressure reducer to fulfill its function. The pressure downstream of the pressure reducer (downstream pressure) is the basic parameter for determining the pump head.

For example:

The inlet pressure fluctuates between 4 and 8 bar. A pressure reducer is needed upstream of the pressure booster system on the inlet side.
Min. inlet pressure (p_{inl}) = 4 bar
Min. pressure gradient = 0.5 bar
Downstream pressure = 3.5 bar.

6.5 Installing unpressurised inlet tanks

Installation and location of an unpressurised inlet tank together with the pressure booster system are governed by the same rules applicable to the pressure booster system.

Install the closed PE inlet tank (under atmospheric pressure) available as a KSB accessory as described in the installation instructions supplied with the tank.
(⇨ Section 6.1, Page 19)

CAUTION

Contamination in the pressure booster system

Damage to the pumps!

- ▷ Clean the tank before filling it.

The tank must be connected mechanically and electrically to the pressure booster system prior to commissioning of the system.

6.6 Fitting the dry running protection device

Install the dry running protection device supplied together with the pressure booster system as a separate, non-fitted accessory, or supplied at a later date for retrofitting, in accordance with its operating instructions and connect it to the switchgear and controlgear assembly.
The switchgear and controlgear assembly is provided with the requisite inputs.

6.7 Connection to power supply

DANGER

Electrical connection work by unqualified personnel

Danger of death from electric shock!

- ▷ Always have the electrical connections installed by a trained and qualified electrician.
- ▷ Observe regulations IEC 60364.

WARNING

Incorrect connection to the mains

Damage to the mains network, short circuit!

- ▷ Observe the technical specifications of the local energy supply companies.

NOTE

A motor protection device is recommended.

NOTE

If a residual current device is installed, observe the operating manual for the frequency inverter.

The circuit diagrams for the pressure booster system are included in the control cabinet, where they must remain when not in use.
The product literature of the switchgear and controlgear assembly supplied with the pressure booster system includes a list of the electrical components installed. When ordering spare parts for electrical components, please always indicate the circuit diagram number.

6.7.1 Sizing the power cable

The cross-section of the power cable must be sized for the total rated power requirement.

6.7.2 Connecting the pressure booster system

Connect the pressure booster system to the power supply via terminals L1, L2, L3, PE and N as shown in the enclosed circuit diagram.
Observe the data given on the name plate.

6.7.3 Connecting electrical accessories

The standard version of the switchgear and controlgear assembly is provided with the following terminals for connecting electrical accessories:

- Dry running protection device, analog
- Dry running protection device, digital
- External-ON (fire alert)
- External OFF
- Clip-on temperature sensor per pump

The terminals are marked in the circuit diagram and in the switchgear and controlgear assembly.

6.7.4 Volt-free contacts

Volt-free contacts are provided for the following messages:

- Warning
- Alert

The terminals are marked in the circuit diagram and in the switchgear and controlgear assembly.

6.8 Acoustic cladding

Acoustic cladding reduces the air-borne sound caused by the motors.

CAUTION

Insufficient air circulation after installation of acoustic cladding

Risk of motors overheating!

▷ Do not obstruct the cooling openings.

7 Commissioning/Start-up/Shutdown

7.1 Commissioning/Start-up

7.1.1 Prerequisites for commissioning/start-up

Before commissioning/start-up of the pressure booster system make sure that the following requirements are met:

- 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.

CAUTION

Dry running of pump

Damage to the pump/pressure booster system!

▷ If no dry running protection device is connected when commissioning takes place, pressure booster systems in manual or test run mode will be stopped automatically after approx. 10 seconds. 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.

NOTE

The competent authorities must be informed in due time prior to commissioning/ test running the system.

7.1.2 Dry running protection

Pressure booster systems can be factory-equipped with pressure switches, pressure transmitters or flow monitors as dry running protection devices. Such dry running protection devices will be factory-set to the inlet pressure values specified in the purchase order.

If the factory settings should not match the site data, the dry running protection device must be adjusted accordingly.

- Pressure switch: Set the start and stop pressure as described in the operating manual of the pressure switch.
- Pressure transmitter: Set the start and stop pressure in parameters 3-5-15 and 3-5-16 (⇨ Section 8.4, Page 32)

Table 7: Recommended pressure switch/pressure transmitter settings

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

- Flow monitor: Set the stop pressure in parameter 3-5-17.
  (⇨ Section 8.4, Page 32)
  The flow monitor will stop the pressure booster system due to lack of water when no flow can be detected on the suction side and the discharge-side pressure drops below the set value.

Table 8: Recommended flow monitor settings

	Stop pressure	Start-up pressure
Flow monitor	0.5 bar below p_{set}	Cannot be adjusted

NOTE

Systems protected against dry running by flow monitoring cannot be reset automatically! One pump at least must be started in manual mode to build up pressure on the discharge side.
This will reset the dry running protection device.

7.1.3 Commissioning/start-up of pressure booster system

NOTE

The pressure booster systems undergo hydraulic testing with water at the factory and are drained carefully before shipment. However, for technical reasons the presence of some residual water is unavoidable.
The hydraulic connections are closed in as-supplied condition. They must only be opened immediately before installation.
Refer to EN 806 before commissioning/starting up the pressure booster system.
After an extended pre-installation period, in particular, flushing or even professional disinfection is recommended. For extensive or branched piping systems the pressure booster system should preferably be flushed either before installation, or flushing should be restricted to a limited area.

Commissioning should be carried out by specialist KSB staff.

CAUTION

Foreign matter in the piping

Damage to the pumps/pressure booster system!

- ▹ 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.

NOTE

Commissioning of the pressure booster system - even test running - shall only be carried out in full compliance with all pertinent VDE (German Association of Electrical Engineers) regulations.

CAUTION

Operation without the fluid to be handled

Damage to the pump!

- ▹ Prime the pressure booster system with the fluid to be handled.

- ✓ The pipe unions between the pump and the piping have been re-tightened.
- ✓ The flange bolting has been checked for firm seating.
- ✓ The cooling air inlet and outlet openings on the motor are unobstructed.
- ✓ All shut-off valves of the pressure booster system are open.
- ✓ The pre-charge pressure of the membrane-type accumulator has been checked. (⇨ Section 9.2.3, Page 59)

1. Set the master switch to "0"; unlock all motor protection switches (if applicable).
2. Provide connection to power supply.
3. Open/loosen the vent plugs on the pumps (refer to the pump's installation/operating manual).
4. Slowly open the inlet-side shut-off element and prime the pressure booster system until the fluid to be handled escapes through all vent holes.
5. Close and slightly tighten the vent plugs.

6. Switch on all motor protection switches.
7. Switch on the master switch.
8. Start one pump after the other in manual mode, checking the direction of rotation. The direction of rotation must match the rotation arrow on the motor. If the pump runs in the wrong direction of rotation, interchange two phases at the motor terminal strip.
9. Open the discharge-side shut-off element.
10. When all pumps are running, loosen the vent plugs again to let any remaining air escape.
11. Then re-tighten the vent plugs firmly.
12. Check that the pumps are running smoothly.
13. Close the discharge-side shut-off element for a short period in order to verify that the pump reaches the shut-off head.
14. Close the discharge-side shut-off element, causing all pumps to stop.
15. On pressure booster systems with manual-0-automatic switch (supplementary equipment) set all pumps to automatic mode.

NOTE

Minor leakage of the mechanical seals during commissioning is normal and will cease after a short period of operation.

7.2 Switching on the pressure booster system

Switch on the master switch to energise the pressure booster system. The green LED on the control panel lights up, indicating the system's readiness for operation.

NOTE

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

7.3 Checklist for commissioning/start-up

Table 9: Checklist

Operations		Done
1	Read the operating instructions.	
2	Check power supply and compare against the name plate data.	
3	Check the earthing system (by measuring).	
4	Check the mechanical connection to the water mains. Re-tighten the flange bolting and pipe unions.	
5	Prime and vent the pressure booster system from the inlet side.	
6	Check inlet pressure.	
7	Check whether all cables are still firmly connected to the terminals inside the control unit.	
8	Compare the settings of the motor protection switches with the name plate data; re-adjust, if necessary.	
9	Set pump to "0", if manual-0-automatic switch is provided. Briefly start up one pump after the other in manual mode and compare the direction of rotation at the fanwheel with the arrow indicating the direction of rotation.	
10	Check the direction of rotation in automatic mode.	
11	Check the start and stop pressure; re-adjust, if necessary.	
12	Test the proper function of the dry running protection equipment. If not fitted, make a relevant note in the commissioning report.	
13	Vent the pumps for a second time after they have been running for 5 to 10 minutes.	
14	Set all switches to "automatic".	

Operations		Done
15	Check the pre-charge pressure.	
16	Record all system conditions that do not correspond to our specifications or to the purchase order in the commissioning report (i.e. no dry running protection or inlet pressure + max. pressure of pressure booster system higher than 16 bar).	
17	Complete the commissioning report together with the operator/user and instruct the operator/user as to the function of the system.	

7.4 Shutdown

NOTE

As long as the pressure booster system is out of operation, water is supplied directly at p_{inl} through the pressure booster system.

Set the master switch to "0".

NOTE

Drain the pressure booster system for prolonged shutdown.

8 Operating the Pressure Booster System

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

The pressure booster system is factory-set to the start and stop pressures indicated on the name plate.
The settings can be modified via the control panel, if necessary.

	**NOTE** The factory settings are permanently stored in the control unit. Should an incorrect setting result in pressure booster system failure, the factory settings can be restored. (⇨ Section 8.8.2, Page 53)

	**NOTE** The settings made at the site can be saved and loaded when required. (⇨ Section 8.8.1, Page 53) (⇨ Section 8.8.2, Page 53)

8.1 Control panel

The control panel comprises a back-lit display, LEDs, function and navigation keys, and an access point for the service interface.

The display shows important information for operating the pressure booster system. Plain-text data can be accessed and parameters can be set.

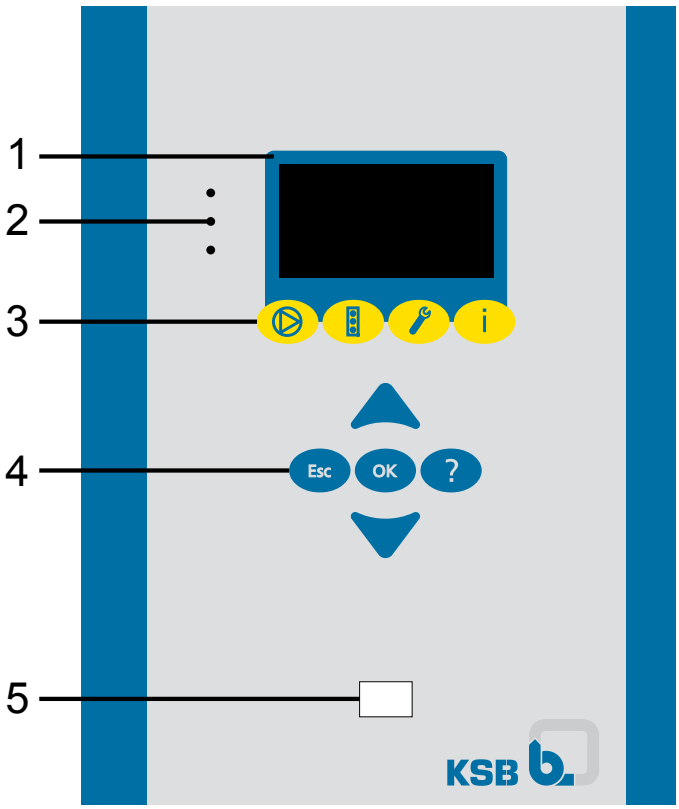


Fig. 6: BoosterControl Advanced control panel

1	Display	2	"Traffic light" LEDs
3	Function keys	4	Navigation keys
5	Service interface		

8.1.1 Display

The six-row display contains the following information:

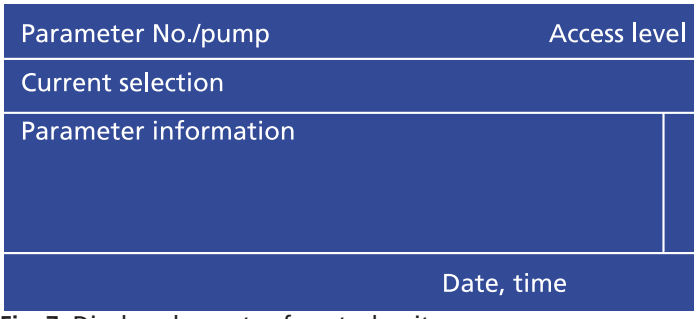


Fig. 7: Display elements of control unit

Display element	Description
Parameter No./Pump	Shows the number of the parameter or pump selected
Current selection	Shows the current parameter in plain text
Parameter information	List of selectable parameters/parameter information
Level	Shows the current access level: Blank = Standard (limited access to parameters) C = Customer, access to main parameters S = Service F = Factory
Date, time	Shows the set date and time

Example: Setpoint adaptation at "Customer" access level:

Fig. 8: Example: Setpoint adaptation

The number of the current menu or parameter is always displayed at the top left of the screen. This number indicates the path through the menu levels and thus enables the user to quickly locate parameters. See "Displaying and changing parameters". (⇨ Section 8.4, Page 32)

8.1.2 LEDs

The "traffic light" LEDs provide information about the pump system's operating status.

Table 10: LED description

LED	Description
●	**Red**: One or more than one alert is active
●	**Amber**: One or more than one warning is active
●	**Green**: Trouble-free operation

8.1.3 Function keys

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

Table 11: Assignment of menu keys

Key	Menu
	Operation
	Diagnosis
	Settings
	Information

8.1.4 Navigation keys

For navigating through the menus and confirming settings:

Table 12: Control unit: Navigation keys

Key	Description
	**Direction keys:** ▪ Move up/down in the menu options ▪ Increase/decrease a numerical value ▪ Scroll up or down
	**Escape key:** ▪ Cancel an entry without saving it. ▪ Move up one menu level.
	**OK key:** ▪ On the start display: Open the quick menu. ▪ Confirm settings. ▪ Confirm a menu selection. ▪ When entering numbers: Go to the next digit.
	**Help key:** ▪ Displays a help text for each selected menu option.

8.1.5 Service interface

The service interface allows a PC/Notebook to be connected via a special cable (USB - RS232).

The pressure booster system can be parameterised by using the Service-Tool software.

The control unit can also be updated via this interface.

8.2 Menu structure

Main menu: KSB logo/actual value display

Main menu	Key	Sub-menu	Information displayed
➡	Operation	➡ General	System pressure System load % RDP switch present/not present Inlet pressure Level content % Level height m Ambient temp. Digital inputs
		➡ Pumps	Operating mode of pumps Display pump load Display thermal protection
		➡ Time and statistics	Operating hours Service interval Current min. runtime
➡	Diagnosis	➡ General	Display messages Show history Acknowledge faults Clear history
➡	Settings	➡ Control panel	Basic settings CAN configuration Service interface Logo
		➡ Control unit	Login Service
		➡ System configuration	Number of pumps Configuration suction side Configuration operating mode
		➡ System settings	Suction side Discharge side Configuration of frequency inverter
		➡ Pressure configuration	Configuration setpoint and dry running protection
		➡ Timer settings	Operation check run/alternative setpoint
		➡ Time/date	
		➡ Program outputs	
		➡ Messages	
		➡ Main menu	
➡	Information	➡ Control module	Serial number Material number Firmware Parameter set Hardware version

8.3 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.

8.4 Displaying and changing parameters

The parameter numbers contain the navigation path, which helps you find a particular parameter quickly and easily.

The first digit of the parameter number indicates the first menu level, which is called up directly via the four function keys.

Table 13: Function keys

	Operation
	Diagnosis
	Settings
	Information

Subsequent steps are carried out via the navigation keys.

Example: Parameter 3-5-1 Setpoint

First, enter the customer password. (⇨ Section 8.3, Page 31)
Then change the setpoint as follows:

First digit of parameter number: 3-5-1

	Press the third function key for Settings. 3-1 appears on the top left of the screen.

Second digit of parameter number: 3-5-1

	Change the display 3-1 (top left) to 3-5 by pressing the navigation keys.
	To confirm the selection, press OK. 3-5-1 appears on the top left of the screen. You have reached the required parameter.
	To change this parameter, press OK again.

Numbers can then be entered digit by digit from left to right.

	Increase value.
	Reduce value.

The bar above the entry displays the value currently being entered in relation to the value range.

	Confirm the selected value by pressing OK. The cursor moves to the next position (second position from the left).

Make the settings for the subsequent positions as described above and then

	press OK to save the new parameter value.
	Press ESC several times to return to the main display. The new setpoint is now active.

8.5 Displaying messages

All monitoring and protective functions trigger alerts or warnings. These are signalled by the yellow or red LED and connected to the relay outputs.

- All current messages can be displayed in the Diagnosis menu under 2-1-1 and acknowledged individually if the cause of the fault has gone.
- The history of messages can be accessed in the Diagnosis menu under 2-1-2. It indicates the start and end of a fault.
- The list of alerts and warnings can be acknowledged in the Diagnosis menu under 2-1-3.
- The history of messages can be deleted in the Diagnosis menu under 2-1-4. For this step, you have to login at the "Service" level.

When the pressure booster system is reset (by switching the pressure booster system off and on with the master switch), all alerts are acknowledged automatically. Acknowledging alerts may cause the system to re-start.

8.6 Parameter list

Table 14: Overview of parameters

Parameter	Description	Factory settings	Possible settings	Min. value	Max. value	Read access right	Write access right
1	Operation *Display of operating mode*	-	-	-	-	Everybody	Nobody
1-1	System *General operating status indicators*	-	-	-	-	Everybody	Nobody
1-1-1	System pressure *Displaying the measured system pressure*	-	-	-	-	Everybody	Nobody
1-1-2	System load *Displaying the total pump load in percent*	-	-	-	-	Everybody	Nobody
1-1-3	RDP switch *Detection of dry running protection via pressure switch is activated/deactivated.*	-	Not available, available	-	-	Everybody	Nobody
1-1-4	Inlet pressure *Displaying the suction-side pressure*	-	-	-	-	Everybody	Nobody
1-1-5	Level content in % *Displaying the water level in inlet tank in percent*	-	-	-	-	Everybody	Nobody
1-1-6	Level height *Displaying the water level in the inlet tank*	-	-	-	-	Everybody	Nobody
1-1-7	Ambient temp. (WSD) *Displaying the measured ambient temperature if water flow detection is available*	-	-	-	-	Everybody	Nobody
1-1-8	Digital inputs *Displaying the status of the digital inputs*	-	-	-	-	Service	Service
1-1-9.2	Position suppl.valve *Position of supply valve*	Open	Open, closed	-	-	Everybody	Nobody
1-1-9.1	Position suppl.valve *Position of proportional supply valve 0 % ... 100 %*	0	0...100	0	100	Everybody	Nobody
1-1-10	Power down speed *Calculated stop speed if zero-flow detection is activated in energy-saving mode*	-	-	-	-	Service	Nobody
1-1-14	WSD pulses tank 1 *Water flow detection, number of fills in tank 1*	0	-	-	-	Everybody	Nobody
1-1-15	WSD pulses tank 2 *Water flow detection, number of fills in tank 2*	0	-	-	-	Everybody	Nobody

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

Parameter	Description	Factory settings	Possible settings	Min. value	Max. value	Read access right	Write access right
2-1-4	Clear History *Deleting the message history*	-	-	-	-	Service	Service
3	Settings *Settings*	-	-	-	-	Everybody	Nobody
3-1	HMI *Control panel*	-	-	-	-	Everybody	Nobody
3-1-1	Basic settings *Basic settings for control panel*	-	-	-	-	Everybody	Nobody
3-1-1-1	Language *Language settings*	English	English, German, Dutch, French, Turkish	-	-	Everybody	Everybody
3-1-1-4	Contrast *Contrast*	13	5.. 20	5	20	Everybody	Everybody
3-1-1-2	Backlight *Configuring the illumination time of the display*	-	-	-	-	Everybody	Everybody
3-1-1-2-1	Mode *Illumination type of system display*	Timed	Always on, timer-based	-	-	Everybody	Everybody
3-1-1-2-2	Backlight Time *System display: setting the illumination time in seconds*	600	10.. 999	10	999	Everybody	Service
3-1-1-3	Displayed units *Selecting the units shown on the display. The measured values are converted in the device.*	-	-	-	-	Everybody	Nobody
3-1-1-3-1	Pressure *Units of measured pressure values*	kPa	kPa, bar, PSI, feet, mwc	-	-	Everybody	Service
3-1-1-3-2	Height *Units of tank fill level*	cm	cm, m	-	-	Everybody	Service
3-1-1-3-3	Temperature *Units of water flow detection temperature*	°C	°C, °F	-	-	Everybody	Service
3-1-2	Fieldbus *Field bus settings*	-	-	-	-	Nobody	Nobody
3-1-2-1	Fieldbus Type *Type of connected field bus module*	No module	No module, Profibus, Modbus	-	-	Nobody	Nobody
3-1-4	Logo *Setting the logo displayed*	-	-	-	-	Service	Nobody

Parameter	Description	Factory settings	Possible settings	Min. value	Max. value	Read access right	Write access right
3-1-4-1	Logo *Selecting the logo displayed*	No logo	KSB logo, dp logo, no logo	-	-	Service	Service
3-2	Device *Device-specific settings*	-	-	-	-	Everybody	Nobody
3-2-1	Login *Login*	-	-	-	-	Everybody	Nobody
3-2-1-1.1	PIN *Entering the user level and password*	-	-	-	-	Everybody	Nobody
3-2-1-1.1.1	Access Level *Selecting the login level*	User level	User level, service level, factory level	-	-	Everybody	Everybody
3-2-1-1.1.2	PIN acceptance *Prompt to enter PIN*	-	0.. 9999	0	9999	Everybody	Everybody
3-2-1-1.2	PIN *Entering the user level and password*	-	-	-	-	Factory	Nobody
3-2-1-1.2.1	Access Level *Selecting the login level*	User level	User level, service level, factory level, development level	-	-	Factory	Factory
3-2-1-1.2.2	PIN acceptance *Prompt to enter PIN*	-	0.. 9999	0	9999	Factory	Factory
3-2-1-2	Login required *Password entry required*	Yes	No, yes	-	-	Customer	Customer
3-2-2	Service *Service settings*	-	-	-	-	Customer	Nobody
3-2-2-1	Factory setting *Factory-set defaults*	-	Reset ok, no set available	-	-	Customer	Customer
3-2-2-2	Reset Srv Interval *Resetting the service interval*	-	OK, failed	-	-	Service	Service
3-2-2-3	Customer setting *Loading locally saved settings*	-	Reset ok, no set available	-	-	Customer	Customer
3-2-2-4	Save custom. setting *Saving the customer settings*	-	-	-	-	Customer	Customer
3-2-2-5	Save factory setting *Saving the factory settings*	-	-	-	-	Factory	Factory
3-2-2-6	Default setting *Resetting to default settings*	-	-	-	-	Service	Service
3-2-2-6.1.1	Reset default param. *Resetting to default settings*	Default	Default, Hyamat K, Hyamat V, Hyamat VP, HyaEco VP	-	-	Service	Service

Parameter	Description	Factory settings	Possible settings	Min. value	Max. value	Read access right	Write access right
3-2-2-7	Edit Pump Opera. hrs *Editing pump operating hours*	-	-	-	-	Service	Service
3-2-2-7.1.1	Pump number *Number of pump*	1	1.. 6	1	6	Service	Service
3-2-2-7.2.1	Hours *Hours*	0	0.. 500000	0	500000	Service	Service
3-2-2-7.2.2	Minutes *Minutes*	0	0.. 59	0	59	Service	Service
3-2-2-7.2.3	Seconds *Seconds*	0	0.. 59	0	59	Service	Service
3-2-2-8	Reset Sys. Oper. hrs *Resetting the operating hours*	-	OK, failed	-	-	Service	Service
3-2-3	Factory Test *Factory test*	-	-	-	-	Factory	Nobody
3-2-3-1	Factory Test *Factory test*	-	-	-	-	Factory	Factory
3-2-3-1.1.1	Test result *Test result*	Failed	Failed, passed	-	-	Factory	Factory
3-3	Configuration *System configuration*	-	-	-	-	Everybody	Nobody
3-3-1	Number of pumps *Maximum number of pumps used in system*	3	1.. 6	1	6	Everybody	Service
3-3-2	Inlet *General configuration, suction side*	Pressure switch	Pressure switch, pressure sensor, water flow detection, inlet tank/gate valve, inlet tank/ proportional valve	-	-	Everybody	Service
3-3-3	Discharge *General configuration, discharge side*	Cascade	Cascade (without frequency inverter), 1 jockey, 2 jockeys, floating frequency inverter, frequency inverter per pump	-	-	Everybody	Service
3-3-4	WSD *Configuring the water flow detection for the tank*	Off	Off, 1 tank, 2 tanks, 3 tanks, 1 tank + temp., 2 tanks + temp., 3 tanks + temp., temperature	-	-	Everybody	Service

Parameter	Description	Factory settings	Possible settings	Min. value	Max. value	Read access right	Write access right
3-3-5	Leakage detection *Activating leakage monitoring*	Off	On, off	-	-	Everybody	Service
3-3-7	PumpMode int/ext *Setting for pump mode via HMI (internal) or switch (external)*	Internal	Internal, external	-	-	Everybody	Service
3-4	System settings *Parameterisation of system*	-	-	-	-	Everybody	Nobody
3-4-1	Inlet *Suction-side parameterisation*	-	-	-	-	Everybody	Nobody
3-4-1-1	Sensor press. 4 mA *Analog measured value at 4 mA, suction side*	0	-100.. 1000	-100	1000	Everybody	Service
3-4-1-2	Sensor press. 20 mA *Analog measured value at 20 mA, suction side*	1000	0.. 9999	0	9999	Everybody	Service
3-4-1-3	Damp. Time Inlet *Damping time for smoothing measured value to compensate for measurement peaks*	200	100.. 2000	100	2000	Factory	Factory
3-4-1-4	Level config *Configuring inlet tank control*	-	-	-	-	Everybody	Service
3-4-1-4-1	0% level *Minimum water level at which no air enters into tank, in percent, from upper edge of inlet nozzle*	0	0.. 99	0	99	Everybody	Service
3-4-1-4-2	100% level *Maximum water level of inlet tank, in percent, from upper edge of inlet nozzle*	200	0.. 999	0	999	Everybody	Service
3-4-1-4-3	Sensor level *Distance of sensor positioned above tank floor to tank floor, in centimetres*	0	-100.. 999	-100	999	Everybody	Service
3-4-1-4-4	Low level shut down *System stop when dry running level reached*	10	0.. 99	0	99	Everybody	Service
3-4-1-4-5	Low level reset *Resetting the system when defined dry running level is reached*	15	0.. 99	0	99	Everybody	Service
3-4-1-4-6	Critical water level *Threshold of critical water level in inlet tank*	30	0.. 99	0	99	Everybody	Service
3-4-1-4-7	High water level *Threshold of high water level in inlet tank*	105	0.. 199	0	199	Everybody	Service
3-4-1-4-8	Threshold *1 or 2 extra signalling relay contacts for switching thresholds*	-	-	-	-	Everybody	Service

Parameter	Description	Factory settings	Possible settings	Min. value	Max. value	Read access right	Write access right
3-4-1-4-8-1	Threshold 1 ON *Inlet tank level for relay 1 energised in percent*	50	0...199	0	199	Everybody	Service
3-4-1-4-8-2	Threshold 1 OFF *Inlet tank level for relay 1 de-energised in percent*	50	0...199	0	199	Everybody	Service
3-4-1-4-8-3	Threshold 2 ON *Inlet tank level for relay 2 energised in percent*	40	0...199	0	199	Everybody	Service
3-4-1-4-8-4	Threshold 2 OFF *Inlet tank level for relay 2 de-energised in percent*	40	0...199	0	199	Everybody	Service
3-4-1-4-9	Supply valve ON/OFF *Position of inflow gate valve for filling inlet tank*	-	-	-	-	Everybody	Nobody
3-4-1-4-9-1	Level 1 open *Level for opening gate valve to start filling inlet tank*	70	0.. 99	0	99	Everybody	Service
3-4-1-4-9-2	Level 1 closed *Level for closing gate valve to stop filling inlet tank*	90	0.. 99	0	99	Everybody	Service
3-4-1-4-9-3	Level 1A open *Second level (timer-based) for opening gate valve to start filling*	40	0.. 99	0	99	Everybody	Service
3-4-1-4-9-4	Level 1A closed *Second level (timer-based) for closing gate valve to stop filling*	60	0.. 99	0	99	Everybody	Service
3-4-1-4-10	Supply valve prop. *Use of a proportional valve to fill inlet tank*	-	-	-	-	Everybody	Nobody
3-4-1-4-10-1	Level setpoint 1 *Level in inlet tank at which valve is completely closed*	80	0.. 99	0	99	Everybody	Service
3-4-1-4-10-2	Level setpoint 1A *Second level (timer-based) in inlet tank at which valve is completely closed*	40	0.. 99	0	99	Everybody	Service
3-4-1-4-10-3	Hysteresis *Setting the hysteresis for fully open valve*	15	0.. 99	0	99	Everybody	Service
3-4-1-4-10-4	Sample time *Measurement cycle for measuring to control proportional valve*	10	0.. 99	0	99	Everybody	Service
3-4-1-4-10-5	Analog output *Configuring the analog output*	4-20mA	4-20mA, 0-20mA	-	-	Everybody	Service

Parameter	Description	Factory settings	Possible settings	Min. value	Max. value	Read access right	Write access right
3-4-1-5	Auto. Setpoint Redu. *Automatic setpoint reduction in case of inlet pressure drop*	-	-	-	-	Everybody	Nobody
3-4-1-5-1	ASR function *Automatic setpoint reduction in case of inlet pressure drop*	Off	Off, on	-	-	Everybody	Service
3-4-1-5-2	Switch on point *Re-start point*	200	100.. 400	100	400	Everybody	Service
3-4-1-5-3	Inlet Set point *Entering the minimum inlet pressure setpoint*	100	0.. 400	0	400	Everybody	Service
3-4-1-5-4	Switch off point *Stop point*	90	0.. 100	0	100	Everybody	Service
3-4-1-5-5	Proportional const. *Proportional constant of PID controller*	3	0.. 10	0	10	Everybody	Service
3-4-1-5-6	Integral time *Integral constant of PID controller*	1	0.. 60	0	60	Everybody	Service
3-4-1-5-7	Differential time *Differential constant of PID controller*	0	0.. 99	0	99	Everybody	Service
3-4-1-5-9	Switch On time *Time to pump start*	5	0.. 60	0	60	Service	Service
3-4-1-5-10	Switch Off time *Time to pump stop*	5	0.. 60	0	60	Service	Service
3-4-2	Discharge *Discharge-side parameterisation*	-	-	-	-	Everybody	Service
3-4-2-1	Sensor press. 4 mA *Analog measured value at 4 mA, discharge side*	0	-100.. 1000	-100	1000	Everybody	Service
3-4-2-2	Sensor press. 20 mA *Analog measured value at 20 mA, discharge side*	1000	0.. 9999	0	9999	Everybody	Service
3-4-2-3	Pumps ON sensor fail *Number of pumps started up in the event of a sensor failure on the discharge side*	0	0.. 3	0	3	Everybody	Service
3-4-2-4	Max power *Limitation of maximum system power (n x 100 %, n = number of pumps)*	600	0.. 600	0	600	Everybody	Service
3-4-2-5	Max power ext. oper. *Limitation of maximum system power for operation on emergency power*	600	0.. 600	0	600	Everybody	Service
3-4-3	Variable freq. drive *Configuring the frequency inverters*	-	-	-	-	Everybody	Nobody

Parameter	Description	Factory settings	Possible settings	Min. value	Max. value	Read access right	Write access right
3-4-3-1	Communication *Configuring the communication protocol for the frequency inverter*	None	None, analog 4-20 mA, analog 0-20 mA, PumpDrive, Danfoss VLT 2800, Danfoss MicroDrive, Danfoss AquaDrive	-	-	Everybody	Service
3-4-3-2	Proportional const. *Proportional constant of PID controller*	3	0.. 100	0	100	Everybody	Service
3-4-3-3	Integral time *Integral constant of PID controller*	1	0.. 60	0	60	Everybody	Service
3-4-3-4	Differential time *Differential constant of PID controller*	0	0.. 99,99	0	99,99	Everybody	Service
3-4-3-5	No flow detection *Accuracy with which a minimum flow is detected (procedure for stopping the pumps)*	-	-	-	-	Everybody	Service
3-4-3-5-1	No flow bandwith *Bandwidth of flow detection*	6	0.. 50	0	50	Service	Service
3-4-3-5-2	No flow time *Flow detection time in seconds*	16	0.. 60	0	60	Service	Service
3-4-3-5-3	No flow step *Step height of flow detection in percent*	1	1.. 50	1	50	Service	Service
3-4-3-5-4	No flow max. power *Flow detection is active below this pump load in percent*	100	0.. 100	0	100	Service	Service
3-4-4	WSD settings *Configuring water flow detection*	-	-	-	-	Everybody	Nobody
3-4-4-1	Nbr of refreshments *Number of water replacement cycles*	30	0.. 99	0	99	Everybody	Service
3-4-4-2	Refresh time span *Duration of water replacement procedure in hours*	24	0.. 999	0	999	Everybody	Service
3-4-4-3	Average room temp. *Measured average ambient temperature*	25	0.. 50	0	50	Everybody	Service
3-4-4-4	Room temp. time span *Duration of ambient temperature measurement in hours*	24	0.. 999	0	999	Everybody	Service
3-5	Pressure *Configuring the system pressure*	-	-	-	-	Everybody	Nobody
3-5-1	Set point *Entering the pressure setpoint (system pressure)*	400	0.. 1000	0	1000	Everybody	Customer

Parameter	Description	Factory settings	Possible settings	Min. value	Max. value	Read access right	Write access right
3-5-3	Bandwidth *Bandwidth within which the frequency inverters remain at the same, constant speed independent of pressure.*	5	0.. 999	0	999	Everybody	Customer
3-5-4	Accumulation press. *Procedure for increasing pressure in the accumulator before the system stops*	30	0.. 999	0	999	Everybody	Customer
3-5-5	Max.set point *Limit value for maximum setpoint*	1000	400.. 1000	400	1000	Everybody	Service
3-5-9	Adapt. setpoint *Date/time-based alternative setpoint*	400	0.. 1000	0	1000	Everybody	Customer
3-5-10	Delta p Dynamic pressure compensation *Quadratic function for correcting the setpoint*	0	-999.. 999	-999	999	Everybody	Customer
3-5-11	High pressure alarm *Upper limit value for maximum system pressure*	1000	400.. 1000	400	1000	Everybody	Customer
3-5-12	High pressure action *Parameter for selecting action in case of excessively high system pressure (stop pumps or output message only)*	Stop pumps	Stop pumps, message only	-	-	Everybody	Customer
3-5-13	Low pressure alarm *Lower limit value for minimum system pressure*	0	0.. 400	0	400	Everybody	Customer
3-5-14	Low pressure action *Parameter for selecting action in case of excessively low system pressure (stop pumps or output message only)*	Stop pumps	Stop pumps, message only	-	-	Everybody	Customer
3-5-15	Shut down RDP *Minimum suction-side pressure limit for dry running protection*	20	0.. 80	0	80	Everybody	Customer
3-5-16	Reset RDP *Suction-side pressure for re-start following dry running occurrence*	80	20.. 999	20	999	Everybody	Customer
3-5-17	Press. Flow Control *Lack-of-water fault is set if setpoint minus pressure defined is undershot.*	100	0.. 1000	0	1000	Everybody	Service
3-6	Timer settings *Configuring the time parameters*	-	-	-	-	Everybody	Nobody
3-6-1	Opt. pump starts /h *Entering the optimal pump starts per hour. The pump runtime is adjusted automatically.*	10	0.. 99	0	99	Everybody	Service

Parameter	Description	Factory settings	Possible settings	Min. value	Max. value	Read access right	Write access right
3-6-2	Min. run time *Limit for minimum runtime of pump*	180	0.. 999	0	999	Everybody	Customer
3-6-3	Min. run time corr. *Correction value for minimum runtime of pump*	10	0.. 99	0	99	Everybody	Service
3-6-4	Max. run time *Maximum pump runtime.* *After the time has lapsed, the system switches over to the next pump.*	86400	0.. 604800	0	604800	Everybody	Service
3-6-5	Start delay *Start delay of pumps if pressure remains below setpoint*	1	0.. 999	0	999	Everybody	Service
3-6-6	Stop delay *Stop delay of pumps if pressure remains at setpoint*	1	0.. 999	0	999	Everybody	Service
3-6-8	RDP delay *Stop delay following detection of dry running occurrence*	10	0.. 999	0	999	Everybody	Service
3-6-9	High/low alarm delay *Time window for suppressing alerts when system pressure is exceeded/undershot*	60	10.. 999	10	999	Everybody	Service
3-6-10	WSD 1 pulse length *Water flow detection 1, length of pulse in seconds*	4	0.. 99	0	99	Everybody	Service
3-6-11	WSD 2 pulse length *Water flow detection 2, length of pulse in seconds*	4	0.. 99	0	99	Everybody	Service
3-6-12	WSD 3 pulse length *Water flow detection 3, length of pulse in seconds*	4	0.. 99	0	99	Everybody	Service
3-6-13	Sys. start up delay *Start delay following re-start*	10	0.. 32	0	32	Service	Service
3-7	Time/Date *Date and time*	-	-	-	-	Everybody	Nobody
3-7-1	Date *Setting the date*	-	-	-	-	Everybody	Customer
3-7-1.1.1	Year *Setting the year*	...	1970.. 2099	1970	2099	Everybody	Customer
3-7-1.1.2	Month *Setting the month*	1	1.. 12	1	12	Everybody	Customer
3-7-1.1.3	Day *Setting the day of the week*	1	1.. 31	1	31	Everybody	Customer
3-7-2	Time *Setting the time*	-	-	-	-	Everybody	Customer

Parameter	Description	Factory settings	Possible settings	Min. value	Max. value	Read access right	Write access right
3-7-2.1.1	Time *Setting the time in the format HH:MM:SS*	0	0.. 86399	0	86399	Everybody	Customer
3-7-3	Check run mode *Basic setting for forced start (check run)*	Interval	Off, digital input, interval, day-based, week-based	-	-	Everybody	Customer
3-7-4	Check run interval *Interval-controlled forced start (check run); the pumps are started at fixed, defined intervals.*	86400	0.. 1000000	0	1000000	Everybody	Service
3-7-5	Check run at *Day-controlled forced start (check run); the pumps are started at a defined time*	-	-	-	-	Everybody	Customer
3-7-5.1.1	Hours *Hours for daily forced start (check run)*	0	0.. 23	0	23	Everybody	Customer
3-7-5.1.2	Minutes *Minutes for daily forced start (check run)*	0	0.. 59	0	59	Everybody	Customer
3-7-6	Check run at *Weekly forced start (check run): at a defined time on specific days*	-	-	-	-	Everybody	Customer
3-7-6.1.1	Hours *Weekly forced start (check run): at a defined time (hours) on specific days*	_	0.. 23	0	23	Everybody	Customer
3-7-6.1.2	Minutes *Weekly forced start (check run): at a defined time (minutes) on specific days*	_	0.. 59	0	59	Everybody	Customer
3-7-6.1.3	Day *Weekly forced start (check run): at a defined time on a specific day*	Sunday	Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday	-	-	Everybody	Customer
3-7-7	Check run duration *Specifying the duration of the forced start (check run)*	30	0.. 30	0	30	Everybody	Service
3-7-9	Date adapt level On *The alternative fill level is activated in accordance with day(s)/month(s).*	-	-	-	-	Everybody	Customer

Parameter	Description	Factory settings	Possible settings	Min. value	Max. value	Read access right	Write access right
3-7-9.1.1	Month adapt level On *Entering the month in which the alternative fill level is activated*	Off	Off, January, February, March, April, May, June, July, August, September, October, November, December	-	-	Everybody	Customer
3-7-9.1.2	Day adapt level On *Entering the weekday on which the alternative fill level is activated*	1	1.. 31	1	31	Everybody	Customer
3-7-10	Date adapt level Off *Entering the date on which the alternative fill level is deactivated*	-	-	-	-	Everybody	Customer
3-7-10.1.1	Month adapt lev Off *Entering the month in which the alternative fill level is deactivated*	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 *Entering the weekday on which the alternative fill level is deactivated*	1	1.. 31	1	31	Everybody	Customer
3-7-11	Maintenance interval *Configuring the maintenance interval for the system in days*	0	0.. 3000	0	3000	Service	Service
3-7-8	Clock adapt setp. *Alternative setpoint to take effect based on time*	-	-	-	-	Everybody	Nobody
3-7-8-1	Adaptation mode *Configuring the alternative setpoint to take effect on a daily or weekly basis*	Off	Off, weekly, daily	-	-	Everybody	Customer

Parameter	Description	Factory settings	Possible settings	Min. value	Max. value	Read access right	Write access right
3-7-8-2	Change on/off times *The alternative pressure setpoint is activated/deactivated.*	-	-	-	-	Everybody	Customer
3-7-8-2.1.1	Hours adapt setp.ON *Entering the hours when the alternative pressure setpoint is activated*	0	0.. 23	0	23	Everybody	Customer
3-7-8-2.1.2	Min adapt setp.ON *Entering the minutes when the alternative pressure setpoint is activated*	0	0.. 59	0	59	Everybody	Customer
3-7-8-2.1.3	Hours adapt setp.OFF *Entering the hours when the alternative pressure setpoint is deactivated*	0	0.. 23	0	23	Everybody	Customer
3-7-8-2.1.4	Min adapt setp.OFF *Entering the minutes when the alternative pressure setpoint is deactivated*	0	0.. 59	0	59	Everybody	Customer
3-7-8-3	Select day of week *Entering the weekday on which the alternative pressure setpoint is activated*	Sunday	Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday	-	-	Everybody	Customer
3-7-8-4	Change on/off times *Entering the weekday on which the alternative pressure setpoint is deactivated*	-	-	-	-	Everybody	Customer
3-7-8-4.1.1	Hours adapt setp.ON *Entering the hours when the alternative pressure setpoint is activated*	0	0.. 23	0	23	Everybody	Customer
3-7-8-4.1.2	Min adapt setp.ON *Entering the minutes when the alternative pressure setpoint is activated*	0	0.. 59	0	59	Everybody	Customer
3-7-8-4.1.3	Hours adapt setp.OFF *Entering the hours when the alternative pressure setpoint is deactivated*	0	0.. 23	0	23	Everybody	Customer
3-7-8-4.1.4	Min adapt setp.OFF *Entering the minutes when the alternative pressure setpoint is deactivated*	0	0.. 59	0	59	Everybody	Customer
3-8	Definable I/O *Programming inputs/outputs*	-	-	-	-	Service	Service
3-8-1	Inputs *Inputs*	-	-	-	-	Service	Nobody

Parameter	Description	Factory settings	Possible settings	Min. value	Max. value	Read access right	Write access right
3-8-1-1	Input 1 *Configuration of input 1*	None	None, forced start (check run), alt. setpoint, leakage, remote acknowledgement, bypass valve, emergency power	-	-	Service	Service
3-8-1-2	Input 2 *Configuration of input 2*	None	None, forced start (check run), alt. setpoint, leakage, remote acknowledgement, bypass valve, emergency power	-	-	Service	Service
3-8-1-3	Input 3 *Configuration of input 3*	None	None, forced start (check run), alt. setpoint, leakage, remote acknowledgement, bypass valve, emergency power	-	-	Service	Service
3-8-2	Outputs *Outputs*	-	-	-	-	Service	Nobody
3-8-2-1	Output 1 (P4) *Configuration of output 1*	None	None, threshold 1, threshold 2, supply valve, bypass valve, lack of water	-	-	Service	Service
3-8-2-2	Output 2 (P5) *Configuration of output 2*	None	None, threshold 1, threshold 2, supply valve, bypass valve, lack of water	-	-	Service	Service
3-8-2-3	Output 3 (P6) *Configuration of output 3*	None	None, threshold 1, threshold 2, supply valve, bypass valve, lack of water	-	-	Service	Service

Parameter	Description	Factory settings	Possible settings	Min. value	Max. value	Read access right	Write access right
3-8-2-4	Output 4 (FR4) *Configuration of output 4*	None	None, threshold 1, threshold 2, supply valve, bypass valve, lack of water	-	-	Service	Service
3-8-2-5	Output 5 (FR5) *Configuration of output 5*	None	None, threshold 1, threshold 2, supply valve, bypass valve, lack of water	-	-	Service	Service
3-8-2-6	Output 6 (FR6) *Configuration of output 6*	None	None, threshold 1, threshold 2, supply valve, bypass valve, lack of water	-	-	Service	Service
3-9	Messages *Messages*	-	-	-	-	Service	Nobody
3-9-1	Message Settings *List of all alerts*	-	-	-	-	Service	Service
3-9-1.1.1	failure id *Fault ID*	-		-	-	Service	Service
3-9-1.2.1	Traffic Light *Assignment of fault as warning or alert*	Red	Green, amber, red	-	-	Service	Service
3-9-1.2.2	Fault on Hold *Without/with automatic reset (re-start)*	Off	Off, on	-	-	Service	Service
3-10	Root menu *Configuring the main menu*	-	-	-	-	Customer	Nobody
3-10-1.1	Root Menu Settings *List of all main menu elements*	-	-			Customer	Everybody
3-10-1.2	Root Menu Settings *List of all main menu elements*	-	-	-	-	Develop	Develop
3-10-1.2.1	rootmenu selection *Root menu selection*	1	1.. 65	1	65	Develop	Develop
3-10-1.2.1	Traffic Light *Assignment of fault as warning or alert*	Off	Off, on	-	-	Develop	Develop
3-11	Energy Saving Mode *Energy-saving mode*	-	-	-	-	Service	Nobody
3-11-1	Energy Saving Mode *Energy-saving mode*	Off	Off, on	-	-	Service	Service

Parameter	Description	Factory settings	Possible settings	Min. value	Max. value	Read access right	Write access right
3-11-2	direct off *Energy-saving mode is carried out without zero-flow detection function.*	Off	Off, on	-	-	Service	Service
3-11-3	Power down speed % *Calculated stop speed if zero-flow detection is activated in energy-saving mode (in %)*	30	1.. 99	1	99	Service	Service
3-11-4	time direct off *Time after which the energy-saving mode is carried out without the zero-flow detection function*	5	0.. 9999	0	9999	Service	Service
3-12	FC failure behavior *Frequency inverter fault behaviour*	-	-	-	-	Everybody	Service
3-12-1	behavior *Behaviour*	Off	Off, cascade (without frequency inverter)	-	-	Service	Service
3-12-2	Fixed Speed *Cascade (without frequency inverter)*	-	-	-	-	Service	Nobody
3-12-2-1	Max power *Limitation of maximum system power (n x 100 %, n = number of pumps)*	300	0.. 600	0	600	Service	Service
3-12-2-2	Set point *Entering the pressure setpoint (system pressure)*	400	0.. 1000	0	1000	Service	Customer
3-12-2-3	Bandwidth *Bandwidth*	30	0.. 999	0	999	Service	Customer
3-12-2-4	Min. run time *Limit for minimum runtime of pump*	30	0.. 999	0	999	Service	Customer
3-12-2-5	Max. run time *Maximum pump runtime. After the time has lapsed, the system switches over to the next pump.*	86400	0.. 356400	0	356400	Service	Service
3-12-2-6	Start delay *Start delay of pumps if pressure remains below setpoint*	2	0.. 999	0	999	Service	Service
3-14	By Pass Valve *Bypass valve*	-	-	-	-	Everybody	Service
3-14-1	Valve Function *Activating/deactivating the valve function*	Off	Off, forced start (check run), Pt1000, digital input	-	-	Everybody	Service

Parameter	Description	Factory settings	Possible settings	Min. value	Max. value	Read access right	Write access right
3-14-2	Open delay *Delay time that lapses before valve is opened*	2	0.. 20	0	20	Everybody	Service
3-14-3	Close delay *Delay time that lapses before valve is closed*	2	0.. 20	0	20	Everybody	Service
3-14-4	Temperature *Temperature above which the valve is opened*	20	0.. 40	0	40	Everybody	Service
3-14-5	Flush Time *Time window in which the valve is opened*	120	10.. 600	10	600	Everybody	Service
3-14-6	Attemps in 24Hrs *Valve opening frequency before an alert is displayed*	2	1.. 5	1	5	Everybody	Service
3-14-7	Min. open time *Minimum opening time of valve*	2	0.. 20	0	20	Everybody	Service
3-15	Fieldbus *Field bus settings*	-	-	-	-	Customer	Nobody
3-15-1	Profibus *Profibus settings*	-	-	-	-	Customer	Nobody
3-15-1-1	PB Slave Address *Profibus slave address*	126	1.. 255	1	255	Customer	Customer
3-15-2	Modbus *Modbus settings*	-	-	-	-	Customer	Nobody
3-15-2-1	MB Slave Address *Modbus slave address*	247	1.. 247	1	247	Customer	Customer
3-15-2-2	Baudrate *Baud rate*	192	9600,192	-	-	Customer	Customer
4	Info *Information*	-	-	-	-	Everybody	Nobody
4-1	Device *Control module (CM)*	-	-	-	-	Everybody	Nobody
4-1-1	Serial Number *Serial number of control module*	-	-	-	-	Everybody	Nobody
4-1-2	Parameter Set *Version of the control panel parameter set*	0	-	-	-	Everybody	Everybody
4-2	IO Info *IO information on internal communications unit*	-	-	-	-	Everybody	Nobody
4-2-1	IO Serial Number *IO information on serial number of internal communications unit*	-	-	-	-	Everybody	Nobody

Parameter	Description	Factory settings	Possible settings	Min. value	Max. value	Read access right	Write access right
4-2-2	IO FW-Version *IO information on firmware of internal communications unit*	-	-	-	-	Everybody	Nobody
4-2-3	IO FW-Revision *IO information on revision of internal communications unit*	-	-	-	-	Everybody	Nobody
4-2-4	IO HW-Revision *IO information on hardware of internal communications unit*	-	-	-	-	Everybody	Nobody
4-3	HMI Info *IO information on HMI*	-	-	-	-	Everybody	Everybody
4-3-1	HMI Serial Number *IO information on serial number of HMI*	-	-	-	-	Everybody	Nobody
4-3-2	HMI FW-Version *IO information on firmware of HMI*	-	-	-	-	Everybody	Nobody
4-3-3	HMI FW-Revision *IO information on revision of HMI*	-	-	-	-	Everybody	Nobody
4-3-4	HMI HW-Revision *IO information on hardware of HMI*	-	-	-	-	Everybody	Nobody
4-4	Profibus Info *Information on Profibus used*	-	-	-	-	Everybody	Everybody
4-4-1	PB FW-Version *Information on firmware of Profibus*	-	-	-	-	Everybody	Nobody
4-4-2	PB FW-Revision *Information on firmware of Profibus*	-	-	-	-	Everybody	Nobody
4-4-3	PB HW-Revision *Information on hardware of Profibus*	-	-	-	-	Everybody	Nobody
4-5	Modbus Info *Information on Modbus used*	-	-	-	-	Everybody	Everybody
4-5-1	MB FW-Version *Information on firmware of Modbus*	-	-	-	-	Everybody	Nobody
4-5-2	MB FW-Revision *Information on revision of Modbus*	-	-	-	-	Everybody	Nobody
4-5-3	MB HW-Revision *Information on hardware of Modbus*	-	-	-	-	Everybody	Nobody
5	Quickmenu *Information on quick menu*	-	-	-	-	Everybody	Nobody

8.7 Quick menu

The following main parameters, which may be required for adapting the pressure booster system to site conditions, can be called directly via the Quick Menu, which can be accessed directly from the start screen by pressing the OK key:

- PIN
- Proportional constant
- Integral constant
- Differential constant
- Setpoint
- Bandwidth
- Accumulator pressure
- Delta P
- High pressure alarm
- Low pressure alarm
- Min. run time
- Start delay
- Stop delay
- RDP delay
- High/low alarm delay

8.8 Saving and restoring settings

Users have to be logged in at "Customer" level to save and restore settings.

8.8.1 Saving settings

The changes made to the control unit parameters at the site can be saved under 3-2-2-4.

8.8.2 Restoring settings

Three types of settings can be restored if the system does not operate any more as a result of incorrect settings made at the site.

- Parameter 3-2-2-1 Resetting to factory settings. The control unit is reset to the values and settings the pressure booster system was delivered with.
- Parameter 3-2-2-3: Resetting to the site-specific settings.
- Parameter 3-2-2-6: Resetting to default settings (*"Factory" level* only). The control unit is reset to the pressure booster system type (no settings for pressure, dry running protection, etc.)

8.9 Fault messages

Table 15: 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 water 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	-	✗

Fault message	Description	Type of message	
		Warning	Alert
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 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)	-	✗
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 system stop active	✗	-
Fire alarm	External fire alert command for starting all pumps active	-	✗
Failure VFD	Fault, frequency inverter	-	✗
Br. Wire Sens.dis	Fault, discharge-side pressure sensor	-	✗
Br. Wire Sens.Inl	Fault, suction-side pressure sensor	-	✗
Leakage	Leak detected	-	✗
Eeprom HW Error	EEPROM data not saved due to hardware problems	-	✗
Manual off Pump 1	Pump 1 stopped (independent of automatic mode)	✗	-
Manual off Pump 2	Pump 2 stopped (independent of automatic mode)	✗	-
Manual off Pump 3	Pump 3 stopped (independent of automatic mode)	✗	-
Manual off Pump 4	Pump 4 stopped (independent of automatic mode)	✗	-
Manual off Pump 5	Pump 5 stopped (independent of automatic mode)	✗	-
Manual off Pump 6	Pump 6 stopped (independent of automatic mode)	✗	-
Manual On Pump 1	Pump 1 in manual mode (independent of automatic mode)	✗	-
Manual On Pump 2	Pump 2 in manual mode (independent of automatic mode)	✗	-
Manual On Pump 3	Pump 3 in manual mode (independent of automatic mode)	✗	-
Manual On Pump 4	Pump 4 in manual mode (independent of automatic mode)	✗	-

Fault message	Description	Type of message	
		Warning	Alert
Manual On Pump 5	Pump 5 in manual mode (independent of automatic mode)	✗	-
Manual On Pump 6	Pump 6 in manual mode (independent of automatic mode)	✗	-
More Pumps off	Several pumps stopped (independent of automatic mode)	✗	-
Flushing	Flushing procedure in progress	✗	-
Valve opened oftenly	Several flushing procedures carried out	✗	-
Ext. Power Operation	Emergency power mode active; maximum system load limited	✗	-
Setpoint Reduction	Setpoint reduced due to drop in inlet pressure	✗	-
Factory Test	No test carried out in factory	-	✗
ASR Shutdown	Cancellation of automatic setpoint reduction	-	✗

8.10 Connecting the Remote OFF contact

The remote-OFF connection is a NC contact. When this contact opens, all pumps which are in operation are sequenced out after the set stop delay, and a warning is output (yellow LED).
When this contact closes, the pumps are started up again in line with demand, and the warning is cleared.
Wiring see circuit diagram.

8.11 Connecting the fire alert

The fire alert connection is a NC contact. When this contact opens, all pumps are sequenced in after the set start delay and an alert (red LED) is output. The dry running protection and remote-OFF functions are ignored.

When this contact closes, the pumps are sequenced out again in line with demand. The alert is cleared. Wiring see circuit diagram.

8.12 Charging the accumulator

The "Charge accumulator" function can be activated at parameter 3-5-4. Before the last pump stops the actual value is increased by the value entered here, in order to fill the accumulator located on the discharge side of the pressure booster system.
If "0" is entered the function is deactivated.

8.13 Energy-saving mode

In energy-saving mode (-> Parameter 3-11 ff.) the energetically inefficient operation of a single pump at minimum water consumption can be reduced.

CAUTION

Hunting (excessive starting/stopping) of pressure booster system

Damage to the pumps!

- ▹ Only activate the energy-saving mode if a sufficiently sized accumulator is fitted on the discharge side.

NOTE

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.

Making settings:

1. Close the discharge-side shut-off valve slowly until only a single pump is left running and delivering a small amount of water.
2. Read the pump load in parameter 1-1-2.
3. Activate "Charge accumulator" in parameter 3-5-4. (⇨ Section 8.12, Page 55)
4. Set parameter 3-11-1 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.
6. Enter the value read under item 2 in parameter 3-11-3.
7. Set parameter 3-11-4 to define the period the pump is to keep on running in order to charge the accumulator before stopping.
8. Keep changing parameters 3-11-3 and 3-11-4 to obtain the required pump stopping behaviour.

8.14 Flow detection

When only one pump is operated, the control unit checks whether a liquid volume is being pumped. To this end, the rotational speed is reduced slightly every 10 seconds. If the control unit detects that the actual value is within a settable bandwidth (-> parameter 3-4-3-5-1) during a settable period (-> parameter 3-4-3-5-2), the "Charge accumulator" function is carried out and the pump stops.

8.15 Connecting the ambient temperature monitoring device (option)

If ambient temperature monitoring has been selected under parameter 3-3-4, WSD, a Pt1000 sensor must be connected. The ambient temperature can be read on the display.
A warning can be output if a set temperature has been exceeded, see parameter 3-4-4-3.

NOTE

This function cannot be used in conjunction with digital inputs for remote reset, setpoint changeover and check run!

8.16 Digital inputs for remote reset, setpoint changeover and check run (option)

If "OFF" (standard setting) has been selected at parameter 3-3-4, WSD, the WSD inputs 1 to 3 can be used for the following functions:

- Remote reset, activated by pulse to terminals.
- Setpoint changeover (see parameter 3-5-9), activated by closing of contact, deactivated by opening of contact.
- Check run, pulse-activated.

NOTE

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

9 Servicing/Maintenance

9.1 General information/Safety regulations

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

DANGER

Unintentional start-up of pressure booster system

Danger to life!

- The pressure booster system must be de-energised before repair or maintenance work is carried out.
  Switching off the motor protection switch will **not de-energise the motor power cables reliably.**

WARNING

Improper lifting/moving of heavy assemblies or components

Personal injury and damage to property!

- Use suitable transport devices, lifting equipment and lifting tackle to move heavy assemblies or components.

WARNING

Unintentional start-up of pressure booster system

Risk of injury by moving parts!

- Make sure the pressure booster system has been de-energised before commencing work on the pressure booster system.
- Make sure that the pressure booster system cannot be started up unintentionally.

WARNING

Unqualified personnel performing work on the pressure booster system

Risk of personal injury!

- Always have repair and maintenance work performed by specially trained, qualified personnel.

CAUTION

Incorrectly serviced pressure booster system

Function of pressure booster system not guaranteed!

- 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.

Observe the general safety instructions and information.

Observe the operating manual of the pump when performing work on the pumps.

In the event of damage you can always contact our service staff.

A regular maintenance schedule will help avoid expensive repairs and contribute to trouble-free, reliable operation of the pressure booster system with a minimum of maintenance expenditure and work.

Never use force when dismantling and re-assembling the pressure booster system.

9.1.1 Inspection contract

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

Checklist for commissioning/inspection and maintenance (⇨ Section 7.3, Page 26)

9.2 Servicing/inspection

9.2.1 Supervision of operation

CAUTION

Increased wear due to dry running

Damage to the pump set!

- ▷ 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

Impermissibly high temperature of fluid handled

Damage to the pump!

- ▷ 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 system is in operation, observe and check the following:

- Check the test run (if activated).
- Compare the start and stop pressures of the pumps with the data on the name plate (using the pressure gauge).
- Compare the pre-charge pressure of the accumulator with the recommended data. (⇨ Section 9.2.3, Page 59)
  Close the shut-off elements under the accumulator and drain the accumulator via the drain valve.
  Remove the protective cap of the accumulator valve and check the pre-charge pressure with the aid of a tyre pressure gauge.
  Add nitrogen as necessary.

⚠ WARNING

Wrong gas

Danger of poisoning!

- ▷ Use only nitrogen to charge the accumulator.

- 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 correct functioning of any auxiliary connections.

9.2.2 Checklist for inspection

In the event that you decide to conduct your own inspections, proceed according to the following checklist at least once a year:

1. Check the pump and drive for smooth running and the mechanical seal for integrity.
2. Check the shut-off, drain and check valves for proper functioning and tightness.
3. Clean the strainer in the pressure reducer (if applicable).
4. Check expansion joints for wear (if applicable).
5. Verify the pre-charge pressure level and check the accumulator for integrity if required. (⇨ Section 9.2.3, Page 59)
6. Check the automatic switching functionality.
7. Check the start and stop points of the pressure booster system.
8. Check the water inflow, inlet pressure, lack-of-water monitoring, flow monitoring and pressure reducer.
9. Check the inlet tank and the float valve (if applicable). Check the overflow for integrity and cleanliness.

9.2.3 Setting the pre-charge pressure

⚠ WARNING

Wrong gas

Danger of poisoning!

- ▷ Use only nitrogen to charge the accumulator.

The pre-charge pressure in the accumulator should be set to a value below the set start-up pressure.
The setting can be effected via a valve located under the cover at the top of the accumulator.

Example: Pre-charge pressure 10 % lower than start-up pressure

Pre-charge pressure of accumulator p = 0.9 x p_{start}
p_{start} = start-up pressure of pressure booster system

Recommendation

The stated values are average values. Tests on accumulators have shown that the best storage volumes are achieved with the following factors:
pressures >3 bar: factor 0.9 and
pressures <3 bar: factor 0.8

Example:

p_{start} = 5 bar: pre-charge pressure 5 x 0.9 = 4.5 bar
p_{start} = 2 bar: pre-charge pressure 2 x 0.8 = 1.6 bar

CAUTION

Pre-charge pressure too high

Damage to accumulator!

- ▷ Observe data provided by accumulator manufacturer (see name plate or operating manual of accumulator).

10 Trouble-shooting

⚠ WARNING

Improper work to remedy faults

Risk of injury!

- ▷ For any work performed to remedy faults, observe the relevant information given in this operating manual and/or in the product literature provided by the accessories manufacturer.

NOTE

Before performing any work on the pump's internal parts during the warranty period please always consult the manufacturer. Our after-sales service will be at your disposal. Non-compliance will lead to forfeiture of any and all rights to claims for damages.

If problems occur that are not described in the following table, consultation with the KSB customer 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 16: Trouble-shooting

A	B	C	D	E	F	G	H	I	J	K	L	Possible cause	Remedy[1)]
-	-	✗	✗	-	-	-	✗	-	✗	-	-	Pumps and/or piping are not completely vented or primed.	Vent and/or prime.
✗	✗	✗	✗	✗	-	-	✗	-	-	✗	-	Shut-off valves (partially) closed	Check, open as necessary.
✗	-	-	✗	✗	-	-	-	-	✗	✗	-	Strainer clogged (inlet-side pressure reducer)	Clean.
✗	-	-	✗	✗	✗	-	-	-	✗	✗	-	Inlet-side pressure reducer set incorrectly	Check, adjust as necessary.
-	-	✗	✗	✗	-	-	✗	✗	✗	✗	-	Check valve in bypass line defective	Replace.
✗	✗	-	-	-	-	-	-	-	-	-	-	Inlet-side shut-off valve closed	Check, open as necessary.
-	✗	-	-	-	-	-	✗	-	✗	-	-	Discharge-side shut-off valve closed or defective	Check, open as necessary.
✗	-	-	✗	✗	-	-	✗	-	✗	✗	-	Inlet pressure lower than stated in the purchase order	Contact KSB.
-	✗	-	-	-	✗	-	-	-	-	-	-	Inlet pressure higher than stated in the purchase order	Contact KSB.
-	-	-	-	✗	-	-	-	-	✗	-	-	Start-up pressure set too high	Check setting.

1) The pump pressure must be released before attempting to remedy faults on parts which are subjected to pressure. Disconnect the pump from the power supply!

A	B	C	D	E	F	G	H	I	J	K	L	Possible cause	Remedy[1)]
-	✗	-	-	✗	✗	-	✗	-	✗	-	✗	Pressure transmitter set incorrectly or defective	Check setting.
-	-	-	-	-	-	-	✗	-	-	✗	✗	Pre-charge pressure of the accumulator too low	Restore nitrogen cushion.
-	-	-	-	-	-	-	✗	-	-	✗	✗	Defective accumulator	Check integrity/replace, if necessary.
-	-	-	-	-	-	✗	-	-	-	-	-	Defective mechanical seal	Replace.
✗	-	-	-	-	-	-	✗	-	✗	-	-	Suction-side pressure transmitter/ pressure switch set incorrectly or defective.	Check setting.
-	-	✗	✗	✗	-	-	✗	✗	✗	✗	-	Defective check valve in the pressure booster system	Check, replace sealing element as necessary.
-	-	-	-	✗	-	-	-	✗	✗	-	✗	Water extraction higher than stated in the purchase order	Contact KSB.
-	✗	-	-	-	-	-	-	✗	-	-	✗	Motor protection switch triggered or set incorrectly, or pump seized	Compare setting with the motor's rating plate data.
-	-	-	-	-	-	-	-	-	-	✗	-	Delay setting too short	Check setting.
-	✗	-	-	-	-	-	-	-	-	-	-	Mains supply interrupted	Check and remedy defect/check fuse.
-	✗	-	-	-	-	-	-	-	-	-	-	Control current fuse tripped (control cabinet)	Determine cause and reset.
-	✗	-	-	-	-	-	-	✗	-	-	-	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.
-	-	-	-	-	-	-	-	✗	-	-	-	Intermittent voltage fluctuations	Press reset and fault acknowledgement key.
-	✗	-	-	-	-	-	-	-	-	-	-	Phase failure	Check individual phases; replace fuse, if necessary.
✗	-	-	-	-	-	-	-	-	-	-	-	Inlet tank empty or float switch defective / disconnected	Check and remedy defect.

11 Related Documents

11.1 List of components

11.1.1 Surpresschrom SIC.2 V with acoustic cladding and Movitec 2, 4, 6, 10, 15

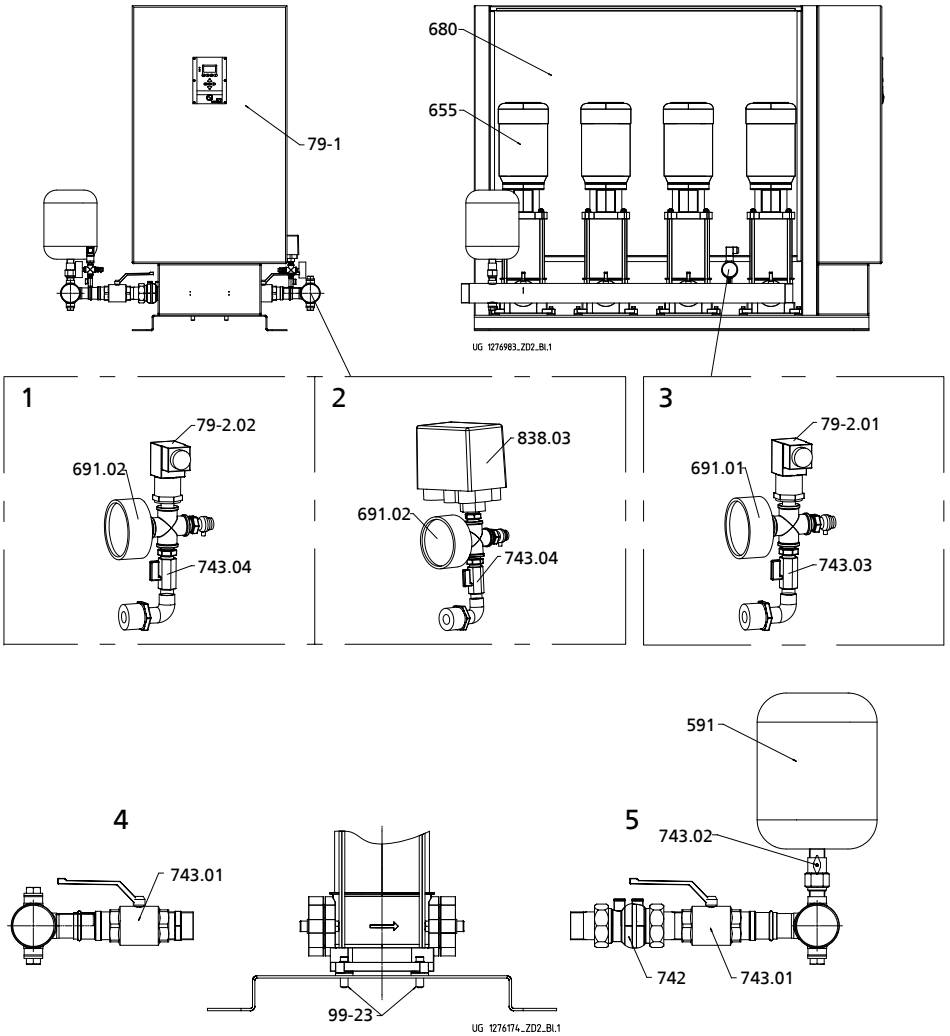


Fig. 9: Spare parts for Surpresschrom SIC.2 V with Movitec 2, 4, 6, 10, 15

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

Table 17: Spare parts for Surpresschrom SIC.2 V with Movitec 2, 4, 6, 10, 15

Part No.	Description	Ident. No.
591	Accumulator	01 079 764
655	Pumps see Spare Parts Programme	
680	Acoustic cladding see accessories	
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 $^{1}/_{4}$ (Movitec 6)	01 149 254
742	Lift check valve 1 $^{1}/_{2}$ (Movitec 10)	01 149 255
742	Lift check valve 2 (Movitec 15)	01 149 256

Part No.	Description	Ident. No.
743.01	Ball valve G 1 (Movitec 2, 4)	01 057 427
743.01	Ball valve G 1 $^1/_4$ (Movitec 6)	01 057 428
743.01	Ball valve G 1 $^1/_2$ (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 $^1/_4$	00 410 125
743.04	Ball valve G $^1/_4$	00 410 125
79-2.01	Measuring transducer 0 - 16 bar	01 533 185
79-2.02	Measuring transducer 0 - 10 bar	01 115 087
79-2.02	Measuring transducer 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
838.03	Pressure switch 0 - 11 bar	01 034 231
903	Set of screw plugs	On request
99-23	Installation set per pump	18 040 627

For electric parts refer to the circuit diagram in the Annex.

Non-documented parts on request (please indicate serial No. or order No.)

NOTE

Pump spare parts correspond to Movitec in standard design.

11.1.2 Surpresschrom SIC.2 V with acoustic cladding and Movitec 25, 40, 60, 90

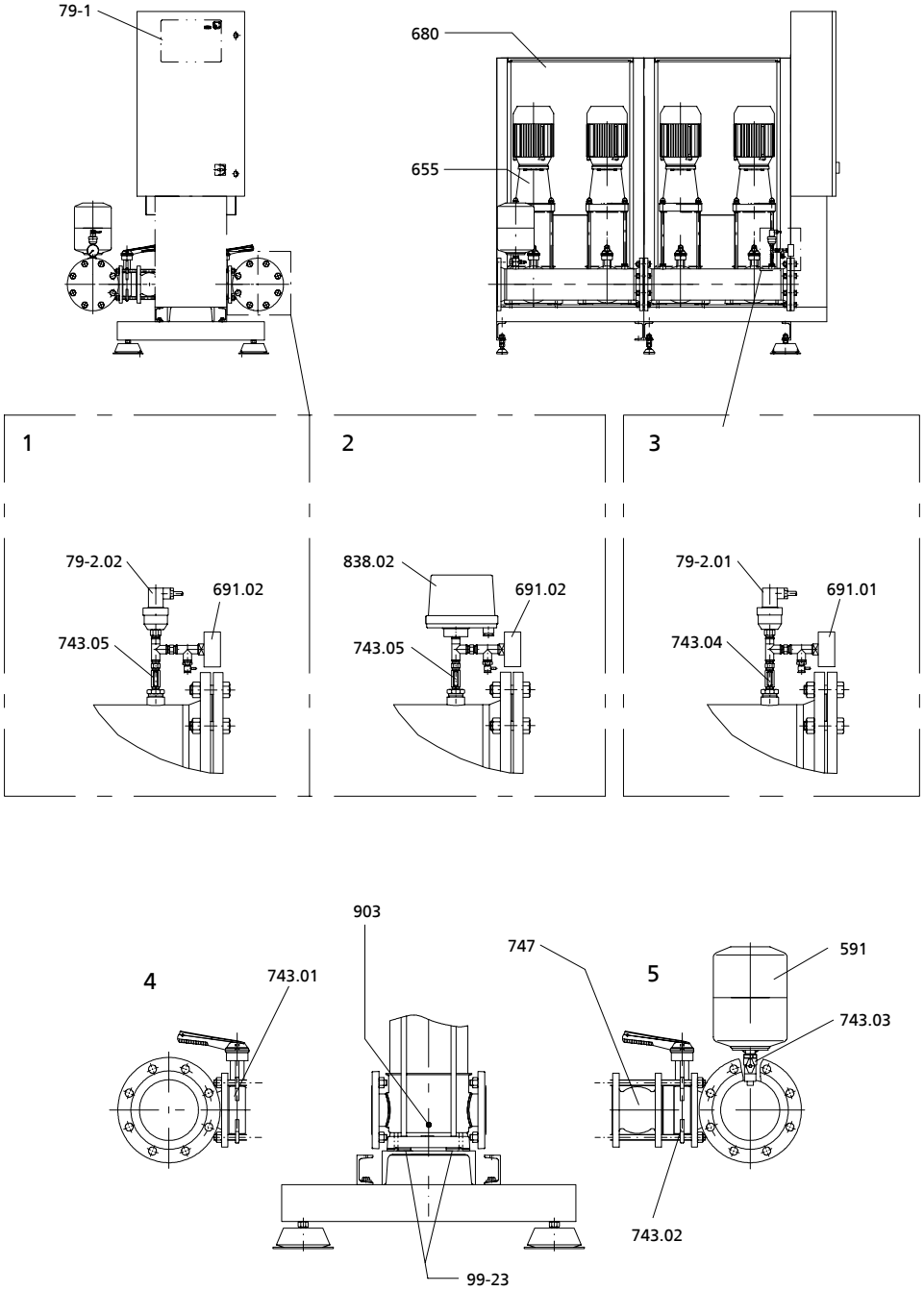


Fig. 10: Spare parts for Surpresschrom SIC.2 V with Movitec 25, 40, 60, 90

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

Table 18: Spare parts for Surpresschrom SIC.2 V with Movitec 25, 40, 60, 90

Part No.	Description	Ident. No.
591	Accumulator	01 079 764
655	Pumps see Spare Parts Programme	
680	Acoustic cladding see accessories	
691.01	Pressure gauge, indication 0 - 16 bar	00 401 413
691.02	Pressure gauge, indication 0 - 10 bar	00 401 414

Part No.	Description	Ident. No.
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 65, 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 65, 90)	42 087 768
743.03	Ball valve for accumulator	01 079 765
743.04	Ball valve G $^1/_4$	00 410 125
743.05	Ball valve G $^1/_4$	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 65, 90)	40 984 472
79-2.01	Measuring transducer 0 - 16 bar	01 533 185
79.2.02	Measuring transducer 0 - 10 bar	01 115 087
79-2.02	Measuring transducer 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

For electric parts refer to the circuit diagram in the Annex.

Non-documented parts on request (please indicate serial No. or order No.)

NOTE

Pump spare parts correspond to Movitec in standard design.

11.2 Flow diagram

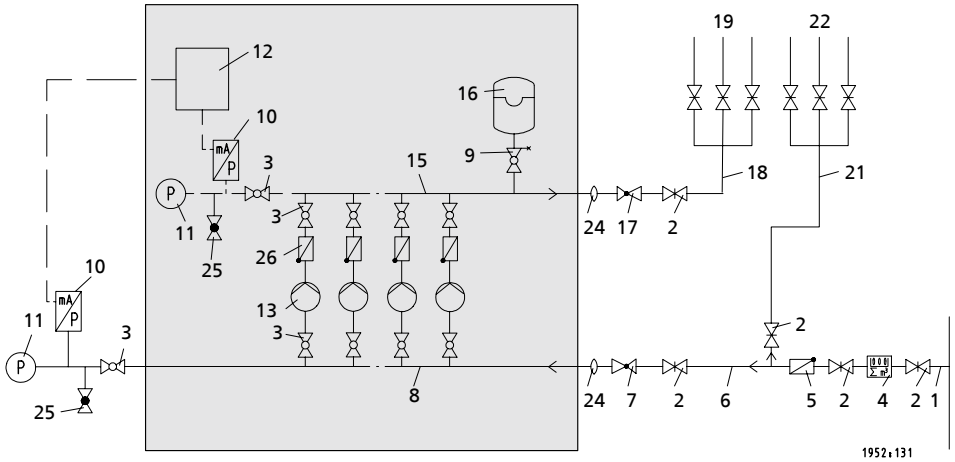
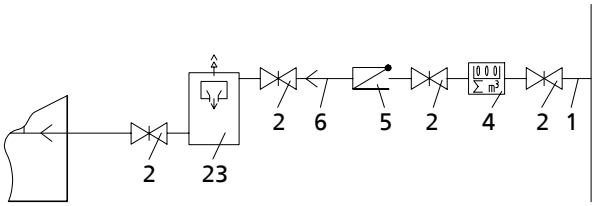


Fig. 11: Flow diagram for direct connection (grey box: KSB's scope of supply)



Surpress-chrom

Fig. 12: Surpresschrom flow diagram

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
20	By-pass line (for direct connection only)
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

12 EU Declaration of Conformity

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

The manufacturer herewith declares that **the product**:

Surpresschrom SIC.2
Surpresschrom SIC.2 V
Surpresschrom SIC.2 VP
Surpresschrom SIC.2 SVP

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

.....[2)].....

Name

Function

Company
Address

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

13 Certificate of Decontamination

Type: .....
Order number/
Order item number[3]: .....
Delivery date: .....
Field of application: .....
Fluid handled[3]: .....

Please tick where applicable[3]:

☐ Radioactive

☐ Explosive

☐ Corrosive

☐ Toxic

☐ Harmful

☐ Bio-hazardous

☐ Highly flammable

☐ Safe

Reason for return[3]: .....
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

3) Required fields

14 Commissioning Report

The KSB pressure booster system specified below was today commissioned by the undersigned authorised KSB customer service engineer 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 details please refer to the circuit diagram.

Start-up pressure	p_{start} bar	.....
Inlet pressure monitoring (setting of inlet pressure switch)	p_{inl} - x	.....
Stop pressure	p_{stop} bar	.....
Inlet pressure	p_{inl} bar	.....
Pre-charge pressure of accumulator	$p_{pre\text{-}charge}$ bar	.....

The system operator/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-conformities 1	.....
.....	.....
.....	.....
.....	.....

Name of KSB representative	Name of purchaser or representative
.....	.....
Place	Date
.....	.....

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1953.822/04-EN (01325375)

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