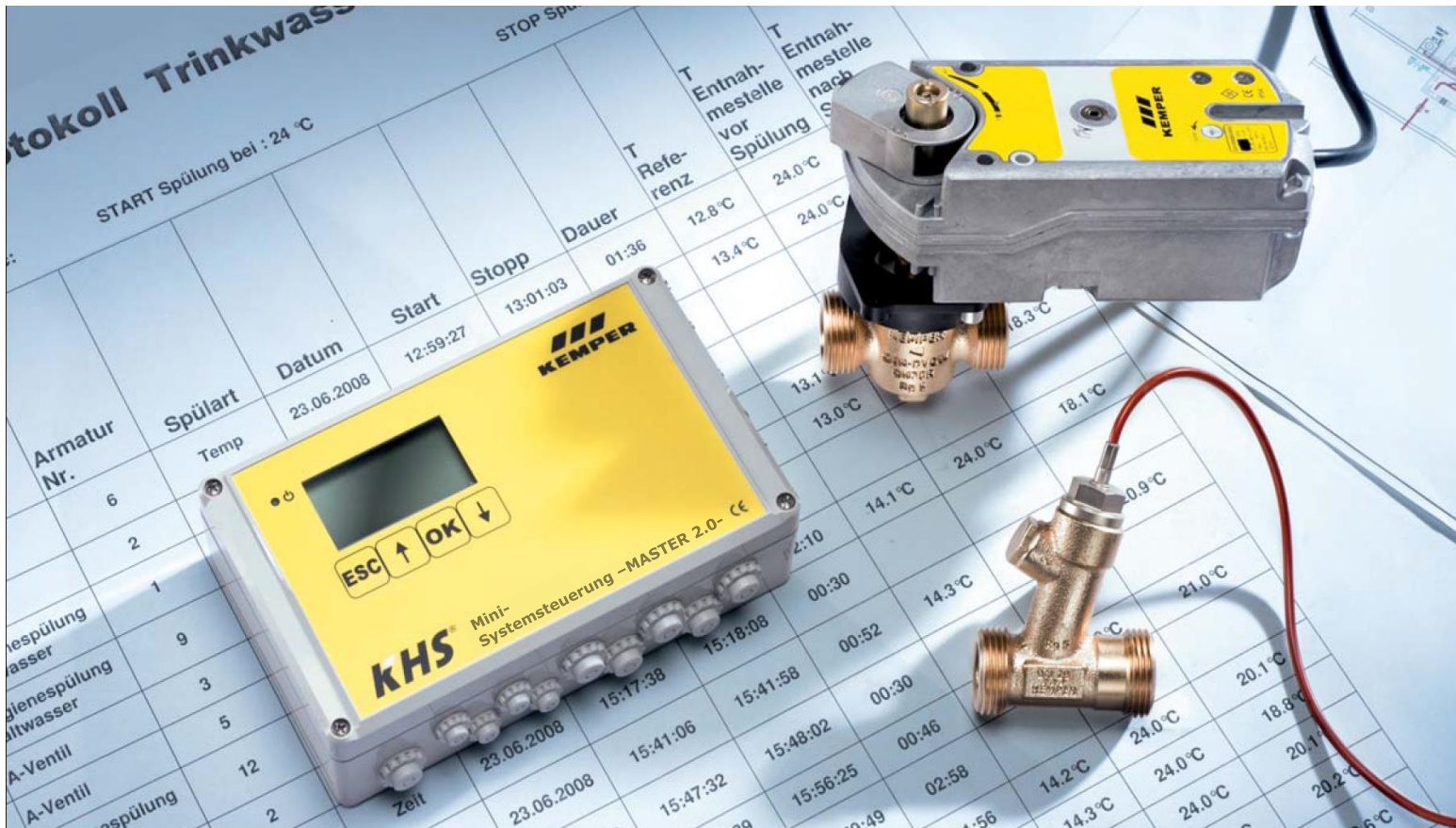


# **Installation and Operating instructions** **KEMPER KHS Mini Control System**

KHS Mini Control System MASTER 2.0  
 KHS Mini Control System SLAVE

*Figure 686 02 008*  
*Figure 686 02 006*



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## 1 INFORMATION



### 1.1 Precautions

For installation, maintenance and operation

#### Installation and operation

Read the manual and follow the instructions before installation!

Installation and maintenance must be carried out by qualified plumbers.

Provide the manual to the plant operator and keep on hand for further reference!

Make sure that the installation location is frost-proof and not prone to flooding.

Priority must be given to the national standards and provisions on sanitary installations and accident prevention.

#### Warranty

No warranty in case of:

- Non-compliance with the manual.
- Damage due to incorrect installation.
- Unauthorised modification of the product.

#### Use

Thanks to the MASTER/SLAVE technology, KHS Mini Control System can be used to implement specific water exchanging measures to maintain drinking water hygiene. For each individual water

exchange group, time or temperature-controlled water exchange can be configured individually or according to a specified water volume.

Only skilled professional personnel are permitted to operate electrical systems in accordance with DIN EN 50110-1.

Do not use the device for other purposes than described above in non-freezing interiors. Any other uses constitute misuse.

#### Warnings used in the manual:



##### Warning!

Highlights risks that may result in injury, material damage or contamination of drinking water.



##### Note!

Highlights risks that may result in damage to the plant or dysfunction.



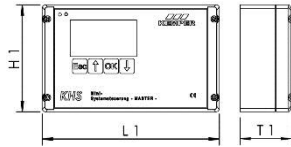
### 1.2 Important advice to the operator

- The reliability of the supplied unit is only ensured when used as intended. Never exceed the limits stated in this documentation under any circumstances
- During assembly and maintenance, make sure that the control is not switched on.
- Use only original/approved spare parts  
⇒ otherwise no warranty claims will be recognized.
- Be sure to comply to local regulations on waste recycling and disposal.

### 1.3 Technical Data

Technical Data	
Operating voltage	230V, AC, 50 / 60Hz
Power input for the unit	10 W
Relay flushing valve output	230 V, 2 A
Relay alarm output	max. 230 V, 2 A
CAN bus subscribers	max. 62
Logbook entries	max. 50,000
Datalogging entries	max. 12 million
Ambient temperature range	0 °C to + 50 °C
Degree of protection	IP 54
Dimensions	200 x 130 x 60 [mm]
Integrated user interface (display + 4 keys)	<ul style="list-style-type: none"> <li>▪ Settings</li> <li>▪ Configuration</li> <li>▪ System overview</li> <li>▪ Data transfer</li> </ul>
Network interface for web-based user interface	<ul style="list-style-type: none"> <li>▪ Settings</li> <li>▪ Configuration</li> <li>▪ System overview</li> <li>▪ Data transfer</li> <li>▪ E-mail management (fault message)</li> </ul>
USB interface for USB mass storage	<ul style="list-style-type: none"> <li>▪ Firmware update</li> <li>▪ Web server update</li> <li>▪ Reading out the flushing log</li> <li>▪ Reading out the logbook</li> <li>▪ Reading the configuration in and out</li> </ul>
Language menu	<ul style="list-style-type: none"> <li>▪ German</li> <li>▪ English</li> <li>▪ Dutch</li> </ul>
Operating modes	<ul style="list-style-type: none"> <li>➤ Time controlled water exchange</li> <li>➤ Temperature controlled water exchange</li> <li>➤ Volume controlled water exchange</li> <li>➤ Routine</li> <li>➤ Datalogging</li> <li>➤ Backup</li> </ul>
External switch function	<ul style="list-style-type: none"> <li>▪ Change program</li> <li>▪ System lock / Maintenance operation</li> </ul>

## 1.4 Scope of delivery | Accessories



Art.-No.	H1 [mm]	L1 [mm]	T1 [mm]
6860200800	120	200	58



	Fig.
	686 04
	686 05
	688 00
	628 0G
	138 4G
	685 15
	689 06 001
	689 06 002

## 2 Installation

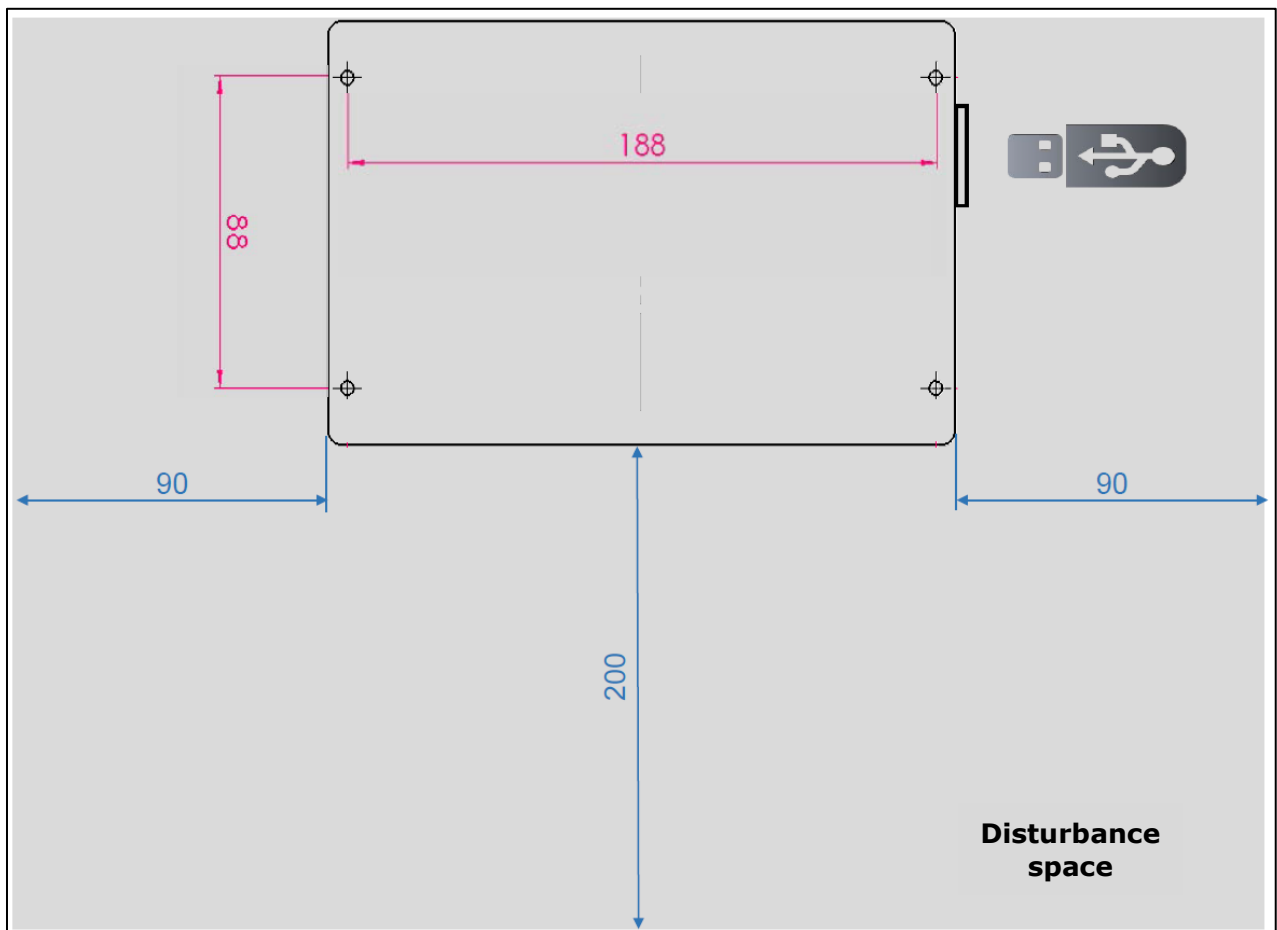


Allow only certified electricians to assemble and install electrical equipment.  
Danger of fatal electric shock.



Rigid leads must form a loop for wiring so that there is no pressure on the terminals and the housing closes without resistance.

### 2.1 Wall mounting



III. 1 Illustration of the mounting holes for wall installation

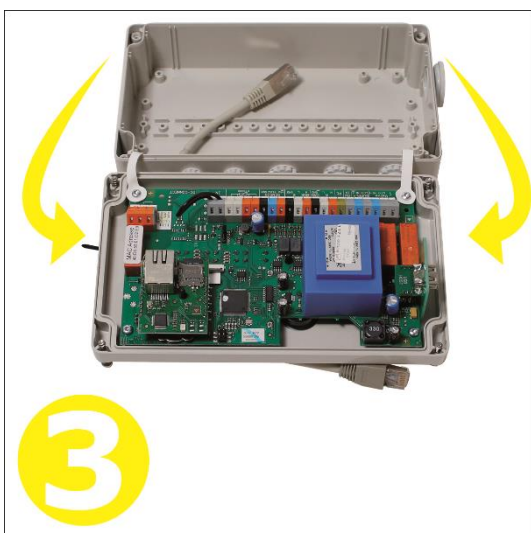


Please pay attention to the disturbance space when installing the Control System.

**Left-hand side:** Serial number of the KHS Mini Control System

**Right-hand side:** USB slot

## 2.2 Electrical installation


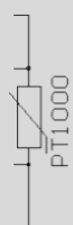





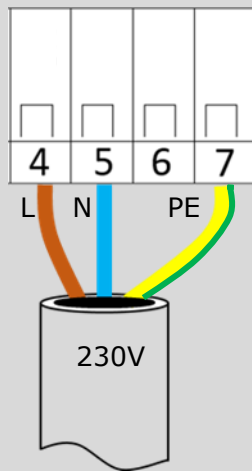
## 2.2.1 Connection of the components

GR	GR	BL	GR	BL	GR	GN	OR	NS	SM	OR	NS	SM	OR	BL	SM	OR	OR	NS	NS	GR	GR
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	17	18	19	20	21	22	23
Valve	L(+)	N(-)	SUPPLY	L(+)	N(-)	SW	PE	H	A	CAN-BUS	GND	H	L	B	GND	+5V	SENSOR	FLOW	GND	PT1000	IN

OR	OR	OR
24	25	26

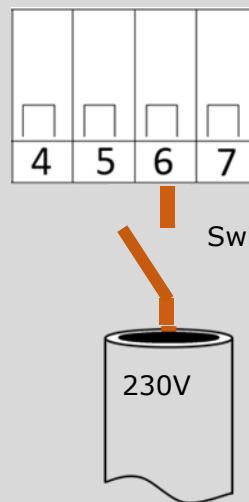
Terminal	characters	Meaning
1		Flushing valve – Switching output 230V
2	L (+)	Flushing valve – Voltage output 230V
3	N (-)	Flushing valve – N
4	L (+)	Power supply – L1 230V
5	N (-)	Power supply – N
6	SW IN	External input - 230V (MASTER only)
7	PE	Protective earth conductor – PE
8	H	A CAN bus – High
9	L	A CAN bus – Low
10	GND	A CAN bus – Ground
11	H	B CAN bus – High
12	L	B CAN bus – Low
13	GND	B CAN bus – Ground
14	+ 5V	Flow measurement valve – Voltage output 5V
15	FLOW	Flow measurement valve – Flow input
17	GND	Flow measurement valve – Ground
18		Input 1 Pt1000
19		Input 1 Pt1000
20		Input 2 Pt1000
21		Input 2 Pt1000
22	IN	Free drain / water sensor (conductors interchangeable)
23	IN	Free drain / water sensor (conductors interchangeable)
24		Alarm relay – External voltage input
25		Monitoring of ext. voltage = Fault
26		Monitoring of ext. voltage = Operation





[4] → bn (BN) = L  
[5] → bu (BU) = N  
[7] → ye/gn (YE/GN) = PE

230V +/- 10% AC 50/60Hz  
Back-up fuse max. 16A



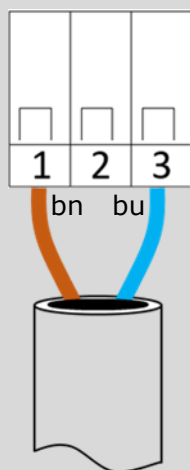
[6] → bn (BN) = L

Switch

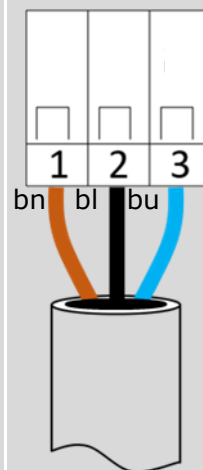
230V +/- 10% AC 50/60Hz  
Back-up fuse max. 16A

#### KHS isolating valve + spring reset (Fig. 686 05)

#### KHS isolating valve (Fig. 686 04)



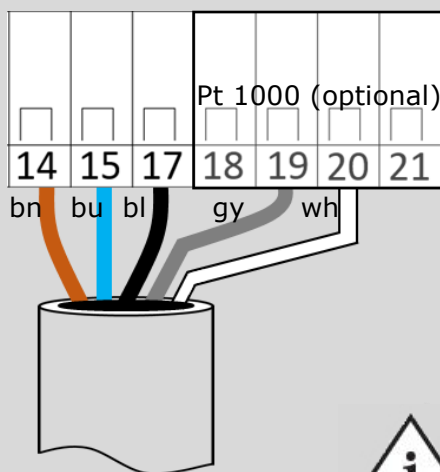
[1] → bn (BN)  
[2] → bu (BU)  
[3] → bu (BU)



[1] → bn (BN)  
[2] → bl (BK)  
[3] → bu (BU)



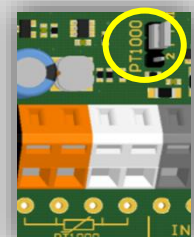
#### KHS CONTROL-PLUS (Fig. 138 4G)



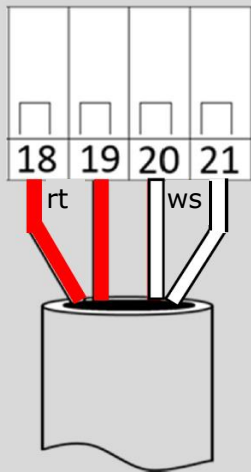
[14] → bn (BN)  
[15] → bu (BU)  
[17] → bl (BK)  
[18]  
[19] → gy (GY) = Pt 1000 (optional)  
[20] → wh (WH) = Pt 1000 (optional)  
[21]



If the temperature is measured using the CONTROL-PLUS, the jumper on the board must be changed from 4-wire to 2-wire.



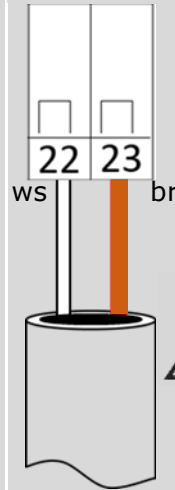
### KHS temperature measurement valve (Fig. 628)



[18] → rt (RD)  
[19] → rt (RD)  
[20] → ws (WH)  
[21] → ws (WH)



### KHS Free Drain (Fig. 688 00)

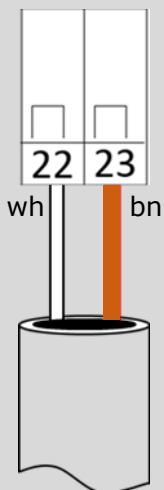


[22] → ws (WH)  
[23] → br (BN)



In the as-delivered state, a cable bridge is plugged between Terminals 22 and 23. This must be removed before connecting the KHS Free Drain.

### Water sensor for leaks (Fig. 620 00)

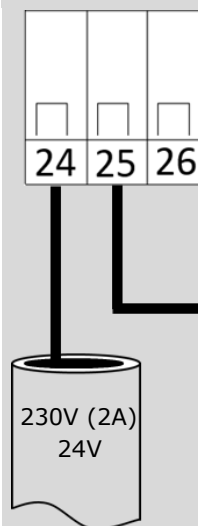


[22] → wh (WH)  
[23] → bn (BN)



In the as-delivered state, a cable bridge is plugged between Terminals 22 and 23. This must be removed before connecting the KHS water sensor.

### Potential-free alarm relay



[24] → 230V (2A) / 24V  
[25] → OUT (fault)  
[26] → OUT (operation)

Warning lamp

Signal horn

BMS



Monitoring example: Faults and mains voltage failures are reported with external voltage to the network warning lamp, the warning horn or to the BMS.

## 2.3 Bus system overview

### 2.3.1 CAN bus cable

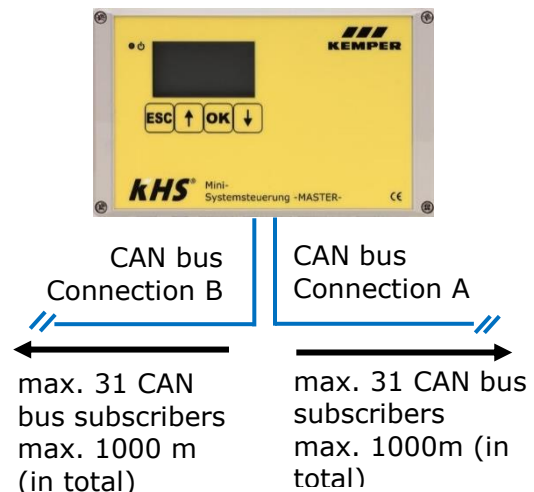
Bus cables for the wiring of CAN bus systems (controller area network) in accordance with ISO 11898 must be used for bus systems with 120  $\Omega$  nominal impedance. Only when such cables are used can a high level of data transfer security be guaranteed.

#### Recommended properties for the CAN bus cable

Cable type	CAN bus cable	
Conductor material	Kupfer	
Conductor cross-section and number of wires	Cross-section	Length
	1 x 2 x 0,34 mm <sup>2</sup>	300 m
	1 x 2 x 0,50 mm <sup>2</sup>	500 m
	1 x 2 x 0,75 mm <sup>2</sup>	1000 m
Shielding	Braiding of tinned copper wires	
Impedance at $f \geq 1\text{Hz}$	120 $\Omega \pm 15\%$	

### 2.3.2 CAN-Bus-Anschluss

The KHS Mini Control System has two integrated CAN bus connections with which up to 62 CAN bus participants can be addressed. A maximum of 31 bus subscribers can be connected to each CAN bus connection.



Components	Designation	Number of subscribers per component	Max. number of components per -MASTER-
	Control System SLAVE	1	62
	KHS HS2 Hygiene flushing box with one connection + Can bus connection set	1	60
	KHS HS2 Hygiene flushing box with two connections + Can bus connection set	2	30

### 2.3.3 CAN bus subscriber arrangement

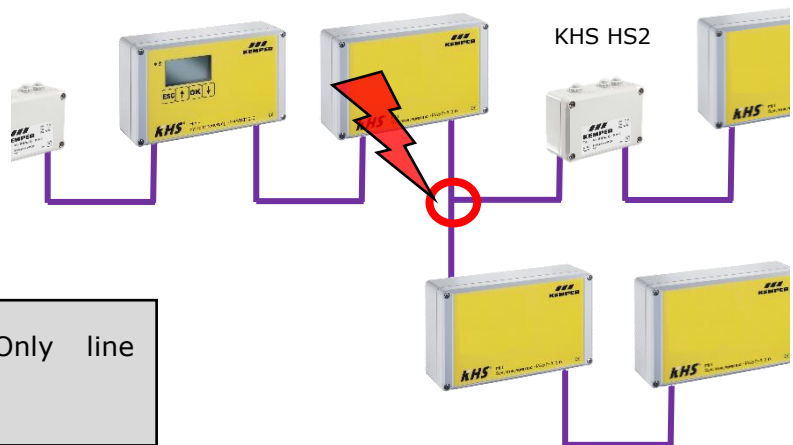
**RIGHT**



**RIGHT**



**WRONG**



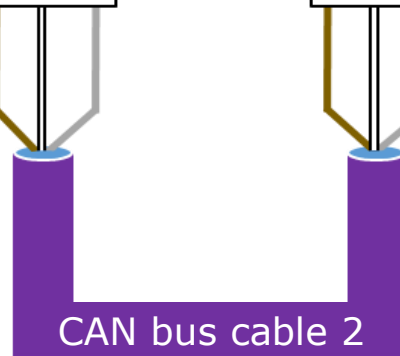
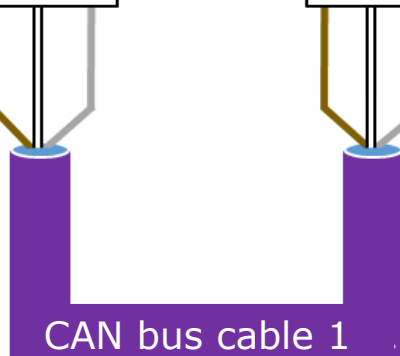
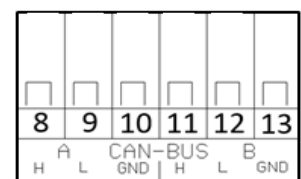
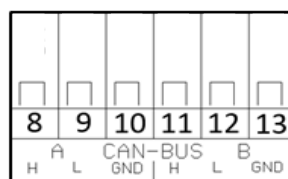
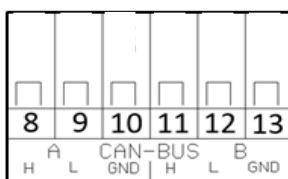
Wrong topology! Only line topology allowed!

### 2.3.4 CAN bus cable connection

**MASTER**

**Device 1**

**Device 2**



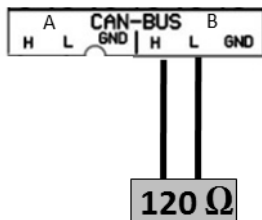
120 Ω

### 2.3.5 Terminal resistor

The 120  $\Omega$  terminal resistor may only be installed in the last control component of a CAN bus cable. The MASTER does not require a terminal resistor.



### 2.3.6 Connection of terminal resistor



All KHS Mini Controls -SLAVE- are supplied with a 120  $\Omega$  terminal resistor.

**For non-terminal SLAVE controls, the resistor must be removed!**

### 3 Commissioning

Before commissioning, make sure the connections have been made properly and professionally and that the system is properly protected. The pertinent regulations (EN, VDE, etc.) and the

regulations of the local energy utility must be complied with. After finishing the wall installation and the electrical installation, apply the mains voltage of 230V.



Allow only certified electricians to assemble and install electrical equipment. Danger of fatal electric shock.



To simplify configuration and to guarantee correct installation, fill in the system commissioning overview of the KHS Mini Control System (see supply pressure, Chapter 10.2) before making the settings.

**It is mandatory to fill in the form** to be able to take advantage of the optional factory support.

#### 3.1 Menu navigation

All menus have a "rolling" structure, i.e., pressing the "↓ key" on the last menu item

jumps back to the first menu item.



Keys	Description
Esc	Exit the menu / switch between overview and main menu
↑	Roll backwards
OK	Confirm key
↓	Roll forwards

The menu navigation of the KHS Mini Control System –MASTER 2.0– is divided in two types of windows.

Window types	Description
General plan	The "General plan" window is used only for visualising the current states. Viewing possible without password.
Main menu	Preset parameters can be viewed, changed and saved. Viewing not possible without password.

### 3.1.1 General plan

P1	1/8	012:45:31
MAS	Y	SL01Y
SL02Y	40	HS03Y
HS04Y	0	SL05
SL06		SL07

The following illustrations explain the symbols of the "General plan" menu interface of the KHS Mini Control System -MASTER 2.0-.

Symbol	Meaning
MAS	Overview -Master-
SLXX	Overview -SLAVE- with the number XX
HSXX	Overview KHS HS2 with the number XX
	KHS VAV maximum flow isolating ball valve with servo drive created
	KHS VAV maximum flow isolating ball valve opened
	CAN bus of the Control System active
	Fault detected
	Leakage monitoring of Control System active
	Flow sensor created (symbol flashes: flow control is active)
	Symbol flashes: Time control activated
	Temperature sensor created (symbol flashes: temperature control is active)
P1 / P2	Activated program for the program switchover
1/8	Sheet 1 of 8

#### Detailed overview

1x „OK“ Selects control (frame\*)  
2x "OK" Changes into detailed overview

OK

\*: A frame appears around the entry of the first controller on the selected sheet (see 1). Pressing the OK key once more opens the "Detailed overview" (see 2) of the selected control. Alternatively, press the ↑ or ↓ key to select another controller. The following table describes the possible content of the detailed views.

P1	1/8	009:40:41
MAS	Y	SL01Y
SL02Y	40	SL03
SL04		SL05
SL06		SL07

1

SNr: 004711	013:09:07
Y	005/12/13
MASTER	L
safety/leak detection:	
Safety valve	
open	

2

Symbol	Meaning
Safety device	Safety valve closed or open
Temperature	Current value of the connected temperature sensor
Flow	Current value of the connected volume flow sensor
Volume	Volume of the last or current water exchange
Flushing duration	Volume of the forthcoming or current water exchange
SNo:	Serial number of the selected Control System



### 3.1.2 Main menu

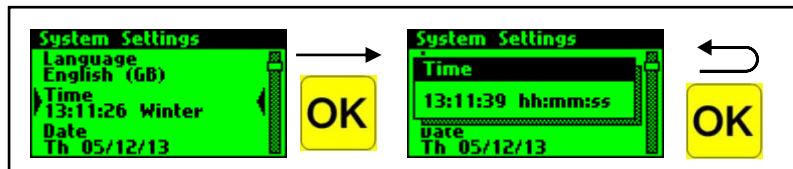
Main menu item	Function
System settings	Basic system settings (language; time; etc.)
CAN bus setup	Assignment of the Control System to the CAN bus network
Device settings	Assignment of the actuators and sensors
Operating modes	Setting the operating modes for each water exchange group
Logbook	Access to the event log
Program switchover	Settings for the program switchover
Manual valve operation	Specific manual operation of certain valves
Network setup	Settings for integration into an existing network

#### 3.1.2.1 System settings

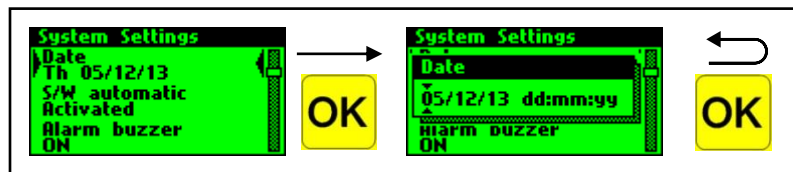
##### Language



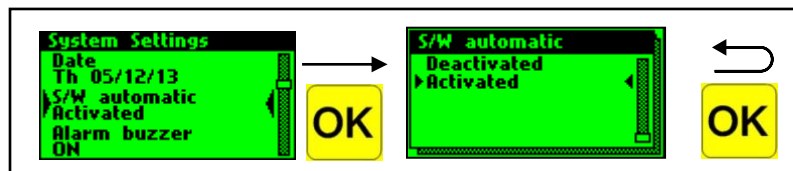
##### Time



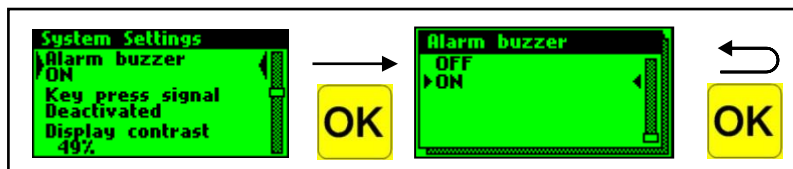
##### Date



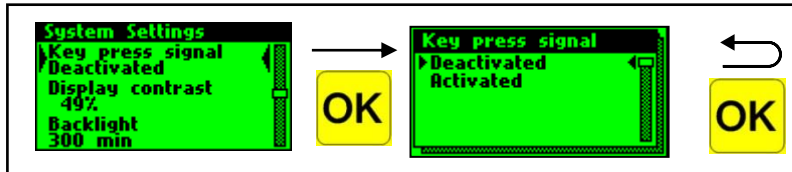
##### S/W automatic



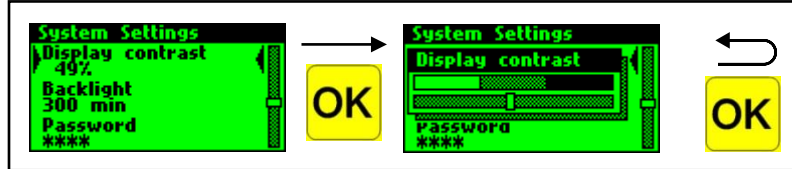
##### Alarm buzzer



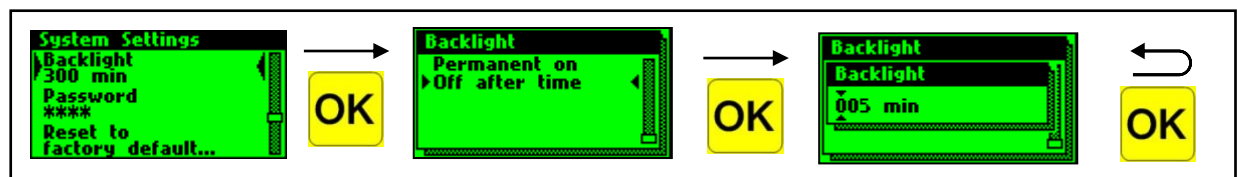
### Key press signal



### Display contrast



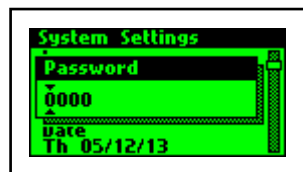
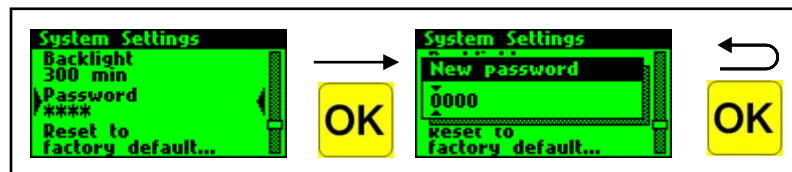
### Display illumination



### Password

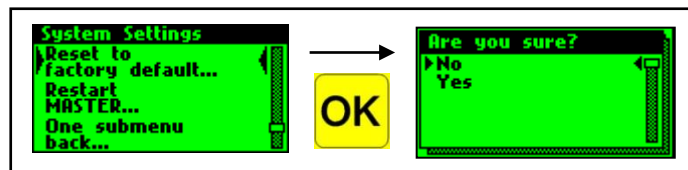
To protect the controller from unauthorised external influences, a password can be configured. If a password has been stored,

the password will be queried before every setting.



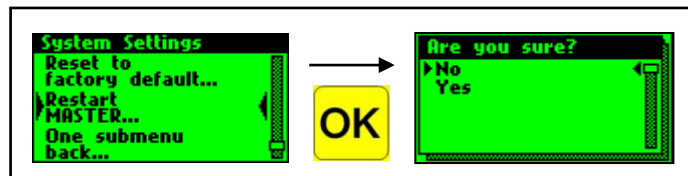
The password "0000" is the factory default setting.

### Factory settings



All previous configurations will be lost!

### Reboot the MASTER

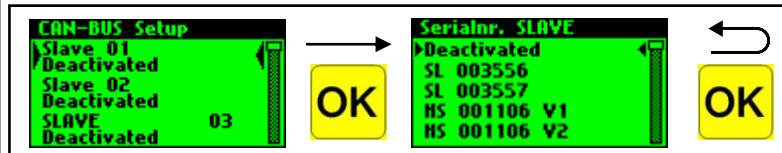


### 3.1.2.2 CAN bus setup

Before device settings can be made, the Control System or KHS HS2 hygiene flushing boxes, which are connected to the -MASTER 2.0- by the CAN bus cable, must be added to the CAN bus

network using the menu item "CAN Bus Setup". The serial numbers of connected devices are automatically listed, and are assigned to a SLAVE in the system.

#### Adding devices



Even if the KHS HS2 has two valves, it only has one serial number.

Term	Meaning
SL XXXXXX	KHS Mini Control System -SLAVE- including serial number
<b>HS XXXXXX</b> V1 / V2	KHS HS2 hygiene flushing box including serial number
HS XXXXXX <b>V1 / V2</b>	Valve of the KHS HS2 hygiene flushing box (V2 = left; V1 = right)
Deactivated	No device is added to the selected SLAVE

#### Serial number

Serial number KHS Mini Control System -SLAVE-



Ser.Nr.: XXXXXX

HW 2.XX  
SW 2.XX  
KW 07/14

Typ: KHS-Mini Systemsteuerung-SLAVE  
Netz: 230V/1/N/PE/50Hz/max.3,15A  
Art.Nr.: 8210068602006-00  
Ser.Nr.: XXXXXX IP54 62

Serial number KHS HS2 Hygiene flushing box



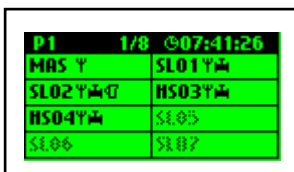
S/N: XXXXXX

HS2-14	884.139.00.0 RS 01	4801
12 VDC 0.6A	S47 04/15	
IP45 t <sub>30</sub>	S/N: XXXXXX	

### Main view

When all the devices have been added, they are displayed in the main view, as

shown below. The individual devices can then be configured in Device settings.



Check to see if the antenna icon can always be seen and if the LEDs light up green on all KHS Mini Control System. Only then has a proper connection been established.

### 3.1.2.3 Device settings

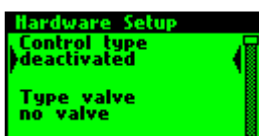
In the "Device settings" submenu, the individual Control System are logically assigned to the integrated actuators

and sensors. The valve control type is also determined.

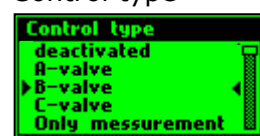
Control type	Description
B valve	Terminal flushing valve, with several A valves hydraulically preconnected.
A valve	Flushing valve which switches the water exchange for one line.
C valve	Terminal flushing valve for one line.
Safety device	Valve which protects a distribution line.
Only measurement	Slave for the acquisition and long-term monitoring of sensor values.

### Configuration of the B Valve

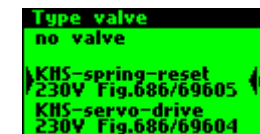
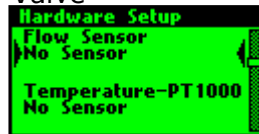
Device selection



Control type



Valve



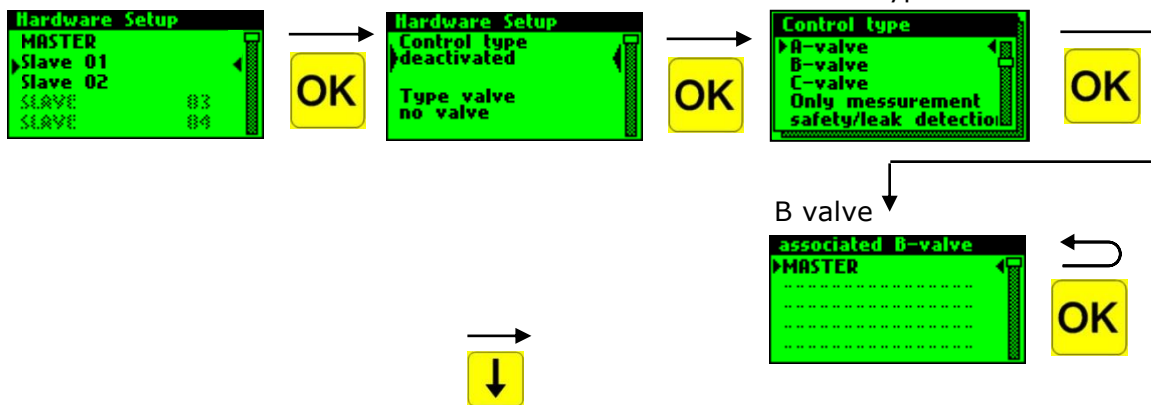
See Miscellaneous settings



When using A/B valve technology, always make sure that the B valve is configured first. A valves can then be assigned to the B valve. The assignment of the A valves is shown in the following. For information on valve technology, please see Chapter 10.1.

### Configuration of the A Valve

Device selection

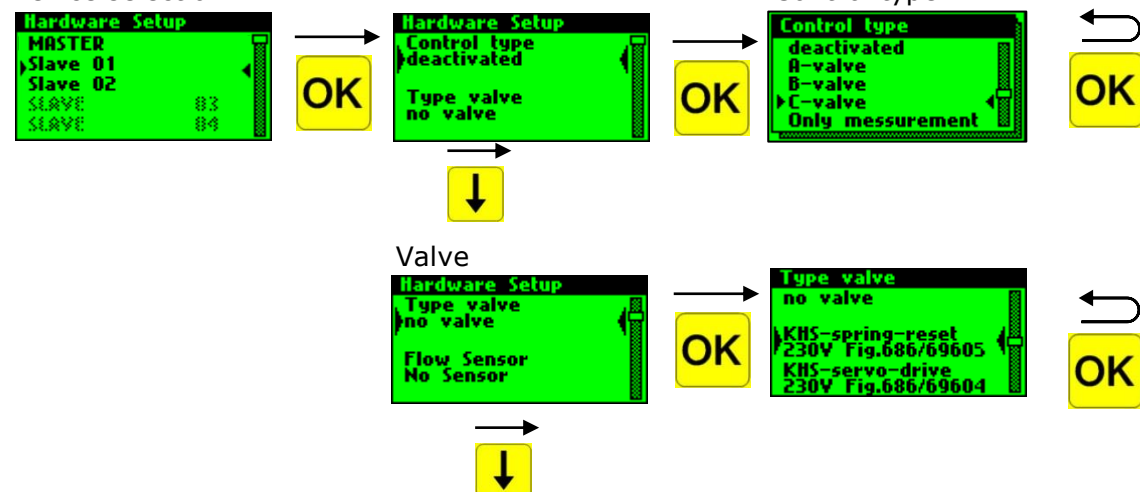


See Miscellaneous settings

**!** You are recommended not to link more than 5 A valves to one B valve.

### Configuration of the C Valve

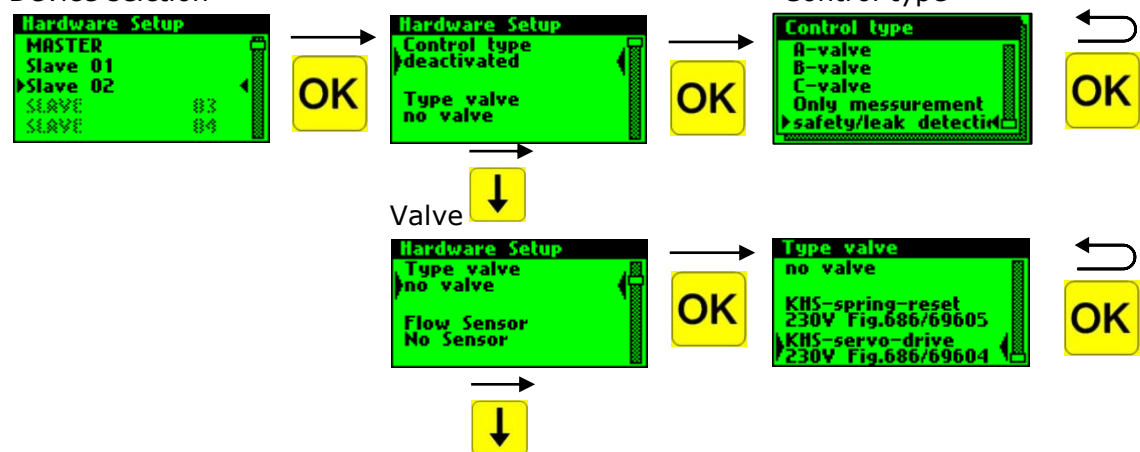
Device selection



See Miscellaneous settings

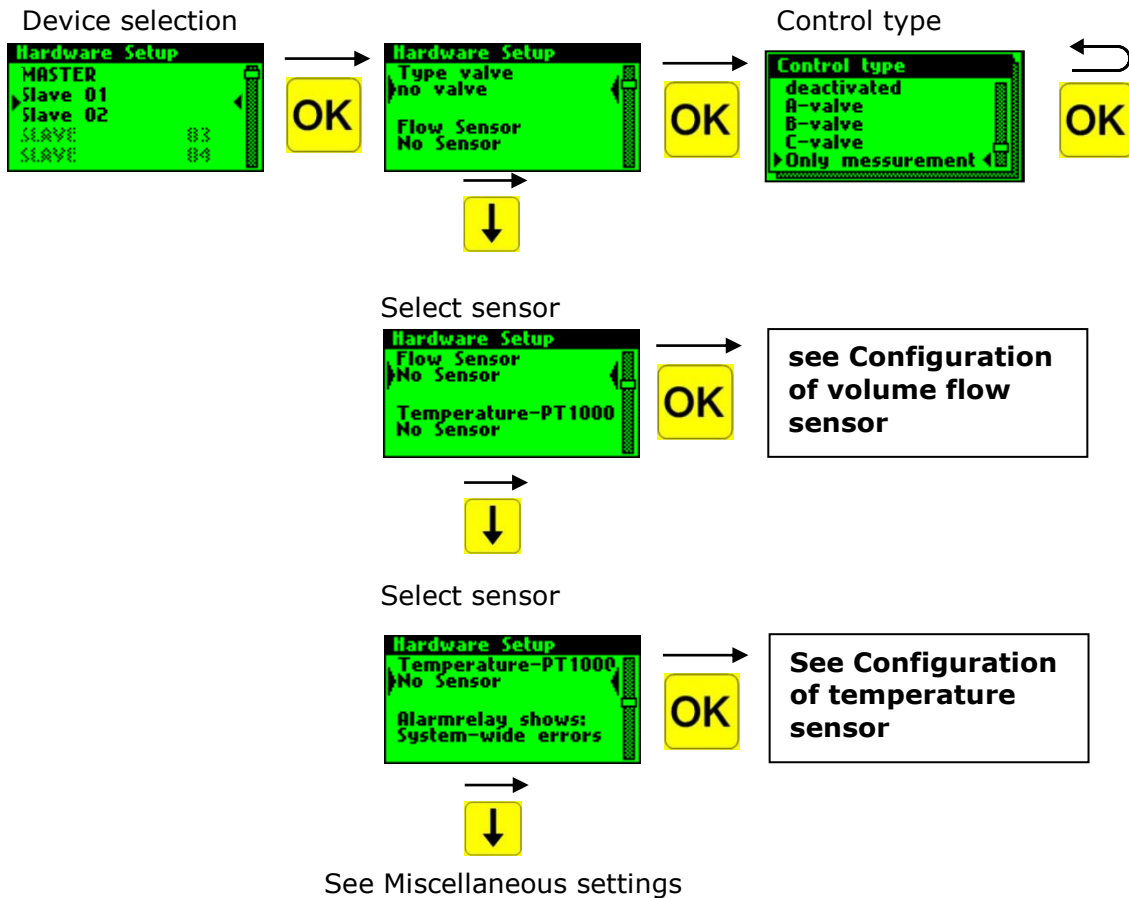
### Configuration of the safety device

Device selection

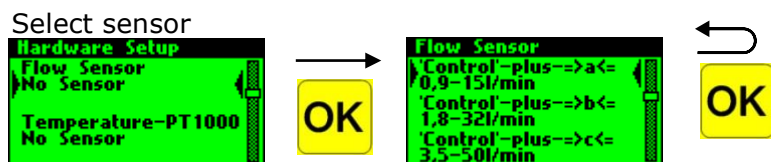


See Miscellaneous settings

## Configuration of flow measurement

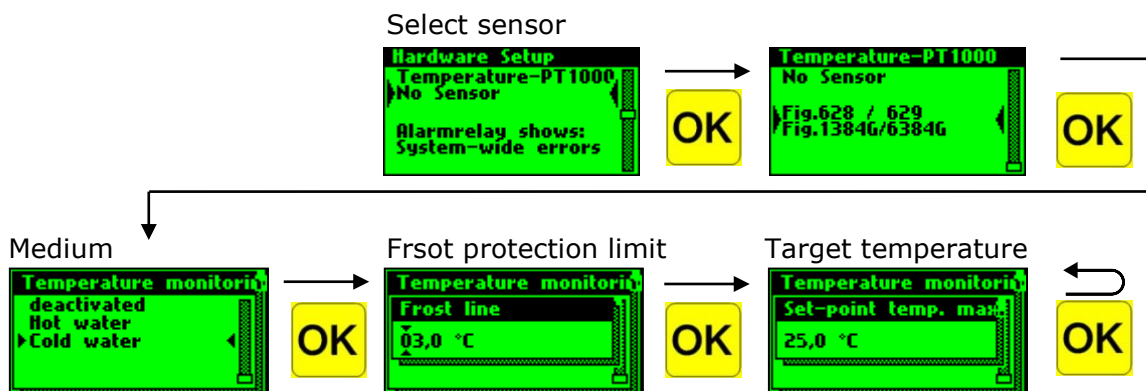


## Configuration of volume flow sensor



The measuring range of the sensor can be determined by means of a sticker on the installed flow measurement valve.

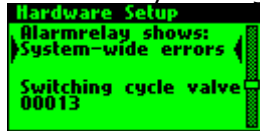
## Configuration of temperature sensor



## Miscellaneous settings



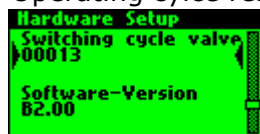
### Alarm relay setting



Alarm in the event of the Control System own faults, or in the event of system faults.



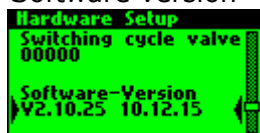
### Operating cycle reset



After 20,000 operating cycles of a flushing valve, a maintenance request is generated. After maintenance, the operating cycles of the actuator should be reset.



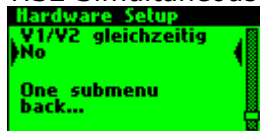
### Software version



Overview of the software version of the selected Control System.



### HS2 Simultaneous opening of V1/V2



Setting for the simultaneous opening of two valves in a KHS HS2.  
Depending on the flow rate, the following instructions apply with regard to sound protection and free discharge.

	DIN EN 13077		DIN 4109	
	V1	V2	V1	V2
> 15 l/min	✗	✗	✗	✗
15 l/min	OK	✗	OK	OK
10 l/min	OK	OK	OK	OK
4 l/min	OK	OK	OK	OK



### 3.1.2.4 Operating modes

In the "Operating modes" submenu, programs and times are added to the actuators and sensors.

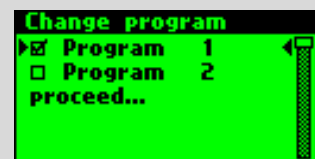
Mode	Description
Time Control	Triggers a water exchange of defined duration at a certain point in time.
Temperature control	Triggers a water exchange when a predefined start temperature is reached, until a predefined stop temperature is reached.
Volume control	Triggers a water exchange with a defined flush volume at a certain point in time.
Backup	Backs up a distribution line by means of a water sensor in a predefined time window.
Datalogging	Acquires sensor values in a predefined time window with a predefined sampling rate.
Routine	Triggers a water exchange for a predefined duration or quantity if a temperature control has not actuated for a certain time.



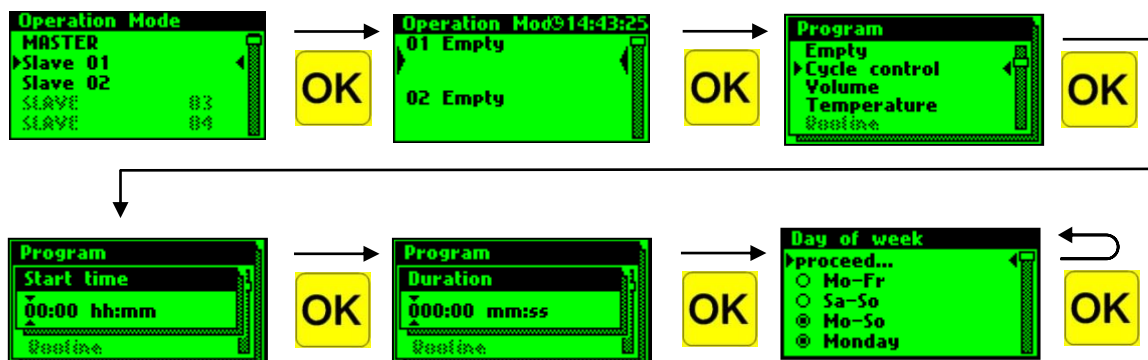
If two or more valves are simultaneously opened in a drinking water system, under certain circumstances pressure fluctuations or a large pressure drop can occur in the system. For that reason, make sure beforehand that the required flow pressure is continuously guaranteed at all tapping points. You are recommended not to perform simultaneous water exchanging measures.



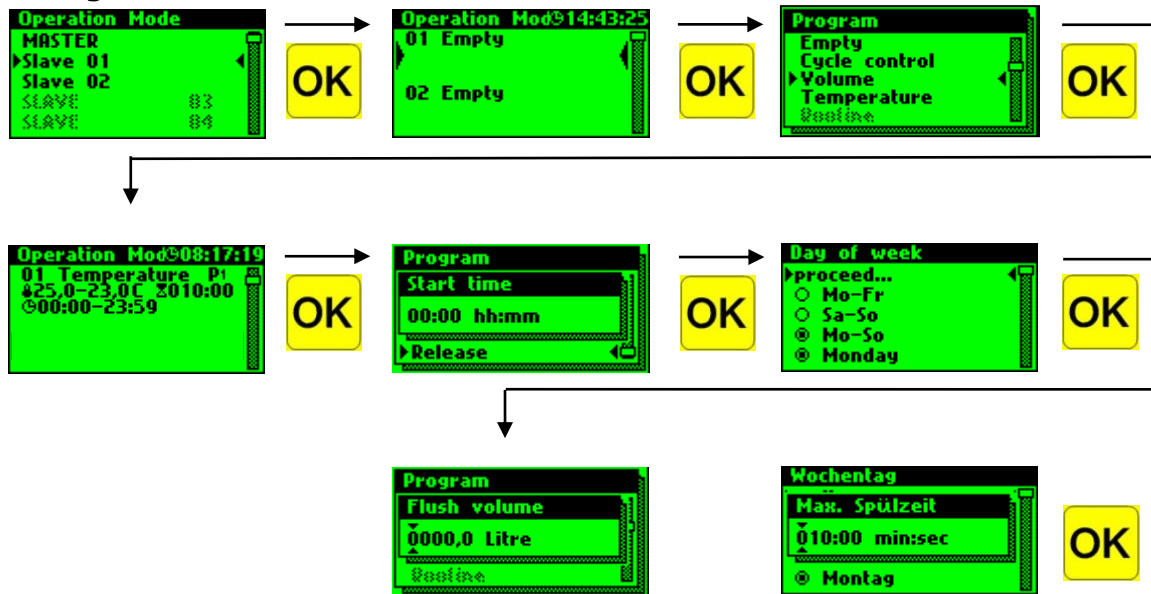
If the program switch is "Activated" (see Chapter 3.1.2.6), a query is presented during the operating modes configuration to determine the program this applies to (see right). The two mentioned flushing programs can be switched using an external manual switch. The electrical connection is shown in Chapter 2.2.



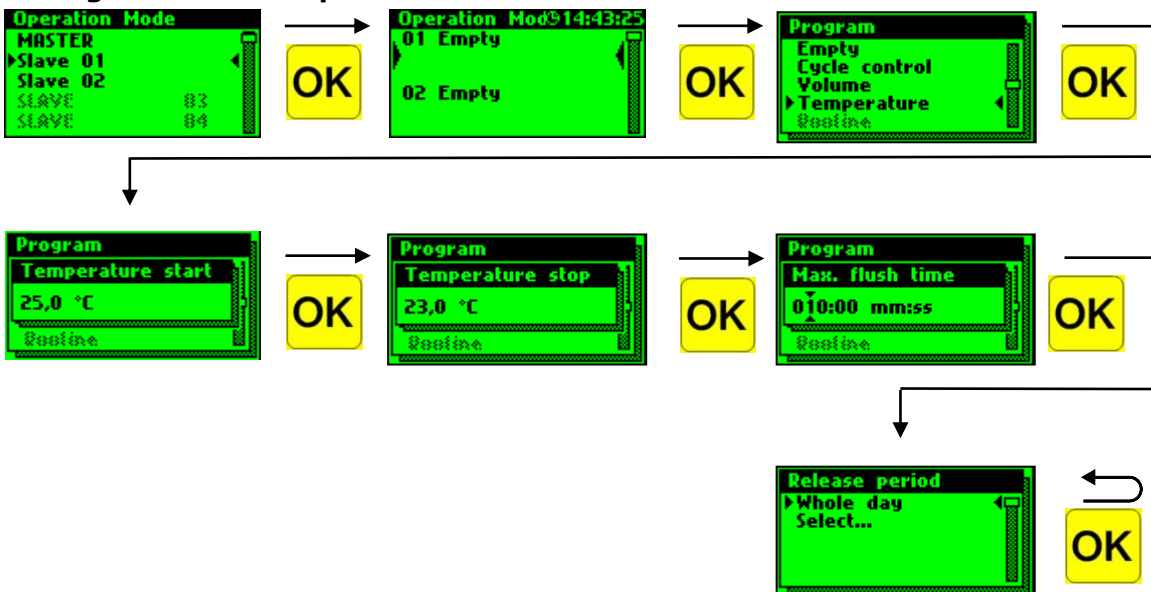
#### Configuration of time control



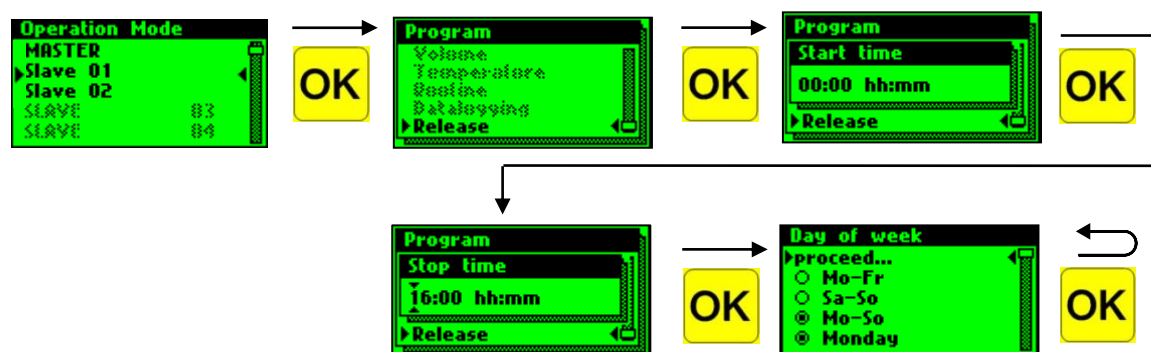
### Configuration of volume control



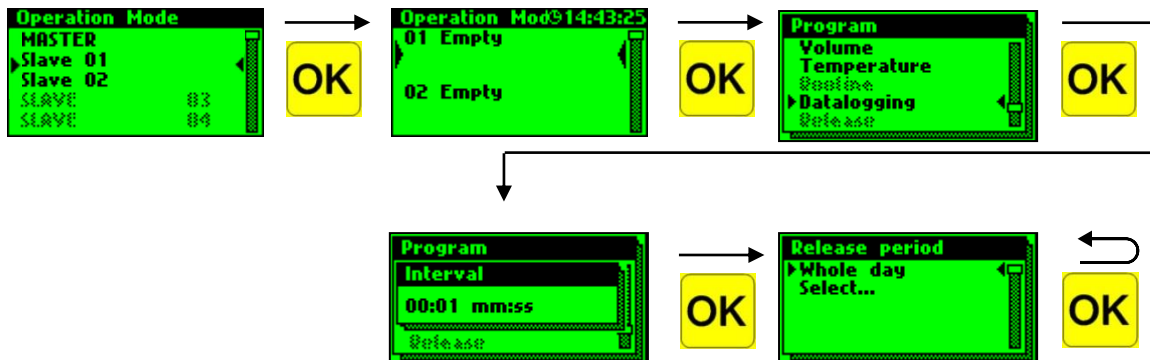
### Configuration of temperature control



### Configuration of the safety device



## Configuration of datalogging



The following shows an exemplary extract from a CSV log file. In the written log file you can find a detailed listing of the entire measured data. They are

sorted by date, time, index, name and the measured data of the connected measurement valve. Up to 12 million lines can be saved.

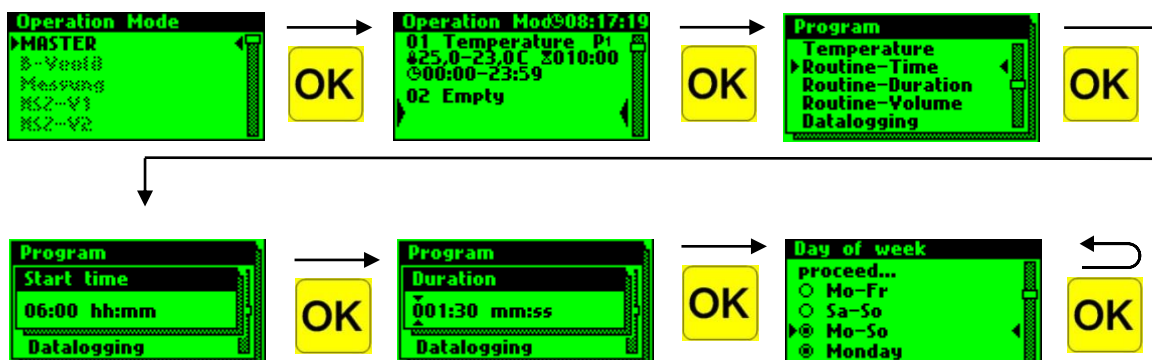
Datum	Zeit	Index	Name	T(min)/°C	T(max)/°C	T(avg)/°C	Q(min)/L/min	Q(max)/L/min	Q(avg)/L/min	V/Liter
22.11.2013	11:48:10	Master	MASTER C-Ventil	0,00	0,00	0,00	0,00	0,00	0,00	0,00
22.11.2013	11:48:20	Master	MASTER C-Ventil	0,00	0,00	0,00	0,00	0,00	0,00	0,00
22.11.2013	11:48:30	Master	MASTER C-Ventil	0,00	0,00	0,00	0,00	0,00	0,00	0,00
22.11.2013	11:48:40	Master	MASTER C-Ventil	0,00	0,00	0,00	0,00	0,00	0,00	0,00
22.11.2013	11:48:50	Master	MASTER C-Ventil	0,00	0,00	0,00	0,00	0,00	0,00	0,00
22.11.2013	11:49:00	Master	MASTER C-Ventil	0,00	0,00	0,00	0,00	0,00	0,00	0,00
22.11.2013	11:49:10	Master	MASTER C-Ventil	0,00	0,00	0,00	0,00	0,00	0,00	0,00
22.11.2013	11:49:20	Master	MASTER C-Ventil	0,00	0,00	0,00	0,00	0,00	0,00	0,00
22.11.2013	11:49:30	Master	MASTER C-Ventil	0,00	0,00	0,00	0,00	0,00	0,00	0,00
22.11.2013	11:49:40	Master	MASTER C-Ventil	0,00	0,00	0,00	0,00	0,00	0,00	0,00

## Routines

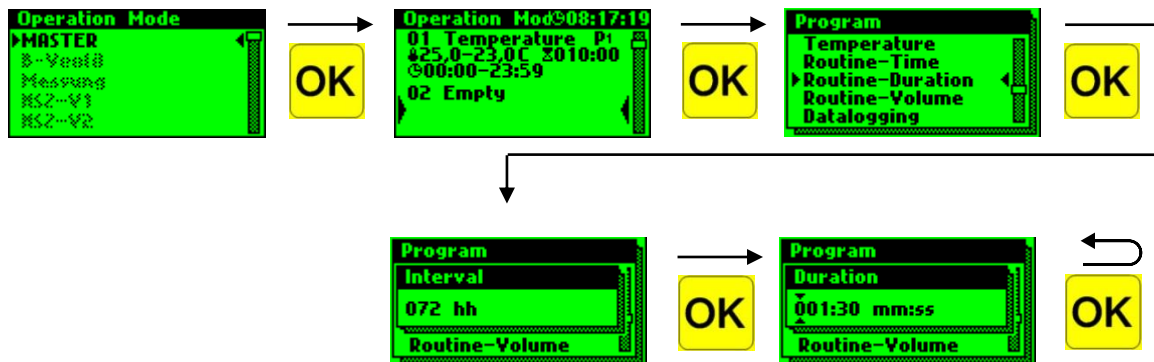
If temperature flushing is configured, a routine duration is automatically activated. Generally speaking, it is

possible to choose between the following routines:

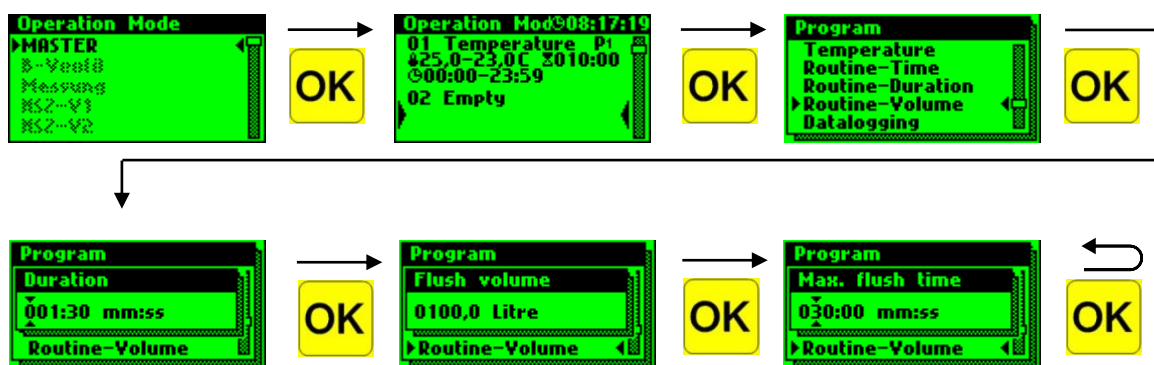
## Routine time



### Routine Duration



### Routine Volume



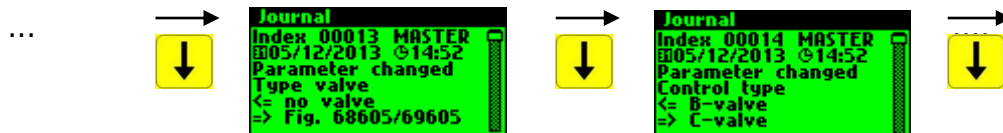
After your Control System have been successfully configured, you are recommended to save the configuration as a backup file. If the KHS Mini Control System -MASTER 2.0- is defective it can be quickly replaced and the configuration can be read in. This saves having to configure everything again.

### 3.1.2.5 Logbook

The "Logbook" submenu provides a facility for opening event logging. Press the "↑" and "↓" keys to change between the individual logbook entries. The event log documents the water exchange operations, error messages

and configuration changes made by the Kemper KHS Mini Control System (see the following illustration).

Up to 50,000 logbook entries can be saved.



III: Illustration of a logbook entry index 9-10, configuration change



The stored logbook entries can be saved through the USB interface on a USB memory stick. This function is explained in detail in Chapter 5.

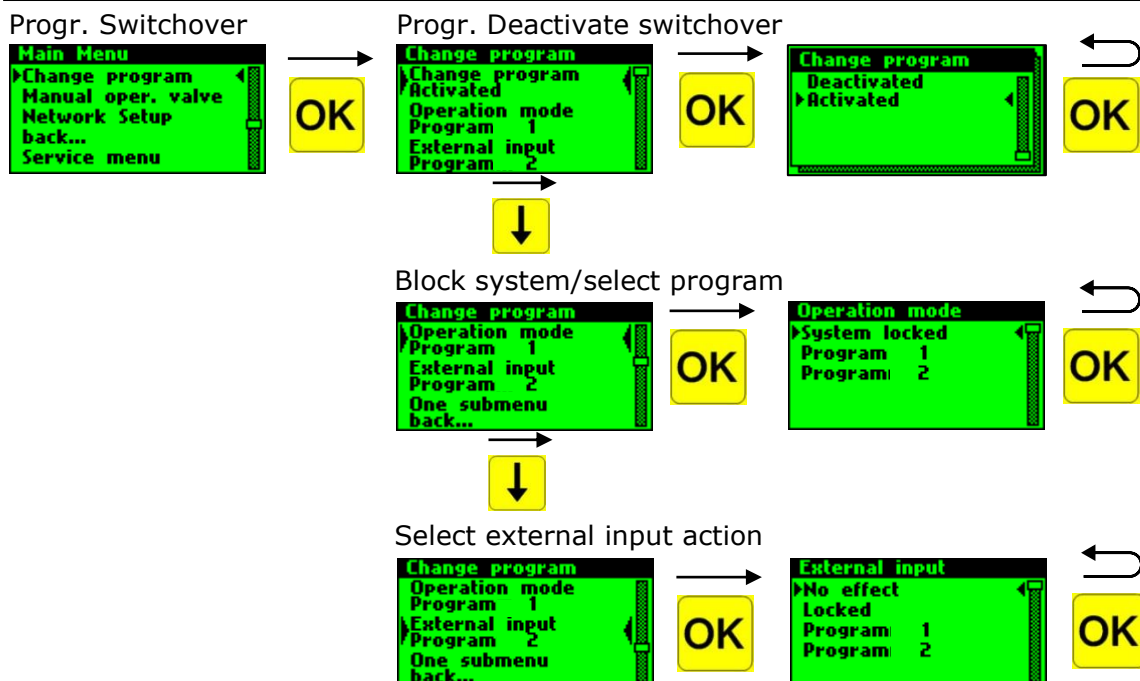
### 3.1.2.6 Change Program

With the KHS Mini Control System - MASTER 2.0- it is possible to switch between two flushing programs or to block them using an external switch. The programs can also be activated or

deactivated in the "Switch program" submenu. The "External input" or "External switch" can be assigned to a program switch in this submenu.



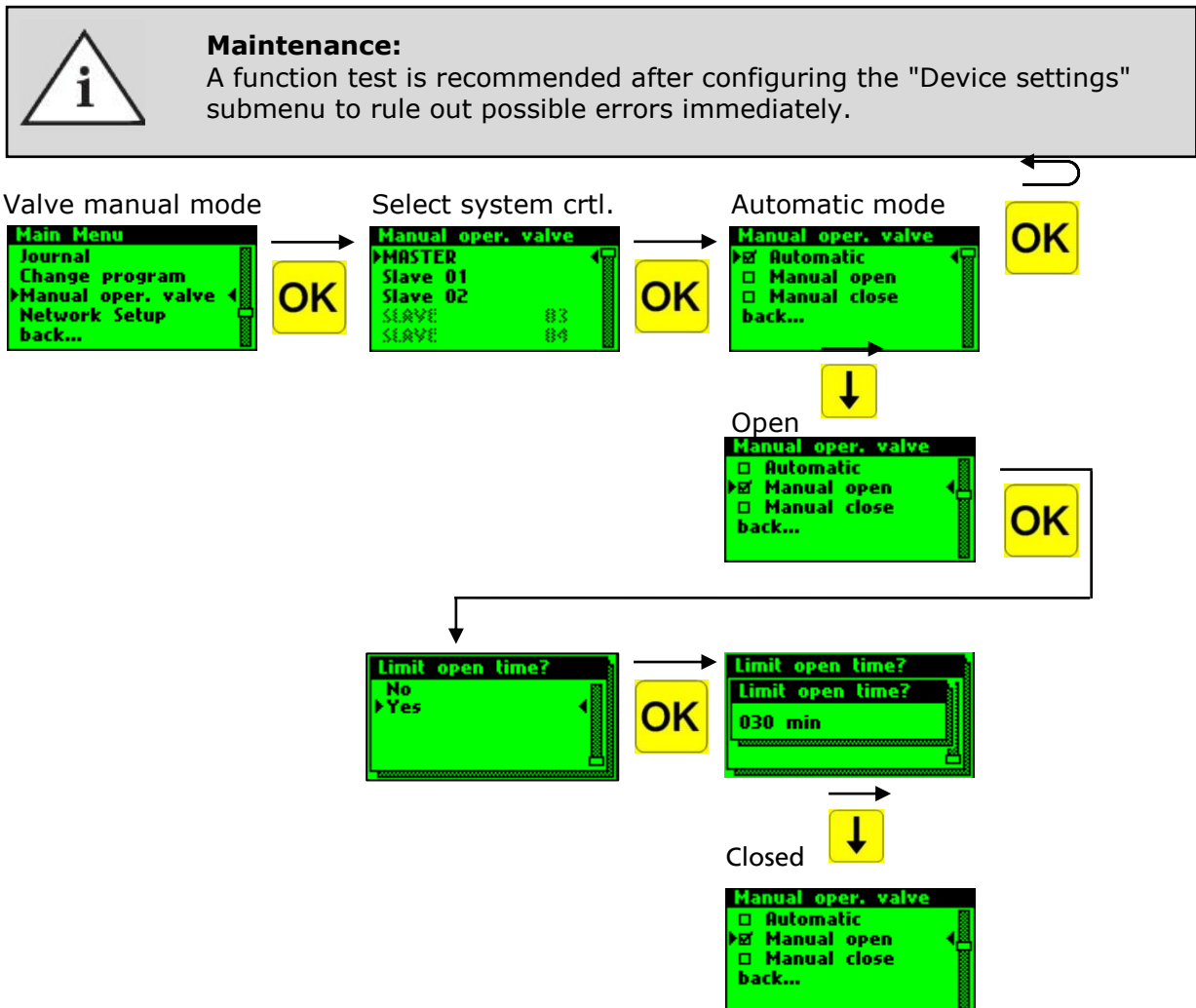
The two mentioned flushing programs can be switched using an external manual switch. The electrical connection is shown in Chapter 2.2.



### 3.1.2.7 Valve manual mode

With the KHS Mini Control System - MASTER 2.0-, it is possible to run a function test of the valves using the "Valve manual mode" submenu. Furthermore, the valves can be

individually addressed during maintenance. The functions are shown in the following illustration.




### 3.1.2.8 Network setup

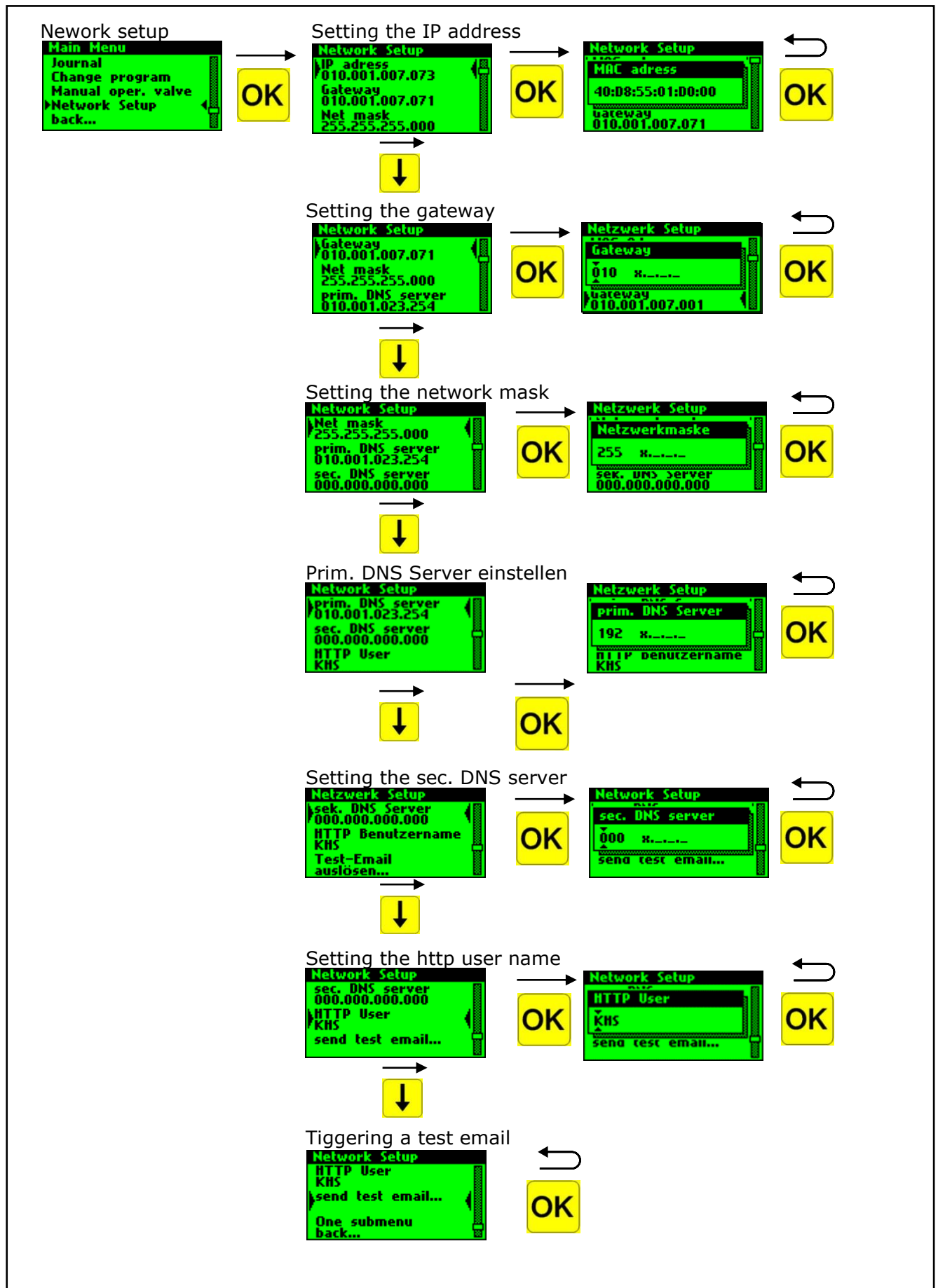
To establish a connection between the PC and the KHS Mini Control System - MASTER 2.0-, the required network

configurations can be set up in the "Network setup" submenu.

Connection	Description
PC ↔ MASTER	The IP addresses of the two devices should not differ greatly from each other.
PC ↔ LAN ↔ MASTER	You can obtain the appropriate parameters for integration into your network from your system administrator


 The following parameters are configured as factory defaults:
 

- IP-Adresse: 10.1.23.150
- Subnet: 255.255.255.0
- Gateway: 10.1.23.1





## 4 Acknowledge error

All the errors that occur in the system are sent to the KHS Mini Control System - MASTER 2.0- and are signalled acoustically by means of a buzzer. It is possible to integrate an alarm relay (see Chapter 2.2). In normal operation, the alarm relay is energized ("pulled") with voltage. If there is an error, the voltage

drops and an acoustic signal reports the error. Here it does not matter what different effect the error has on the system. The control goes into alarm latching and has to be acknowledged by the user after the malfunction has been repaired.

1

Switch off / acknowledge buzzer

1 x OK Buzzer off

The control remains in alarm latching

P1 1/8 @15:37:24

Information

Quit piezo with <OK>

SL06	SL87
------	------

2

Error display

The errors of the MASTER / SLAVE controls are displayed flashing in the general plan with a lightning icon

Change into the detail view

2 x OK Selected control

P1 1/8 @15:39:34

MAS RM 0%	SL01LW
SL02YH	SL83
SL84	SL85
SL86	SL87

3

Acknowledge error

After the malfunction has been repaired, the malfunction can be acknowledged in the detail display

1 x OK Acknowledge error

SNr: 004711 @15:40:56

RM 0% 005/12/13

MASTER

Flow: 0.0l/min

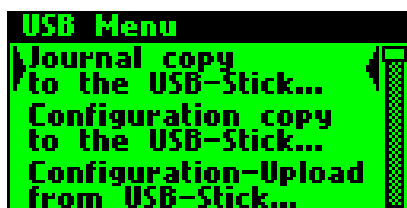
Total: 0.0litre

Duration: 000:00m:s

Temperature: >>>°C

A detailed list of possible errors and their corrections is given in chapter 7.

## 5 USB interface



Data can be transmitted comfortably with the USB interface of the KHS Mini Control System MASTER 2.0-. Data can be imported by the device and also exported from the device. It is also possible to use the USB stick to install updates not only for the Control System but also for the web browser.



The USB menu is not visible in normal mode. The menu is automatically activated when a USB memory stick is connected to the KHS Mini Control System -MASTER 2.0-.

- Max. storage capacity of the USB stick 16 GB
- File system FAT32


USB menu	Meaning
Copy logbook to USB stick	All saved events are stored on the USB stick in the form of a CSV file.
Copy flushing log to USB stick	All saved flushing processes are stored on the USB stick in the form of a CSV file.
Copy configuration to USB stick	All settings are stored on the USB stick in the form of a CFG file.
Read configuration from USB stick	A saved configuration can be written from the USB stick into the controls.
Copy data log to USB stick	When the "Datalogging" mode is activated, the measured values recorded can be copied onto the USB stick.
Software update from USB stick	Control System software update by means of a UPE file, using the USB stick.
Copy web server from USB stick	Web browser update using the USB stick.

## 6 Web browser

The KHS Mini Control System -MASTER 2.0- is a web-based Control System. Using a web browser, basic settings,

configurations and changes can be carried out easily.



Chapter 6 concerns only the web browser interface. You can find the complete operating instructions on the web browser with the button  and Downloads, or through the Service/ Download section of our website, [www.kemper-olpe.de](http://www.kemper-olpe.de).

To use the web browser, the following minimum system requirements must be met:

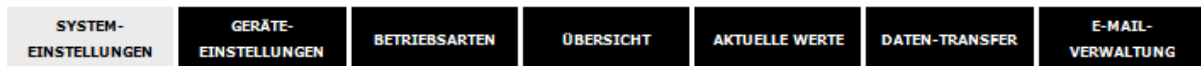
- Java script must be activated
- Mozilla Firefox Version 22.0.1 or higher
- Google Chrome Version 31.0 or higher
- Windows Explorer Version 10.0 or higher
- or an alternative browser Safari, etc.

Please note Chapter 3.1.2.8 and make sure you know which network settings of the Control System are stored.

## 6.1 Basic menu operation and functions

The WEB browser is subdivided into seven menu interfaces. They can be selected through the web browser tabs shown in Fig. 6.1.1. In the individual menu interfaces, you can make the basic

settings, the configurations and changes. Use the **WRITE TO CONTROL** button to save your parameters. If you do not want to store the changes in the system, use the **DISCARD CHANGES** button.



### III. 6.1.1 Menu tab of the web browser

The web browser interface can also be used with a tablet PC or a mobile phone. Here, the input interfaces are changed slightly. When using with a mobile phone, the menu tabs can be seen over the button (see below). The modes of functioning of the individual menu interfaces remain unchanged; merely the graphics of the components are not displayed.

The username "KHS" and password "0000" is the factory default.

## 6.2 System settings

In the "SYSTEM SETTINGS" menu interface you can make settings for user

data, date / time, network, external switch function and other settings.

The diagram shows the 'SYSTEM SETTINGS' menu with the following sections highlighted by numbered callouts:

- 1** User administration: Fields for User, New password, and Repeat new password.
- 2** Date / Time: Fields for Date (09.12.2013) and Time (16:16:17), with a checkbox for 'Change daylight savings/standard time' and an 'APPLY DATE / TIME' button.
- 3** Network: Fields for IP address (10.1.200.160), Subnet (255.255.255.0), Gateway (10.1.200.1), prim. DNS (192.168.0.1), and sec. DNS.
- 4** Function external switch: A section with a 'Programmschaltung aktiv' checkbox and fields for Program 1, Designation Program 1, Program 2, Designation Program 2, Current operating mode, and External input.
- 5** Other settings: A section with a checkbox for 'Alarm buzzer enabled' and a dropdown for 'Language control' set to 'Deutsch'.

### User data

The 'User administration' form includes fields for User, New password, and Repeat new password, with a callout '1' pointing to the User field.

To create a user for the web browser of your KHS Mini Control System, choose a user name and a suitable password. To save the settings, click the **WRITE TO CONTROL** button. After the settings have been saved, you must identify yourself every time the web browser is started. To do this, enter the user name you have just chosen and the relevant password in the input dialogue that then opens, as shown in Fig. 6.2.1. Use by several users is not possible.

The 'Authentication Required' dialog box prompts the user to 'Enter user name and password for http://10.1.7.3'. It contains fields for 'User Name:' and 'Password:', with 'OK' and 'Cancel' buttons.



The username "KHS" and password "0000" is the factory default.

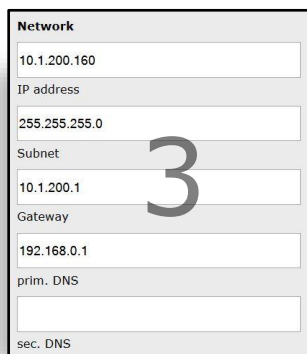
III. 6.2.1 Input dialogue Identification

## Date / Time



The current time and current date of the KHS Mini Control System -MASTER 2.0- are displayed in the grey boxes. To set the Control System time, click the **APPLY DATE/TIME** button. This causes the Control System to apply the date and time settings of your PC, for example. The KHS Mini Control System -MASTER 2.0- can switch automatically between daylight saving and standard time. If you do not want this setting, click the **ON** button. If the button is showing **OFF**, the switchover between daylight savings and standard time is not automatic.

## Network



To establish a connection between the PC and the KHS Mini Control System -MASTER 2.0- using a web browser, the required network configurations can be entered in the boxes IP address, Subnet, Gateway, prim. DNS and sec. DNS.



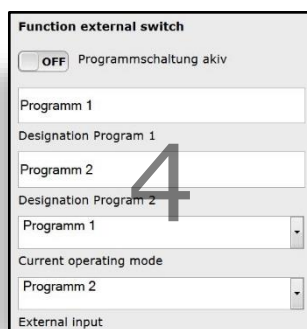
You can obtain the appropriate parameters for integration into your network from your system administrator.

The following parameters are configured as factory defaults:

- IP address: 10.1.23.150
- Subnet: 255.255.255.0
- Gateway: 10.1.23.254

The network settings can only be loaded when the configuration is loaded using a USB stick. They are not imported when the configuration is loaded using the web server.

## Program switch



With the KHS Mini Control System -MASTER 2.0- it is possible to switch between two flushing programs. The programs can be configured in the Operating modes menu interface and the individual Control System can be added (see Chapter 6.2).

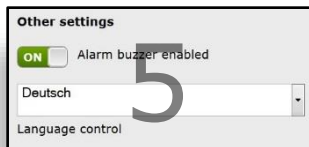
If the button for the program switchover is set to **OFF**, the external program switching is deactivated. If the button for the program switchover is set to **ON**, the external program switching is active. The names of the flushing programs can be changed with an entry in the related box. Use the "Current operating mode" drop-down list to manually switch the flushing programs in the web server and to block them for maintenance purposes. Use the "External input" drop-down list to set the operating mode of the external input.



### Maintenance:

The two flushing programs mentioned above can be switched using the web browser and can be blocked for maintenance purposes.

## Other settings



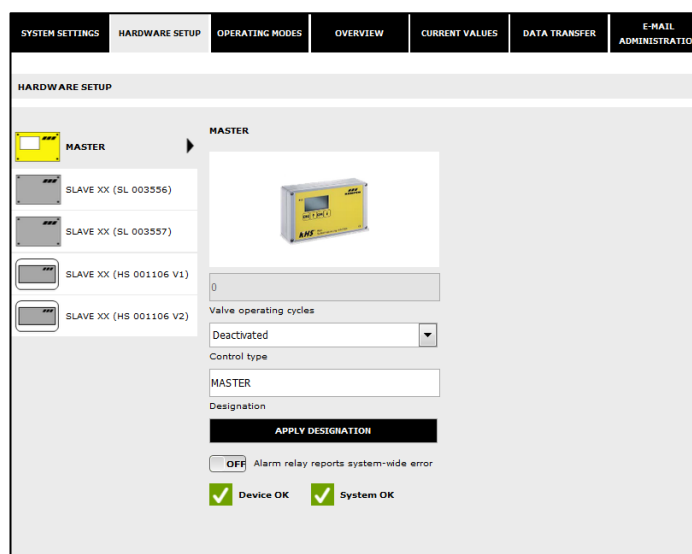
The KHS Mini Control System -MASTER 2.0- can activate an internal buzzer in case of faults. If the related button displays **ON**, the alarm buzzer is activated.

If the related button displays **OFF**, the alarm buzzer is not activated. Using the drop-down menu you can also customise the language setting of the control.

## 6.3 Device settings

In the "DEVICE SETTINGS" menu interface, the individual KHS Mini Control

System with integrated actuators and sensors are logically linked to each other.



## Selection interface



The "DEVICE SETTINGS" menu interface is a dynamic interface. The selection interface of the installed KHS Mini Control System are shown on the left-hand side. Click on the desired KHS Mini Control System to open the relevant input box.



The changes must be written into the control after every change in the input box. If another KHS Mini Control System is selected immediately after a change in the selection interface, the changes are automatically discarded.

## Input box

2

If a KHS Mini Control System is selected in the selection interface, the input box appears on the right-hand side. Use this box to allocate the related actuators and sensors to the KHS Mini-Control System.

If an error occurs in the Control System, it can be reported across the entire system. To do this, set the button to **ON**. The remaining input options of the input box are explained in the following.

## Adding devices

### Configuration (B valve)

### Select control type

Choose the available control types that can be used by the selected KHS Mini Control System from a drop-down list. The KHS Mini Control System - MASTER 2.0 - should control a B valve in this sample project.

### Select valve

The possible valves are selected from a drop-down list. In this sample project, the KHS Mini Control System -MASTER 2.0- should actuate a KHS VAV maximum flow isolating ball valve with spring reset and servo drive.



SYSTEM SETTINGS | **HARDWARE SETUP** | OPERATING MODES | OVERVIEW | CURRENT VALUES | DATA TRANSFER | E-MAIL ADMINISTRATION

**HARDWARE SETUP**

**B-VALVE**

SLAVE XX (SL 003557)

SLAVE XX (HS 001106)

SLAVE XX (HS 001106)

V2)

14

Valve operating cycles

B-valve

Control type

SL 003556

LOG OFF DEVICE

Serial number

B-Valve

Designation

APPLY DESIGNATION

☐ OFF Alarm relay reports system-wide error

☒ Device OK ☒ System OK

Valve

KHS-spring-reset 230V Fig. 686/69605

Valve type

Flow sensor

Control plus =>d<= 5,0-85 l/min Fig 1384G

No Flow sensor

Control plus =>a<= 0,9-15 l/min Fig 1384G

Control plus =>b<= 1,8-32 l/min Fig 1384G

Control plus =>c<= 3,5-50 l/min Fig 1384G

Control plus =>d<= 5,0-85 l/min Fig 1384G

Control plus =>e<= 9,0-150 l/min Fig 1384G

Control plus =>f<= 11,0-188 l/min Fig 1384G

Control plus =>g<= 18,0-316 l/min Fig 1384G

KHS Flow DN20 5-100 l/min Fig 638

KHS Flow DN25 10-200 l/min Fig 638

## Select sensor

The possible sensors are selected from a drop-down list. In this sample project, the KHS Mini Control System - MASTER 2.0- should actuate a KHS CONTROL PLUS

Control plus =>d<= 5,0-85 l/min Fig 1384G

No Flow sensor

Control plus =>a<= 0,9-15 l/min Fig 1384G

Control plus =>b<= 1,8-32 l/min Fig 1384G

Control plus =>c<= 3,5-50 l/min Fig 1384G

Control plus =>d<= 5,0-85 l/min Fig 1384G

Control plus =>e<= 9,0-150 l/min Fig 1384G

Control plus =>f<= 11,0-188 l/min Fig 1384G

Control plus =>g<= 18,0-316 l/min Fig 1384G

KHS Flow DN20 5-100 l/min Fig 638

KHS Flow DN25 10-200 l/min Fig 638

SYSTEM SETTINGS | **HARDWARE SETUP** | OPERATING MODES | OVERVIEW | CURRENT VALUES | DATA TRANSFER | E-MAIL ADMINISTRATION

**HARDWARE SETUP**

**B-VALVE**

SLAVE XX (SL 003557)

SLAVE XX (HS 001106)

SLAVE XX (HS 001106)

V2)

14

Valve operating cycles

B-valve

Control type

SL 003556

LOG OFF DEVICE

Serial number

B-Valve

Designation

APPLY DESIGNATION

☐ OFF Alarm relay reports system-wide error

☒ Device OK ☒ System OK

Valve

KHS-spring-reset 230V Fig. 686/69605

Valve type

Flow sensor

Control plus =>d<= 5,0-85 l/min Fig 1384G

Flow sensor

Flow in l/min

Flow volume in litres

DISCARD CHANGES

WRITE INTO CONTROL

## Save settings

To allow the new parameters of the input box to become effective, the settings must be saved by clicking the **WRITE TO CONTROL** button.

☒ The settings have been saved.

## Configuration of the A valve

### Select control type

Choose the available control types that can be used by the selected KHS Mini Control System from a drop-down list. The KHS Mini Control System should actuate an A valve in this sample project.

### Select the relevant B valve

Each A valve must be assigned to a B valve. The available KHS Mini Control System that are linked to a B valve can be selected from a drop-down list. The KHS Mini Control System in this sample project should be assigned to the B valve of the KHS Mini Control System -MASTER 2.0-.

**SYSTEM SETTINGS** **HARDWARE SETUP** **OPERATING MODES** **OVERVIEW** **CURRENT VALUES** **DATA TRANSFER** **E-MAIL ADMINISTRATION**

**HARDWARE SETUP**

**MASTER**

**B-VALVE**

SLAVE XX (SL 003557)

SLAVE XX (HS 001106 V1)

SLAVE XX (HS 001106 V2)

Temperature sensor

No temperature sensor

Temperature sensor

Valve operating cycles

A-valve

Control type

MASTER

Designation

**APPLY DESIGNATION**

B-valve

Related B-valve

☐ OFF Alarm relay reports system-wide error

☒ Device OK ☒ System OK

Valve

KHS-servo-drive 230V Fig.686/69604

No valve

KHS-spring-reset 230V Fig. 686/69605

KHS-servo-drive 230V Fig.686/69604

## Select valve

The possible valves are selected from a drop-down list. In this sample project, the KHS Mini Control System should actuate a KHS VAV maximum flow isolating ball valve with servo drive.



**SYSTEM SETTINGS** **HARDWARE SETUP** **OPERATING MODES** **OVERVIEW** **CURRENT VALUES** **DATA TRANSFER** **E-MAIL ADMINISTRATION**

**HARDWARE SETUP**

**MASTER**

**B-VALVE**

SLAVE XX (SL 003557)

SLAVE XX (HS 001106 V1)

SLAVE XX (HS 001106 V2)

Temperature sensor

KHS-Temp. PT1000 (Fig. 628/629/13847/6384G)

No temperature sensor

KHS-Temp. PT1000 (Fig. 628/629/13847/6384G)

0.0

Temperature in °C

Deactivated

Temperature monitoring

Valve operating cycles

A-valve

Control type

MASTER

Designation

**APPLY DESIGNATION**

B-valve

Related B-valve

☐ OFF Alarm relay reports system-wide error

☒ Device OK ☒ System OK

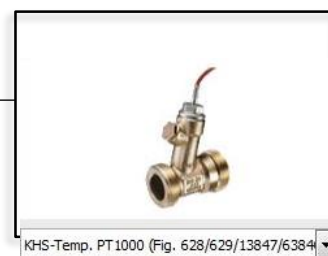
Valve

KHS-servo-drive 230V Fig.686/69604

Valve type

## Select sensor

The possible sensors are selected from a drop-down list. The KHS Mini Control System in this sample project should actuate a KHS temperature sensor Pt 1000.



**SYSTEM SETTINGS** **HARDWARE SETUP** **OPERATING MODES** **OVERVIEW** **CURRENT VALUES** **DATA TRANSFER** **E-MAIL ADMINISTRATION**

**HARDWARE SETUP**

**MASTER**

**B-VALVE**

SLAVE XX (SL 003557)

SLAVE XX (HS 001106 V1)

SLAVE XX (HS 001106 V2)

Valve operating cycles

A-valve

Control type

MASTER

Designation

**APPLY DESIGNATION**

B-Valve

Related B-valve

☐ OFF Alarm relay reports system-wide error

☒ Device OK ☒ System OK

**Valve**

KHS-servo-drive 230V Fig.686/69604

Valve type

**Temperature sensor**

KHS-Temp. PT1000 (Fig. 628/629/13847/6384G)

Temperature sensor

0.0

Temperature in °C

Deactivated

Deactivated

Hot water

Cold water

## Select the medium to be monitored

Select the medium to be monitored from a drop-down list. In this sample project, it is cold water.

The temperature ranges are then configured.

Deactivated

Deactivated

Hot water

Cold water

**SYSTEM SETTINGS** **HARDWARE SETUP** **OPERATING MODES** **OVERVIEW** **CURRENT VALUES** **DATA TRANSFER** **E-MAIL ADMINISTRATION**

**HARDWARE SETUP**

**MASTER**

**B-VALVE**

SLAVE XX (SL 003557)

SLAVE XX (HS 001106)

VE XX (HS 001106)

☒ The settings have been saved.

Valve operating cycles

A-valve

Control type

MASTER

Designation

**APPLY DESIGNATION**

B-Valve

Related B-valve

☐ OFF Alarm relay reports system-wide error

☒ Device OK ☒ System OK

**Valve**

KHS-servo-drive 230V Fig.686/69604

Valve type

**Temperature sensor**

KHS-Temp. PT1000 (Fig. 628/629/13847/6384G)

Temperature sensor

46.0

Temperature in °C

Cold water

Temperature monitoring

25.0

Set-point temperature max.

3.0

Frost protection limit

**DISCARD CHANGES** **WRITE INTO CONTROL**

## Save settings

For the new parameters of the input box to become effective, the settings must be saved by clicking **WRITE TO CONTROL**.

☒ The settings have been saved.

## Configuration of the C valve

### Select control type

Choose the available control types that can be used by the selected KHS Mini Control System from a drop-down list. The KHS Mini Control System should actuate a C valve in this sample project.

### Select valve

Die möglichen Ventile werden mittels einer Dropdownliste gewählt. Die KHS Mini Systemsteuerung soll im gegebenen Musterprojekt ein KHS VAV-Vollstromabsperrventil mit Feder-rückzug und Stellantrieb ansteuern.

SYSTEM SETTINGS | **HARDWARE SETUP** | OPERATING MODES | OVERVIEW | CURRENT VALUES | DATA TRANSFER | E-MAIL ADMINISTRATION

**HARDWARE SETUP**

**C-VALVE** ✓ The settings have been saved.

SLAVE XX (SL 003557)

SLAVE XX (HS 001106)

SLAVE XX (HS 001106)

V2)

14

Valve operating cycles

C-Valve

Control type

SL 003556 **LOG OFF DEVICE**

Serial number

C-Valve


Designation

**APPLY DESIGNATION**

☐ OFF Alarm relay reports system-wide error

☒ Device OK ☒ System OK

**Valve**



KHS-spring-reset 230V Fig. 686/69605

Valve type

## Select sensor

The possible sensors are selected from a drop-down list. The KHS Mini Control System in this sample project should actuate a KHS temperature sensor Pt 1000.

No temperature sensor

No temperature sensor

KHS-Temp. PT1000 (Fig. 628/629/13847/6384G)

## Select the medium to be monitored

Select the medium to be monitored from a drop-down list. In this sample project, it is cold water.

The temperature ranges must then be configured.

## Select sensor

The possible sensors are selected from a drop-down list. In this sample project, the KHS Mini Control System should actuate a KHS CONTROL PLUS



**SYSTEM SETTINGS** **HARDWARE SETUP** **OPERATING MODES** **OVERVIEW** **CURRENT VALUES** **DATA TRANSFER** **E-MAIL ADMINISTRATION**

**HARDWARE SETUP**

**C-VALVE**

SLAVE XX (SL 003557)

SLAVE XX (HS 001106)

VE XX (HS 001106)

14

Valve operating cycles

C-valve

Control type

SL 003556

LOG OFF DEVICE

Serial number

C-Valve

Designation

APPLY DESIGNATION

☐ OFF Alarm relay reports system-wide error

☒ Device OK ☒ System OK

Valve

KHS-spring-reset 230V Fig. 686/69605

Valve type

DISCARD CHANGES

WRITE INTO CONTROL

**Temperature sensor**

KHS-Temp. PT1000 (Fig. 628/629/13847/6384c)

Temperature sensor

-229.3

Temperature in °C

Deactivated

Temperature monitoring

Flow sensor

Control plus  $\Rightarrow d \leq 5.0-85$  l/min Fig 1384G

Flow sensor

0.0

Flow in l/min

0.0

Flow volume in litres

### Save settings

For the new parameters of the input box to become effective, the settings must be saved by clicking **WRITE TO CONTROL**

**The settings have been saved.**

## Configuration of the safety device

**SYSTEM SETTINGS** **HARDWARE SETUP** **OPERATING MODES** **OVERVIEW** **CURRENT VALUES** **DATA TRANSFER** **E-MAIL ADMINISTRATION**

**HARDWARE SETUP**

**SAFEGUARD**

SLAVE XX (HS 001106 V1)

SLAVE XX (HS 001106 V2)

11

Valve operating cycles

Safeguard

Deactivated

A-valve

B-valve

C-valve

Only measurement

Safeguard

Designation

APPLY DESIGNATION

☐ OFF Alarm relay reports system-wide error

☒ Device OK ☒ System OK

Valve

No valve

Please select a valve.

### Select control type

Choose the available control types that can be used by the selected KHS Mini Control System from a drop-down list. In this sample project, the KHS Mini Control System should function as a safety valve

Safeguard

Deactivated

A-valve

B-valve

C-valve

Only measurement

Safeguard



### Select valve

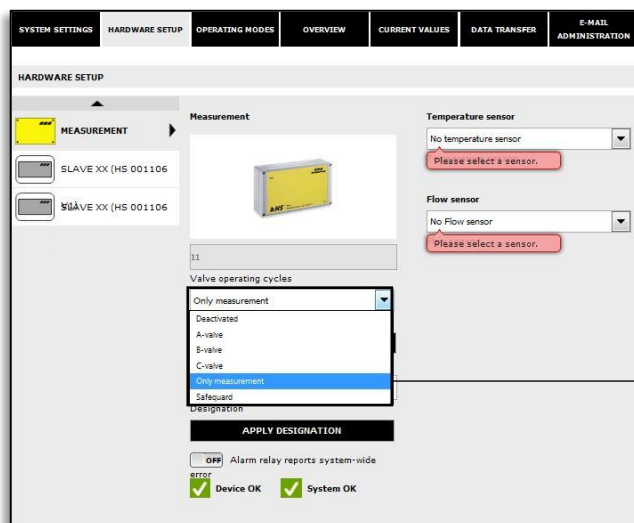
The possible valves are selected from a drop-down list. In this sample project, the KHS Mini Control System should actuate a KHS VAV maximum flow isolating ball valve with servo drive.

### Save settings

For the new parameters of the input box to become effective, the settings must be saved by clicking **WRITE TO CONTROL**.

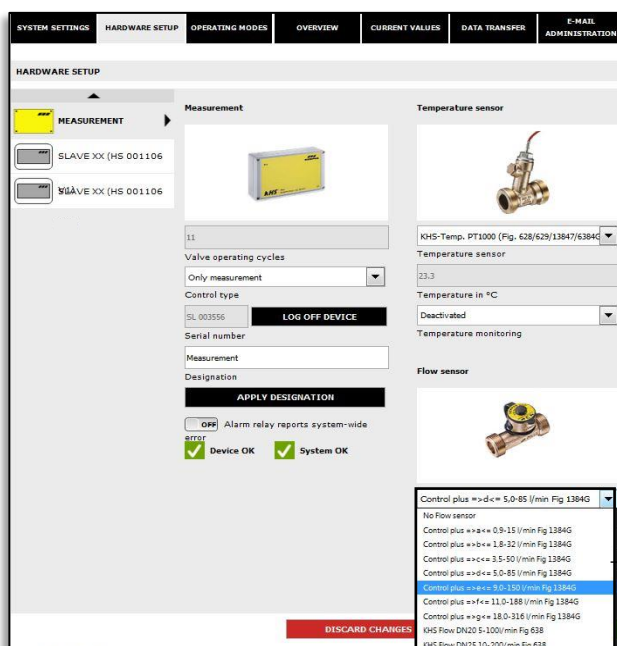
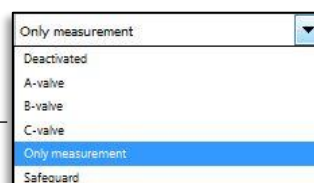
✓ The settings have been saved.

## Configuration of measurement



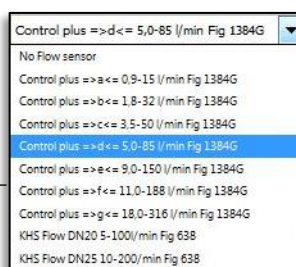
### Select control type

Choose the available control types that can be used by the selected KHS Mini Control System from a drop-down list. The KHS Mini Control System -SLAVE- in this example should act as a measurement SLAVE.



### Select sensor

The possible sensors are selected from a drop-down list. The KHS Mini Control System - SLAVE - should be assigned to a KHS CONTROL PLUS.



## Save settings

For the new parameters of the input box to become effective, the settings must be saved by clicking the **WRITE TO CONTROL** button.

✓ The settings have been saved.

## Configuration of the KHS HS2 Hygiene flushing box V1

## Change Name

...V1 ⇨ Connection right  
...V2 ⇨ Connection left

Use the **APPLY NAME** button to transmit the selected system name.

The KHS HS2 hygiene flushing box is displayed visually.

SYSTEM SETTINGS | **HARDWARE SETUP** | OPERATING MODES | OVERVIEW | CURRENT VALUES | DATA TRANSFER | E-MAIL ADMINISTRATION

**HARDWARE SETUP**

MASTER  
HS2-V1  
B-VALVE  
SLAVE XX (HS 001106 V2)

HS2-V1

14

Valve operating cycles

Deactivated

Deactivated

HS 001106 V1

Serial number

HS2-V1

Designation

APPLY DESIGNATION

OFF Alarm relay reports system-wide error

Device OK System OK

### Select control type

A control type (C valve) is assigned to the KHS HS2 hygiene flushing box by means of a drop-down list.

Deactivated

Deactivated

C-valve

SYSTEM SETTINGS | **HARDWARE SETUP** | OPERATING MODES | OVERVIEW | CURRENT VALUES | DATA TRANSFER | E-MAIL ADMINISTRATION

**HARDWARE SETUP**

HS2-V1  
B-VALVE  
SLAVE XX (SL 003556)  
SLAVE XX (HS 001106 V2)

HS2-V1

14

Valve operating cycles

C-valve

Control type

HS 001106 V1

Serial number

HS2-V1

Designation

APPLY DESIGNATION

OFF Alarm relay reports system-wide error

Device OK System OK

Valve

KHS-magnetic valve 12V Fig. 689/03012

Valve type

Temperature sensor

No temperature sensor

No temperature sensor

KHS-Temp. PT 1000 Fig. 689 00

Flow sensor

No Flow sensor

Flow sensor

OFF Flush V1 and V2 together

### Select sensor

The possible sensors are selected from a drop-down list. A KHS temperature sensor Pt 1000 can be assigned to the KHS HS2 hygiene flushing box.

No temperature sensor

No temperature sensor

KHS-Temp. PT 1000 Fig. 689 00

SYSTEM SETTINGS | **HARDWARE SETUP** | OPERATING MODES | OVERVIEW | CURRENT VALUES | DATA TRANSFER | E-MAIL ADMINISTRATION

**HARDWARE SETUP**

HS2-V1  
B-VALVE  
SLAVE XX (SL 003556)  
SLAVE XX (HS 001106 V2)

HS2-V1

14

Valve operating cycles

C-valve

Control type

HS 001106 V1

Serial number

HS2-V1

Designation

APPLY DESIGNATION

OFF Alarm relay reports system-wide error

Device OK System OK

Valve

KHS-magnetic valve 12V Fig. 689/03012

Valve type

Temperature sensor

KHS-Temp. PT1000 Fig. 689 00

Temperature sensor

-300.0

Temperature in °C

Deactivated

Deactivated

Hot water

Cold water

Flow sensor

No Flow sensor

Flow sensor

OFF Flush V1 and V2 together

### Select the medium to be monitored

Select the medium to be monitored from a drop-down list. In this sample project, it is cold water. The temperature ranges are then configured.

Cold water

Deactivated

Hot water

Cold water

**SYSTEM SETTINGS** **HARDWARE SETUP** **OPERATING MODES** **OVERVIEW** **CURRENT VALUES** **DATA TRANSFER** **E-MAIL ADMINISTRATION**

**HARDWARE SETUP**

HS2-V1

Temperature sensor

KHS-Temp. PT1000 Fig. 689 00

Temperature sensor

-300.0

Temperature in °C

Cold water

Temperature monitoring

25.0

Set-point temperature max.

3.0

Frost protection limit

Flow sensor

No Flow sensor

No Flow sensor

Control plus HS2 Fig. 6894G

OFF Flush V1 and V2 together

Valve

KHS-magnetic valve 12V Fig. 689/03012

Valve type

## Select valve

An internal volume flow sensor can be added to the KHS HS2 hygiene flushing box by means of a drop-down list.

No Flow sensor

No Flow sensor

Control plus HS2 Fig. 6894G

**SYSTEM SETTINGS** **HARDWARE SETUP** **OPERATING MODES** **OVERVIEW** **CURRENT VALUES** **DATA TRANSFER** **E-MAIL ADMINISTRATION**

**HARDWARE SETUP**

HS2-V1

Temperature sensor

KHS-Temp. PT1000 Fig. 689 00

Temperature sensor

-300.0

Temperature in °C

Cold water

Temperature monitoring

25.0

Set-point temperature max.

3.0

Frost protection limit

Flow sensor

Control plus HS2 Fig. 6894G

Flow sensor

0.0

Flow in l/min

0.0

Flow volume in litres

OFF Flush V1 and V2 together

Valve

KHS-magnetic valve 12V Fig. 689/03012

Valve type

DISCARD CHANGES

WRITE INTO CONTROL

## Save settings

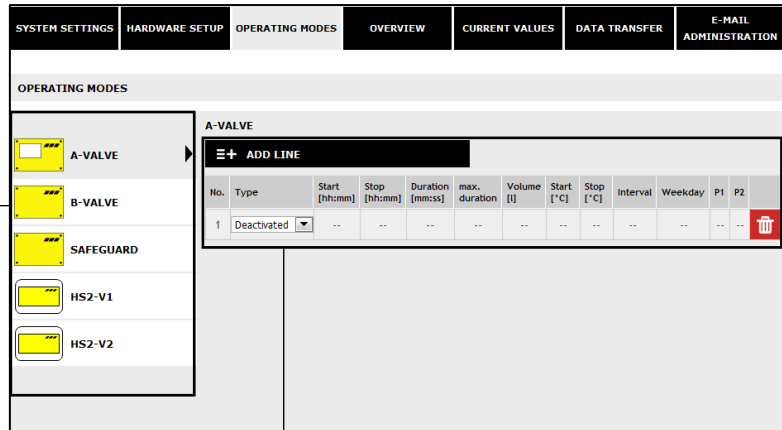
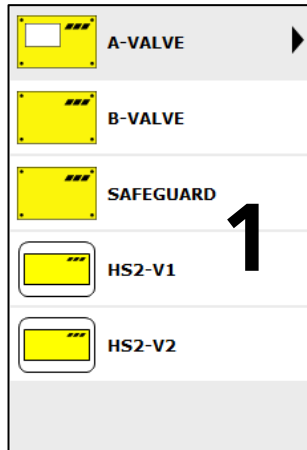
For the new parameters of the input box to become effective, the settings must be saved by clicking the **WRITE TO CONTROL** button.

✓ The settings have been saved.

## 6.4 Operating modes

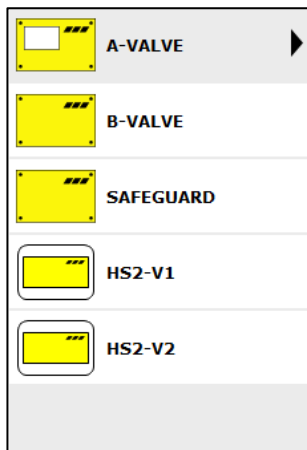
In the "OPERATING MODES" menu interface, the control-specific TIMERS are configured for the KHS Mini Control System. Depending on the control type, a TIMER

defines flushing times, measurement intervals, backup times, routine intervals, temperature flushing etc.



ADD LINE													
No.	Type	Start [hh:mm]	Stop [hh:mm]	Duration [mm:ss]	max. duration	Volume [l]	Start [°C]	Stop [°C]	Interval	Weekday	P1	P2	
1	Deactivated	--	--	--	--	--	--	--	--	--	--	--	

### Selection interface



In the "OPERATING MODES" menu interface, you will find the selection interface of the added KHS Mini Control System on the left-hand side. Click the desired KHS Mini Control System to open the input box.



The changes must be written into the control after every change in the input box. If another KHS Mini Control System is selected immediately after a change in the selection interface, the changes are discarded.

## Input box

≡+
ADD LINE

No.	Type	Start [hh:mm]	Stop [hh:mm]	Duration [mm:ss]	max. duration	Volume	Start [°C]	Stop [°C]	Interval	Weekday	P1	P2
1	Deactivated ▼	--	--	--	--	--	--	--	--	--	--	--

If a KHS Mini Control System is selected in the selection interface, the relevant input box appears on the right-hand side. Click the **ADD LINE** button to add up to 16 lines to the TIMER. Press the button to

delete the line in question from the TIMER. Click the **RESORT TIMER** button to delete all deactivated lines and to push empty lines to the back. The remaining input options in the lines are explained below.

**Overview for the system commissioning on the KHS Mini System Control**

– MASTER – Figure 686 02 005

– MASTER 2.0 – Figure 686 02 008

(make a hand-written entry based on the example during the installation)

**Building name:**

**Date:**

**Person commissioning:**

KHS Isolating valve with servo drive and spring reset	KHS Isolating valve with servo drive	KHS-CONTROL-PLUS flow measurement valve Figure 138 4G and Figure 638 4G	KHS PT1000	KHS drain with over-flow	Water-sensor	Flow Limiter	KHS-HS2®
Fig. 686 05 Fig. 696 05	Fig. 686 04 Fig. 696 04	a b c d e f g	Fig. 628 0G 629 0G	Fig. 688 00	Fig. 620 00	Fig. 697 DN...	Fig. 689 03

Control	No.	Serial no. (Rating plate on the control)	Location   Room	Control unit A-valve; B-valve; C-valve; measuring (A/B-valve apply only to Master 2.0)	Associated B-valve -Serial no.- of system commissioning (Column applies on to Master 2.0)												
MAS		2785	Cellar	B-Valve	-												
SL	1	1206	Cellar	C-Valve	-												
SL	2	1187	Cellar	A-Valve	-												
SL	3	1184	G floor	Measuring	-												
SL	4	1185	G floor	Measuring	-												
SL	5	1278	G floor	A-Valve	2758												
SL	6	1277	1 floor	A-Valve	2758												

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### III. 6.3.1 Overview of system commissioning for the sample project



The selected times and temperatures serve as examples. The values must always be set for each building and for each type of use and medium so that representative measurement values are generated and intended use is maintained for the system.

## Configuration of time control (A valve)

### Select type

After a line has been added using **ADD LINE**, the line type is selected. The KHS Mini Control System in this sample project is connected to an A valve. To time control the water exchange, the "Time flushing" line type must be selected from a drop-down list.

### Define times

After a line type has been selected, define the times. In the "Time control" line type, a starting time and the duration of the water exchange must be stated. Furthermore, the desired weekday can be selected from a drop-down list. Click the box of the weekday in question to activate it with a check mark.

Start [hh:mm]	Stop [hh:mm]	Duration [mm:ss]
06:00	--	5:00



### Save settings

the new parameters of the input box to become effective, the settings must be saved by clicking the **WRITE TO CONTROL** button.

✓ The settings have been saved.

### Configuration of volume flushing (A valve)

### Select type

After a line has been added using **ADD LINE**, the line type is selected. To volume control the water exchange, the "Volume flushing" line type has to be selected from a drop-down list.

- Deactivated
- Time flushing
- Volume flushing**
- Temperature flushing
- Routine-Time
- Routine-Duration
- Routine-Volume
- Datalogging

No.	Type	Start [hh:mm]	Stop [hh:mm]	Duration [mm:ss]	max. duration	Volume [l]
1	Volume	06:00	--	--	10:00	50,0

### Define times

Ist er a line type has been selected, define the times. In the "Volume control" line type, a starting time, the duration and the volume of the water exchange must be specified. Furthermore, the desired weekday can be selected from a drop-down list. Click in the box of the weekday in question to activate it with a check mark.

Start [hh:mm]	Stop [hh:mm]	Duration [mm:ss]	max. duration	Volume [l]
06:00	--	--	10:00	50,0

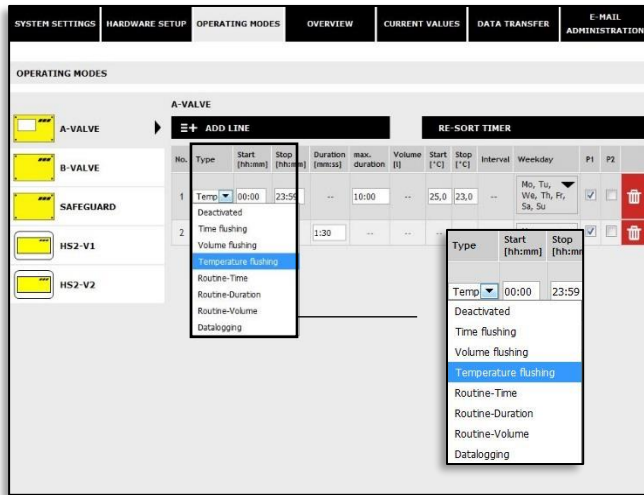
No.	Type	Start [hh:mm]	Stop [hh:mm]	Duration [mm:ss]	max. duration	Volume [l]
1	Volume	06:00	--	--	10:00	50,0

### Save setting

For the new parameters of the input box to become effective, the settings must by saved by clicking the **WRITE TO CONTROL** button.

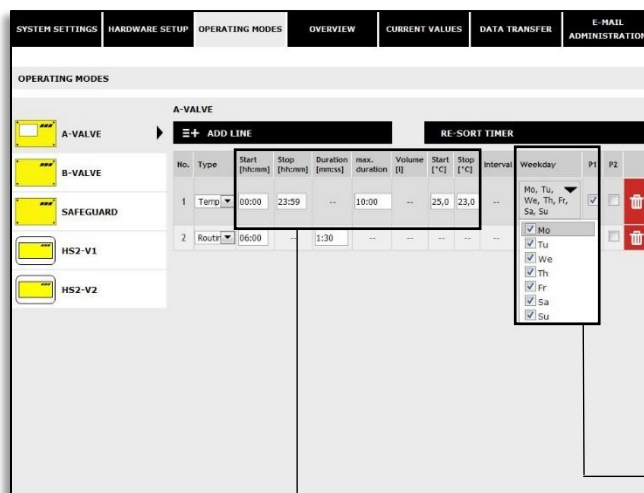
✓ The settings have been saved.

## Configuration of temperature flushing (A valve)



### Select type (Temperature flushing)

After a line has been added using **ADD LINE**, the line type is selected. The KHS Mini Control System in the sample project is linked to a temperature measurement valve. To temperature control the water exchange, the "Temperature control" line type has to be selected from a drop-down list.

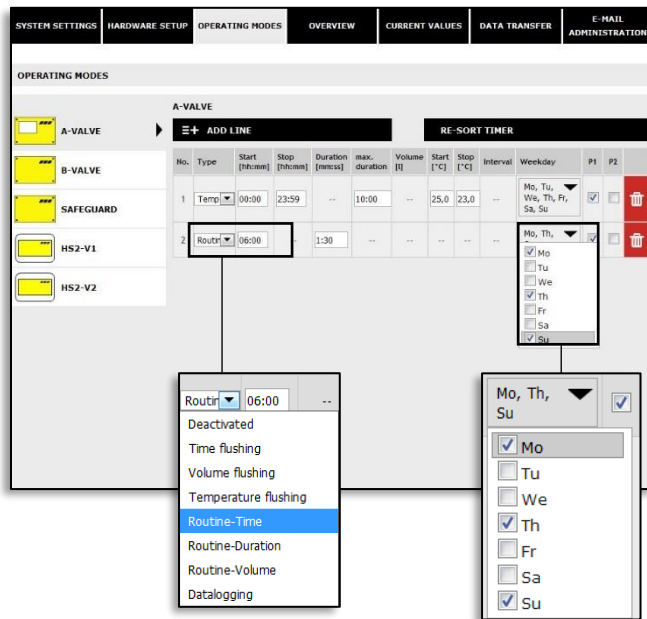


### Define times

If a line type has been selected, define the times. A starting and stopping time has to be specified for the "Temperature flushing" line type. Furthermore, the desired weekday can be selected from a drop-down list. Click in the box of the weekday in question to activate it with a check mark.

Start [hh:mm]	Stopp [hh:mm]	Dauer [mm:ss]	max. Dauer	Menge [l]	Start [°C]	Stopp [°C]
00:00	23:59	--	10:00	--	25,0	23,0

Weekday	P1
Mo, Tu, We, Th, Fr, Sa, Su	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Mo	
<input checked="" type="checkbox"/> Tu	
<input checked="" type="checkbox"/> We	
<input checked="" type="checkbox"/> Th	
<input checked="" type="checkbox"/> Fr	
<input checked="" type="checkbox"/> Sa	
<input checked="" type="checkbox"/> Su	



### **Routine time**

If there is no temperature flushing within 7 days, water exchange is guaranteed through the "Routine time" operating mode. In the "Routine time" operating mode, the

### **Routine duration**

If there is no temperature flushing within the configured interval, the water exchange is guaranteed through the "Routine duration" operating mode. To accomplish

### **Routine volume**

If there is no temperature flushing within the configured interval, the water exchange is guaranteed through the "Routine volume" operating mode. To accomplish this, the

### **Routine time**

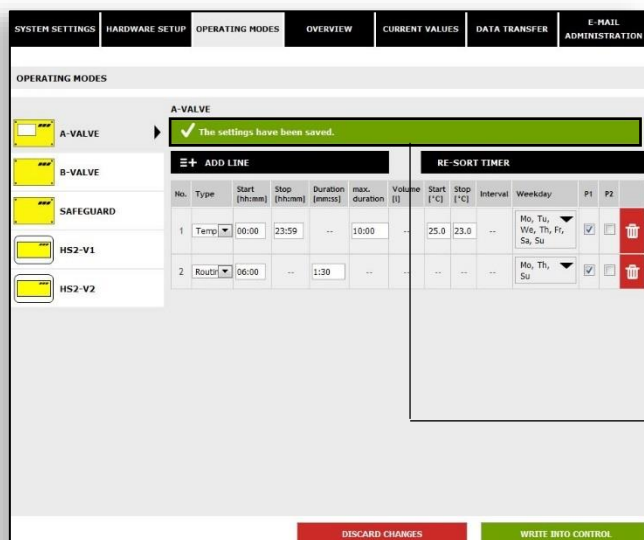
In this sample project, it is cold water. The cold water temperature in winter could always be below the starting temperature. Nevertheless, to prevent stagnation, routine water exchanges can simulate operation for the intended purpose. The "Routine" line type can be selected from the drop-down list.

The desired weekday can also be selected from a drop-down list. Click in the box of the weekday in question to activate it with a check mark.

starting time, the duration and the weekdays of the water exchange can be defined.

that, the decisive interval (max. 168 h) and the duration of the water exchange can be stored in the "Routine duration" operating mode.

decisive interval (max. 168 h), the volume and the maximum flushing time of the water exchange can be assigned to the "Routine volume" operating mode.

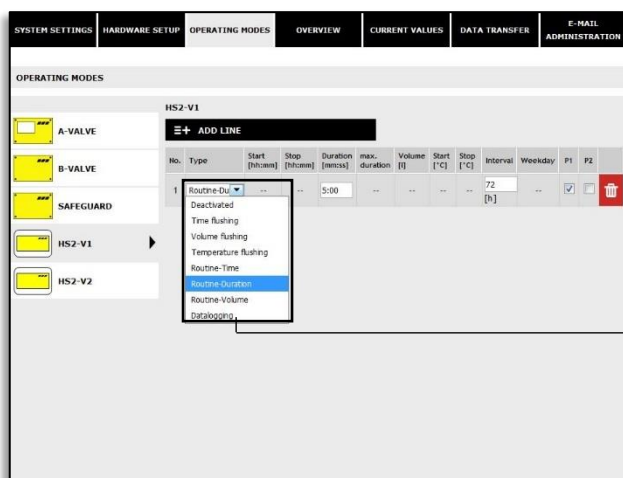


### **Save settings**

For the new parameters of the input box to become effective, the settings must be saved by clicking the **WRITE TO CONTROL** button.

✓ The settings have been saved.

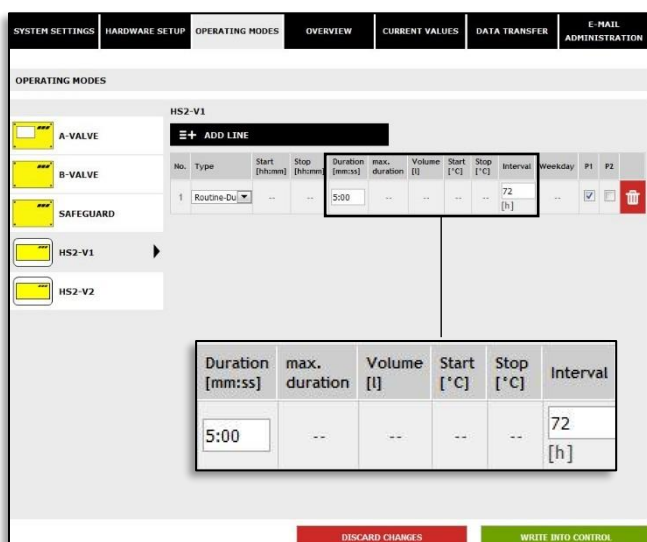
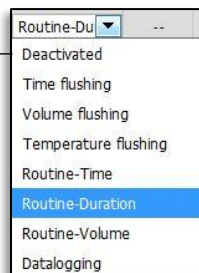
## Configuration of a KHS HS2 Hygiene flushing box V1 (interval flushing)



### Select interval

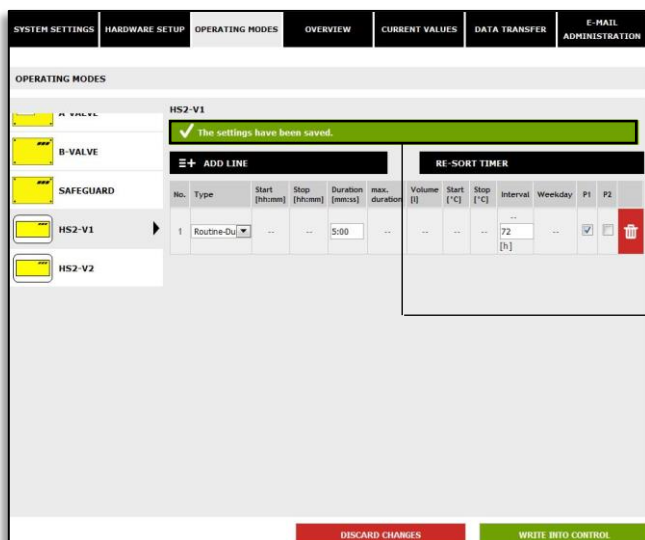
After a line has been added using **ADD LINE**, the line type is selected. The "Routine duration" line type is selected from the drop-down list.

Here, the "Routine duration" line type corresponds to one interval flushing operation.



### Define times

After a line type has been selected, define the times. In the "Routine duration" line type, the duration and the interval of the water exchange must be specified.

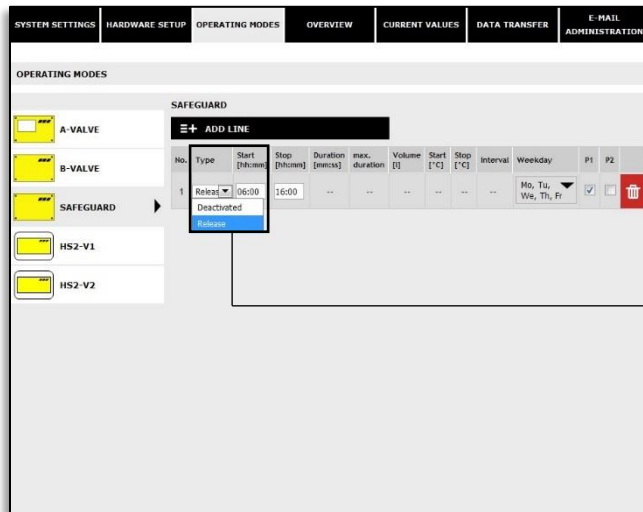


### Save settings

For the new parameters of the input box to become effective, the settings must be saved by clicking the **WRITE TO CONTROL** button.

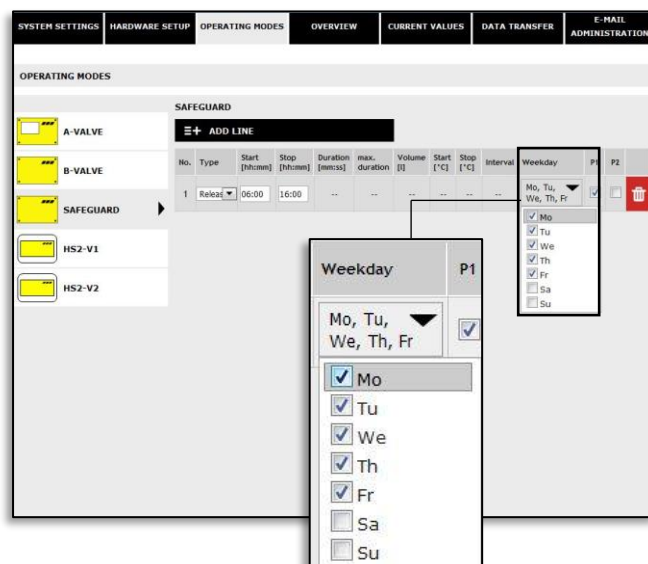


## Configuration of the safety device



### Select type

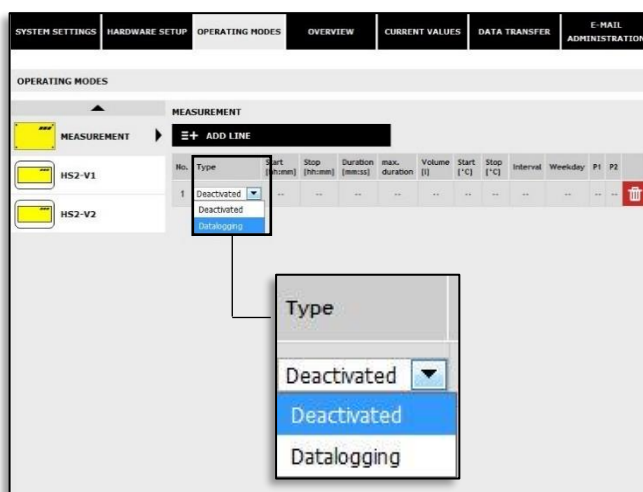
After a line has been added using **ADD LINE**, the line type is selected. The "Release" line type is selected from the drop-down list.



### Define time

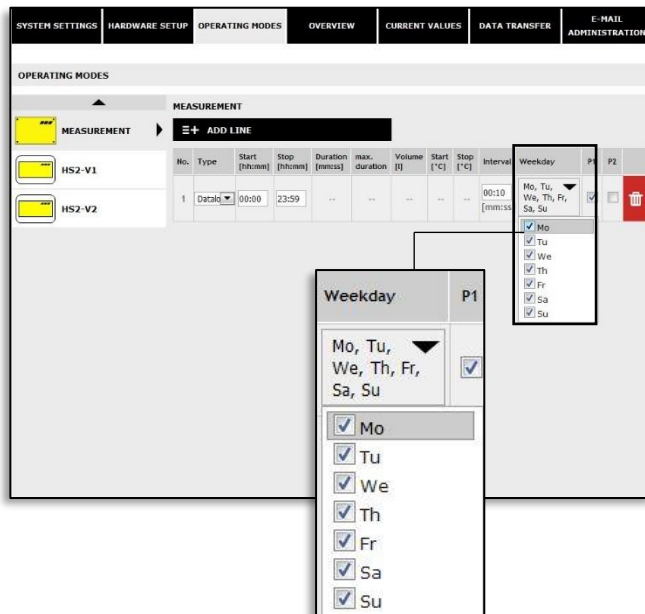
After a line type has been selected, define the times. A starting and stopping time has to be specified for the "Release" line type. Furthermore, the desired weekdays can be selected from a drop-down list. Click in the box of the weekday in question to activate it with a check mark.

## Configuration of measurement (datalogging)



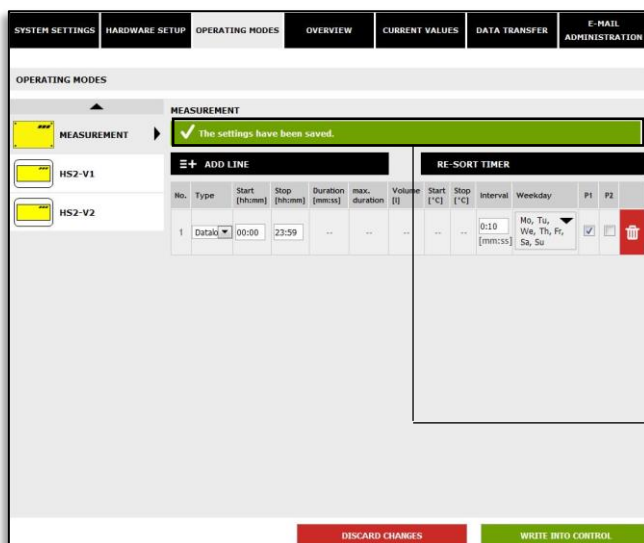
### Select type

After a line has been added using **ADD LINE**, the line type is selected. The KHS Mini Control System in this sample project is connected to a KHS Control Plus flow measurement valve. To record the flow measurement valve measurement data at the same time, the "Datalogging" line type must be selected from a drop-down list.



### Define times

After a line type has been selected, define the times. A starting and stopping time has to be stated for the "Datalogging" line type. Furthermore, the desired weekdays can be selected from a drop-down list. Click in the box of the respective weekday to activate it with a check mark. The interval time states the storage rate of the measurement values.



### Save settings

For the new parameters of the input box to become effective, the settings must be saved by clicking the **WRITE TO CONTROL** button.

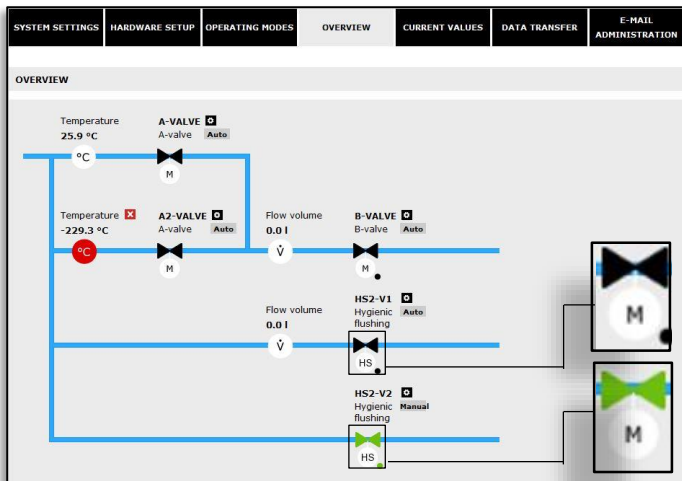
✓ The settings have been saved.



## 6.5 Overview

In the „OVERVIEW“ menu interface, the configured valves and the linked sensors are shown in an overview. Pure

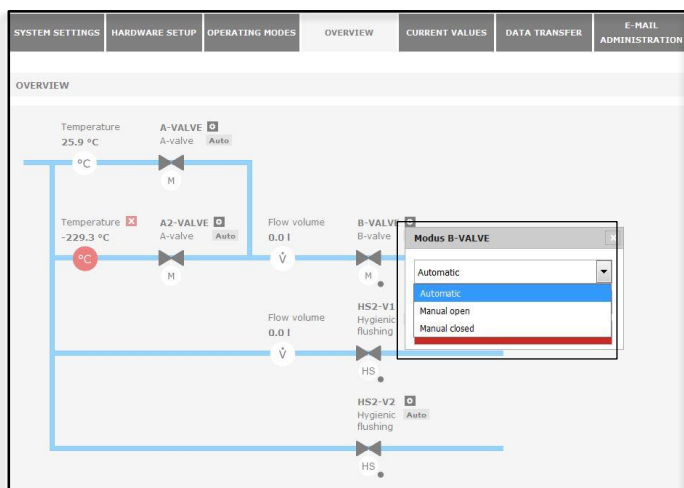
measurement valves are not listed in the „OVERVIEW“.



### Overview

The overview merely shows the current states. No configurations can be carried out on this interface. Click a valve to open the input box of the "SYSTEM SETTINGS" menu interface of the selected component.

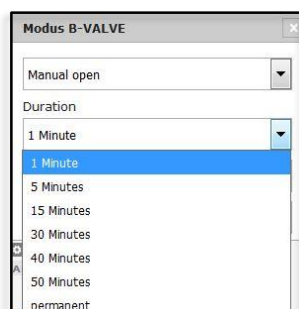
If a valve is highlighted in black, this means it is closed. If the valve is highlighted in grey, it is open. If the valve is highlighted in red, there is a fault.



### Manual mode / Automatic

The actuators can be triggered manually. Click the button to open a selection window. Use the selection window to choose between three settings (C valve) or five settings (A/B valve) from a drop-down list. The button indicates a fault in the system.

- Automatic = Standard setting
- Manual OPEN = Opens valve
- Manual CLOSE = Closes valve
- Group OPEN = With the A valve, the B valve also opens
- Group CLOSE = both close again




After a setting has been selected, the duration of the setting can be defined. Use the **APPLY** button to apply the setting. Press the **CANCEL** button to cancel the action.



## 6.6 Current values

The „CURRENT VALUES“ menu interface shows the current values of the connected KHS Mini Control System and their sensors.

SYSTEM SETTINGS	HARDWARE SETUP	OPERATING MODES	OVERVIEW	CURRENT VALUES	DATA TRANSFER	E-MAIL ADMINISTRATION			
CURRENT VALUES									
Device	Serial number	Designation	Control type	°C	l/min	l	Operating cycles	Mode	Status
MASTER	00000125	A-VALVE	A-valve	25.9	--	--	1	Automatic	✓
SLAVE 1	SL 003556	B-VALVE	B-valve	--	0.0	0.0	15	Automatic	✓
SLAVE 2	SL 003557	A2-VALVE	A-valve	--	--	--	12	Automatic	✓
SLAVE 3	HS 001106 V1	HS2-V1	Hygienic flushing	--	0.0	0.0	21	Automatic	✓
SLAVE 4	HS 001106 V2	HS2-V2	Hygienic flushing	--	--	--	14	Automatic	✓

Click the  button to open the input box of the "DEVICE SETTINGS" menu interface of the selected KHS Mini Control System.

## 6.7 Data transfer

You can use the "DATA TRANSFER" menu interface to load configurations, software updates,

logbook entries and the created datalogging files.

The diagram illustrates the 'DATA TRANSFER' menu interface with four numbered callouts highlighting specific functions:

- Softwareupdate**: A callout box labeled '1' points to the 'Softwareupdate' section, which includes a 'Browse...' button, 'No file selected.' text, and a 'LOAD UPDATE' button.
- Configuration**: A callout box labeled '2' points to the 'Configuration' section, which includes a 'Browse...' button, 'No file selected.' text, and buttons for 'LOAD CONFIGURATION FROM FILE' and 'WRITE CONFIGURATION TO FILE'.
- Journal**: A callout box labeled '3' points to the 'Journal' section, which includes a 'SAVE JOURNAL AS .CSV' button.
- Data logging**: A callout box labeled '4' points to the 'Data logging' section, which includes a 'SAVE LOG FILE' button, a 'Filter:' input field, and a table of log files.

The main interface shows the 'DATA TRANSFER' menu with the following sections:

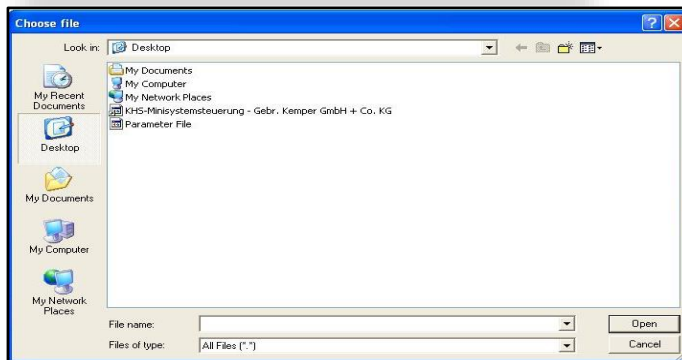
- Configuration**: Includes 'Browse...' button, 'No file selected.' text, 'LOAD CONFIGURATION FROM FILE' button, and 'WRITE CONFIGURATION TO FILE' button.
- Softwareupdate**: Includes 'Browse...' button, 'No file selected.' text, and 'LOAD UPDATE' button.
- Journal**: Includes 'SAVE JOURNAL AS .CSV' button.
- Data logging**: Includes 'SAVE LOG FILE' button, 'Filter:' input field, and a table of log files.

Device	File
MASTER	DataLog_KHS004711_actual.csv

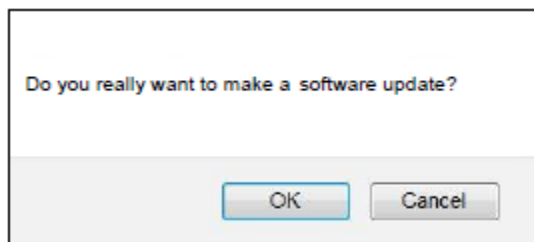
Device	File
MASTER	DataLog_KHS004711_20131206_133033.csv

## Software update



The "Software update" function can be used to install a software update on the connected KHS Mini Control System. To do this, click the Search button. The UPE files open in the window that then opens, see Fig. 6.7.1. After the **LOAD UPDATE** button has been pressed, a confirmation appears as shown in Fig. 6.6.2. Click the **OK** button to load the selected setup into the Control System.

### III. 6.7.1 Selection dialogue „Upload setup file“

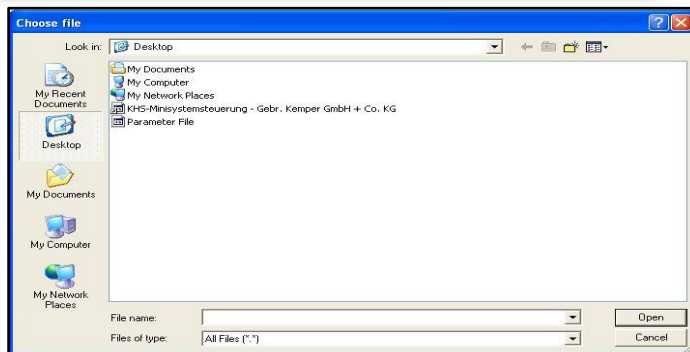
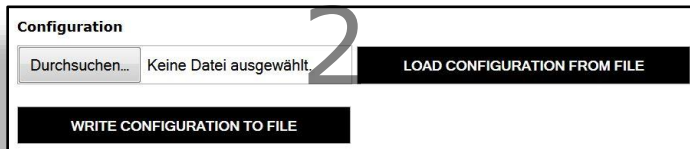


### III. 6.7.2 „Delete software update“ confirmation



As a precautionary measure, please backup your configuration before making an update.

## Configuration

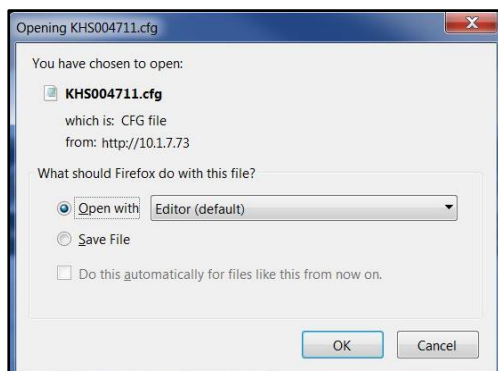


### Loading a configuration from a file

The "Configuration" function can be used to install an existing configuration in the connected KHS Mini Control System. To do this, click the **Search** button. The CFG file opens in the window that then opens, see Fig. 6.7.3. After the **LOAD CONFIGURATION FROM FILE** button has been clicked, the selected configuration is then loaded into the Control System.

The network and e-mail settings can only be loaded when the configuration is loaded using a USB stick. They are not imported when the configuration is loaded using the web server.

### III. 6.7.3 Selection dialogue „Upload configuration file“



### Backing up the configuration

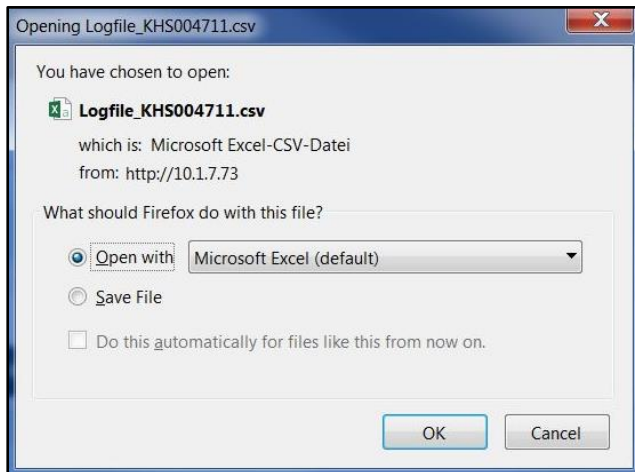
You can use the "Configuration" function to backup parameterised configurations of the connected KHS Mini Control System to your PC. To do this, click the **WRITE CONFIGURATION TO FILE** button. In this window, see Fig. 6.7.4, you can back up the CFG file to the desired folder on your PC.

### III. 6.7.4 Selection dialogue „Back up configuration file“



After successfully configuring your Control System, you are recommended to save the configuration as a backup file. If the KHS Mini Control System -MASTER 2.0- is defective, it can be quickly replaced and the configuration can be read in. This saves having to configure everything again.

## Logbook




You can use the "Logbook" function to open and save the event log as a CSV file. The event log documents the water exchange operations, error messages and configuration changes made by the Kemper KHS Mini Control System.

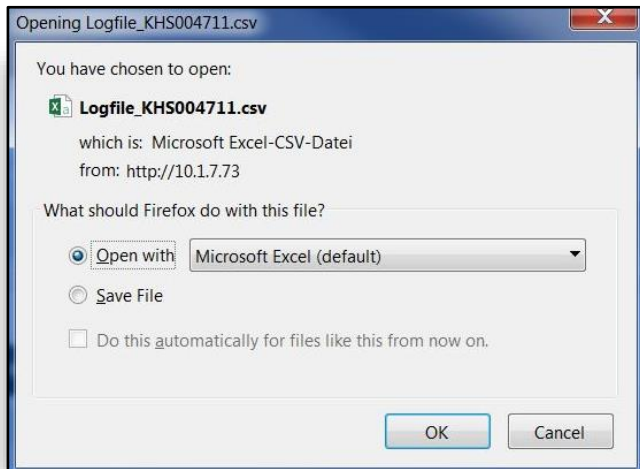
Based on the documentation about the location, duration of the water exchange and the temperatures, recordings can be made across a defined time period to verify the state of hygiene of the drinking water system. To open the CSV file, click **OPEN LOGBOOK AS CSV**. A dialogue window then opens, where you can select whether the flushing log should be saved or if it should be immediately opened (see Fig. 6.7.5).

III. 6.7.5 Opening the CSV log file dialogue

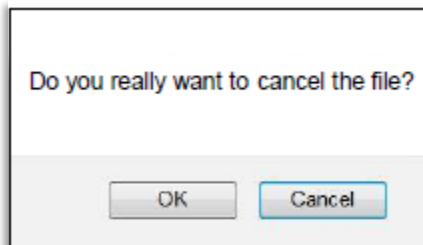


The KHS Mini Control System have a facility to be used as measuring instruments. To do this, the Control System that are connected to a sensor, as described in Chapter 6.3, are configured. Use the "Datalogging" function to generate, delete and save the recorded measurement data records in the form of a CSV file on the PC. Up to 12 million lines can be backed up. Click the

**CREATE LOGFILE** button to generate the current CSV file, which is not yet completely full. Click the CSV file to open a dialogue as shown in Fig. 6.7.6. Here you can select whether the flushing log should be saved or immediately opened. Use the  button to open a query as shown in Fig. 6.7.7. Click **OK** to delete the selected file.



III. 6.7.6 Opening the CSV data log file dialogue



III. 6.7.7 „Delete file“ confirmation

III. 6.7.8 shows an extract of a CSV log file. In the log file you will find a detailed list of the entire measured data; sorted by date,

time, index, name and the measured data of the connected measuring valve.

Datum	Zeit	Index	Name	T(min)/°C	T(max)/°C	T(avg)/°C	Q(min)/L/min	Q(max)/L/min	Q(avg)/L/min	V/Liter
22.11.2013	11:48:10	Master	MASTER C-Ventil	0,00	0,00	0,00	0,00	0,00	0,00	0,00
22.11.2013	11:48:20	Master	MASTER C-Ventil	0,00	0,00	0,00	0,00	0,00	0,00	0,00
22.11.2013	11:48:30	Master	MASTER C-Ventil	0,00	0,00	0,00	0,00	0,00	0,00	0,00
22.11.2013	11:48:40	Master	MASTER C-Ventil	0,00	0,00	0,00	0,00	0,00	0,00	0,00
22.11.2013	11:48:50	Master	MASTER C-Ventil	0,00	0,00	0,00	0,00	0,00	0,00	0,00
22.11.2013	11:49:00	Master	MASTER C-Ventil	0,00	0,00	0,00	0,00	0,00	0,00	0,00
22.11.2013	11:49:10	Master	MASTER C-Ventil	0,00	0,00	0,00	0,00	0,00	0,00	0,00
22.11.2013	11:49:20	Master	MASTER C-Ventil	0,00	0,00	0,00	0,00	0,00	0,00	0,00
22.11.2013	11:49:30	Master	MASTER C-Ventil	0,00	0,00	0,00	0,00	0,00	0,00	0,00
22.11.2013	11:49:40	Master	MASTER C-Ventil	0,00	0,00	0,00	0,00	0,00	0,00	0,00

III. 6.7.8 Illustration of an extract of a CSV log file



As described in Chapter 6.3, the sampling interval of the measured values can be set using the "OPERATING MODES" menu interface.

## 6.8 E-Mail administration

If errors or warning messages occur, the KHS Mini Control System -MASTER 2.0- can send them directly to the plant operating organisation by e-mail.

In the "EMAIL ADMINISTRATION" menu

interface, a selection of error and warning messages can be individually configured. Furthermore, the e-mail configuration is set with the user, server and login information functions.

The diagram illustrates the E-Mail administration interface with five numbered steps:

- User information:** Fields for KHS Mini-System, Control designation, E-mail address, sender, and E-mail address, recipient.
- Serverinformationen:** Fields for mail.kemper-olpe.de, Postausgangsserver (SMTP), and Port.
- Login information:** Fields for User name and Password.
- Select error messages for notification per E-mail:** A list of error messages with checkboxes to select for notification.
- Select warning messages for notification per E-mail:** A list of warning messages with checkboxes to select for notification.

The interface also includes a navigation bar with tabs: SYSTEM SETTINGS, DEVICE SETTINGS, OPERATING MODES, OVERVIEW, CURRENT VALUES, DATA TRANSFER, and E-MAIL ADMINISTRATION. The E-MAIL ADMINISTRATION tab is active, showing the configuration options.

## User information | Server information | Login information

**User information**

KHS Mini-System **1**

Control designation

steuerung@kemper-olpe.de

E-mail address, sender

muster@kemper-olpe.de

E-mail address, recipient

**Server information**

mail.kemper-olpe.de **2**

Outbound mail server (SMTP)

25

Port

**Login information**

**3**

User name

Password

To enable the KHS Mini Control System - MASTER 2.0- to send error and warning messages to the plant operating organisation, the e-mail settings have to be configured. Here, an internal company e-

mail account can be created, or an independent provider can be used if he works without encryption. The control name can be used to allocate a location, e.g. Cologne Gymnastics Hall.

## Select error messages for notification per email

**Select error messages for notification per E-mail**

☐ OFF Error: Backflow

☐ OFF Error: Communication slave

☐ OFF Error: PT1000 value too low

☐ OFF Error: PT1000 value too high

☐ OFF Error: Real-time clock

☐ OFF Error: Runtime exceeded

☐ OFF Error: Too many bus subscribers CAN Bus A

☐ OFF Error: Too many bus subscribers CAN Bus B

☐ OFF Fehler Kommunikation Can A

☐ OFF Fehler Kommunikation Can B

☐ OFF Error: Leak detected

☐ OFF Error: Flow despite closed valve

☐ OFF Error: No flow despite open valve

☐ OFF Error: switching cycle higher than 10,000x

**4**

If the ☐ OFF button is set to ☒ ON, the relevant notification about a possible error is activated. If an error occurs, an error message is sent to the plant operator by e-mail.

## Select warning messages for notification per email

**Select warning messages for notification per E-mail**

☐ OFF Warning: Limit thermal disinfection exceeded

☐ OFF Warning: Limit thermal disinfection exceeded

☐ OFF Warning: Limit set-point max. exceeded

☐ OFF Warning: Limit set-point min. undercut

☐ OFF Warnung Frost klein

☐ OFF Hinweis: Set-point OK

**5**

If the ☐ OFF button is set to ☒ ON, the relevant notification about a possible warning is activated. If a warning occurs, an error message is sent to the plant operating organisation by e-mail.



## 7 Error description and error handling

Error description / Error handling				
Status LED	Status LED	Status LED	Status LED	Status LED
Flashes red	General error			
	Backwater in drain	Drain is clogged or cannot accept the flushing volume.	Check the drain channel, channel acceptance capacity.	Error message! Defective control will be completely blocked
	Backwater in drain	Float switch on the drain has a cable break	Replace cable / switch	Error message! Defective control will be completely blocked
	Temperature flushing switched off during runtime	Medium did not reach the switch-off temperature in the set time	Check the installation setup and the maximum flushing time.	Error message! Temperature operating mode is blocked in the defective control.
	Volume flushing switched off during runtime	Set volume not reached	Check the installation setup and the maximum flushing time.	Error message! Volume operating mode is blocked in the defective control.
	PT1000 value too high	Sensor defective / No sensor available	Replace sensor / Check inputs on the MASTER	Error message! Temperature flushing operating mode is blocked in the defective control.
	PT1000 value too low	Sensor defective / No sensor available	Replace sensor / Check inputs on the MASTER	Error message! Temperature flushing operating mode is blocked in the defective control.
	Leak on sensor	Pipe failure, moisture on the sensor	Check the local area and remove the moisture	The safety valve is blocking the system.
	Real-time clock data inconsistent	Data in the clock are not consistent	Check the time & date and adjust if necessary. Check battery/replace if applicable	All time-based services are running on incorrect time/date.
	Flow detected with valve closed"	Flow is detected by the flow measurement valve when the valve is closed	Check the function of the flushing valve	Error message! The involved valve will be blocked.
	"No flow detected despite open valve"	No flow is detected during a flushing process.	Check the flushing line and the flushing valve	Error message! The involved valve will be blocked.

Error description / Error handling				
Status LED	Status LED	Status LED	Status LED	Auswirkung
<b>Bus error</b>				
Flashes orange	No response from the SLAVE	Cable break, incorrect installation, interference fields	Check CAN bus cables and installation	Faulty SLAVE does not function
	No response from the SLAVE	SLAVE does not have voltage	Restore SLAVE power supply	Faulty SLAVE does not function
	No response from the SLAVE	SLAVE with its corresponding serial number no longer part of the plant (e.g., after a replacement)	Assign the correct serial number to the SLAVE or delete the device from the system	Faulty SLAVE does not function
	CAN bus line fault	Cable break, incorrect installation, interference fields	Check CAN bus cables and installation	CAN bus and all SLAVES do not function.
	Too many bus subscribers CAN bus A	More than 31 SLAVES are connected to CAN bus A	Rewire the BUS subscribers or change the position of the MASTER in the bus system.	CAN bus A faulty. Communication and functions can be impaired.
	Too many bus subscribers CAN bus B	More than 31 SLAVES are connected to CAN bus B	Rewire the BUS subscribers or change the position of the MASTER in the bus system.	CAN bus B faulty. Communication and functions can be impaired.
	Communication error CAN bus A	Cable break, incorrect installation, interference fields	Check CAN Bus A cables and installation	Affected SLAVES do not function
	Communication error CAN bus B	Cable break, incorrect installation, interference fields	Check CAN Bus B cables and installation	Affected SLAVES do not function

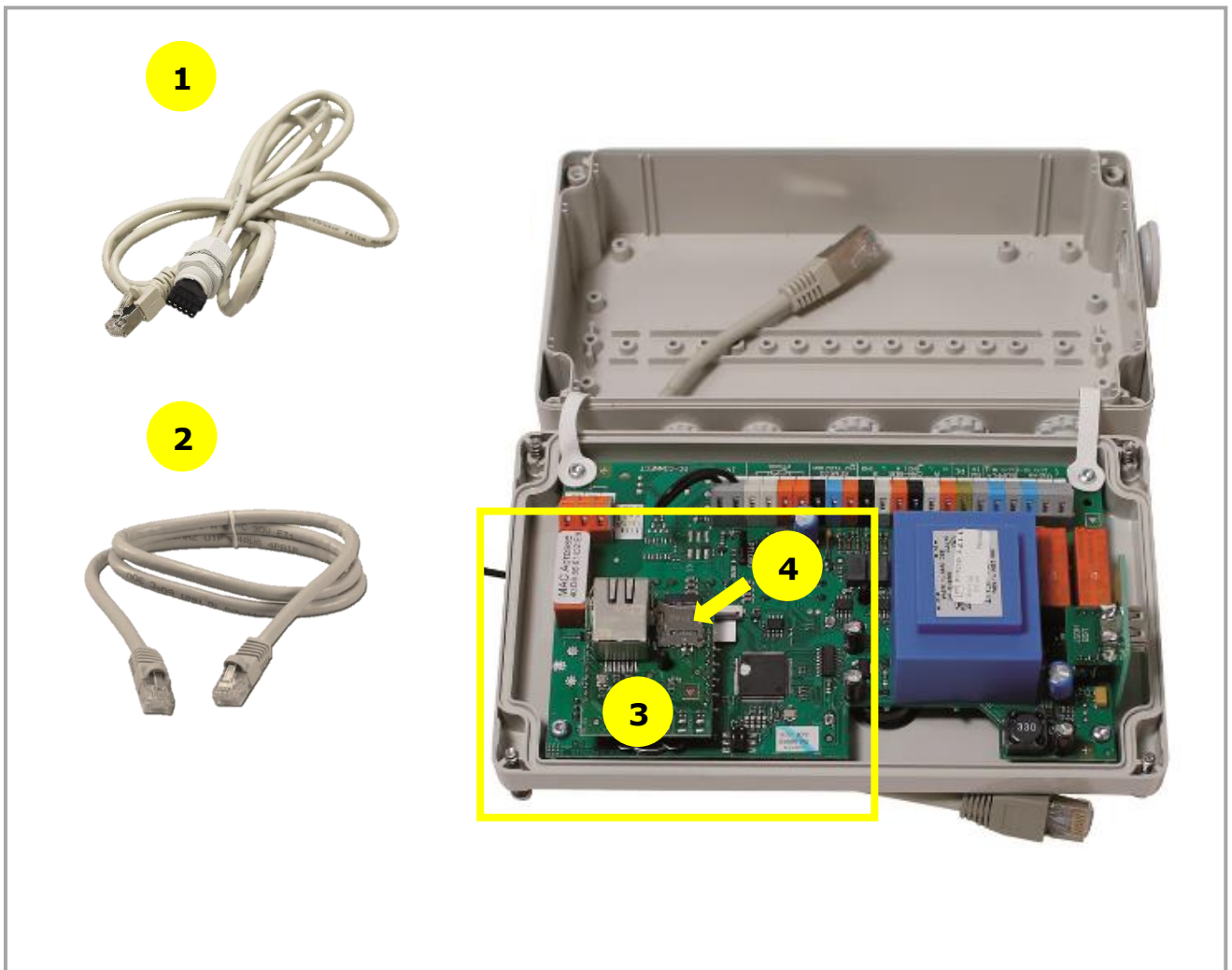
Description of warnings / notices				
Status LED	Status LED	Status LED	Status LED	Status LED
<b>Warnings</b>				
flashes red	Operating cycles exceed 20,000	The VAV on the defective SLAVE has performed more than 20,000 operating cycles	Replace VAV bonnet in accordance with the maintenance manual and reset the operating cycles.	The warning message cannot be confirmed. SLAVE continues to operate normally.
No influence	Thermal disinfection limit exceeded	The monitored temperature has exceeded the set limit value.	Check to see if it needs to be set otherwise.	Entry in logbook and optional message via email.
	Set-point max. limit exceeded	The monitored temperature has exceeded the set limit value.	Check to see if it needs to be set otherwise.	Entry in logbook and optional message via email.
	Set-point min. limit undercut	The monitored temperature has undercut the set limit value.	Check to see if it needs to be set otherwise.	Entry in logbook and optional message via email.
	Frost protection limit undercut	The monitored temperature has undercut the set limit value.	Prevent danger of valves freezing up.	Entry in logbook and optional message via email.
<b>Notes</b>				
No influence	Set-point OK	Notice that the monitored temperature is in the target range.	No action needed!	Entry in logbook and optional message via email.
Lights up green	Control in standby	No flushing pending. Control in standby	No action needed!	No influence
Flashes green	Flushing is running	The valve on the involved control is flushing / is open.	No action needed!	Entry in logbook.

## 8 Accessories | Spare parts

Optionally available accessories	FIGURE
KHS VAV with servo drive 230 V	686 04
KHS VAV plus with spring-reset servo drive (230 V)	686 05
KHS drain with overflow monitor	688 00
KHS temperature sensor fitting Pt 1000	628 0G / 629 0G
KHS flow measurement valve	638 4G / 138 4G
Leakage water sensor	620 00 001

### Spare parts

Pos.	Art.-No.	Designation	Note	Installation advice
(1)	6260201900	Network cable for KHS Mini Control System MASTER 2.0; hardware stand 2.0	For Master hardware stand 2.0	
(2)	6860202000	Network cable for KHS Mini Control System MASTER 2.0; hardware stand 2.01	For Master hardware stand 2.01	
(3)	6860202100	Network cable for KHS Mini Control System MASTER 2.0;	For hardware stand 2.0 additionally cable 6860202000 is required.	Service department - application technology Tel. +49 2761 891-0
(4)	6860202200	Micro SD card for network module in KHS Mini Control System MASTER 2.0	---	Service department - application technology Tel. +49 2761 891-0



## 9 KHS cable list

This list of cables only shows examples of applications. The exact design of the cables in questions must be carried out on site by the planner on the basis of

the ambient conditions (temperature, frequency, routing type, mechanical load).

Designation	Art.-No.	Cable cross-section / diameter	Max. cable length	Cable type*
[-]	[-]	[mm²] [mm]	[m]	[-]
KHS quarter turn stop valve PLUS with spring reset servo drive (24 V)	686 01 015...032	3 x X mm² (power supply) + 2 x 2 x 0.80 mm ** (position feedback)	700 (X=1,50) 1000 (X=2,50)	NYM-J + J-Y(ST)Y
KHS quarter turn stop valve with servo drive (24 V)	686 00 015...032	5 x X mm² (power supply) + 2 x 2 x 0.80 mm ** (position feedback)	250 (X=1,50) 450 (X=2,50)	NYM-J + J-Y(ST)Y
KHS quarter turn stop valve PLUS with spring reset servo drive (230V)	686 05 015...032 685 15 032...050	3 x 1.50 mm²	1000	NYM-J
KHS quarter turn stop valve with servo drive (230 V)	686 04 015...032	5 x 1.50 mm²	1000	NYM-J
KHS free drain with overflow sensor	688 00 020...032	2 x 2 x 0.80 mm **	1000	J-Y(ST)Y
Kemper CONTROL PLUS flow measurement valve Vortex principle	138 4G 015...050	4 x 2 x 0.80 mm **	300	J-Y(ST)Y
Kemper CONTROL PLUS flow measurement valve Vortex principle	138 6G 015...050	4 x 2 x 0.80 mm **	300	J-Y(ST)Y
KHS flow and temperature sensor Pt 1000	628 0G 015...050 629 0G 015...050	2 x 2 x 0.80 mm **	1000	J-Y(ST)Y
Leakage water sensor	620 00 00100	2 x 2 x 0.80 mm **	500	J-Y(ST)Y
CAN bus cable The application is based on the ISO 11898 international standard.		1 x 2 x 0.34 mm² ** 1 x 2 x 0.50 mm² ** 1 x 2 x 0.75 mm² **	300 500 1000	CAN bus cable

\* Possible cable type for fixed routing, without mechanical load

\*\* Shielded cable lead



According to VDE 0815: The specification of signal transmission cables with respect to the diameter is specified in mm.

## 10 Appendix

### 10.1 Valve technologies

The following chapter shows the various valve technologies based on exemplary illustrations.

#### 10.1.1 A-/B Valve technology

In A/B valve technology, several riser branches or distribution lines are connected to a common flushing line. Here, one A valve and the B valve are successively opened and closed together. This guarantees that there is no idling in the flushing lines and there is no water exchange between the pipelines to be flushed.

##### Example of a flushing process:

A1 and B1 open in accordance with the specifications, A1 and B1 close

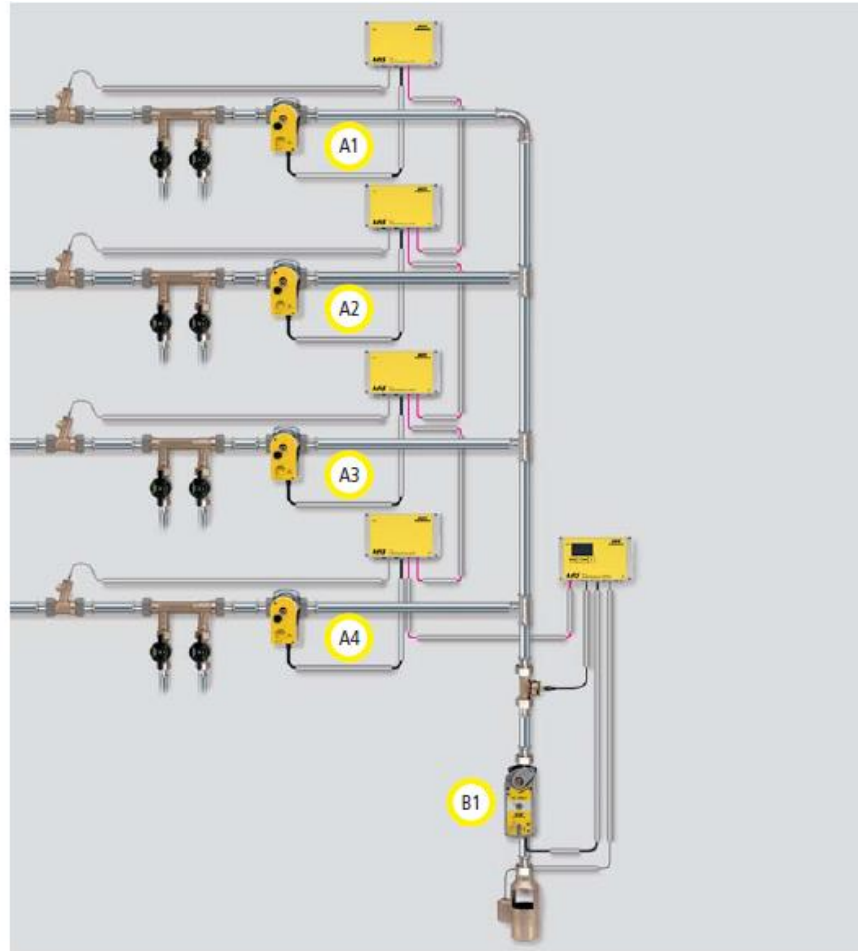
A2 and B1 open in accordance with the specifications, A2 and B1 close

A3 and B1 open in accordance with the specifications, A3 and B1 close

A4 and B1 open in accordance with the specifications, A4 and B1 close

##### Please note:

If valve A1 is flushing, the pending flushing processes of other valves are blocked. With temperature flushing, these are then carried out successively by the system.



#### A Valve



KHS maximum flow isolation ball valve with servo drive  
Figure 686 04 230 V AC

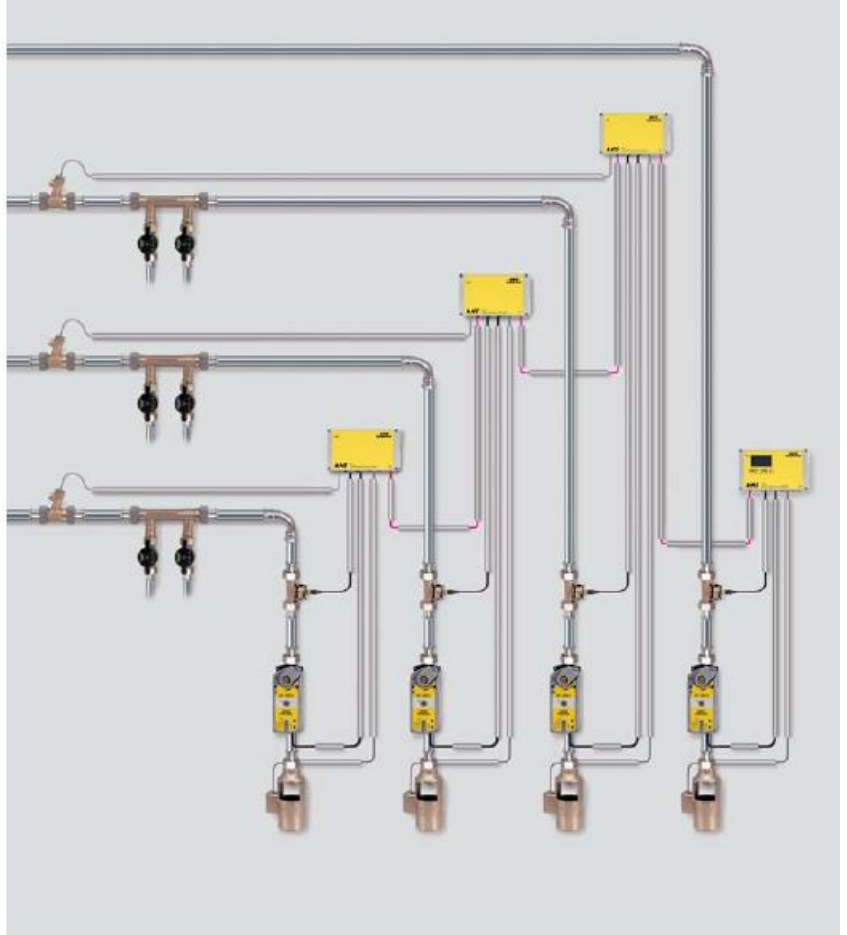
#### B Valve



KHS PLUS maximum flow isolation ball valve with servo drive and spring reset  
Figure 686 05 230 V AC

### 10.1.2 C valve technology

C valve technology makes it possible to exchange the water of an individual riser branch or of one individual distribution line independent of the other water exchanging valves.



C-Ventil

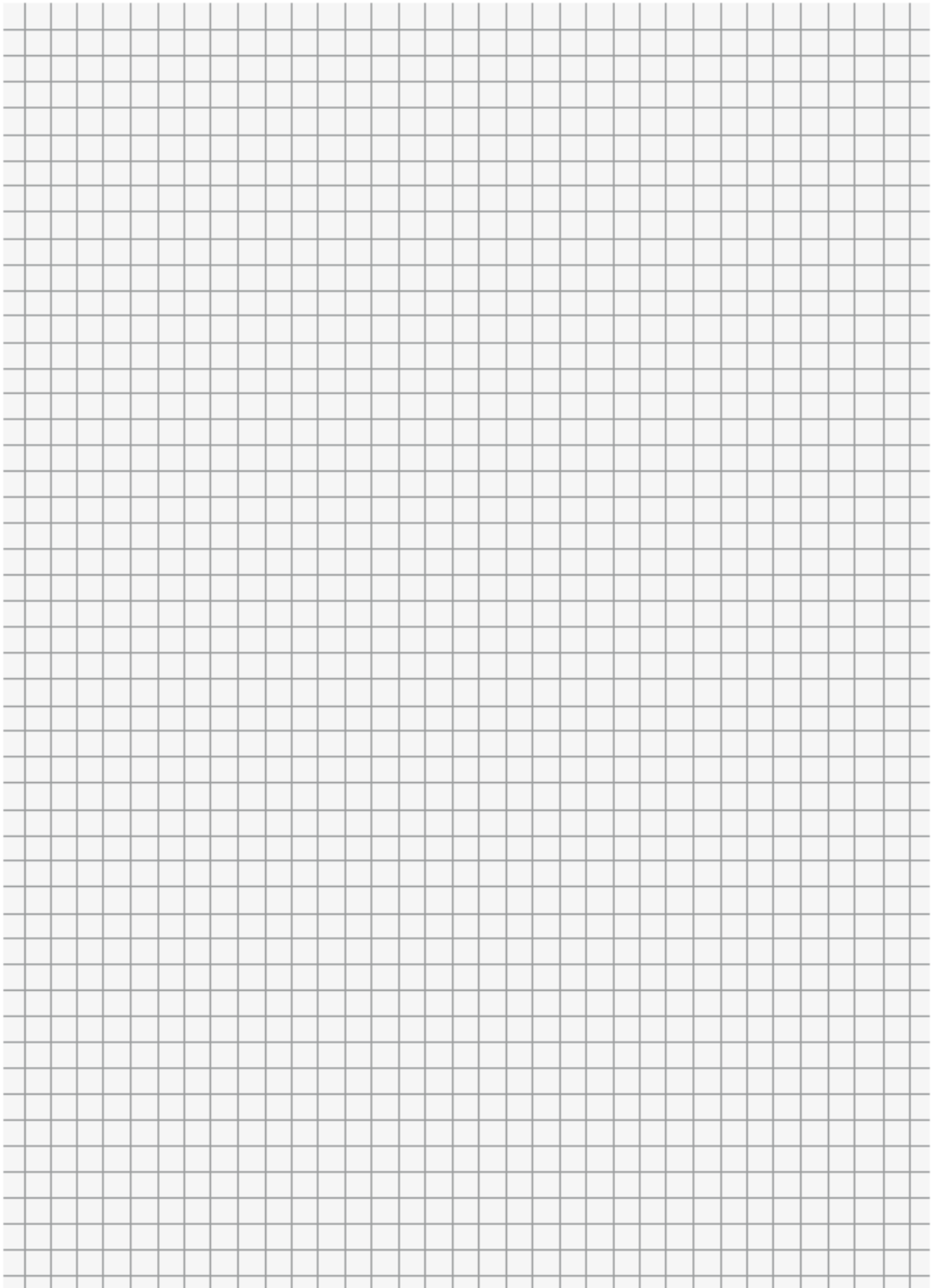


KHS PLUS maximum flow isolation ball valve with servo drive and spring reset  
Figure 686 05 230 V AC











Gebr. Kemper GmbH & Co. KG  
Harkortstraße 5  
D-57462 Olpe



Service-Hotline +49 2761 891-800  
[info@kemper-olpe.de](mailto:info@kemper-olpe.de)  
[www.kemper-olpe.de](http://www.kemper-olpe.de)

