Installation and operating instructions
KEMPER KHS Mini System Control

KEMPER KHS Mini System Control MASTER 2.0 *Figure 686 02 008*
KHS Mini System Control SLAVE *Figure 686 02 006*

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1. General instructions:

Assemble and commission the KEMPER KTS Mini System Control only after reading these assembly and operating instructions. It informs you in detail about the assembly, commissioning, operating principles and operation of the Kemper KHS Mini System Control. If you cannot find the information and instructions you need in these operating instructions, ask the manufacturer, Gebr. Kemper (please refer to last page for the address). Keep the mounting and operating instructions with the device or file it with the other technical documentation in the system documentation.

Symbols used
The symbols used in the text are explained below.

List of symbols

Note:
Useful information

Warning notice:
Danger electric shock

Attention:
Imminent danger

Maintenance:
Maintenance/Repair

2. Area of application

The KEMPER KHS Mini System Control can be used for monitoring and water exchange in drinking water systems. The water exchanges can be generated and documented as flushing logs with the MASTER 2.0 control. The dedicated water exchanges prevent stagnation in the drinking water with the aim of maintaining the drinking water hygiene in the drinking water systems. Based on the KHS Mini System Control MASTER, the MASTER 2.0 is a web-based further development that no longer requires configuration and readout software. The system works entirely independent of the operating system. On top of that, some new functions have been added that make the device also interesting for large buildings.

NOTICE:
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. It is recommended to not make simultaneous water exchanges.

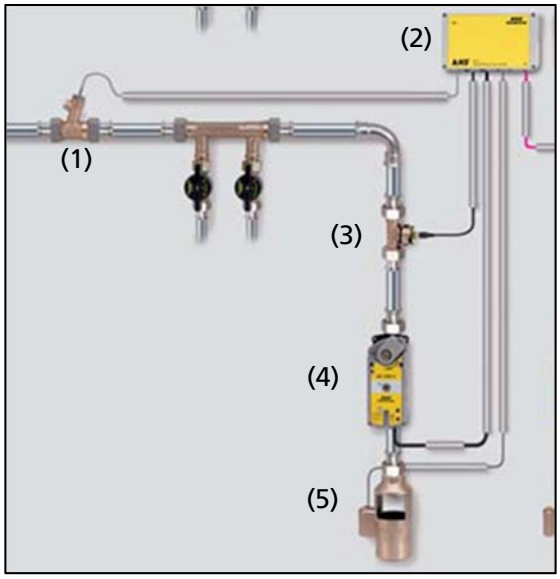
2.1 Operating modes for the water exchange

- Time controlled water exchange
- Temperature controlled water exchange
- Volume controlled water exchange

2.2 KHS MASTER/SLAVE technology

The MASTER/SLAVE technology can be used to trigger flushing measures for maintaining the drinking water hygiene for the drinking water system. The corresponding operating modes can be individually configured for each individual water-exchange group. Positioning the individual MASTER or SLAVE controls directly on the water exchange groups ensures short wiring distances for interconnection.

2.3 Water exchange groups



Ill. 2.1 Illustration of a water exchange group

Shown in Ill. 2.1 as an example is a KHS Mini System Control -SLAVE- (2) in connection with a water exchange group which comprises a KHS-VAV Maximum flow isolating ball valves (4), Temperature sensor (1), Volume flow sensor (3) and a KHS Drain (5). The components of the water exchange group are only listed as examples here. The operating mode depends on the components and the valve technology (for valve technology please refer to Chapter 13.1). In the example illustrated, the -SLAVE-(2) controls the specified water exchange groups. It is connected with the MASTER 2.0- through a CAN bus cable.

Note:
Maintenance cut-offs are recommended in front of the Volume flow sensor (3).

3. Safety

The descriptions and instructions in these operating instructions concern the KHS Mini System Control -MASTER 2.0- and KHS Mini System Control -SLAVE-. The prerequisite for handling the controller is the deployment of professionally trained personnel as per DIN EN 50110-1.

Warning notice:
During assembly and maintenance, make sure that the control is not switched on.

Only skilled professional personnel are permitted to operate electrical systems. Danger of fatal electric shock.

3.1 Safety Instructions

Before commissioning, make sure the connections have been made properly and professionally and that the system is properly protected. Comply with the pertinent regulations (EN, VDE, etc.) and the regulations of the local energy utility.

3.2 Hazards if the safety instructions are not complied with

Non-compliance with the safety instructions can result in both hazards to people and hazards to the environment and the system. Non-compliance with the safety instructions leads to the loss of rights to any compensation claims. In some cases, non-compliance can, for example, result in the following hazards:

- Failure of important functions in the device
- Hazards to people through electrical and mechanical effects

3.3 Unauthorized alteration and spare part fabrication

Alternations and modifications to the device are only permissible after agreement with the manufacturer. Original spare parts and manufacturer authorised accessories serve the purpose of safety. The use of any other parts may annul the liability for any resultant consequences.

Attention:
Use only original/approved spare parts ⇨ otherwise no warranty claims will be recognized.

3.4 Unauthorised modes of operation

The reliability of the supplied unit is only ensured when used as intended. Never exceed the limits stated in this documentation under any circumstances.

Note:
If the operating instructions are not followed, the manufacturer of this controller does not assume any responsibility. These operating instructions contain basic instructions that must be complied with during set-up, commissioning and maintenance. Therefore, the plumber/mechanic and the responsible specialists/operators must read these operating instructions before assembly and commissioning. Comply not only with the general safety instructions listed in this main point; also follow the specific safety instructions listed under the other main points.

4. Technical Data

Technical Data
➲ Power supply 230 V AC 50/60Hz
➲ Display Graphic display with background lighting
➲ Operation with 4 buttons: Up | Down | Enter | Esc
➲ Relay flush valve switching capacity 230 V, 2 A
➲ Floating alarm relay, max. 230 V, 2 A
➲ 16 memory locations for the operating modes: • Time controlled water exchange • Temperature controlled water exchange • Volume controlled water exchange • Routine-time, routine-duration and routine-volume • Data logging • Release
➲ For connecting: • 1 ea. KHS-VAV-plus *or* KHS-VAV • 1 ea. KHS-Temperature sensor Pt 1000 • 1 ea. KHS-Control Plus volume flow measurement valve • 1 ea. KHS overflow monitor • 1 detector circuit with up to 25 water sensors
➲ Acoustic alarm signal in case of faults
➲ Alarm acknowledgement on device
➲ System is expandable: 1 -MASTER- with max. 62 - SLAVEs- via CAN bus
➲ Leak safeguard through water sensor
➲ Bus system connection per direction: CAN installation cable, max. 1000m total length
➲ WEB-based PC-link for configuration and for reading out the flush log
➲ Can save 50,000 journal entries
➲ Datalogging up to 12 million entries
➲ External switch | Switchover: • Program 1 (e.g. school-holidays program) • Program 2 (e.g. school program) • Maintenance mode (system is blocked)
➲ Menu driven operation in German, English or Dutch
➲ Internal consumption 10 VA
➲ Manual operation of the valves on the MASTER or via WEB browser
➲ Ambient temperature range from 0 °C to 50 °C
➲ Protection class IP 54
➲ Surface mounted housing for wall installation
➲ USB interface for updating the firmware, reading out the journal and data logging and for downloading and uploading the configuration file
➲ Network link through network cable (accessory)
➲ Email in case of malfunctions possible

5. CAN bus system overview

The basic version of the -MASTER/SLAVE- technology includes as the smallest solution the -MASTER 2.0- System Control for water exchanging measures in the sector of drinking water and for signal evaluation.
Furthermore, the -MASTER 2.0- System Control, using two integrated CAN bus connections, can trigger up to 62 -SLAVE- controls and one directly-connected KHS water exchange group. Up to a maximum of 31 -SLAVE- controls per CAN-BUS connection of the -MASTER 2.0- can be controlled per CAN bus connection.

- That means up to 63 KHS water exchange groups can be connected and operated through the -MASTER/SLAVE- technology. The accumulated total length of one CAN bus connection can amount to a maximum of 1000 m (total length is thus 2000m).

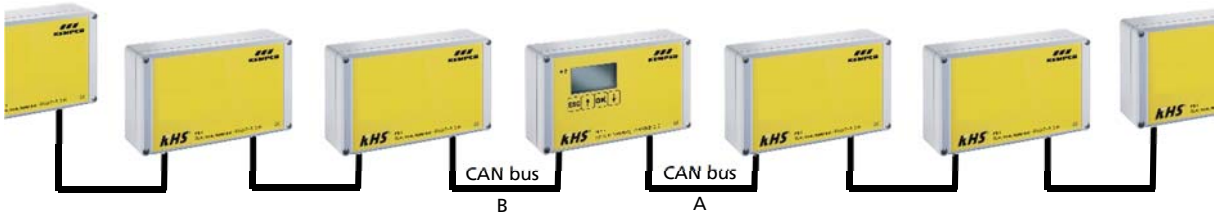
5.1 Layout variants

Note:
The controllers must be connected in series, as can be seen in Example 1. During this, the -MASTER 2.0- System Control can be connected within the series (Variant 2) or as a final subscriber (Variant 1). Branches or start connections, as can be seen in Example 2, are not possible. Furthermore, shorter cable distances are recommended.

Example 1: Layout variant, KHS-Mini System Control -MASTER 2.0-

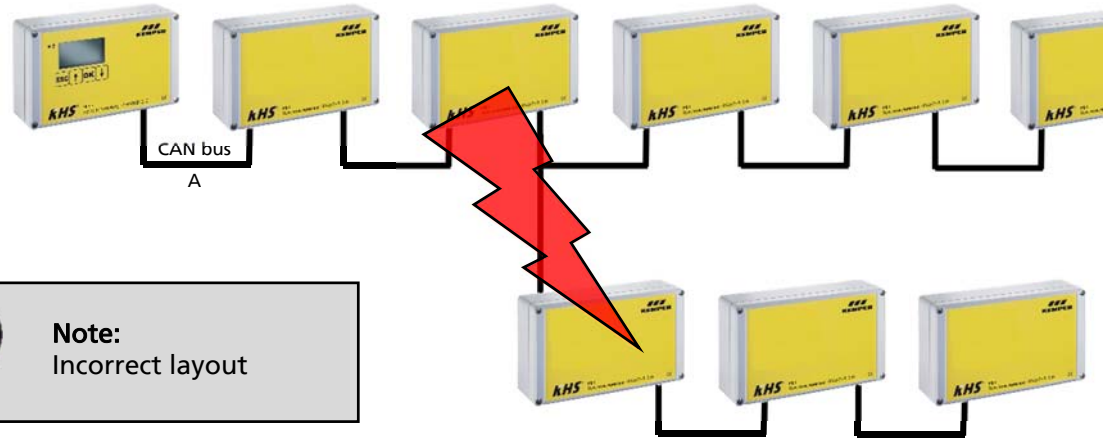
Variant 1

Variant 2



Ill. 5.1 Illustration of a layout variant, KHS Mini System Control -MASTER- system control

Example 2: Incorrect layout

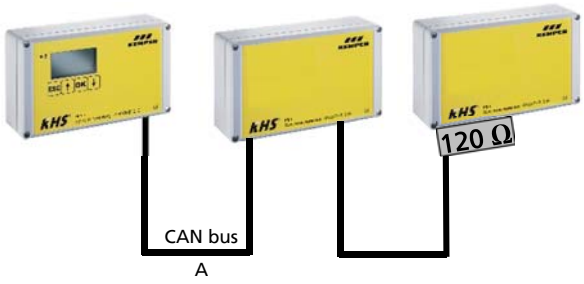


Note:
Incorrect layout

Ill. 5.2 View of an impermissible layout variant, KHS Mini System Control -Master 2.0-

5.2 Terminal resistance

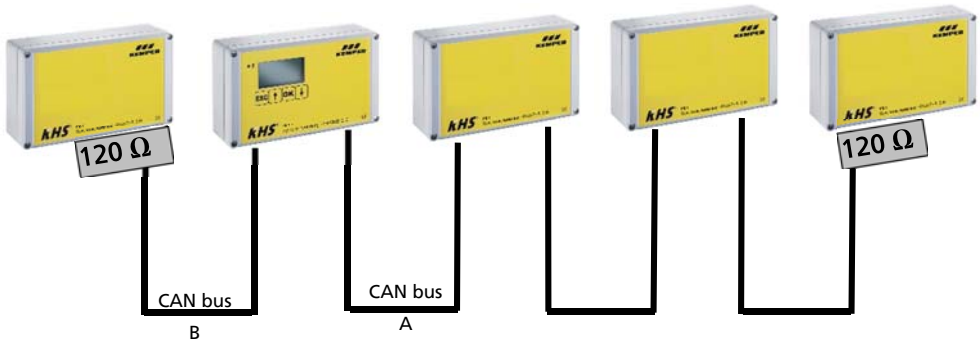
Variant 1



Note:
The 120 Ω terminal resistance must be installed only in the last control component (-SLAVE-) of

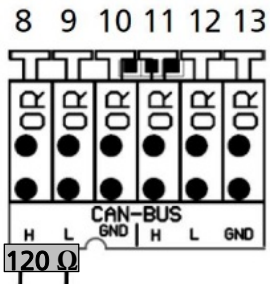
a CAN bus cable line. The -MASTER control does not require a terminal resistance.

Variant 2



Ill. 5.3 Illustration of a CAN bus line with terminal resistor

5.3 Connection of terminal resistor



Attention:
All KHS Mini controls -SLAVE- are supplied with a 120 Ω terminal resistor.
For non-terminal -SLAVE- controls, the resistor must be removed!

Ill. 5.4 Illustration of the terminal resistor

6. Assembly

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

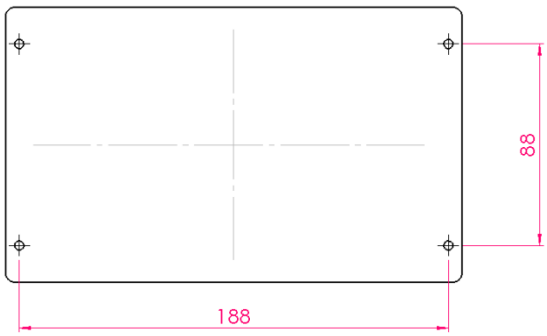
Very strong magnetic fields can impair the functioning. Interferences can be prevented by following the installation rules below:

- Do not mount the controller and the sensors near inductive loads (motors, transformers, contactors, etc.).
- Feed through a separate mains voltage circuit (if necessary, with an a.c. mains filter).
- Inductive loads must be equipped with safeguards to reduce overvoltages (varistors, RC-filter).

Attention:
When using the controller together with other devices in one system, check to see if that causes interference signals to be emitted.

6.1. Wall mounting

The KHS Mini System Control is intended for wall installation. The housing has 4 each ø 4mm mounting holes in a clearance of w = 188mm and h = 88mm. Additional dimensions are listed in Chapter 10. To mount, open the cover and screw the device tightly to the wall. After mounting the housing, make the required electrical connections.



Ill. 6.1 Illustration of the mounting holes for wall installation

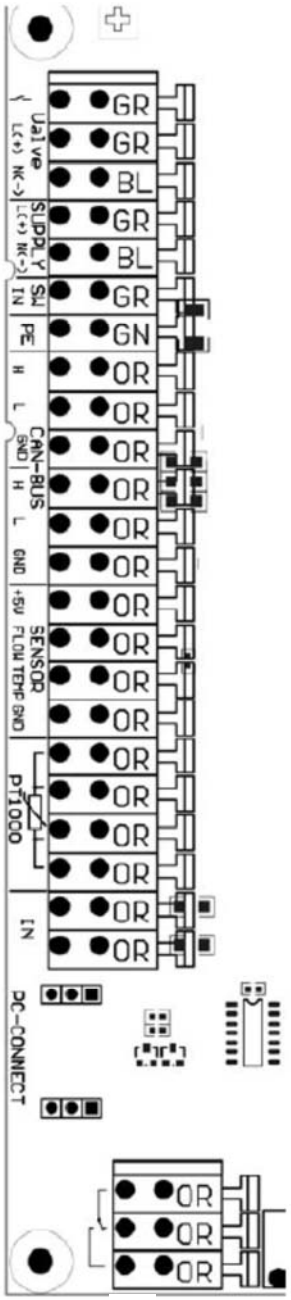
6.2 Electrical installation KHS Mini System Control

The following chapter explains the electrical installation. The electrical connections are made through screwless-type terminals.

6.2.1 Terminal description -MASTER 2.0- and -SLAVE-

Illustration: Control board with terminals

1. Flushing valve switching output 230
2. Flushing valve voltage output 230 V (only on 68654)
3. Flushing valve N
4. Power supply - LI 230V
5. Power supply – N
6. External input 230 V (Function only with -MASTER-)
7. Grounded conductor PE
8. CAN-Bus HIGH 1
9. CAN-Bus LOW 1
10. CAN-Bus GND 1
11. CAN-Bus HIGH 2
12. CAN-Bus LOW 2
13. CAN-Bus GND 2
14 Flow measurement valve - Voltage output 5V
15 Flow measurement valve - Flow input
16 Flow measurement valve - no function
17. Flow measurement valve GND
18. Pt 1000 Input 1
19. Pt 1000 Input 2
20. Pt 1000 Input 3
21. Pt 1000 Input 4
22. Drain floating switch (strands interchangeable)
23. Drain floating switch (strands interchangeable)
    [Terminals 22 and 23 can also be used to connect the water sensor]



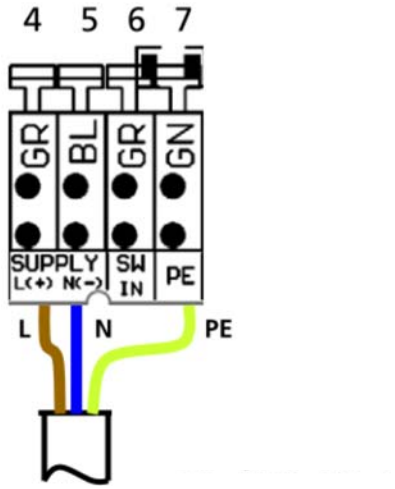
24. Alarm relay voltage input external
25. External monitor voltage error
26. External monitor voltage operation

Ill. 6.2 Cut-out view of the -MASTER 2.0- and -SLAVE- controller board with terminals

6.2.2 Detailed illustration of the terminals for cable entry

Note:
The following illustrations apply to the KHS Mini System Control -MASTER 2.0- and the KHS Mini System Control -SLAVE-. Please note the preceding warning notices:

6.2.2.1 Power supply connection



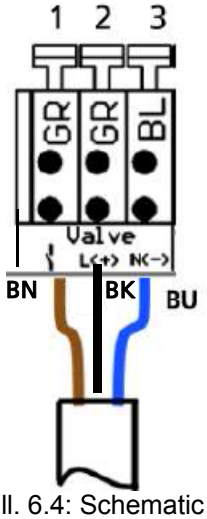
Power supply: 230 V +/- 15% AC 50/60Hz

Connection: Terminals, L, N, PE
Line fuse max. 16A

BN = brown = L
BU = blue = N
GR = green = PE

Ill. 6.3: Schematic representation of the power supply connection

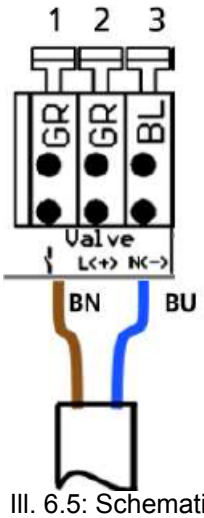
6.2.2.2 Connection of KHS-VAV Maximum flow isolating ball valve with servo-drive (Figure 686 00)



BN = brown = 1
BK = black = 2
BU = blue = 3

Ill. 6.4: Schematic representation of the connection of the KHS-VAV Maximum flow isolating ball valve

6.2.2.3 Connection of KHS-VAV Maximum flow isolating ball valve with spring reset servo-drive (Figure 686 01)



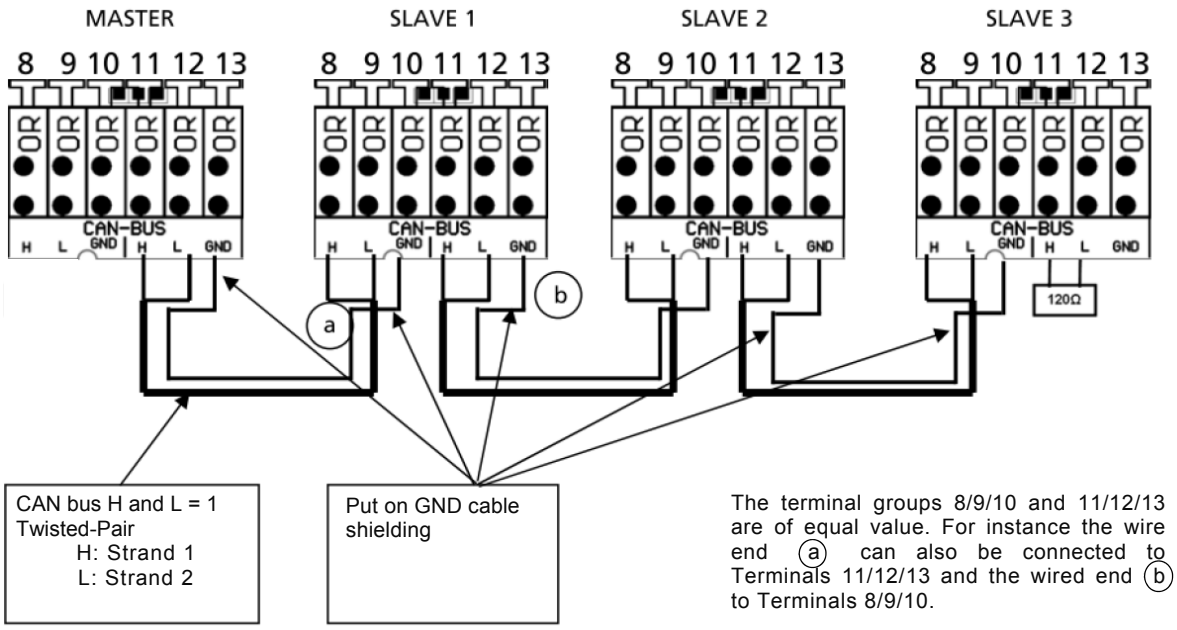
BN = brown = 1
BU = blue = 3

Ill. 6.5: Schematic representation of the connection of the KHS-VAV Maximum flow isolating ball valve with spring reset servo-drive

6.2.2.4 CAN bus connection

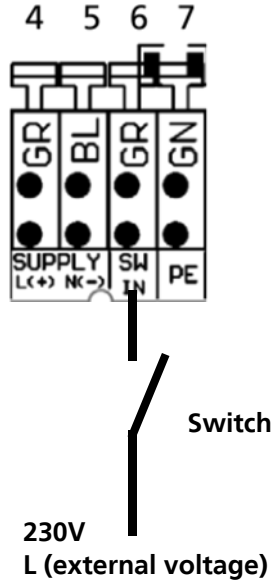
Attention:
Follow the notices and instructions in Chapter 5. The twisted pair of the CAN bus cable should be separated and the shielding removed only as far as necessary to assign the maximum terminals (recommendation: max. 4cm).
The shielding must be properly bundled with a heat shrink tube or insulating tape to prevent contact of the individual wires of the shielding to the other potentials.

Ill. 6.6: Schematic diagram of the twisted pair



Ill. 6.7: Exemplary illustration of a CAN bus installation from a -MASTER 2.0- and three -SLAVE- controls

6.2.2.5 Connection of external switch



Attention:
The external connection can only be used with the KHS Mini System Control -MASTER 2.0-.

Power supply: 230V +/- 15% AC 50/60Hz
Line fuse max. 16A

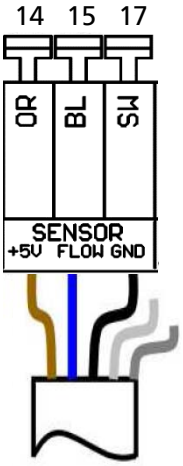
BK = black = L

Ill. 6.8: Schematic diagram of connection of external switch

Note:
Through the trigger on Terminal 6 you have a facility to switch the KHS Mini System Control program with external switching processes through a 230V input. The program switching of the external connection is discussed in Chapter 8.

6.2.2.6 Connection of KHS-CONTROL-PLUS flow measurement valve (Figure 638 4G)

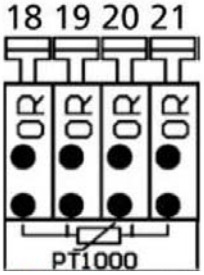
Connection of KHS-CONTROL-PLUS volume flow measurement valve



BR = +5V DC = 14
BU = Flow = 15
BK = GND = 17

Ill. 6.9: Schematic diagram of connection of KHS-CONTROL-PLUS flow measurement valve

Connection of KHS-CONTROL-PLUS temperature sensor

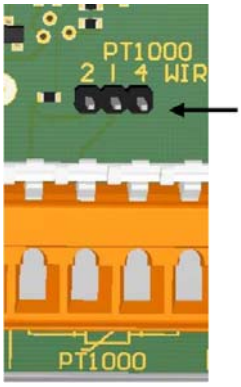


Attention:
The KHS-CONTROL-PLUS has an internal Pt 1000, enabling an additional temperature measurement. If no temperature measurement is needed, insulate and protect the strands from contact with the board.

GY = grey (green/yellow) = 19
W = white = 20

Ill. 6.10: Schematic diagram of connection of KHS-CONTROL-PLUS volume flow sensor

Note



Attention:
To perform the temperature measurement through the KHS-CONTROL-PLUS, the jumper on the board must be changed from 4-wire to 2-wire, see Photo 6.11.

Important comment:
During this measurement, the temperature measurement is falsified through the line resistance. For 10m line-length with 0.34mm² cross-section, the measurement falsification can amount to approx. + 0.5°C.

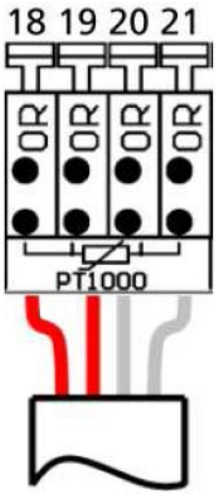
Ill. 6.11: Schematic diagram of connection of KHS-CONTROL-PLUS temperature sensor

Connection of KHS-CONTROL-PLUS cable-plug connector

1. Cut off top of cap | 2. Route cable through | 3. Screw cable to sensor | 4. Put on the cap

Ill. 6.12: Schematic diagram of the preparation of the sensor top to make cable-plug connection of the KHS-CONTROL-PLUS

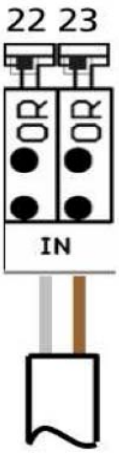
6.2.2.7 Connection of KHS Temperature sensor Pt 1000 (Figure 628 0G)



RD = red = 18
RD = red = 19
W = white = 20
W = white = 21

Ill. 6.13: Schematic diagram of connection of KHS Temperature Measurement Valve Pt1000

6.2.2.8 Connection of KHS drain with overflow monitor (Figure 688 00)

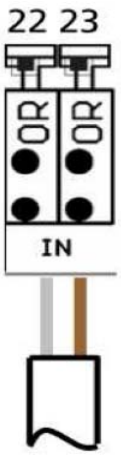


Note:
In the as delivered state, a bridge strand is plugged between Terminals 22 and 23. It must be removed before connecting the KHS drain.

W = white = 22
BN = brown = 23

Ill. 6.14: Schematic diagram of connection of the KHS drain with overflow monitor

6.2.2.9 Connection of water sensor (Figure 620 00)



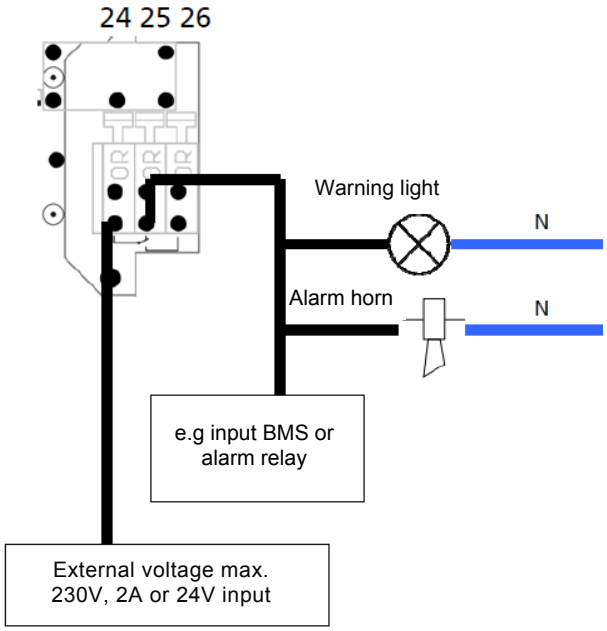
Note:
It is possible to link up to 25 water sensors in parallel in the detection circuit.

- Max. cable length water sensor: **< 50m** with standard cable
- Max. cable length water sensor: **> 50m** to **500m** as shielded cable, 2x 0.75 mm², (e.g. UL-LIYCY)

W = white = 22
BN = brown = 23

Ill. 6.15: Exemplary diagram of the water sensor connection

6.2.2.10 Connection of floating alarm relay



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

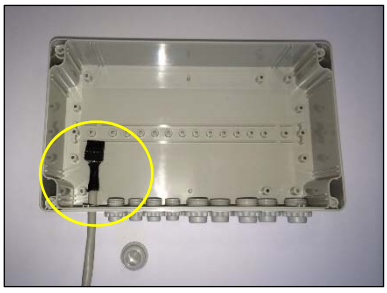
Ill. 6.16: Exemplary diagram of the alarm relay

6.3 Installation of network cable

Note:
The supplied network cable has a total length of 2.5m!

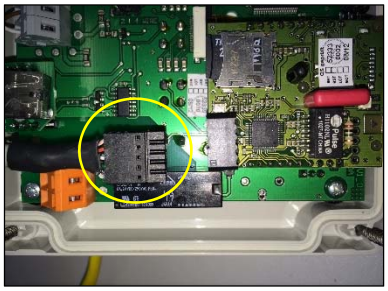
Step 1. Open the housing

Step 2. Route the cable through bottom left into the housing



Step 3. Secure cable

Step 4. Connect cable to the board



7. Commissioning

After finishing the wall installation and the electrical installation in accordance with Chapter 5, apply the mains voltage of 230V.

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

ATTENTION!

Note:
To simplify the control system and to guarantee flawless installation, fill in the overview of the system commissioning of the KHS Mini System Control (see supply pressure, Chapter 13.2) before making the settings. It is mandatory to fill in the supply pressure to be able to take advantage of the optional factory support.

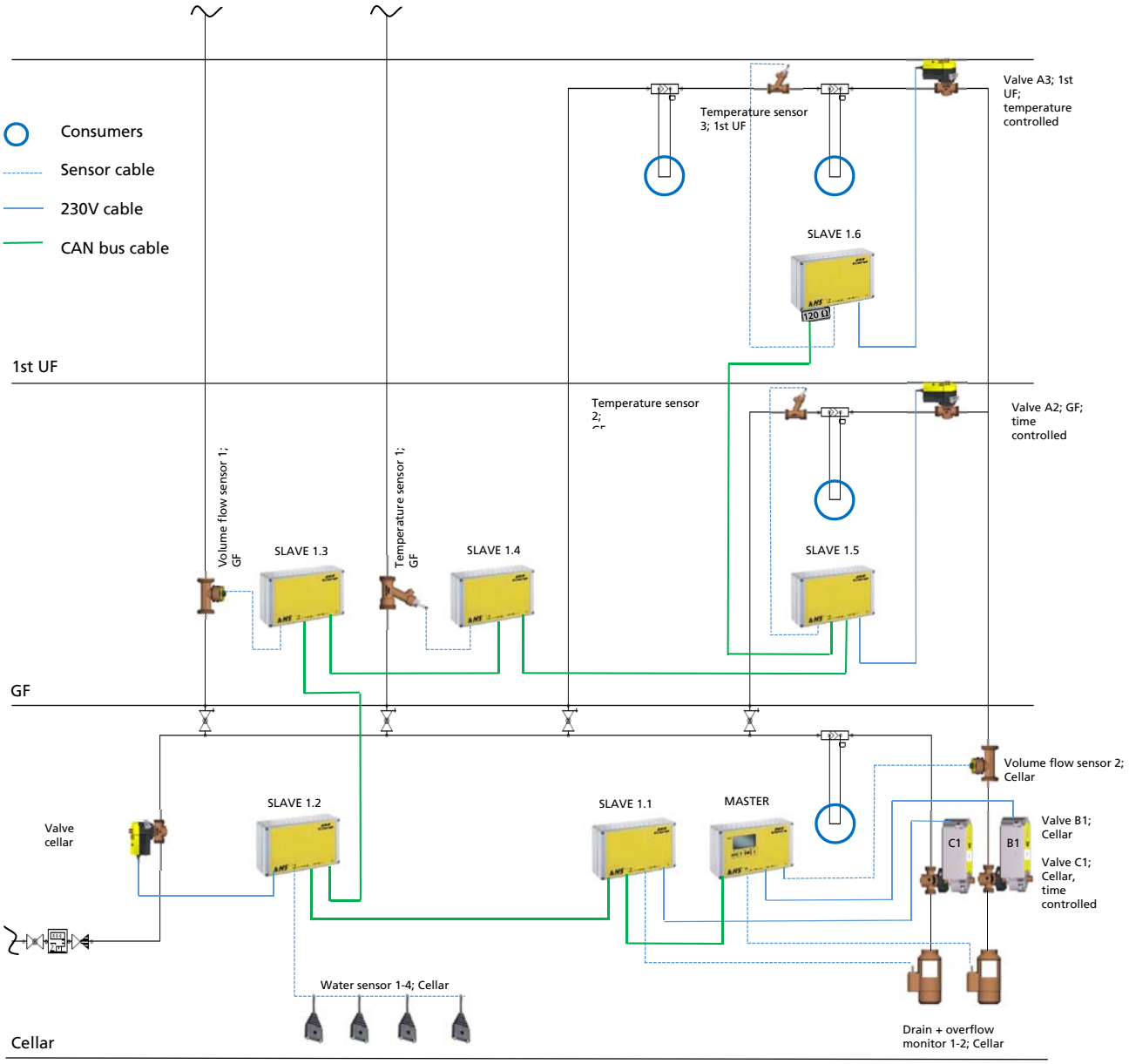
8. Configuration

The KHS Mini System Control -MASTER 2.0- can be configured through the internal menu driven operation or through a web server. Furthermore, the saved configurations can be uploaded through a USB interface to the KHS Mini System Control -MASTER 2.0-.

The sample project shown below shows the basic controller types of the KHS Mini System Control -MASTER 2.0-. The individual configuration facilities of the KHS Mini System Control -MASTER 2.0- is elucidated using exemplary configurations of the sample project in the following chapters (8.1 and 8.2).

After all units, as described in Chapter 6, have been mounted and electrically connected and a network connection has been successfully established, the actual configuration of the individual KHS Mini System Controls starts.

The sample project has one KHS Mini System Control -MASTER 2.0- and six KHS Mini System Controls -SLAVE-. The system controls shown in Illustration 8.1 are intended to secure the cold-water line against stagnation and leaks in a fictitious building.



Ill. 8.1 Sample project

8.1 Manual configuration

Basic settings, configurations and changes can be made onsite by using the integrated menus. In the following chapter, the menu interfaces and their functions are clarified. To explain the settings and functions, the sample project is configured as a reference building.

8.1.1 Basic menu operation and functions

The KHS Mini System Control is set and operated through various menus, which appear in the -MASTER 2.0- display. Access to the menus is enabled through the control panel on the -MASTER 2.0- with the four control buttons.

Ill. 8.1 -MASTER 2.0- buttons

"ESC" button: Exit the menu / switch between overview and main menu
"↑" button: Scroll back
"OK" button: Confirm button
"↓" button: Scroll forward

The menus are structured "scrolling", i.e., pushing the "↓-button" on the last menu item jumps back to the first menu item. Likewise, pressing the "↑-button" changes from the first to the last menu item.

Note:
If no entry is made for three minutes, the control reverts from the setting mode to the overview window.

Window types

Menu operation is divided into two sections. The following windows are available:

- "General plan"
- "Main menu".

The functions of the windows are listed in Table 8.1.

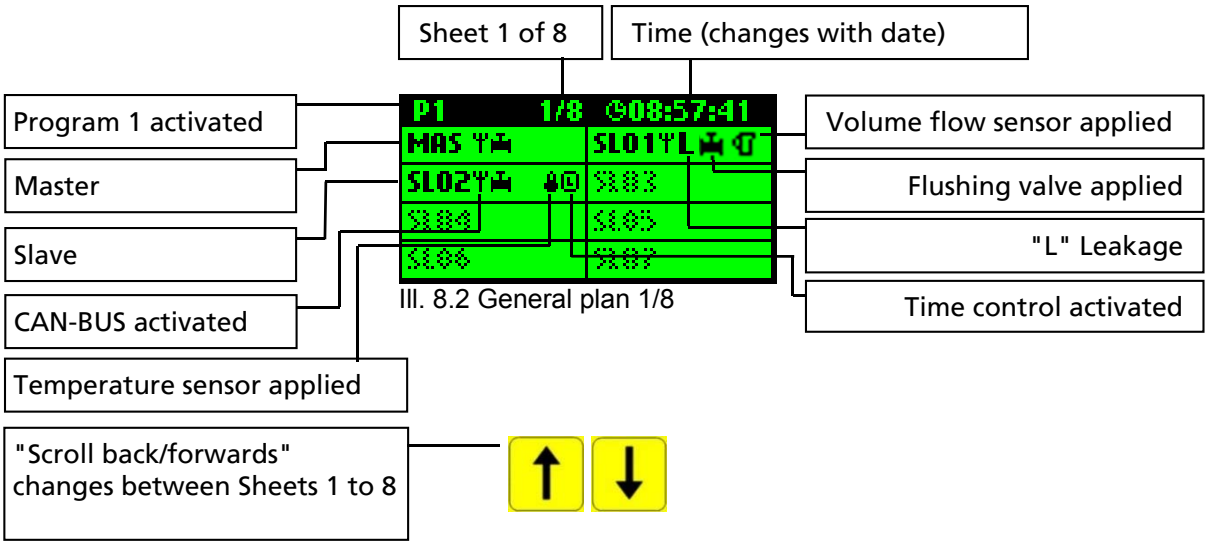
- The "General plan" window is used only for visualising the current states.
- In the "Main menu" window, preset parameters can be viewed, changed and saved. The "Main menu" window can be protected against changes caused by interference through password protection.

Tab. 8.1 Chart of window types

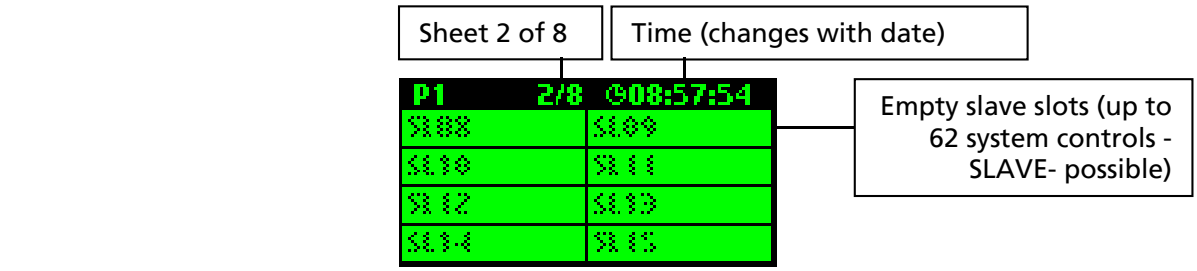
Window types	
General plan	Main menu
Viewing possible without password Functions: • Detailed overview • Control state display • View network • Device settings • Flushing processes • Error statuses	Viewing impossible without password Function: • Setting the control parameters • CAN BUS setup • Select the operating modes • Journal • Network setup • Program selection

8.1.2 General plan

The following illustrations explain the "General plan" menu interface of the KHS Mini System Control -MASTER 2.0-. The illustrations show the "General plan" based on an exemplary configuration of a system with one KHS Mini System Control -MASTER 2.0- and two KHS Mini System Controls -SLAVE-.



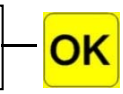
Ill. 8.2 General plan 1/8



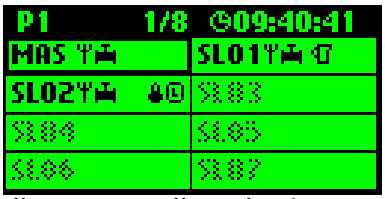
Ill. 8.3 General plan 2/8

Changes from "General plan" into "Detailed overview"

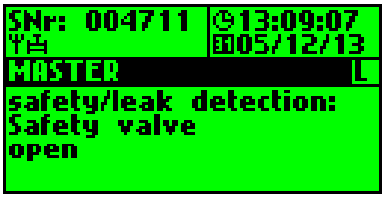
1x "OK" Selects control (frame*)
2x "OK" Changes into detailed



*: A frame appears around the entry of the first controller (see Ill 8.4 upper left) on the selected sheet (1 to 8). Pressing the OK button again opens the "Detailed overview" (see Ill. 8.5) of the selected control. Optionally, press the ↑ or ↓ button to select another active controller. It is indicated again through a flashing frame. If you now press the OK button, the detailed overview of another controller appears.



Ill. 8.4 Controller selection



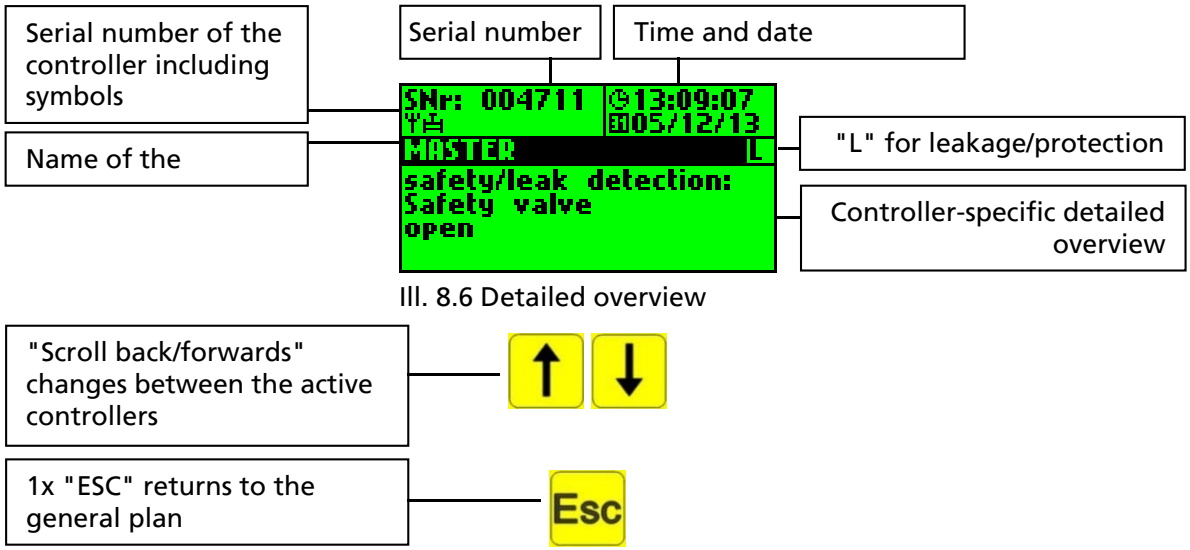
Ill. 8.5 Detailed overview

Legend symbols

Water exchange activated:	Valve symbol is framed	
	Time control	-> Time symbol flashes
	Volume control	-> Volume symbol flashes
	Temperature control	-> Temperature symbol flashes

8.1.3 Detailed overview

The following illustrations clarify the "Detailed overview" menu interface of the KHS Mini System Control -MASTER 2.0-. The illustrations show the "Detailed overview" based on an exemplary configuration of a system with one KHS Mini System Control -MASTER 2.0- and two KHS Mini System Controls -SLAVE-.



Ill. 8.6 Detailed overview

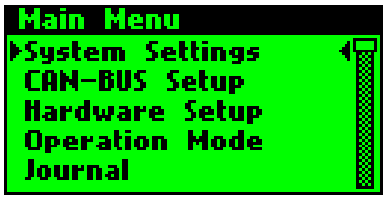
Legend symbols

Water exchange activated: Valve symbol is framed

Time control	-> Time symbol flashes
Volume control	-> Volume symbol flashes
Temperature control	-> Temperature symbol flashes

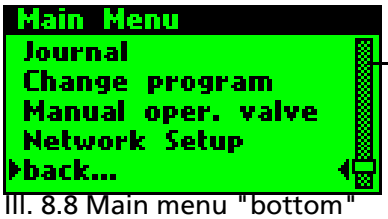
8.1.4 Main menu

The following chapters explain the functions of the "Main menu" interface of the KHS Mini System Control -MASTER 2.0-. In the main menu there are the sub-menus: System settings, Can-bus setup, Device settings, Operating modes, Journal, Switch program, Valve manual mode, Network setup (see Ill. 8.7 and Ill. 8.8).



Ill. 8.7 Main menu "top"

"Scroll back/forwards"
Selection of the submenu



Scrollbar indicates the position in the menu

Ill. 8.8 Main menu "bottom"

1x "OK" Changes into the selected submenu

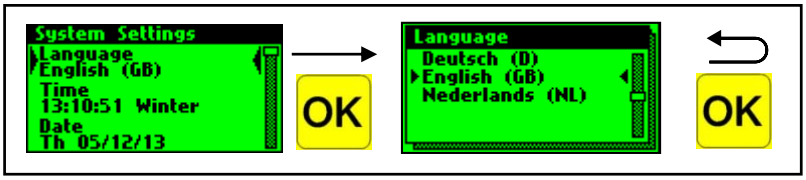
1x "ESC" returns to the main menu

8.1.4.1 System settings

In the "System settings" menu interface, settings for the date / time, language daylight savings/standard time, alarm buzzer, button acknowledgement, display lighting, display contrast, password, factory settings and system reboot can be made.

Language

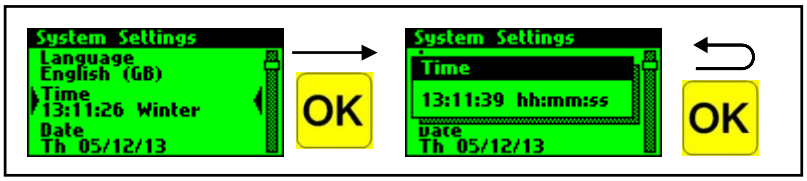
In the system control submenu select the menu item "Language" with "OK"; press "OK" again to store the selected language and to open the system control submenu again.



Ill. 8.9 Setting the language

Time

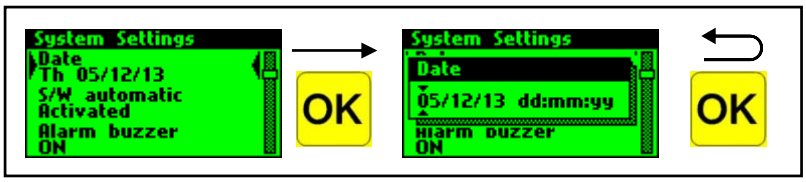
In the system control submenu, select the "Time" menu item with "OK"; press the "↑" and "↓" button to change the selected digit. Press the "OK" button to confirm and to select the next digit. Pressing "OK" again stores the set time and the system control submenu opens again.



Ill. 8.10 Setting the time

Date

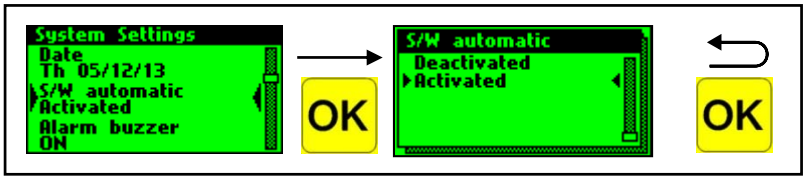
In the system control submenu, select the "Date" menu item with "OK"; press the "↑" and "↓" button to change the selected digit. Press the "OK" button to confirm and to select the next digit. Pressing "OK" again stores the set date and the system control submenu opens again.



Ill. 8.11 Setting the date

S/W automatic

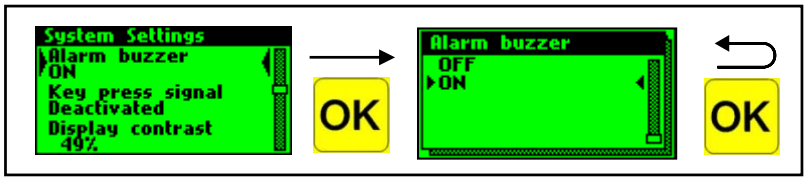
In the system control submenu select the menu item "Daylight savings/Standard time" with "OK"; press "OK" again to save the selected setting and to open the system control submenu again.



Ill. 8.12 Daylight savings/Standard time automatic setting

Alarm buzzer

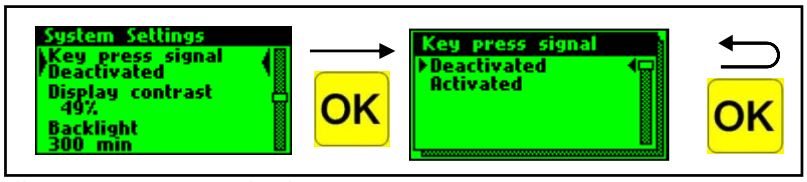
If an error occurs in the system controllers, it can be acoustically reported. To activate this function, select the menu item "Alarm buzzer" in the system control submenu with "OK". Pressing "OK" again saves the selected setting; the system control submenu opens again.



Ill. 8.13 Activating the alarm buzzer

Key press signal

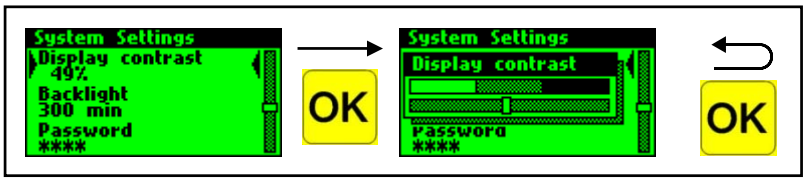
The key press signal can be activated or deactivated through the "Key press signal acknowledgement" menu item. To do that, select the "Key press signal acknowledgement" menu item in the system control submenu with "OK". Pressing "OK" again saves the selected setting; the system control submenu opens again.



Ill. 8.14 Activating the button

Display contrast

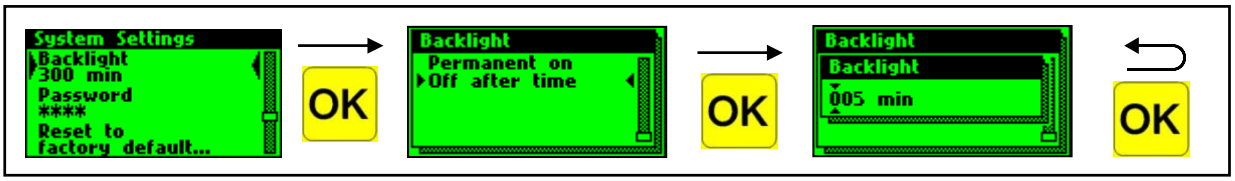
Use the "Display contrast" menu item to set the display contrast. To do that, select the "Display contrast" menu item in the system control submenu with "OK". Press the "↑" and "↓" buttons to change the contrast. Pressing "OK" again saves the selected setting; the system control submenu opens again.



Ill. 8.15 Display contrast

Display illumination

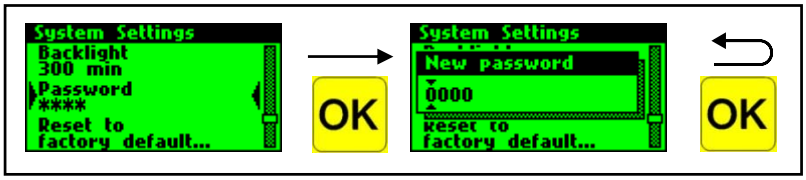
Use the "Backlight" menu item to set the operating time of the display illumination after the last press of a button. To do that, select the "Backlight" menu item in the system control submenu with "OK". Press the "↑" and "↓" buttons to change the time the display continues to illuminate. Save the selected settings by pressing "OK" again. The system control submenu opens again.



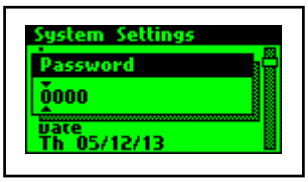
Ill. 8.16 Display illumination

Password

To protect the controller from interference, a password can be configured. If a password has been stored, the password will be queried before every setting (see Ill. 8.18). To do that, select the "Password" menu item in the system control submenu with "OK". Use the "↑" and "↓" buttons to select the digit. Press the "OK" button to confirm and to select the next digit. Pressing "OK" again stores the set password and the system control submenu opens again.



Ill. 8.17 Setting the password

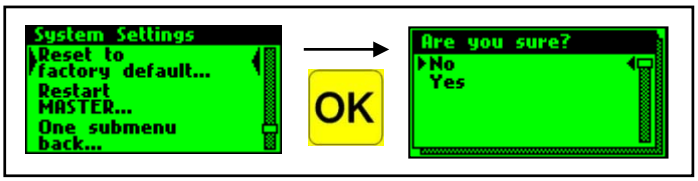


Ill. 8.18 Password query

Note:
The password "0000" is the factory default setting.

Default settings

To reset the control to the default settings, select the menu item "Default setting" in the system control submenu with "OK". A query then opens. If it is acknowledged with "OK", the system is reinstalled.

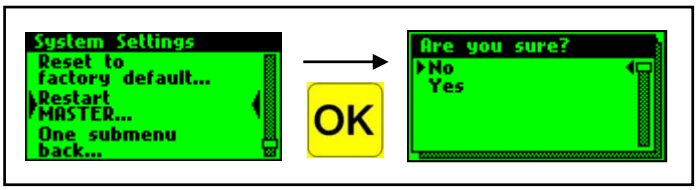


Ill. 8.19 Restore the default settings

Note:
All previous configurations will be lost!

Restart the MASTER

To restart the controller, select the menu item "Default setting" in the system control submenu with "OK". A query then opens. If it is acknowledged with "OK", the system is restarted.



Ill. 8.20 Restart -MASTER 2.0-

8.1.4.2 CAN BUS setup

Use the "CAN BUS setup" to add "SLAVE System Controls" that are connected to the -MASTER 2.0- through the CAN bus system to the CAN BUS network.

The following configuration steps are discussed based on the sample project from Illustration 8.1 (Page 17). For an overview of the system commissioning, Illustration 8.21 is presented.

Overview for the system commissioning on the KHS Mini System Control -MASTER 2.0- Figure 686 02 008
(make a hand-written entry based on the example during the installation)

Building name: / Date: / Person commisioning:						KHS-VAV maximum flow isolating ball with servodrive and spring reset	KHS-VAV-maximum flow isolating ball valve with servodrive	KHS-CONTROL-PLUS flow measurement valve Figure 138 4G and Figure 638 4G							KHS PT1000	KHS drain with over-flow	Water sensor
						Figure 686 05 Figure 696 05	Figure 686 04 Figure 696 04	Measurement range 0,9 – 15 l/min.	Measurement range 1,8 – 32 l/min	Measurement range 3,5 – 50 l/min	Measurement range 5,0 – 85 l/min	Measurement range 9,0 – 150 l/min	Measurement range 11 – 188 l/min	Measurement range 18 – 316 l/min	Figure 628 0G 629 0G	Figure 688 00	Figure 620 00
Control	No.	Serial no. (Rating plate on the control)	Location/ room	Control type (A-valve; B-valve; C-valve; measurement, safeguard)	Related B-valve -Serial no.-	or											
Master		2758	Cellar	B-valve	-	x		x								X	
Slave	1	1206	Cellar	C-valve	-	x										x	
Slave	2	1187	Cellar	A-valve	-		x										x
Slave	3	1184	GF	Measurement	-			x									
Slave	4	1185	GF	Measurement	-										X		
Slave	5	1278	GF	A-valve	2758		X								X		
Slave	6	1277	1. UF	A-valve	2758		X								X		

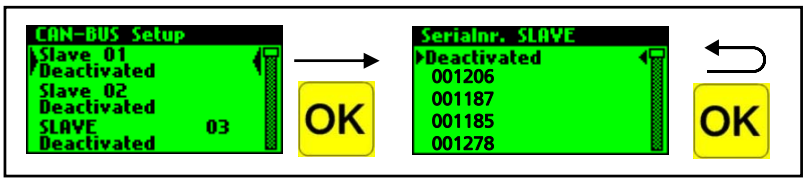
Example

Ill. 8.21 Overview for the system commissioning of the sample project

Adding devices
Before you can configure the KHS Mini System Controls, you have to add them to the system.

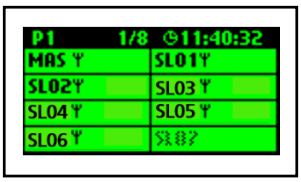
- To add a KHS Mini System control, the desired position has to be specified in the "CAN-BUS Setup" submenu with "OK".
- Subsequently, the serial numbers of all connected KHS Mini System Controls -SLAVES- are shown.
- Press the "↑" and "↓" buttons and confirm with "OK" to add the desired control.
- The "CAN-BUS Setup" submenu then reopens.

Based on this scheme, all connected KHS Mini System Control -SLAVE- are added to the -MASTER 2.0-.



Ill. 8.22 Adding devices

When all the devices have been added, they are displayed in the main view as shown in Illustration 8.23.

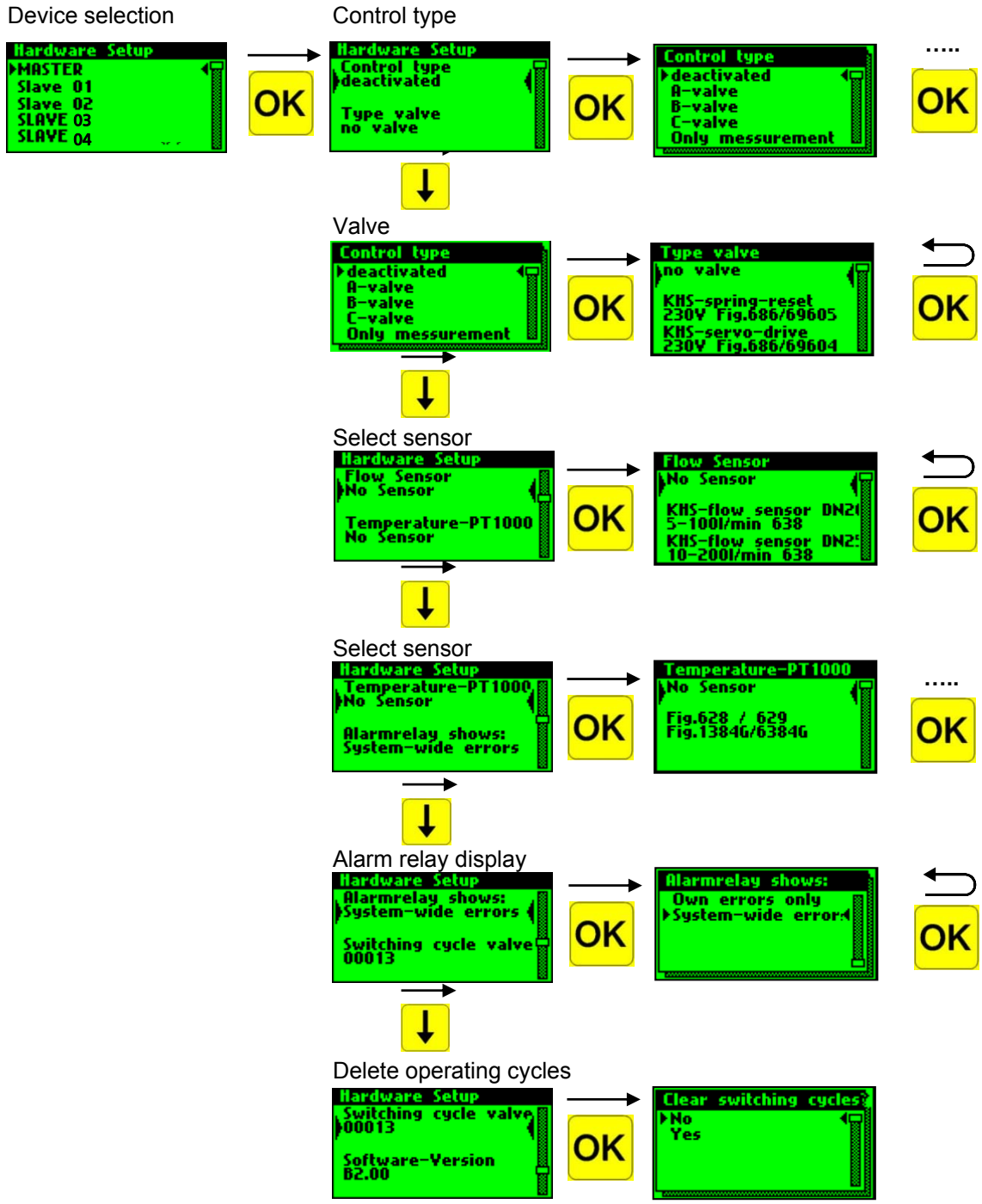


Ill. 8.23 General plan

Note:
Check to see if the antenna icon can always be seen or if the LEDs glow green on all KHS Mini System Controls. Only then has a proper connection been established.

8.1.4.3 Device settings

In the "Device settings" submenu, the individual KHS Mini System Controls with the integrated actuators and sensors are logically linked to each other. Illustration 8.24 shows an overview of the "Device settings" submenu. Press the "↑" and "↓" buttons and confirm with "OK" to select the desired control. Then select the desired linking option (controller type, valve type, sensor type, alarm relay display, operating cycles) with "OK". After that, a selection opens in which the related component can be selected. Press "OK" again to open the device-specific setting facilities. They are explained in detail based on the sample project.



Ill. 8.24 Overview of the "Device settings" submenu

The following configuration steps are discussed based on the sample project from Illustration 8.1 (Page 17). For an overview of the system commissioning, Illustration 8.25 is presented.

Overview for the system commissioning on the KHS Mini System Control -MASTER 2.0- Figure 686 02 008
(make a hand-written entry based on the example during the installation)

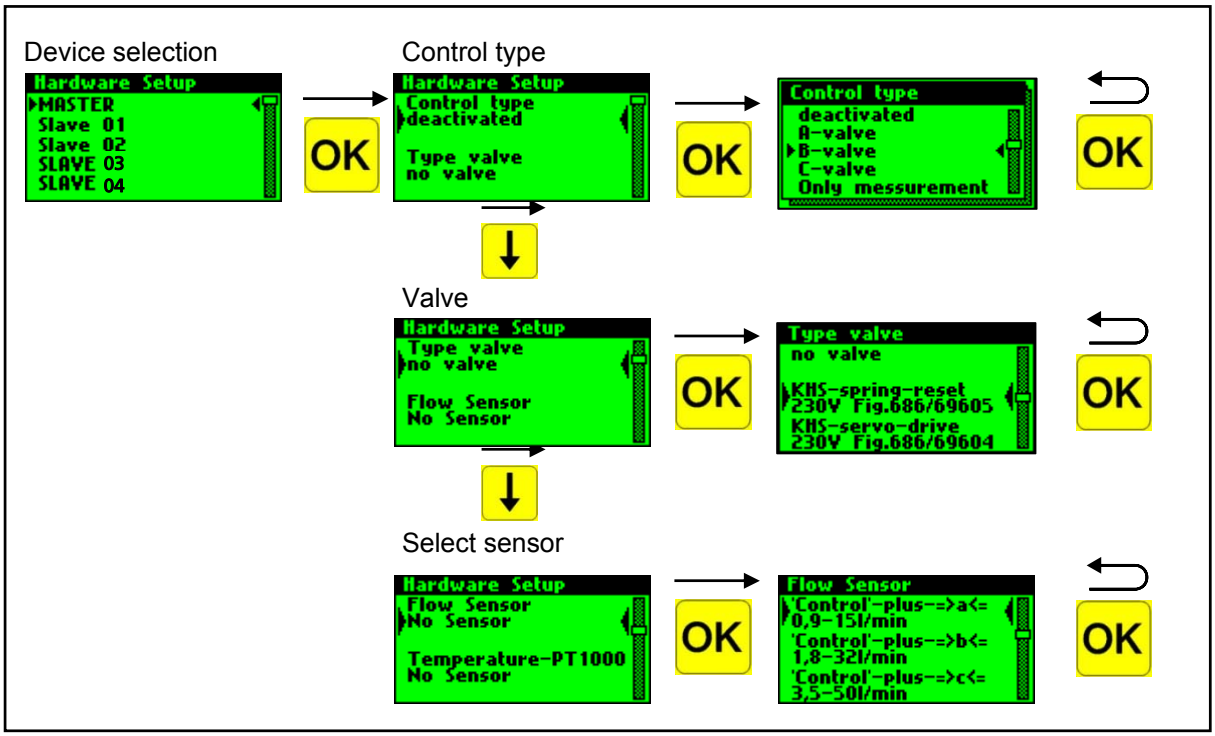
Building name: / Date: / Person commissioning:						KHS-VAV maximum flow isolating ball with servodrive and spring reset	KHS-VAV-maximum flow isolating ball valve with servodrive	KHS-CONTROL-PLUS flow measurement valve Figure 138 4G and Figure 638 4G							KHS PT1000	KHS drain with over-flow	Water sensor
						Figure 686 05 Figure 696 05	Figure 686 04 Figure 696 04	Measurement range 0,9 – 15 l/min.	Measurement range 1,8 – 32 l/min	Measurement range 3,5 –50 l/min	Measurement range 5,0 – 85 l/min	Measurement range 9,0 – 150 l/min	Measurement range 11 – 188 l/min	Measurement range 18 – 316 l/min	Figure 628 0G 629 0G	Figure 688 00	Figure 620 00
Control	No.	Serial no. (Rating plate on the control)	Location/ room	Control type (A-valve; B-valve; C-valve; measurement, safeguard)	Related B-valve -Serial no.-	or											
Master		2758	Cellar	B-valve	-	x		x								x	
Slave	1	1206	Cellar	C-valve	-	x										x	
Slave	2	1187	Cellar	A-valve	-		x										x
Slave	3	1184	GF	Measurement	-			x									
Slave	4	1185	GF	Measurement	-										x		
Slave	5	1278	GF	A-valve	2758		X								X		
Slave	6	1277	1. UF	A-valve	2758		X								X		

Example

Ill. 8.25 Overview for the system commissioning of the sample project

Configuration -MASTER- (B-valve)

In the sample project being used, the KHS Mini System Control -MASTER 2.0- should trigger a B-valve in the form of a VAV-maximum flow isolating ball valve with spring reset servo-drive. Furthermore, a KHS-CONTROL-PLUS flow measurement valve is to be evaluated. Additional settings for this operating mode are explained in Chapter 8.1.4.4. Illustration 8.26 shows the configuration of a B-valve.

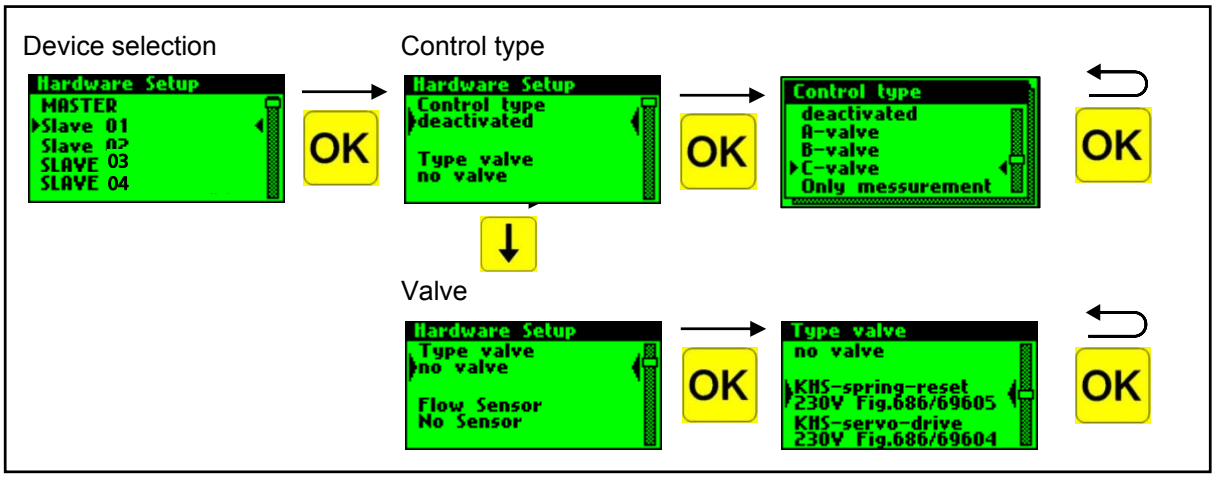


Ill. 8.26 Configuration of B-valve

Note:
A B-valve is always assigned to an A-valve. The A-valve assignment is shown on page 30. For information on the valve technology, please see Chapter 13.1.

Configuration of -SLAVE- 1.1 (C-valve)

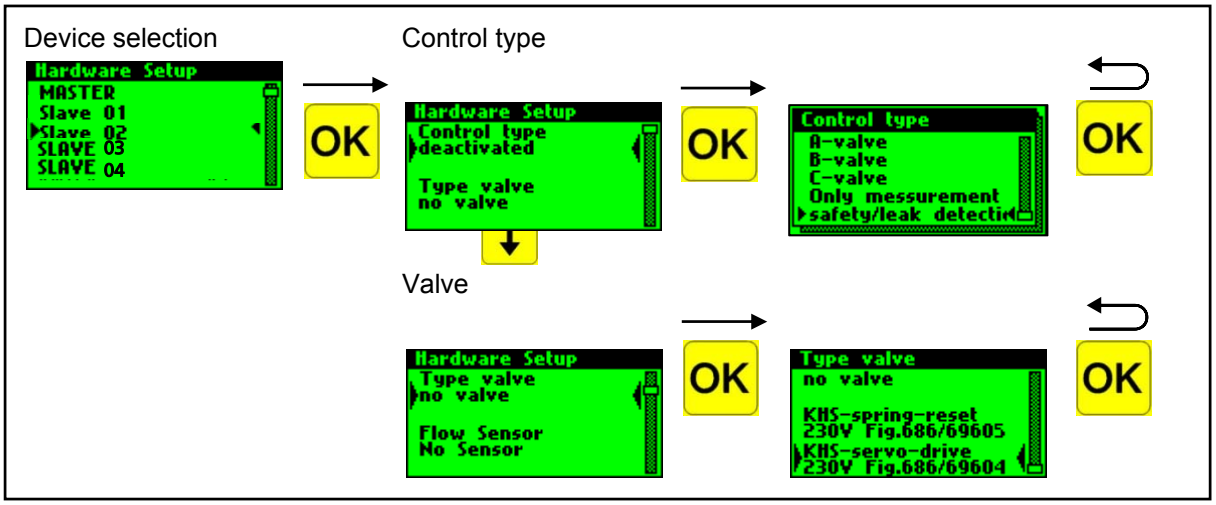
In the sample project being used, the KHS Mini System Control -SLAVE 1.1- should trigger a C-valve in the form of a VAV-maximum flow isolating ball valve with spring reset servo-drive. The KHS Mini System Control -SLAVE- 1.1 is to be time-controlled. Additional settings for this operating mode are explained in Chapter 8.1.4.4. Illustration 8.27 shows the configuration of a C-valve.



Ill. 8.27 Configuration of C-valve

Configuration of -SLAVE- 1.2 (safeguard)

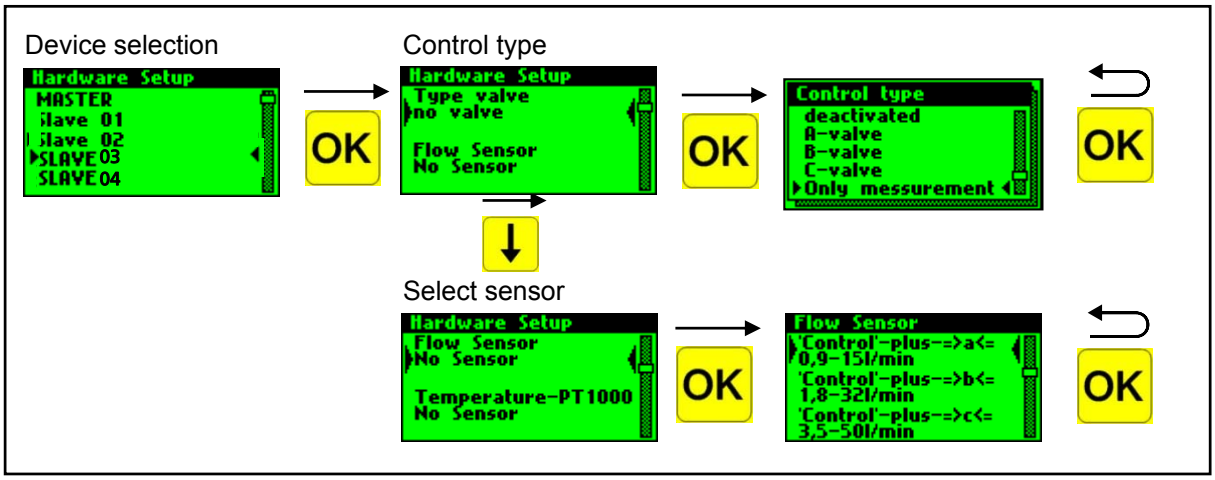
The KHS Mini System Control -SLAVE- 1.2 in this sample project should act as a leakage safeguard. The KHS Mini System Control -SLAVE- 1.2 should trigger a KHS-VAV-Maximum flow isolating ball valves with servo drive as a safety valve. Additional settings for this operating mode are explained in Chapter 8.1.4.4. Illustration 8.28 shows the configuration of a safety device.



Ill. 8.28 Configuration of a safeguard

Configuration of -SLAVE- 1.3 (flow measurement)

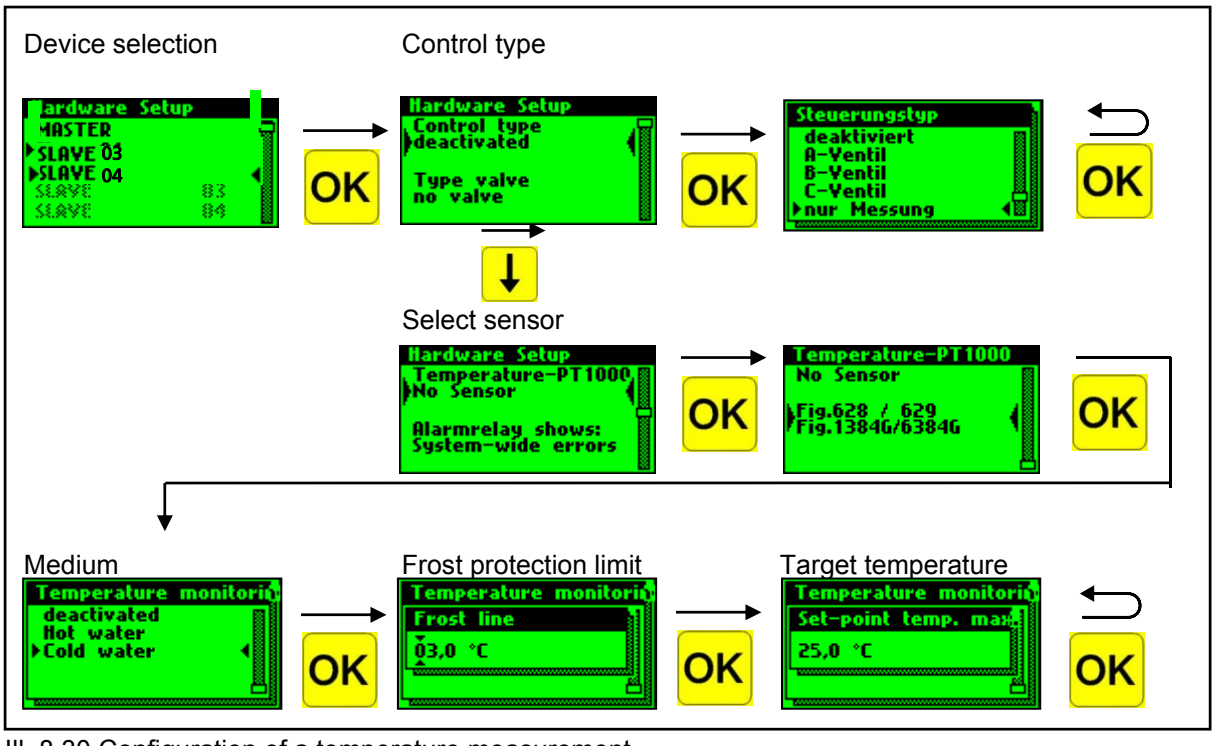
The KHS Mini System Control -SLAVE- 1.3 in this sample project should act as a measurement SLAVE. The flow rate is to be measured with a KHS-CONTROL-PLUS flow measurement valve. Additional settings for this operating mode are explained in Chapter 8.1.4.4. Illustration 8.29 shows the configuration of a flow rate measurement device.



Ill. 8.29 Configuration of a flow measurement

Configuration of -SLAVE- 1.4 (temperature measurement)

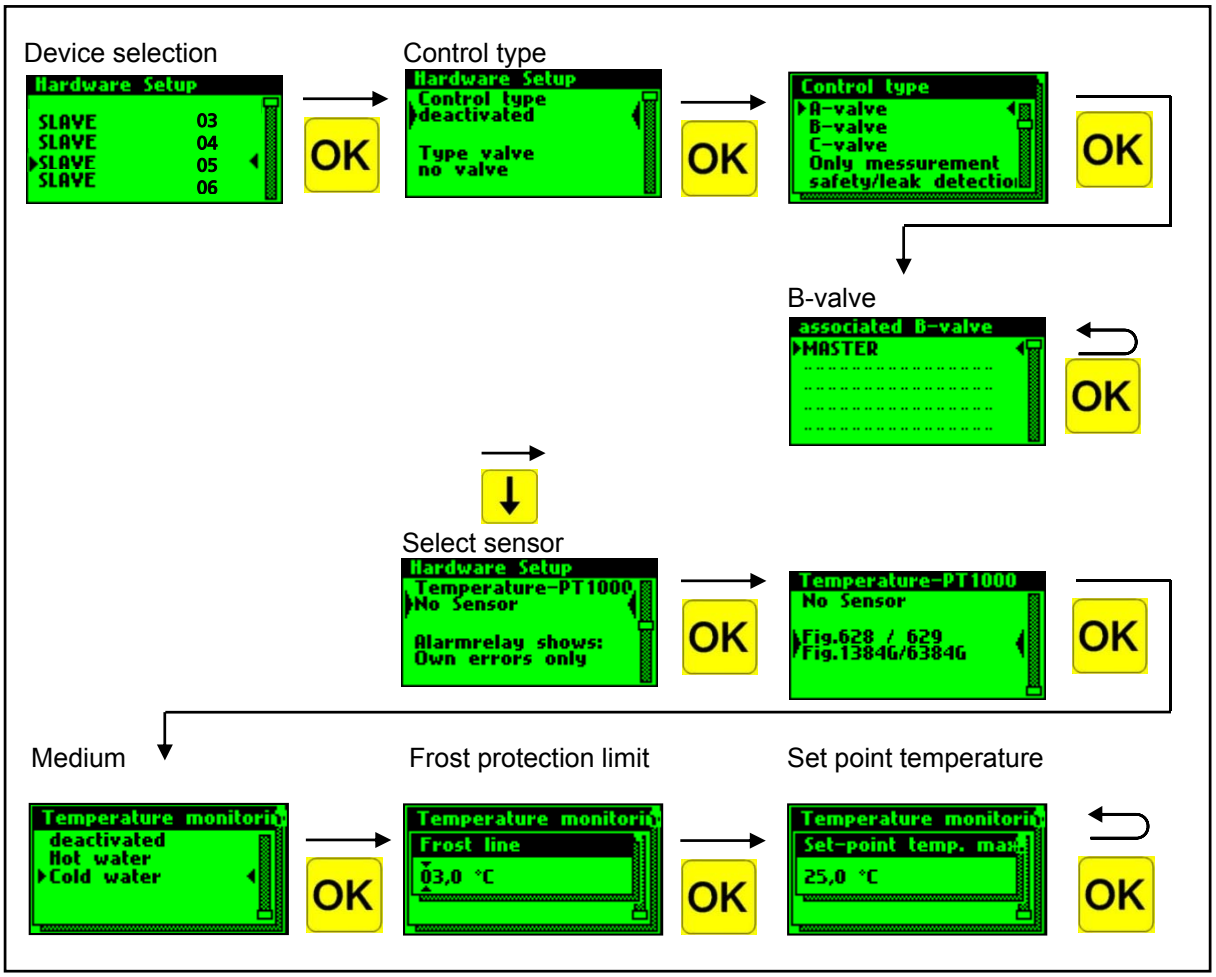
The KHS Mini System Control -SLAVE- 1.4 in this sample project should act as a measurement SLAVE. The temperature is to be measured with a Pt 1000. After selecting the sensor, configure the frost protection limit and the target temperature. There is a cold-water line in the sample project. Illustration 8.30 shows the configuration of a temperature measuring device.



Ill. 8.30 Configuration of a temperature measurement

Configuration of a -SLAVE- 1.5 and 1.6 (A-valve)

The KHS Mini System Control -SLAVE- 1.5 and 1.6 in this sample project should trigger one each A-valve and should be assigned to the B-valve of the KHS Mini System Control -MASTER 2.0-. The A-valve should be a KHS-VAV Maximum flow isolating ball valve with servo drive. Both system controls are temperature controlled through a KHS temperature sensor Pt 1000. Additional settings for this operating mode are explained in Chapter 8.1.4.4. Illustration 8.31 shows the configuration of an A-valve.

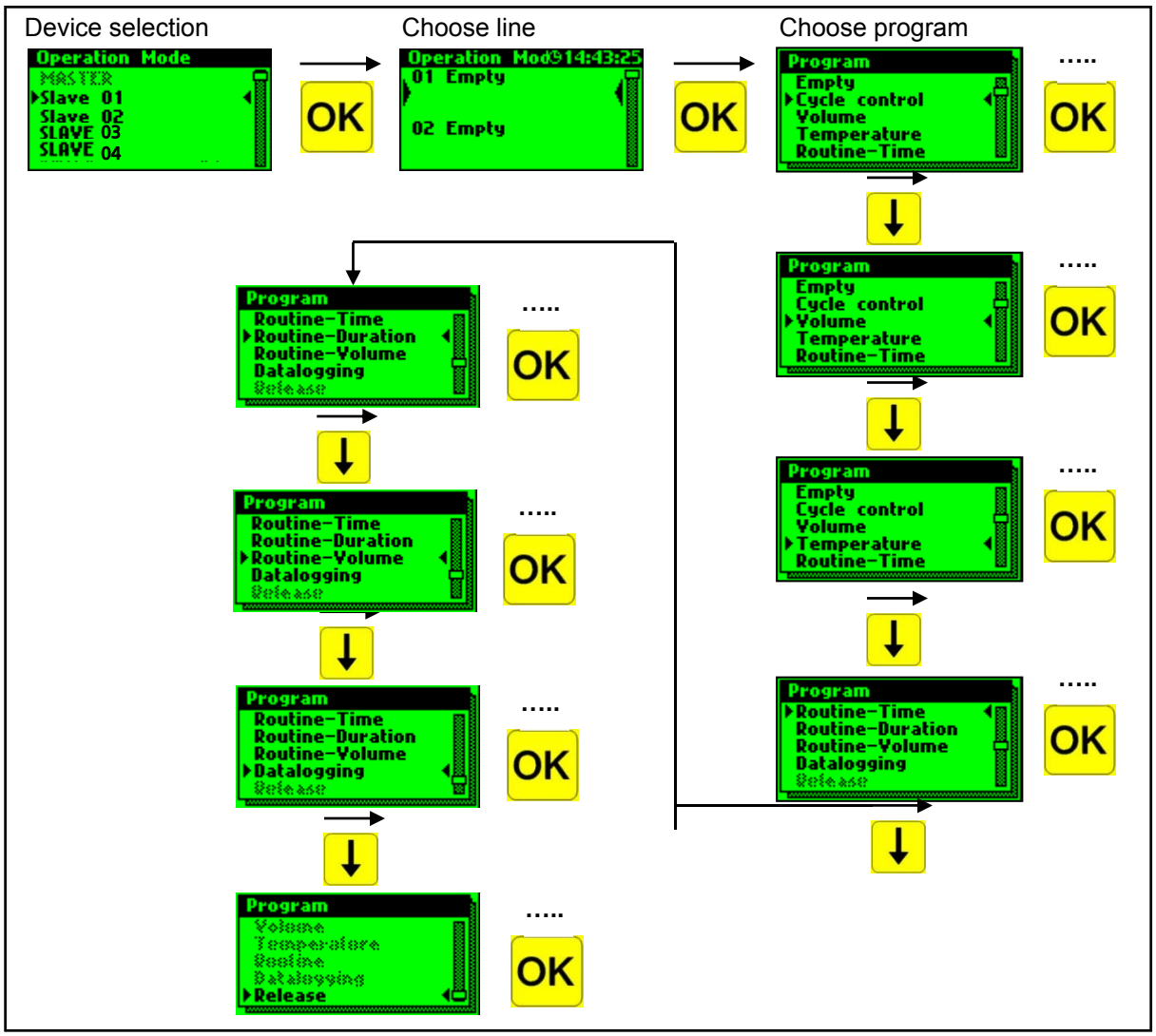


Ill. 8.31 Configuration of A-valve

8.1.4.4 Operating modes

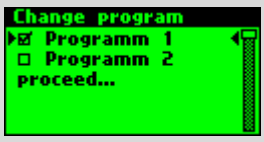
In the "Operating modes" submenu, the individual KHS Mini System Control programs and times are added through lines.

Illustration 8.32 shows an overview of the "Operating modes" shows. Press the "↑" and "↓" buttons and confirm with "OK" to select the desired control. Subsequently use "OK" to select a line; each line can describe one program. A selection then opens to choose which programs will be selected. Press "OK" again to open the specific setting facilities, depending on the program. They are explained in detail based on the sample project.



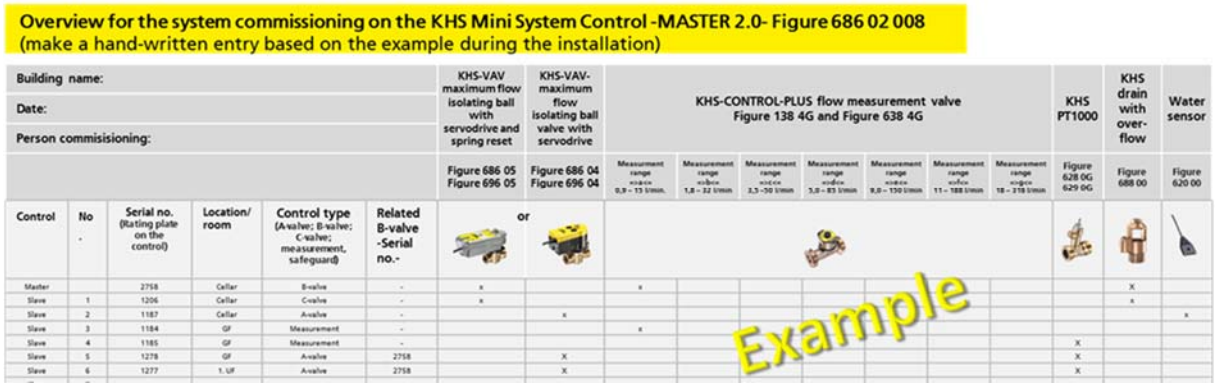
Ill. 8.32 Overview of the "Operating modes" submenu

Note:
If the program switch is "Activated" (see Chapter 8.1.4.6), a query is presented during the operating modes configuration to determine the program this applies to (see Ill. 8.33). The two mentioned flushing programs can be switched using an external manual switch. The electrical connection is shown in Chapter 6.2.2.5.



Ill.8.33 Program switching

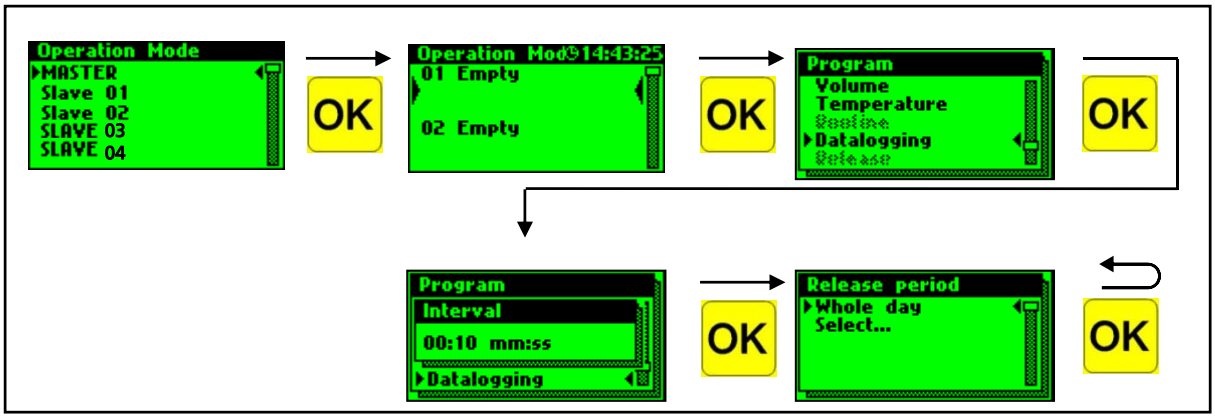
The following configuration steps are discussed based on the sample project from Illustration 8.1 (Page 17). For an overview of the system commissioning, Illustration 8.34 is presented.



Ill. 8.34 Overview for the system commissioning of the sample project

Configuration -MASTER- (datalogging)

The KHS Mini System Control -MASTER 2.0- in the presented sample project is connected to a KHS-CONTROL-PLUS flow measurement valve. To record the flow measurement valve measurement data at the same time, a line has to be selected. Then select the "Datalogging" program. When a program has been specified, define the times. The interval time states the storage rate of the measurement values. "Whole day" data can be logged or fixed times can be defined through a starting and stopping time. Illustration 8.35 shows the configuration of a "datalogging" operating mode.



Ill. 8.35 Configuration of datalogging

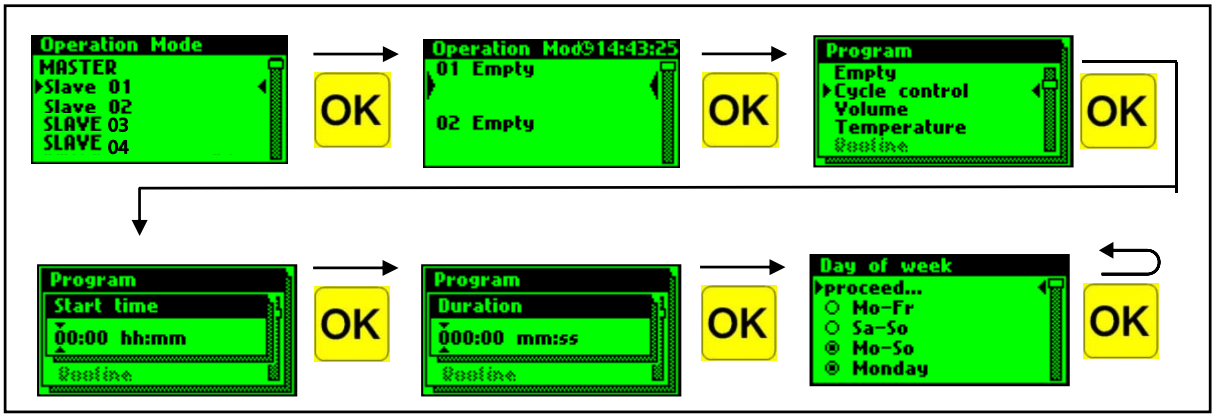
Illustration 8.36 shows an exemplary part of a CSV log file. In the written log file you can find a detailed listing of the entire measured data. They are sorted by date, time, index, name and the measured data of the connected measurement valve. Up to 12 million lines can be saved.

Date	Time	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

Ill. 8.36 Illustration of a part of the CSV log data

Configuration of -SLAVE- 1.1 (time flushing)

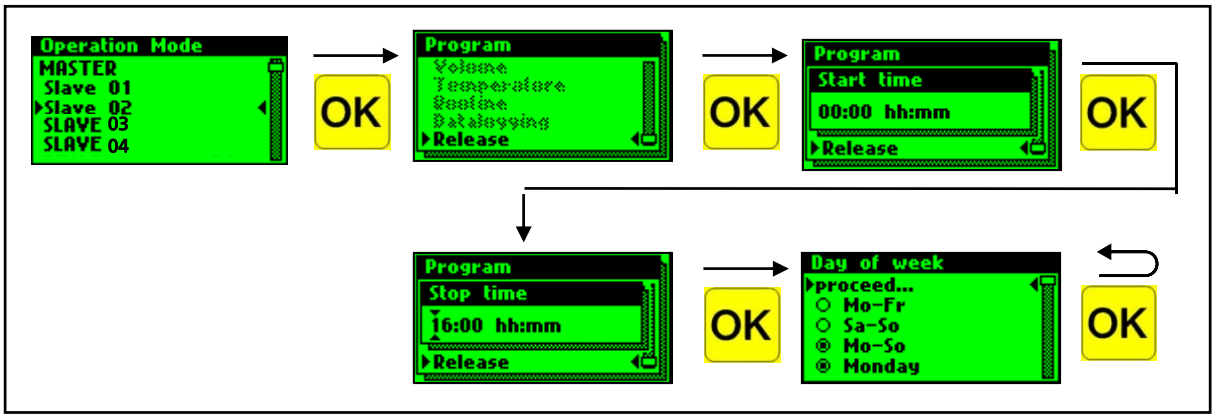
The KHS Mini System Control -SLAVE- 1.1 in this sample project is connected to a C-valve. To time-control exchange the water, a line needs to be added with the "Time control" program. When the program is selected, define the times. In the "Time control" program, a starting time and the duration of the water exchange need to be stated. Furthermore, the desired weekday can be selected through a dropdown list. Illustration 8.37 shows the configuration of a "Time control" operating mode.



Ill. 8.37 Configuration of time flushing

Configuration of -SLAVE- 1.2 (safeguard)

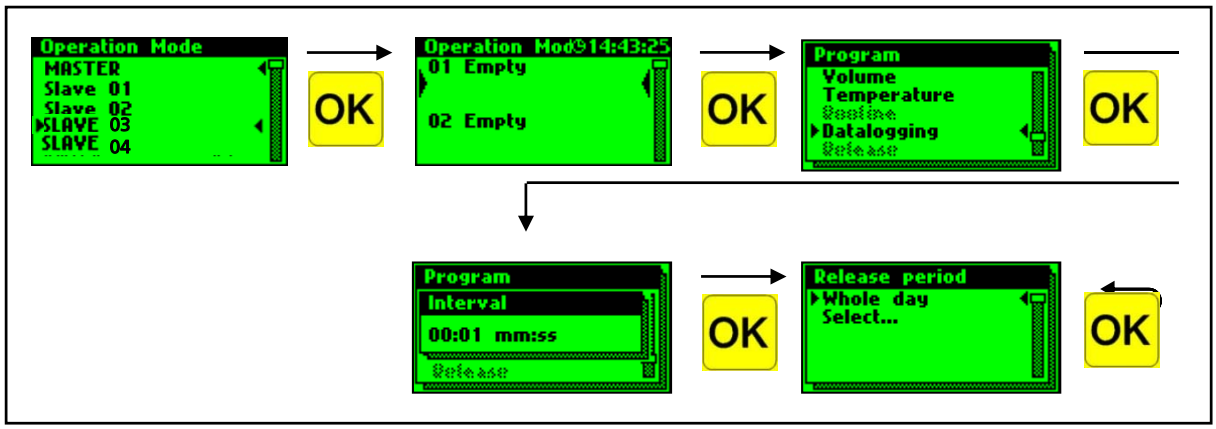
The KHS Mini System Control -SLAVE- 1.2 in this sample project is planned as a safeguard SLAVE. The safeguard is always activated using a water sensor. Use the "Release" program to trigger the linked valve. That way you only have water pressure in the system when it is needed. That in turn achieves more protection against water damages. When a line is selected with the "Release" program, the times can be defined. A starting and stopping time need to be defined for the release. Furthermore, the desired weekday can be selected through a dropdown list. Illustration 8.38 shows the configuration of the "Safeguard" operating mode. If no operating mode is configured, the safety valve is open the whole day and only reacts to a signal from the water sensor.



Ill. 8.38 Configuration of a safeguard

Configuration of a -SLAVE- 1.3 and 1.4 (datalogging)

The KHS Mini System Control -SLAVE- 1.3 and 1.4 in this sample project is planned as a measurement SLAVE. Please refer to the -MASTER- configuration for the settings for the "Datalogging" line type. Illustration 8.39 shows the configuration of a "Datalogging" operating mode.

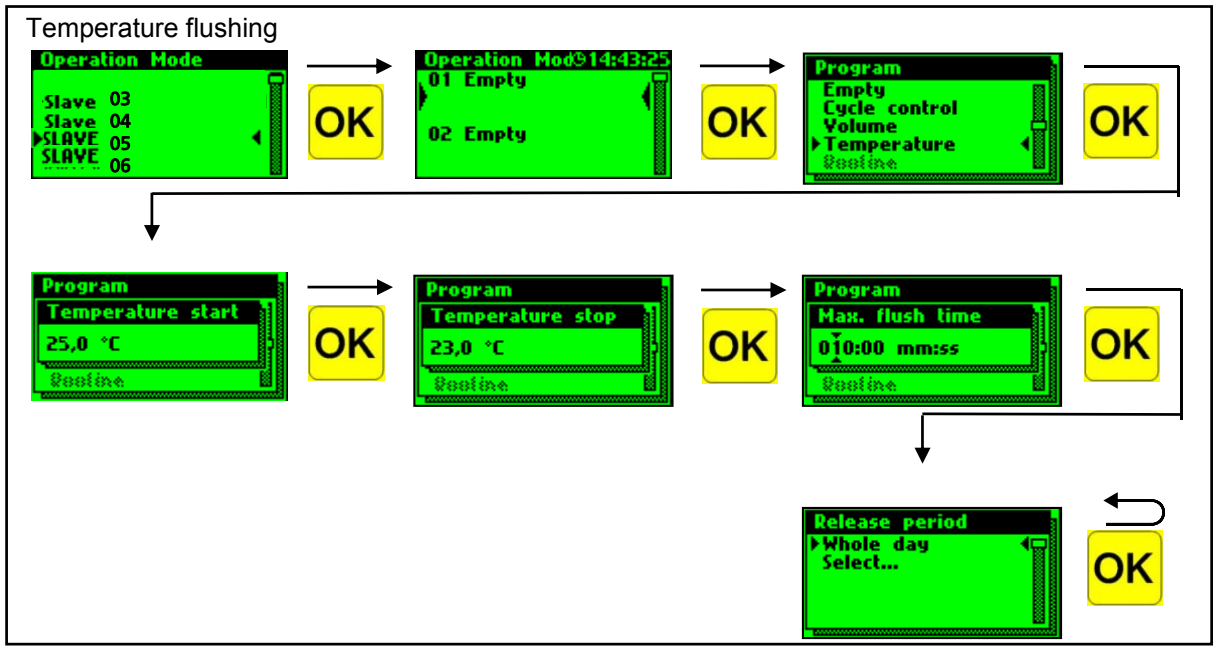


Ill. 8.39 Configuration of datalogging

Configuration of a -SLAVE- 1.5 and 1.6 (Temperature/volume flushing)

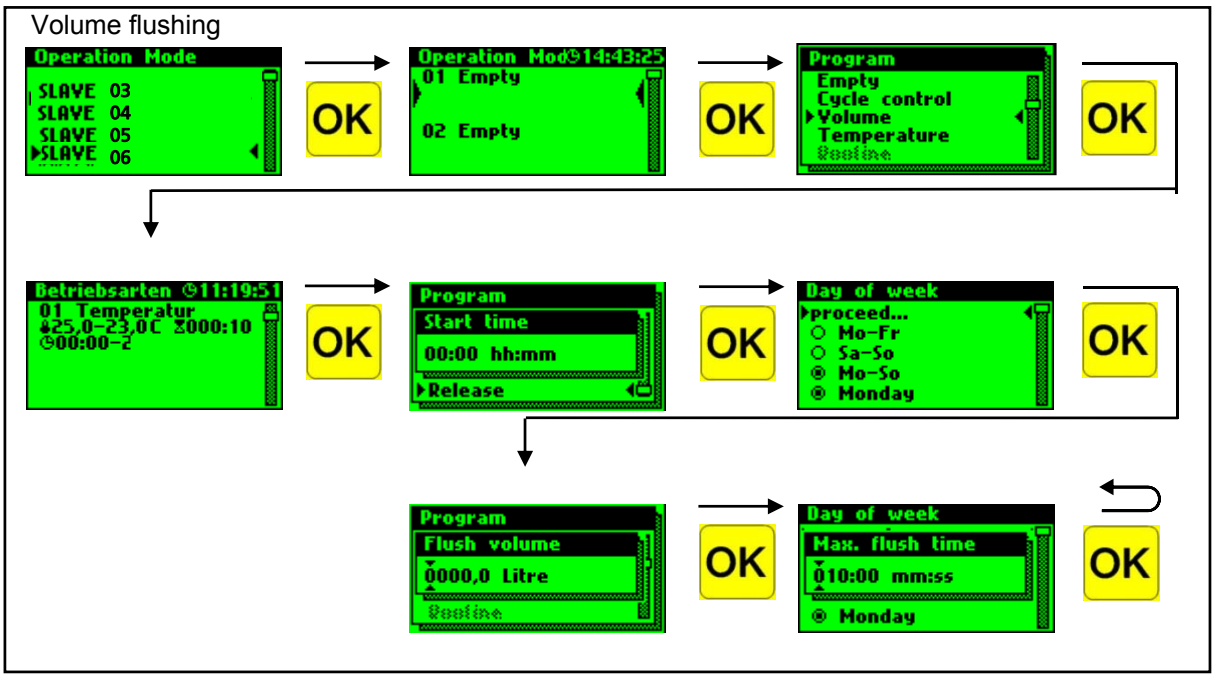
The KHS Mini System Control -SLAVE- 1.5 and 1.6 in the sample project are each linked to a temperature measurement valve. To control the temperature-dependent water exchange, the "Temperature" program needs to be selected. The starting and stopping temperatures and the maximum flushing time need to be set for the "Temperature" program.

Illustration 8.40 shows the configuration of the "Temperature flushing" operating mode.



Ill. 8.40 Configuration of temperature flushing

For the "Volume" program, set the starting time, the flushing volume and the maximum flushing time. Furthermore, the desired weekday can be selected through a dropdown list for both programs. Illustration 8.41 shows the configuration of the "Volume flushing" operating mode.



Ill. 8.41 Configuration of volume flushing

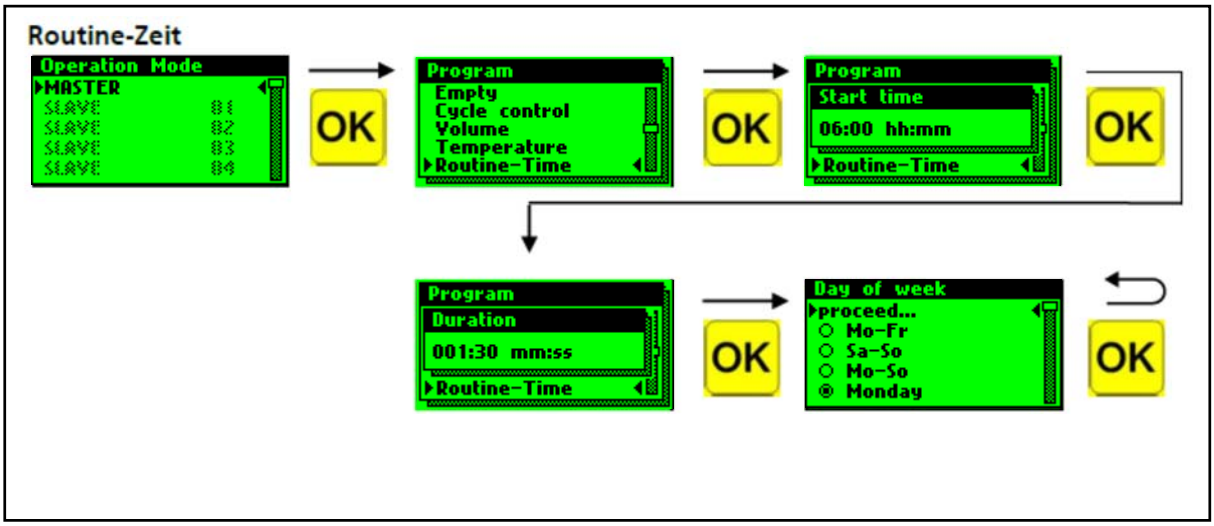
Routine-time, Routine-duration and Routine-volume

The sample project is a cold-water line in which the cold-water temperature in the winter, for instance, could always lie below the set starting temperature. To prevent an impermissible stagnation, after the configuration of the temperature flushing, a routine flushing of the KHS Mini Control System is automatically always stored. The routine flushing "Routine time"" is preset for this; however a selection can also be made between "Routine duration" and "Routine volume" as an alternative. Please note that only one routine flushing can be stored with one KHS Mini System Control.

Routine time

If there is no temperature flushing within 7 days, the water exchange is guaranteed through the "Routine time" operating mode. For the "Routine time" operating mode, the starting time, the duration and the weekdays of the water exchange can be stored for that.

Illustration 8.42 shows the individual steps for configuration.

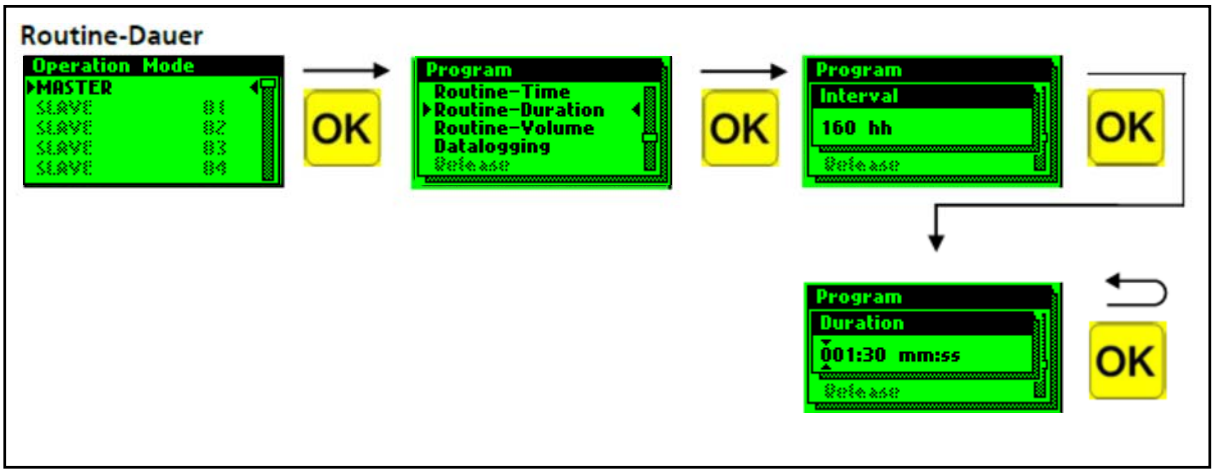


Ill. 8.42 Configuration of routine time

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

Illustration 8.43 shows the individual steps for configuration.

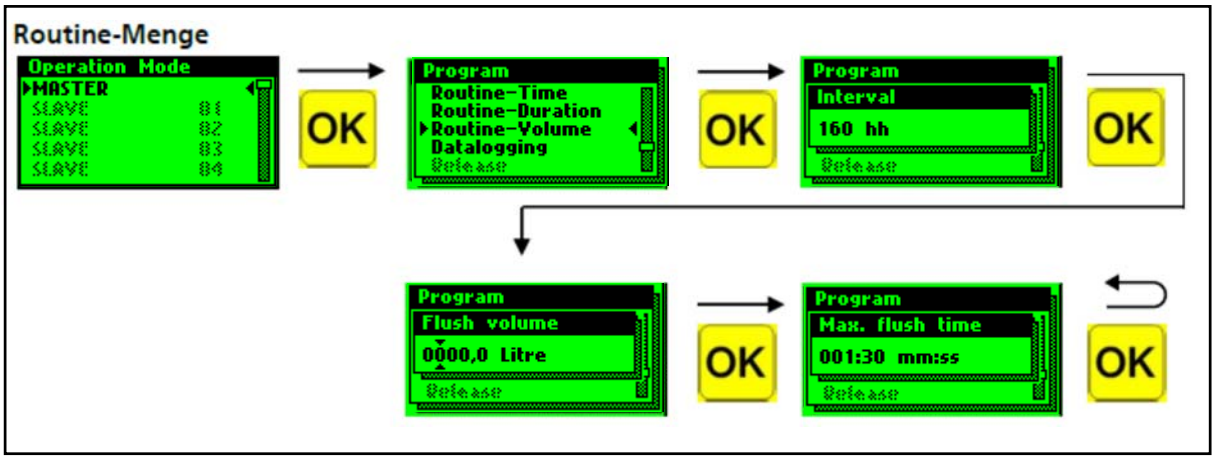


Ill. 8.43 Configuration of routine duration

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

Illustration 8.44 shows the individual steps for configuration.

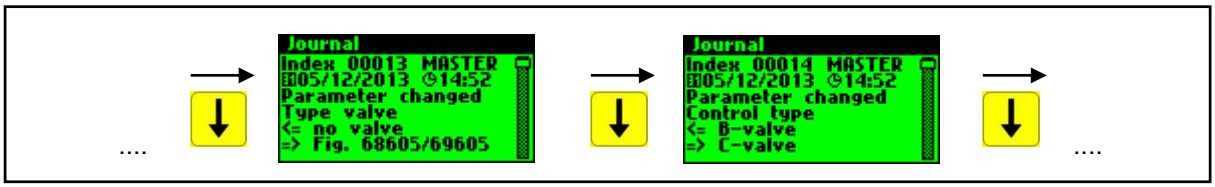


Ill. 8.44 Configuration of routine volume

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

8.1.4.5 Journal

The "Journal" submenu provides a facility for opening the event logging. Press the "↑" and "↓" buttons to change between the individual journal entries. The event log documents the water exchange processes, the error messages and the configuration changes made through the Kemper KHS Mini System Control (for an example, see Ill. 8.42). Up to 50,000 journal entries can be saved. Based on the documentation about the locality, duration of the water exchange and the temperatures, recordings can be made across a defined time period and verify the hygienic state of the drinking water system.



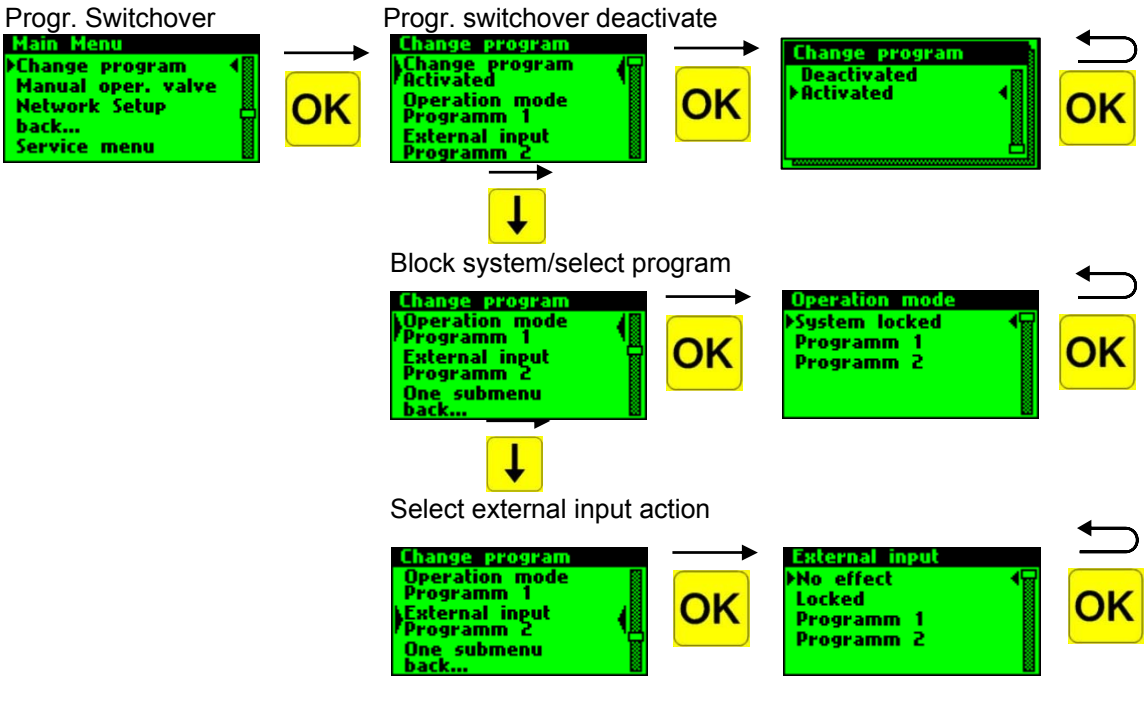
Ill. 8.42 Illustration of a journal entry index 9-10, configuration change

Note:
The stored journal entries can be saved through the USB interface on a USB memory stick. This function is explained in detail in Chapter 8.1.5.

8.1.4.6 Switching programs

With the KHS Mini System Control -MASTER 2.0- it is possible to switch between two flushing programs or to block one through 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 functions are described in Illustration 8.43.

Note:
The two mentioned flushing programs can be switched using an external manual switch. The electrical connection is shown in Chapter 6.2.2.5.

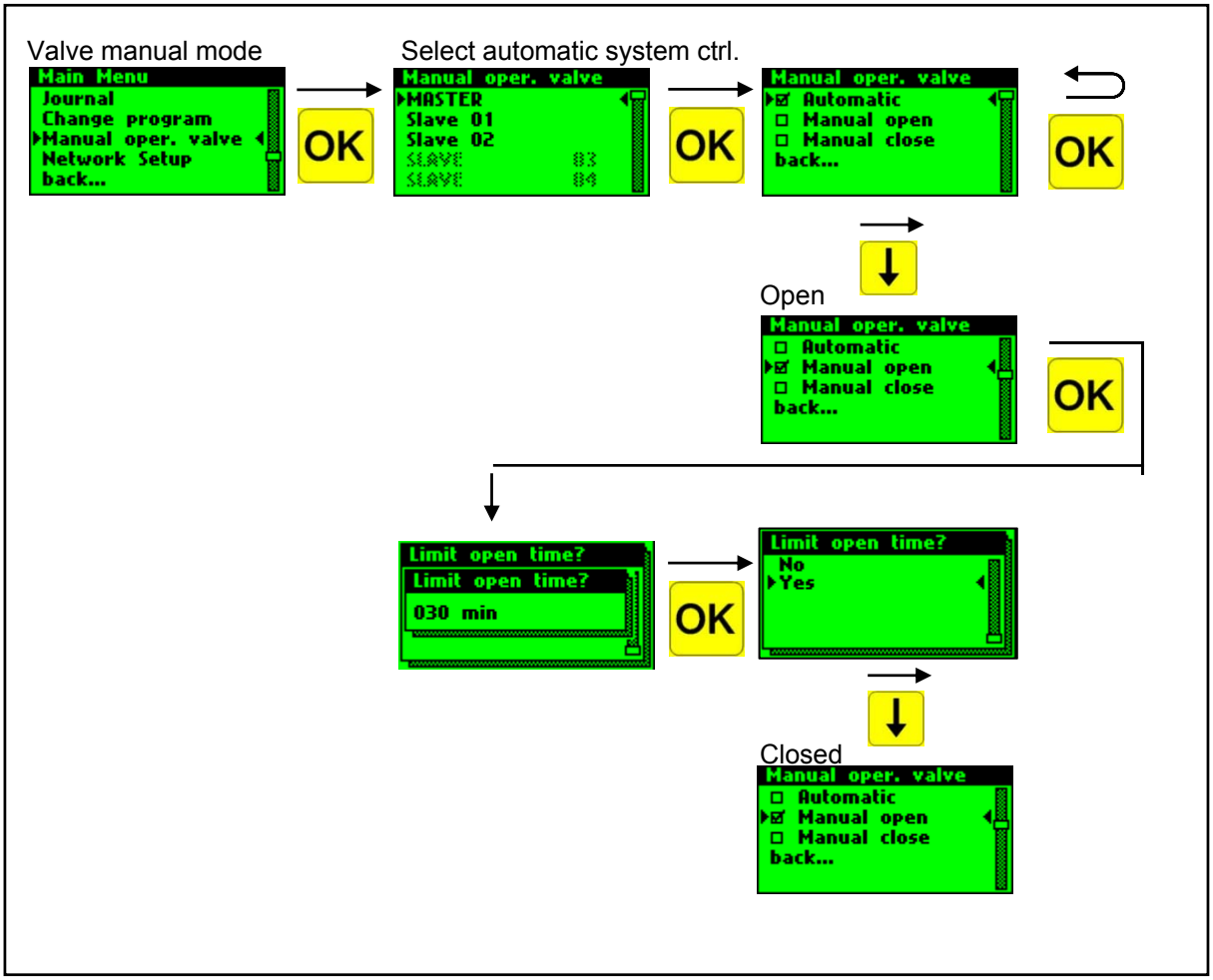


Ill. 8.43 Overview of the "Switch program" submenu

8.1.4.7 Valve manual mode

With the KHS Mini System Control -MASTER 2.0-, it is possible to run a function test of the valves through the "Valve manual mode" operating mode. Furthermore, the valves can be individually triggered during maintenance. The functions are simulated in Illustration 8.44.

Maintenance:
A function test is recommended after configuring the "Device settings" submenu to immediately exclude possible errors.



Ill. 8.44 Overview of the "Valve manual mode" submenu

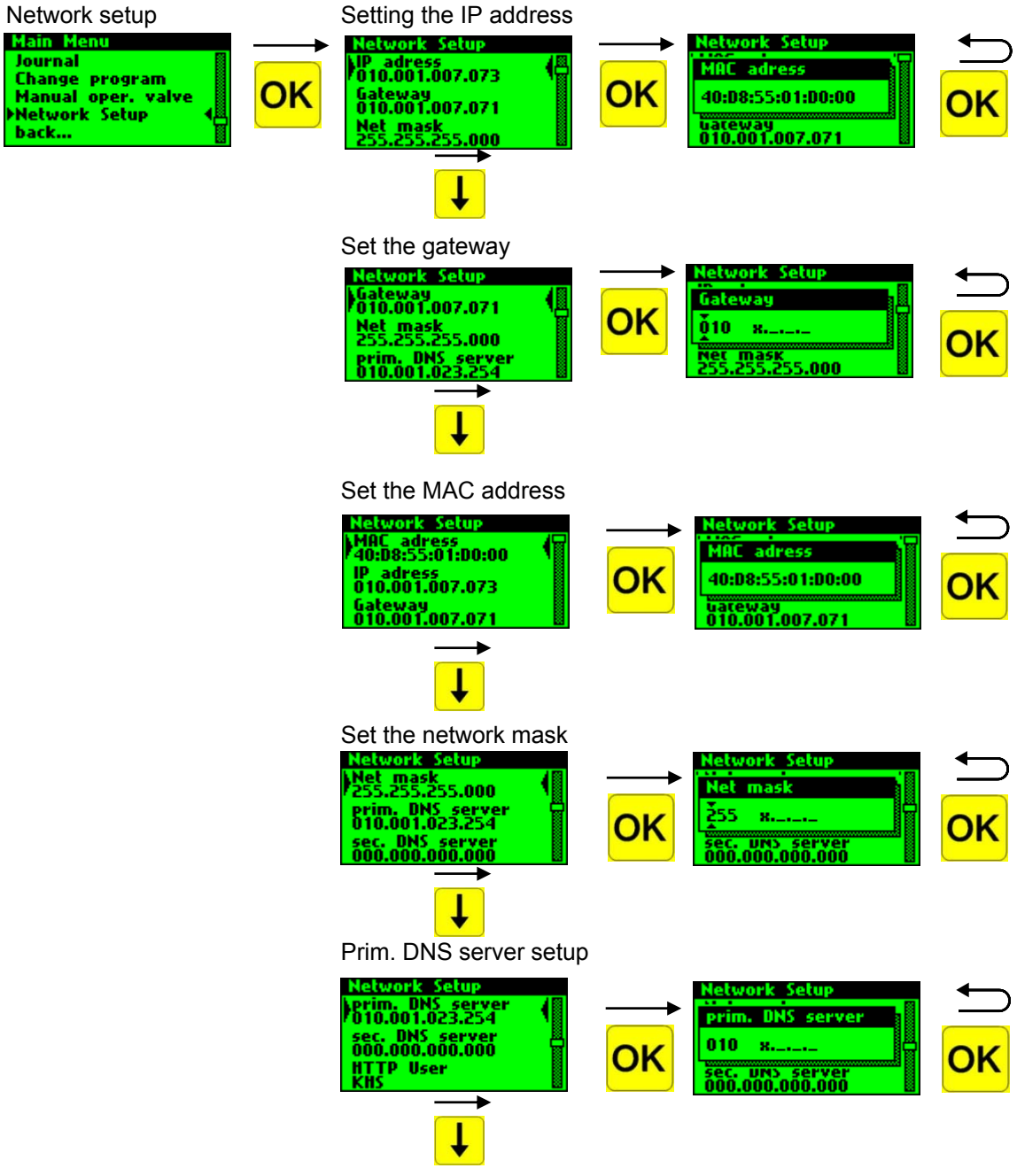
8.1.4.8 Network setup

To establish a connection between the PC and the KHS Mini System Control -MASTER 2.0-, the required network configurations can be set up in the "Network setup". The connection can be made through a direct connection between the PC and -MASTER- or a network link. The functions are simulated in Illustration 8.45.

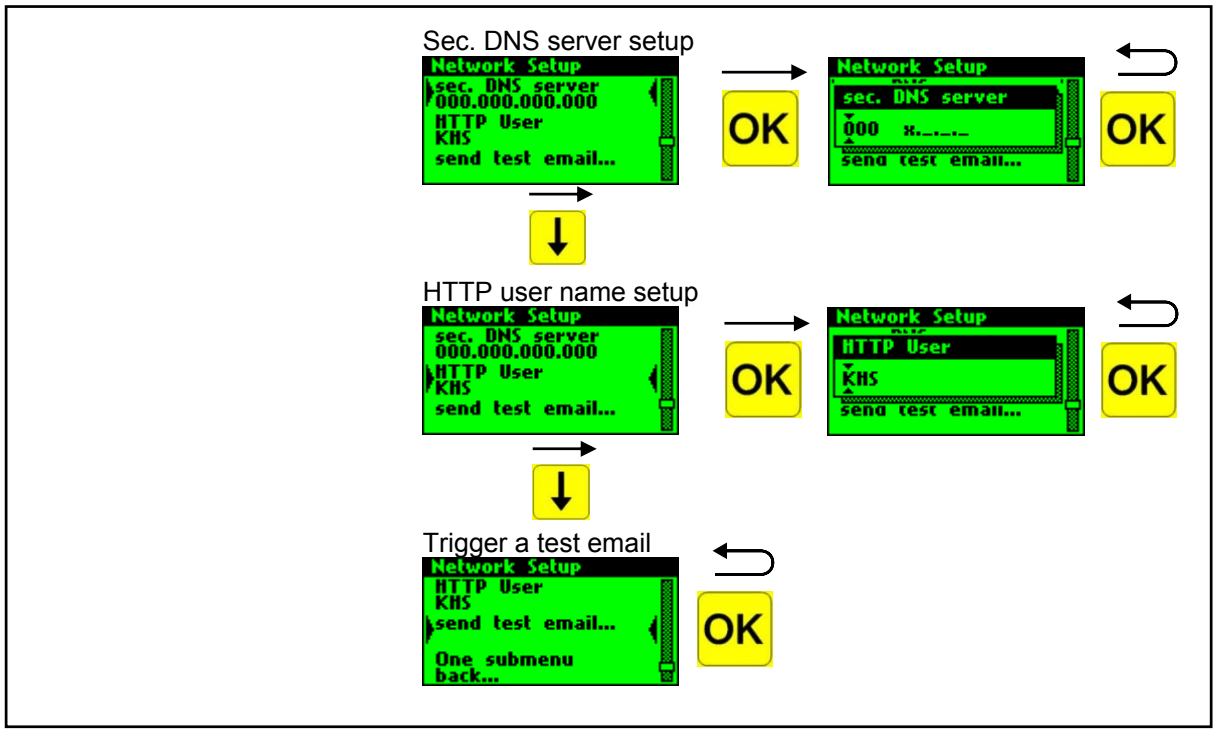
Note:
You can obtain the corresponding parameters for linking in your network from your system administrator.

The following parameters are configured as factory defaults:

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



For more information see the following page



Ill. 8.45 Overview of the required menu items of the "Network setup" submenu

8.1.4.9 Error handling

All the errors that occur in the system are sent to the KHS Mini System Control -MASTER 2.0- and are signalled acoustically through a buzzer. It is possible to integrate an alarm relay (see Chapter 6.2.2.8). 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. During this it does not matter what kind of impact the malfunction could have on the system. The control goes into alarm latching and has to be acknowledged after the malfunction has been repaired.

Switch off / acknowledge buzzer

1 x OK Buzzer off

The control remains in alarm latching

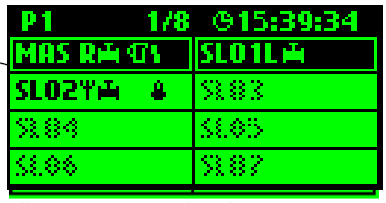
Ill. 8.46 Acknowledge the buzzer

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

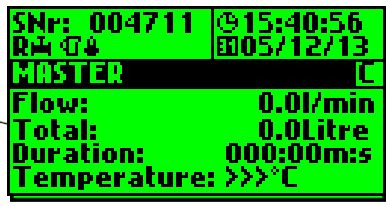


Ill. 8.47 Error display

Acknowledge error

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

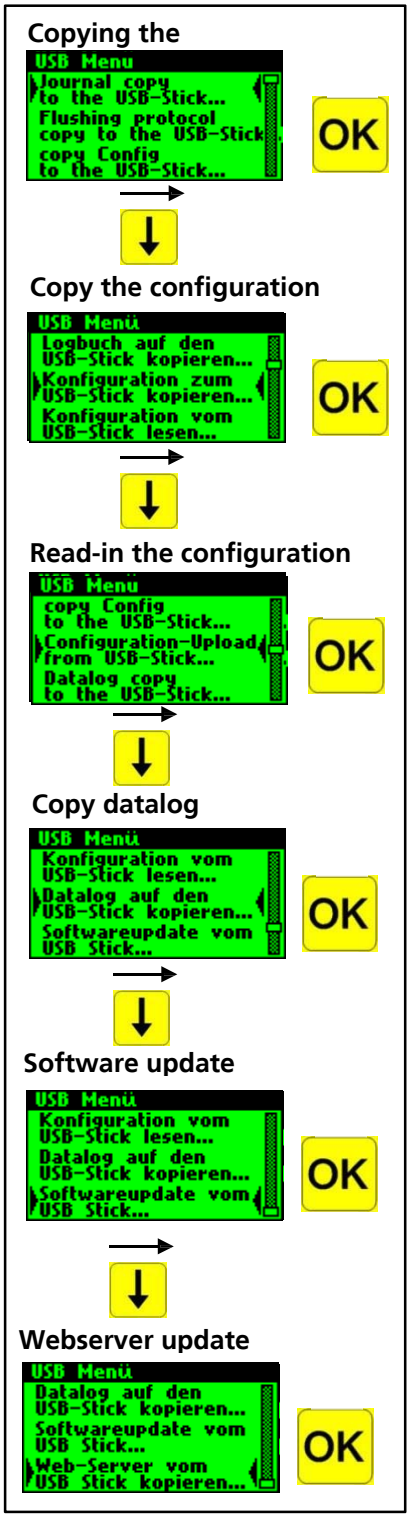
1 x OK Acknowledge error



Ill. 8.48 Acknowledge the error

8.1.5 Using the USB interface

With the USB interface of the KHS Mini System Control -MASTER 2.0-, it is possible to copy the journal (CSV file), the configuration of the system controls (CFG file) and the datalog (CSV file) onto a USB memory stick. Furthermore, backed-up configurations (CFG file) and new software updates (UPD file) can be written to the KHS Mini System Control -MASTER 2.0-. The functions are simulated in Illustration 8.49.



Ill. 8.49 Overview USB menu

Note:
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 System Control -MASTER 2.0-.

Note:
After selecting a menu item, follow the instructions on the subsequent display.

8.2 Configuration of the WEB browser

The KHS Mini System Control -MASTER 2.0- is a web-based system control. Using the WEB browser, basic settings, configurations and changes can be simply made from the PC. In the following chapter, the WEB browser user interface and its functions are clarified.

Note:
Chapters 8.2.1 to 8.2.8 merely involve the WEB browser user interface. You can find the complete operating on the WEB browser with the button or downloads or through the Service/ Download section of our website, www.kemper-olpe.de.

To use the WEB browser, the following 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.

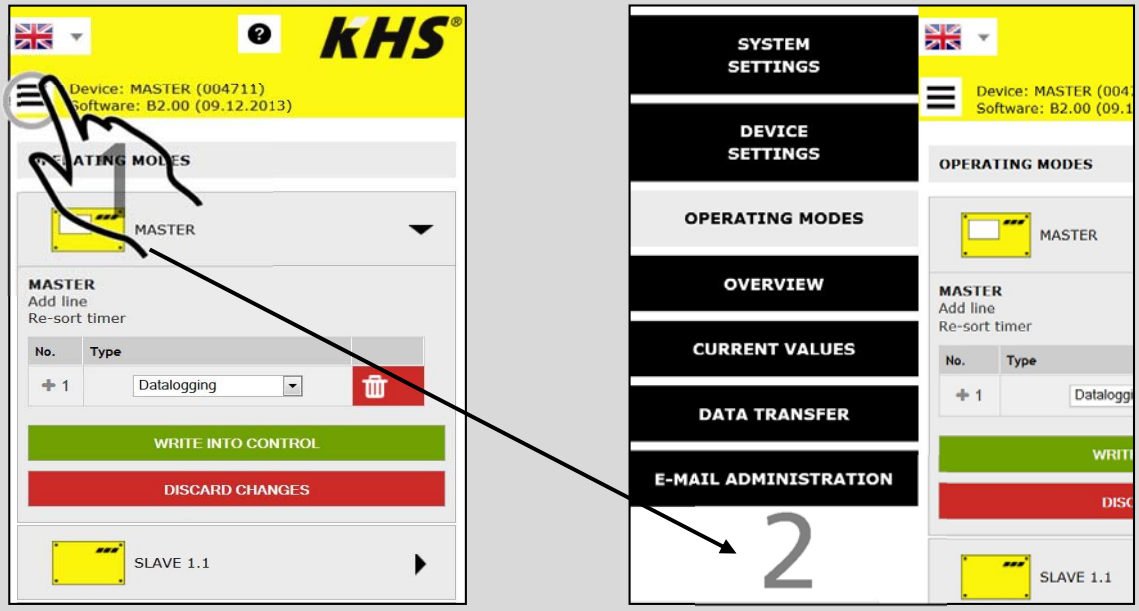
Please note Chapter 8.1.4.8 and make sure you know which network settings of the system control are stored.

8.2.1 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 Illustration 8.50. In the individual menu interfaces, you can make the basic settings, the configurations and changes. Use the WRITE IN CONTROL button to save your parameters. If you do not want to store the changes in the system, use the DISCARD CHANGES button.

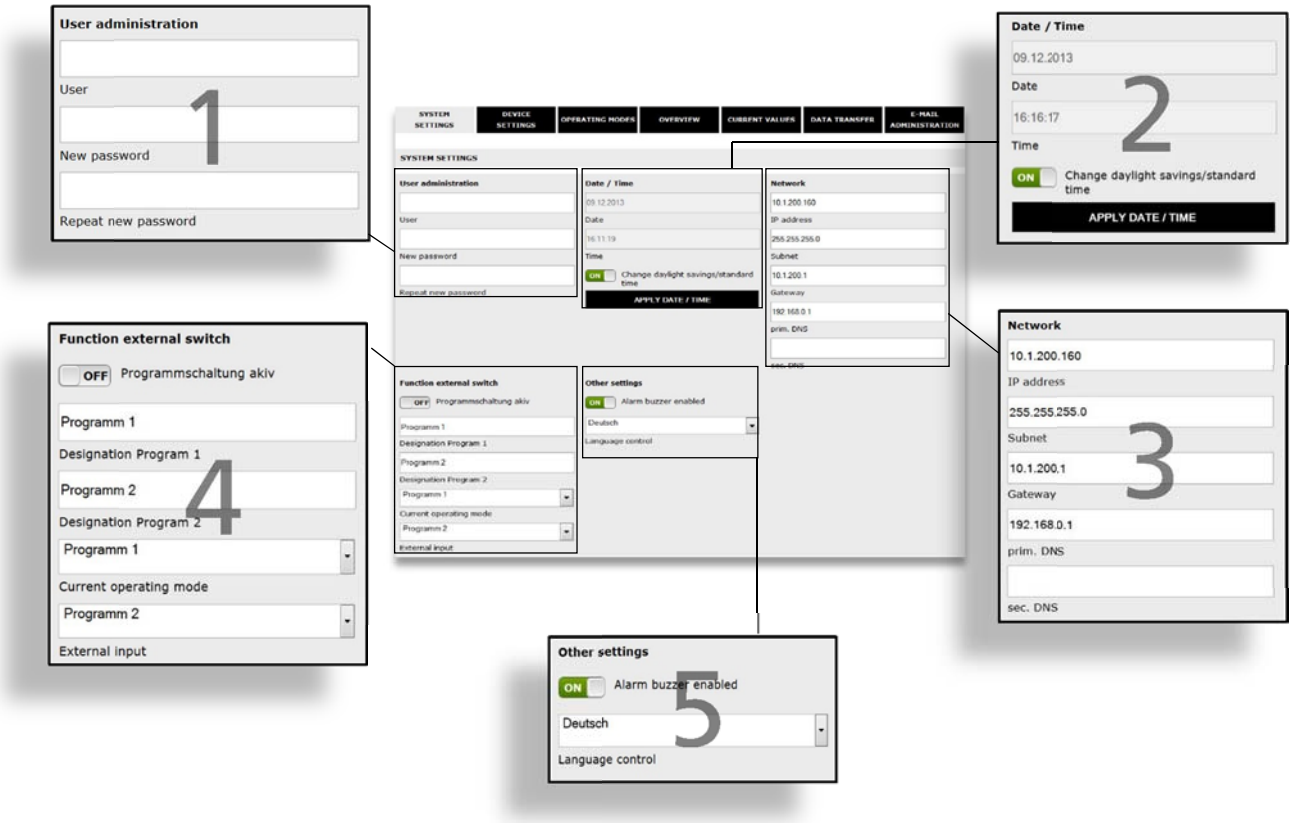
Ill. 8.50 Menu tab of the WEB browser

Note:
The WEB browser interface can also be used through a Tablet-PC or a mobile phone. When doing so, the input interfaces are slightly changed. 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.

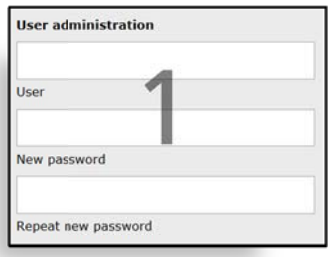


8.2.2 SYSTEM SETTINGS

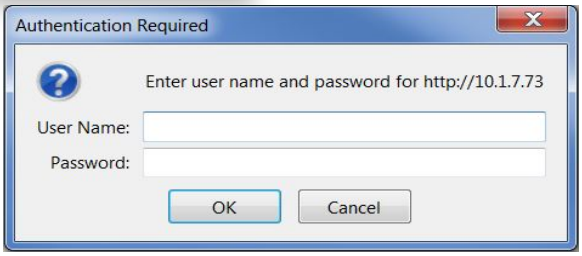
In the "SYSTEM SETTINGS" menu interface you can make settings for the user data, date / time, network, external switch function and other settings.



- User data



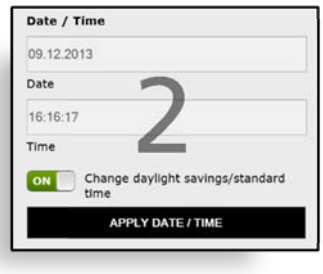
To add a user for the WEB browser of your KHS Mini System Control, choose a user name and a suitable password. To save the settings, click on the WRITE IN CONTROL button. After the settings have been saved, you need to authenticate yourself every time the WEB browser is started. To do that, enter your previously selected user name and the related password in input dialogue as shown in Illustration 8.51. It is not possible to use multiple user names.



Ill. 8.51 Authentication input dialogue

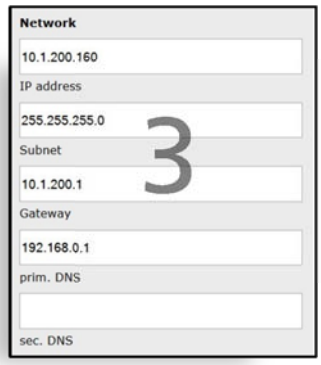
Note:
Factory-provided the password “0000“ is set.

Date / Time



The current time and current date of the KHS Mini System Control -MASTER 2.0- are displayed in the grey boxes. To set the system control time, click on the APPLY DATE/TIME button. That causes the system control to apply the date and time settings of, e.g. your PC. The KHS Mini System Control -MASTER 2.0- can independently switch between daylight savings and standard time. If you do not want this setting, click the ON button. If the button is set to OFF, the switchover between daylight savings and standard time is not automatic.

Network



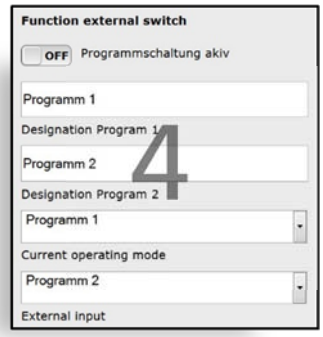
To establish a connection between the PC and the KHS Mini System Control -MASTER 2.0- with a WEB browser, in the boxes IP address, Subnet, Gateway, prim. DNS and sec. DNS enter the required network configurations.

Note:
You can obtain the corresponding parameters for linking in 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: 10.1.23.1

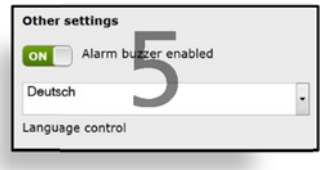
Function external switch



With the KHS Mini System Control -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 system controls can be added (see Chapter 8.2.4). 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" dropdown list to manually switch the flushing programs in the WEB browser and to block them for maintenance purposes. Use the "External input" dropdown list to set the operating mode of the external input.

Maintenance:
The two mentioned flushing programs can be switched with the WEB browser and can be blocked for maintenance purposes.

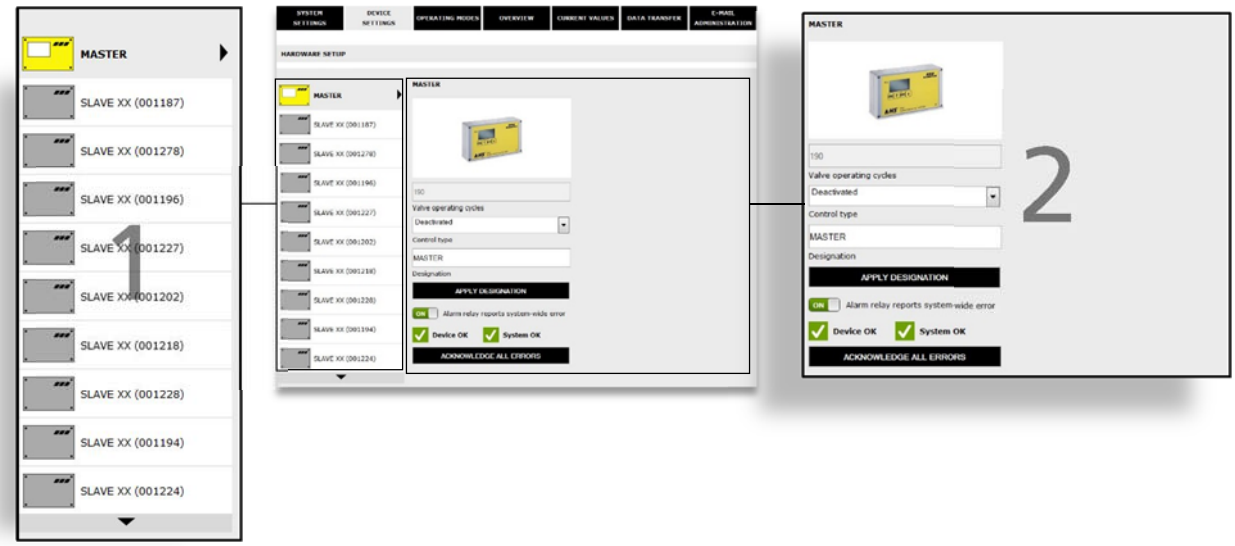
Other settings



The KHS Mini System Control -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. Furthermore, the language can be changed with the dropdown menu.

8.2.3 DEVICE SETTINGS

In the "DEVICE SETTINGS" menu interface, the individual KHS Mini System Controls with the integrated actuators and sensors are logically linked to each other.

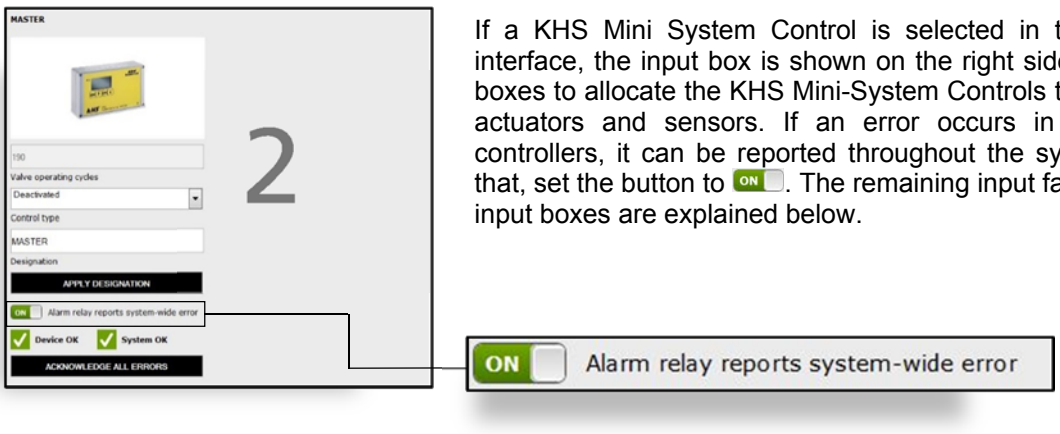


Selection interface

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

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

Input box



If a KHS Mini System Control is selected in the selection interface, the input box is shown on the right side. Use these boxes to allocate the KHS Mini-System Controls to the related actuators and sensors. If an error occurs in the system controllers, it can be reported throughout the system. To do that, set the button to ON. The remaining input facilities of the input boxes are explained below.

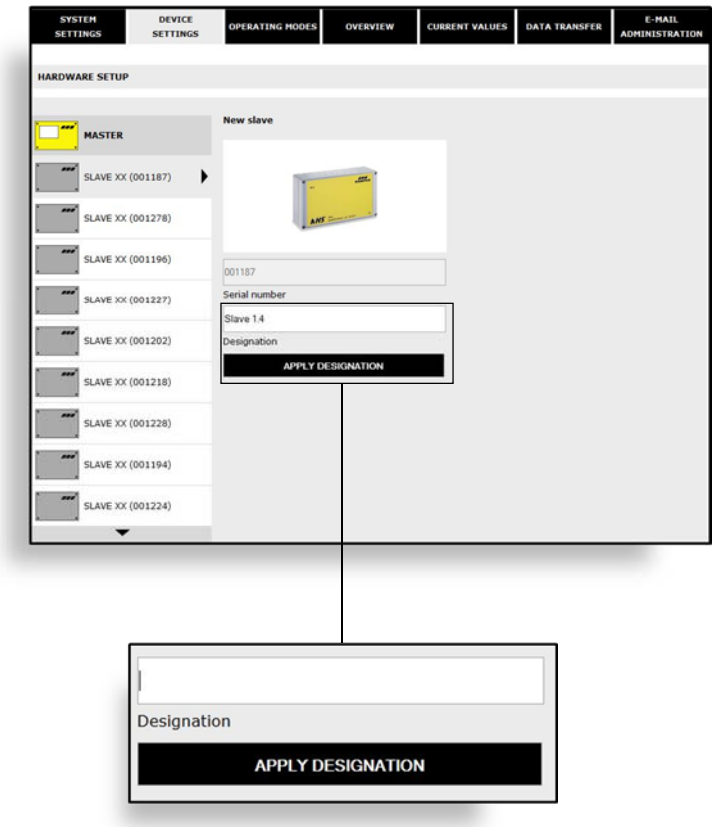
The following configuration steps are discussed based on the sample project from Illustration 8.1 (Page 17). For an overview of the system commissioning, Illustration 8.52 is presented.

Overview for the system commissioning on the KHS Mini System Control -MASTER 2.0- Figure 686 02 008
(make a hand-written entry based on the example during the installation)

Building name: / Date: / Person commisisioning:						KHS-VAV maximum flow isolating ball with servodrive and spring reset	KHS-VAV-maximum flow isolating ball valve with servodrive	KHS-CONTROL-PLUS flow measurement valve Figure 138 4G and Figure 638 4G						KHS PT1000	KHS drain with over-flow	Water sensor
						Figure 686 05 Figure 696 05	Figure 686 04 Figure 696 04	Measurment range 0,9 – 13 l/min.	Measurement range 1,8 – 32 l/min	Measurement range 3,5 –50 l/min	Measurement range 5,0 – 83 l/min	Measurement range 9,0 – 150 l/min	Measurement range 11 – 188 l/min	Measurement range 18 – 316 l/min	Figure 628 0G 629 0G	Figure 688 00	Figure 620 00
Control	No.	Serial no. (Rating plate on the control)	Location/ room	Control type (A-valve; B-valve; C-valve; measurement, safeguard)	Related B-valve -Serial no.-	or											
Master		2758	Cellar	B-valve	-	x		x								X	
Slave	1	1206	Cellar	C-valve	-	x										x	
Slave	2	1187	Cellar	A-valve	-		x										x
Slave	3	1184	GF	Measurement	-			x									
Slave	4	1185	GF	Measurement	-										X		
Slave	5	1278	GF	A-valve	2758		X								X		
Slave	6	1277	1. UF	A-valve	2758		X								X		

Example

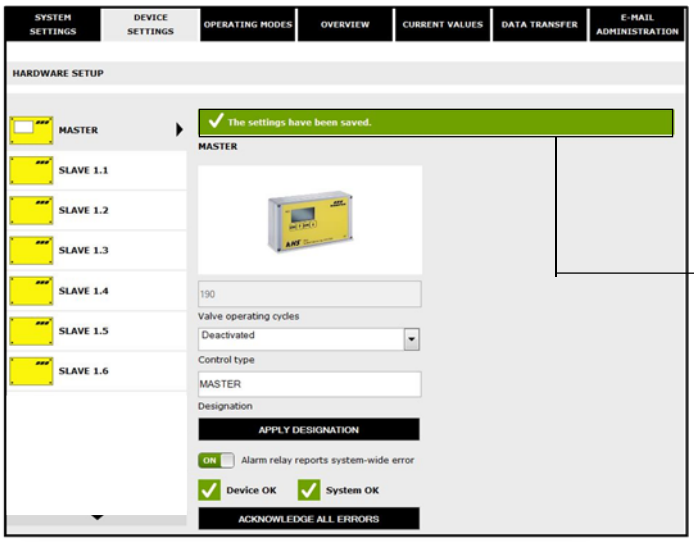
Ill. 8.52 Overview for the system commissioning of the sample project



To the KHS Mini System Control -MASTER 2.0-, the related KHS Mini-System Control –SLAVE- is added at this point. As long as no KHS Mini System Control is added, it is grey. Based on the serial number stated in the brackets, it can be compared with the "Overview for system commissioning".

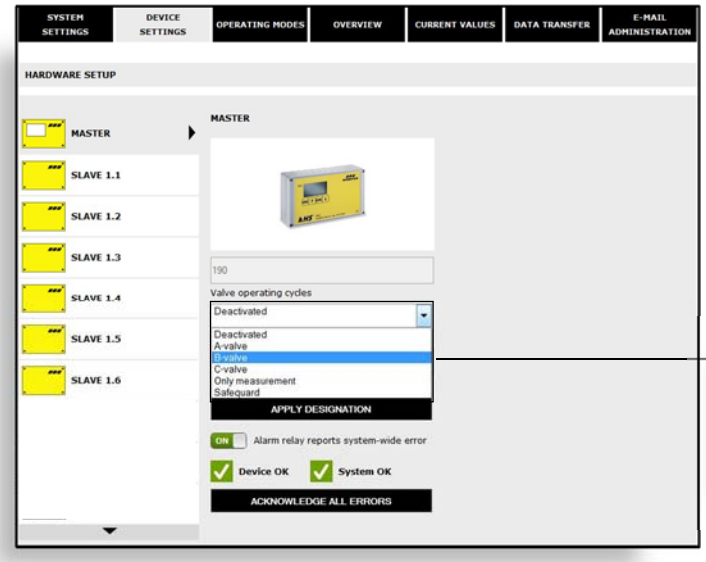
To add a KHS Mini System Control, store a meaningful name in the input box. Use the APPLY NAME button to transmit the selected system name. After successfully storing the name, the selected KHS Mini System Control is shown in yellow.

Based on this scheme, add all KHS Mini System Control -SLAVEs- to the -MASTER 2.0-.

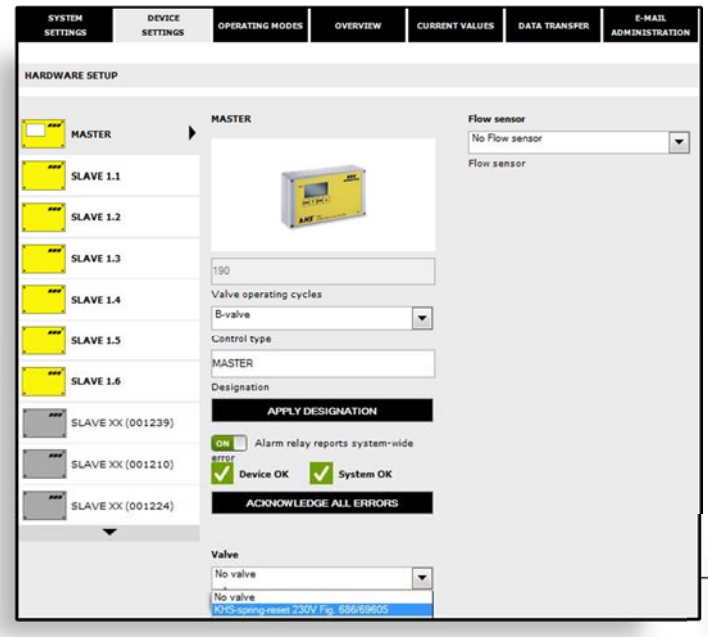


If the name is applied, the change is automatically saved. After adding all KHS Mini Controls they can be configured.

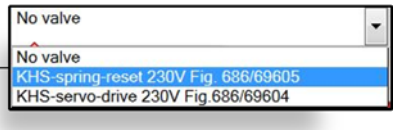
Configuration MASTER (B-valve)

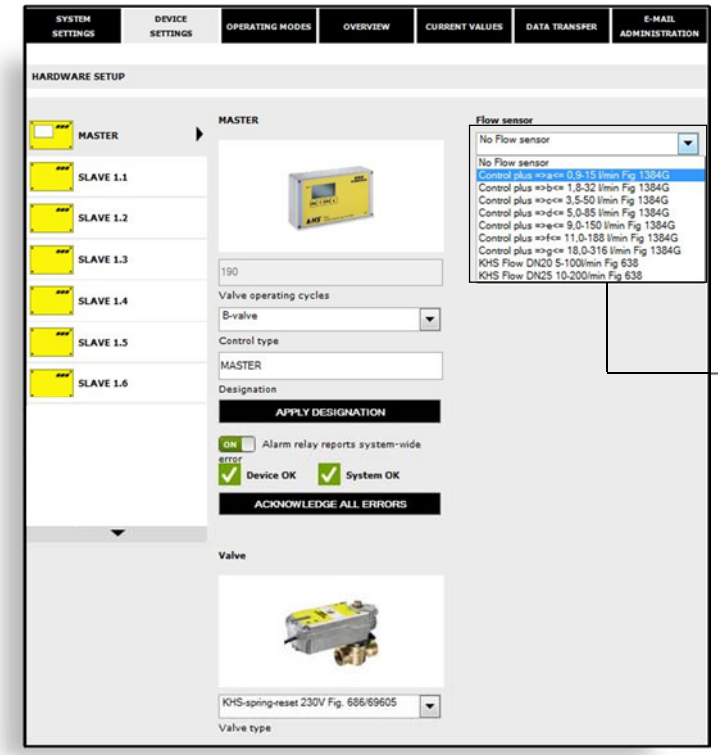


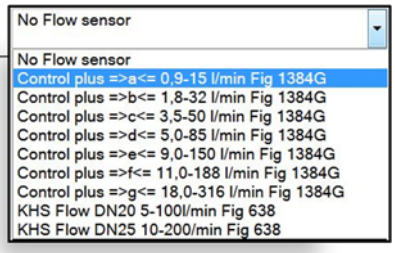
Select control type
Choose the available control types that can be applied to the selected KHS Mini System Control from a dropdown list. The KHS Mini System Control -MASTER 2.0- is intended to control a B-valve in the stated sample project.



Select valve
The possible valves are selected with a dropdown list. In the sample project being used, the KHS Mini System Control -MASTER 2.0- should trigger a VAV-maximum flow isolating ball valve with spring reset servo-drive.

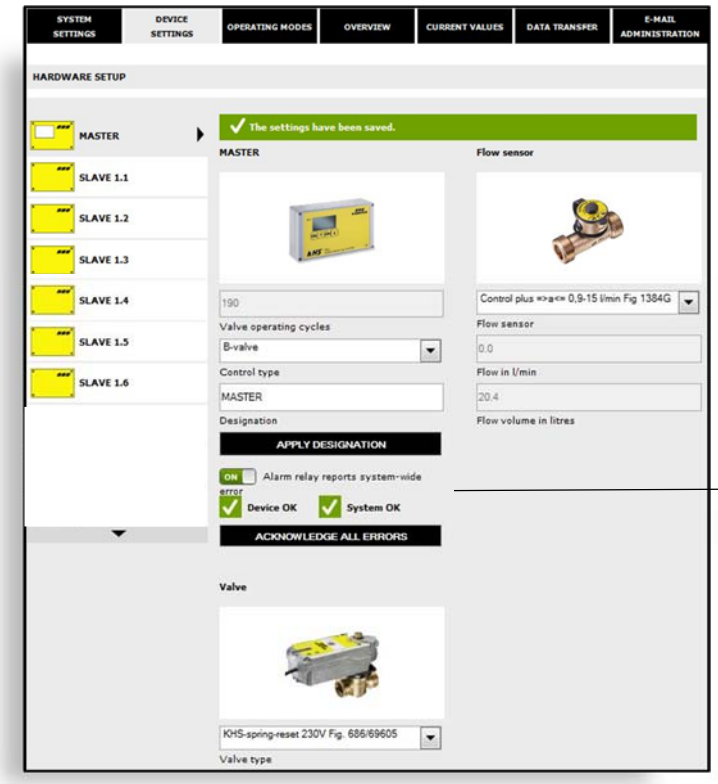


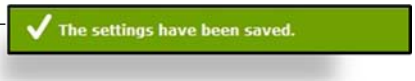




Select sensor

The possible sensors are selected with a dropdown list. In the sample project being used, the KHS Mini System Control -MASTER 2.0- should trigger a KHS-CONTROL-PLUS.

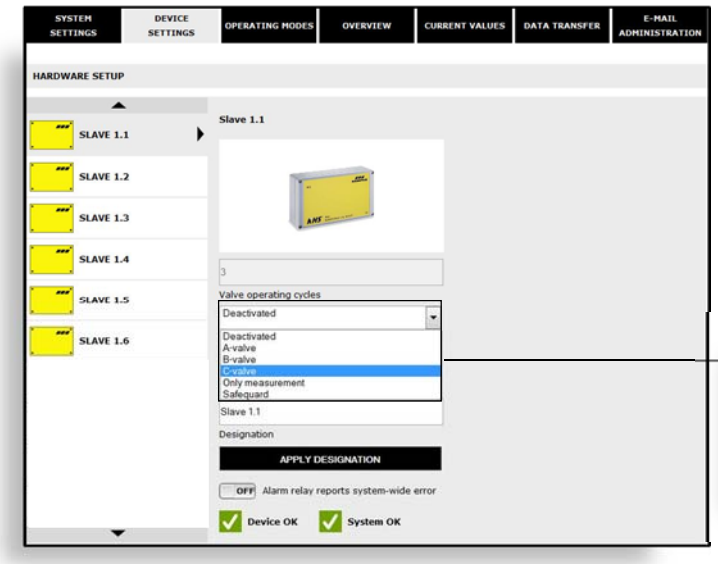


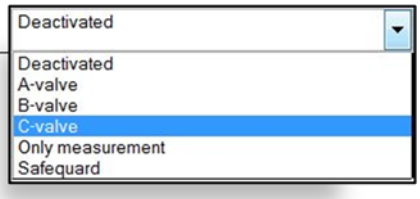


Save settings

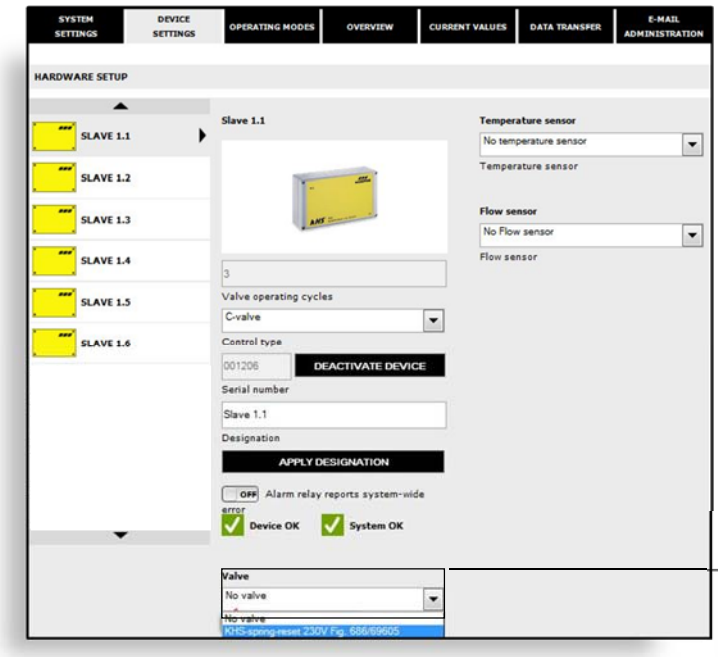
To effect the new parameters of the input box, click the WRITE IN CONTROL button to save the settings.

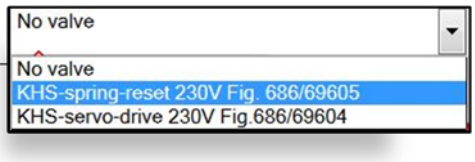
Configuration of SLAVE 1.1 (C-valve)



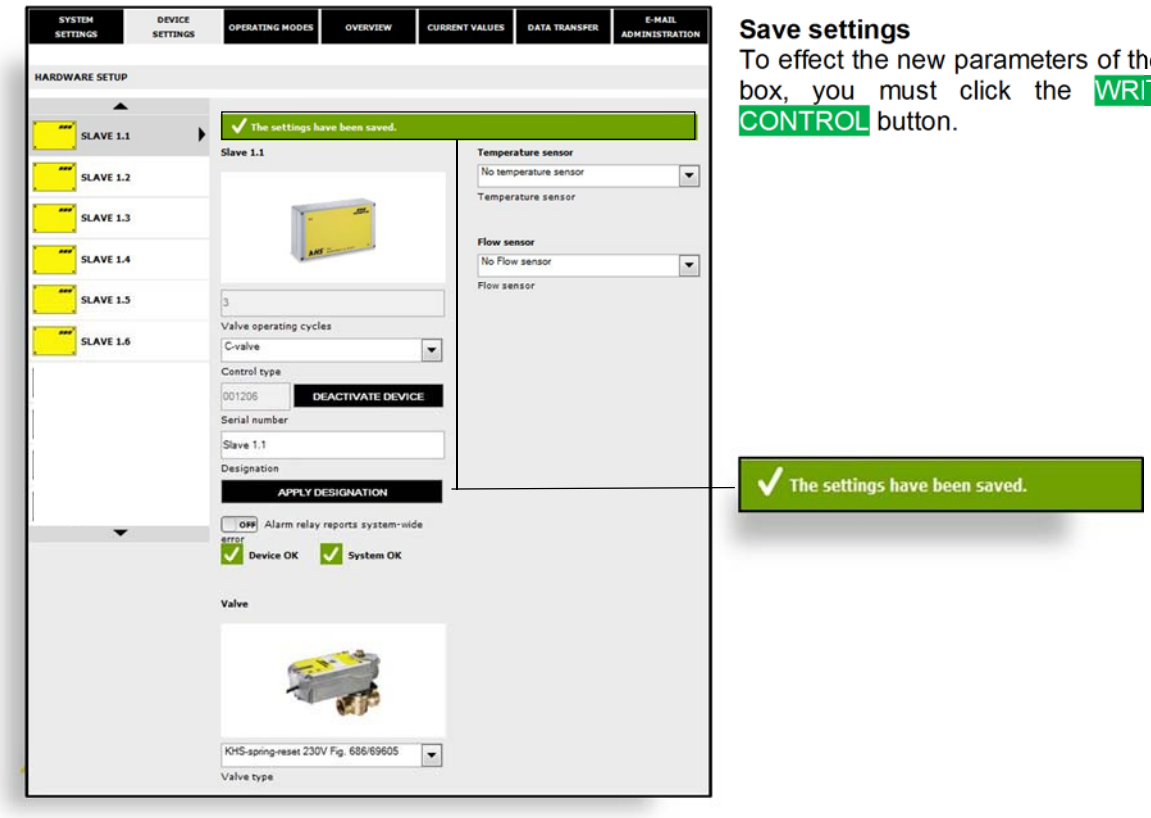


Select control type
Choose the available control types that can be applied to the selected KHS Mini System Control from a dropdown list. The KHS Mini System Control -SLAVE- 1.1 in this sample project should control a C-valve.





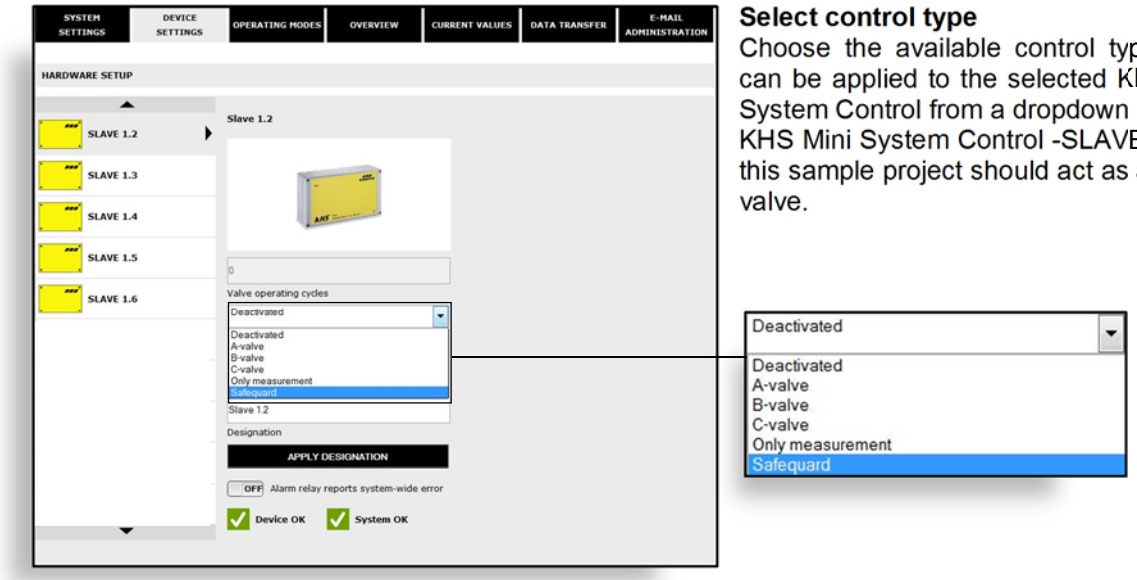
Select valve
The possible valves are selected with a dropdown list. In the sample project being used, the KHS Mini System Control -SLAVE 1.1- should trigger a VAV-maximum flow isolating ball valve with spring reset servo-drive.



Save settings

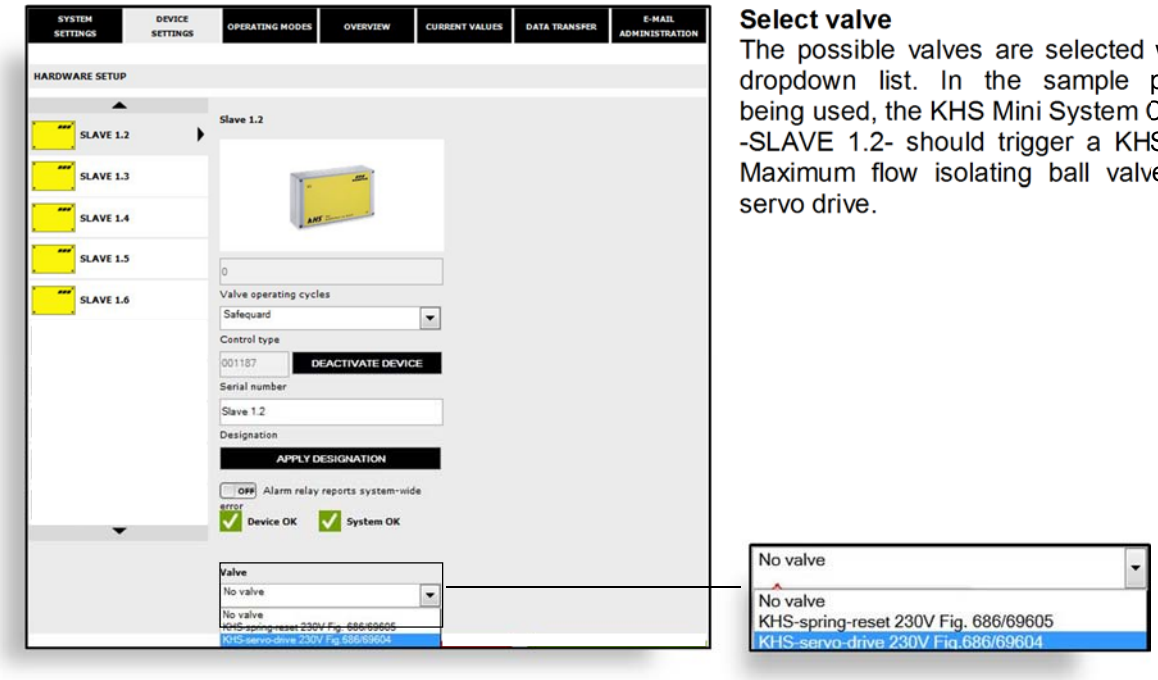
To effect the new parameters of the input box, you must click the WRITE IN CONTROL button.

Configuration of SLAVE 1.2 (safeguard)



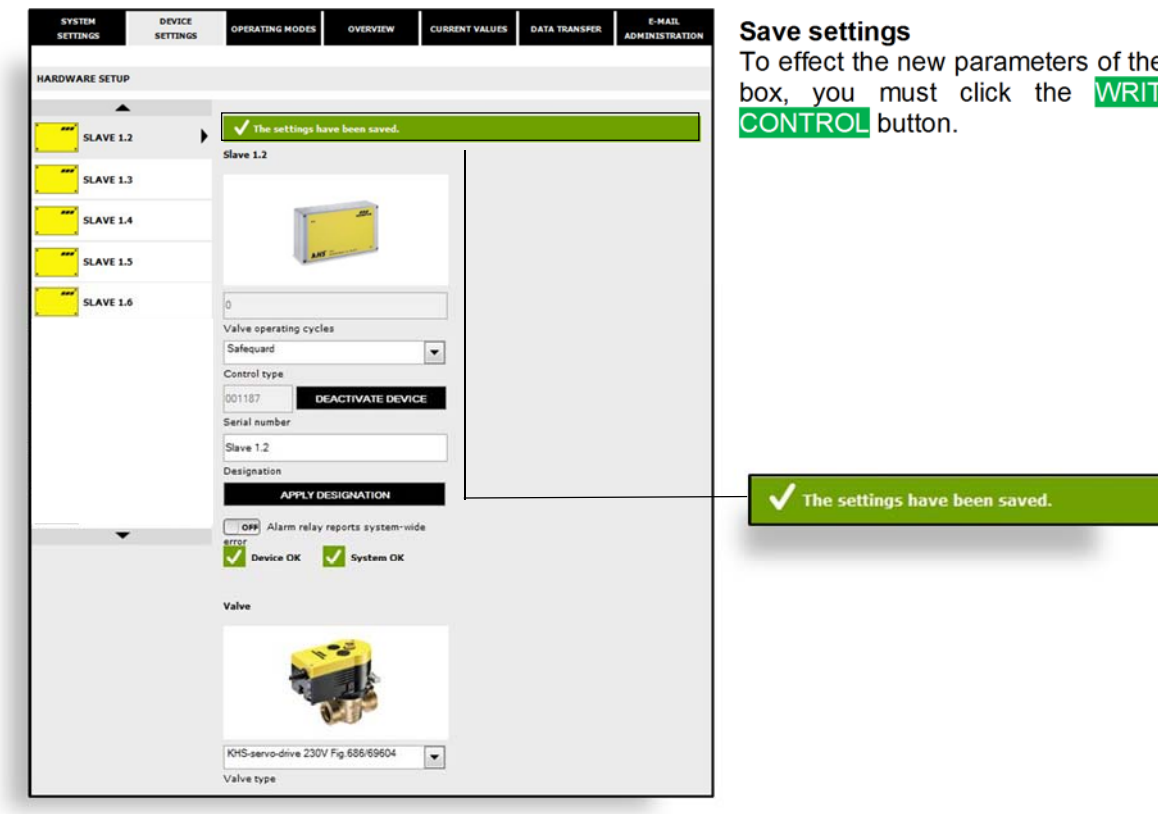
Select control type

Choose the available control types that can be applied to the selected KHS Mini System Control from a dropdown list. The KHS Mini System Control -SLAVE- 1.2 in this sample project should act as a safety valve.



Select valve

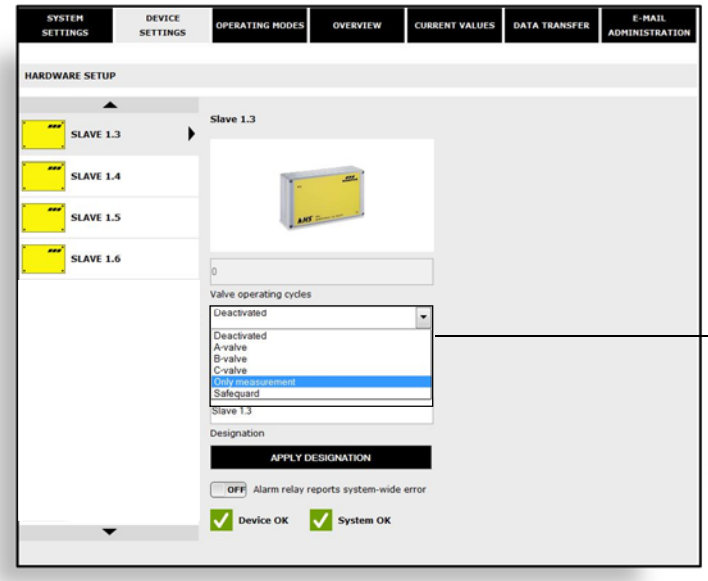
The possible valves are selected with a dropdown list. In the sample project being used, the KHS Mini System Control -SLAVE 1.2- should trigger a KHS-VAV Maximum flow isolating ball valve with servo drive.



Save settings

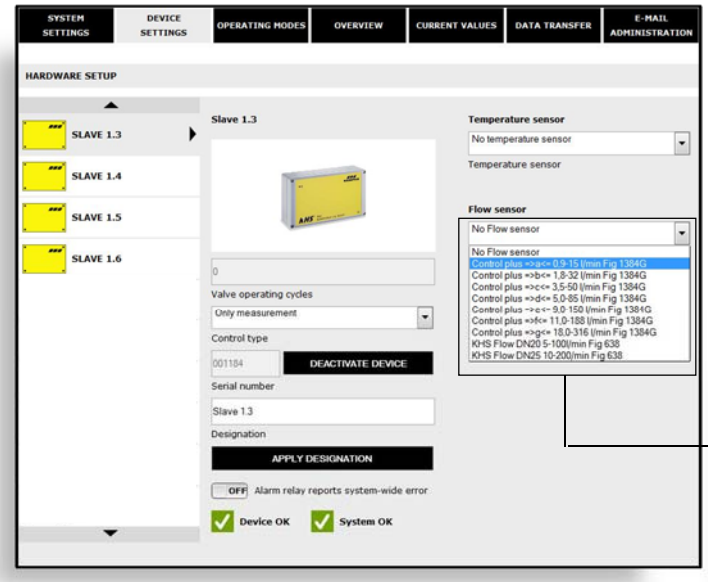
To effect the new parameters of the input box, you must click the WRITE IN CONTROL button.

Configuration of SLAVE 1.3 (measurement)



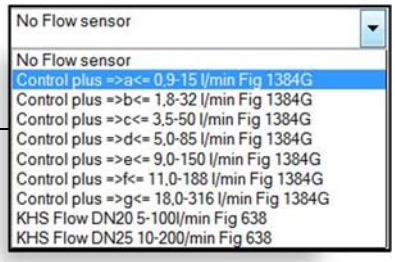
Select control type

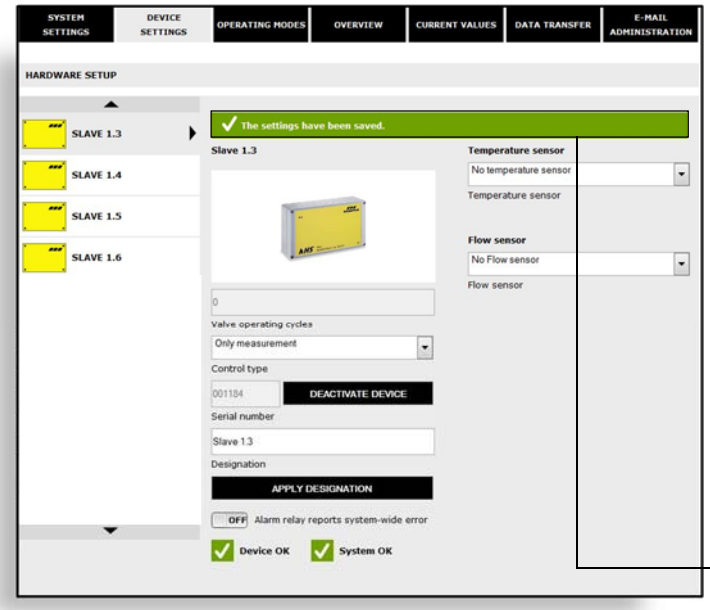
Choose the available control types that can be applied to the selected KHS Mini System Control from a dropdown list. The KHS Mini System Control -SLAVE- 1.3 in this sample project should act as a measurement SLAVE.



Select sensor

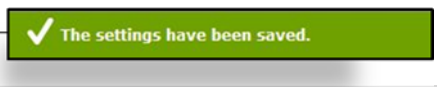
The possible sensors are selected with a dropdown list. In the sample project being used, the KHS Mini System Control -SLAVE 1.3- should trigger a KHS-CONTROL-PLUS.



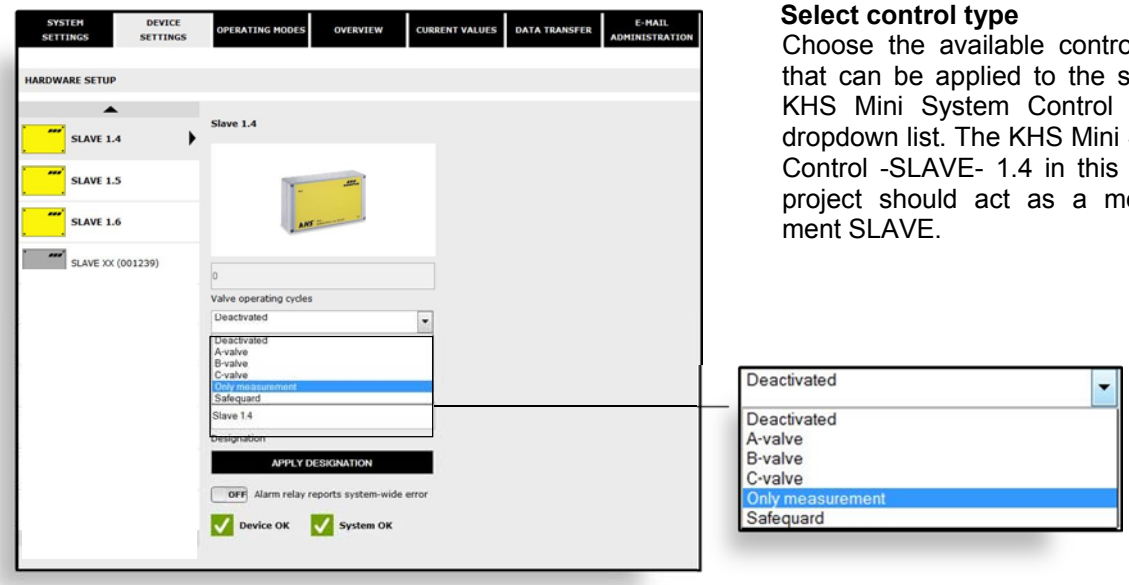


Save settings

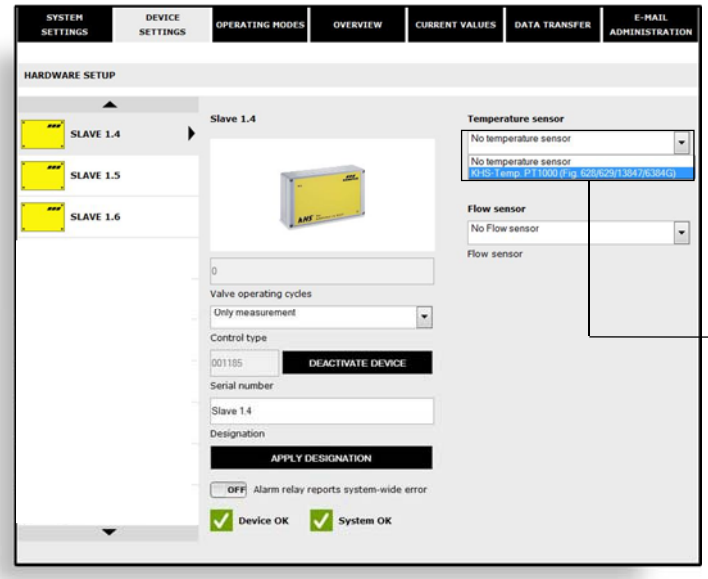
To effect the new parameters of the input box, click the WRITE IN CONTROL button to save the settings.



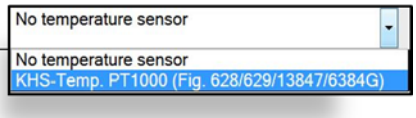
Configuration of SLAVE 1.4 (measurement)

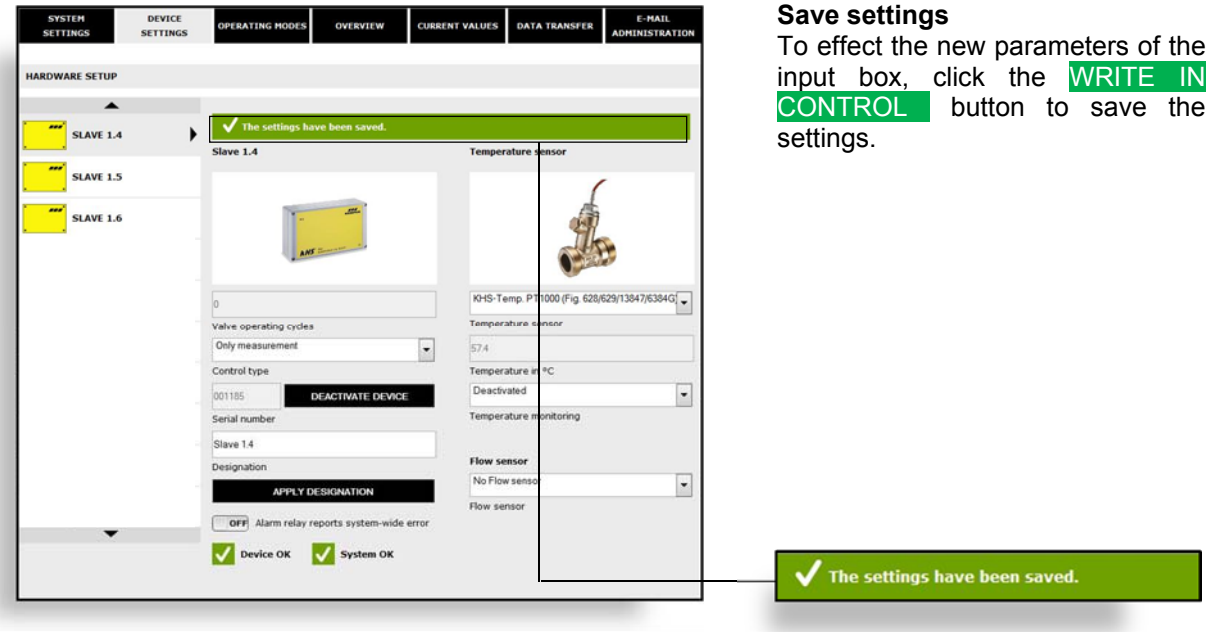


Select control type
Choose the available control types that can be applied to the selected KHS Mini System Control from a dropdown list. The KHS Mini System Control -SLAVE- 1.4 in this sample project should act as a measurement SLAVE.



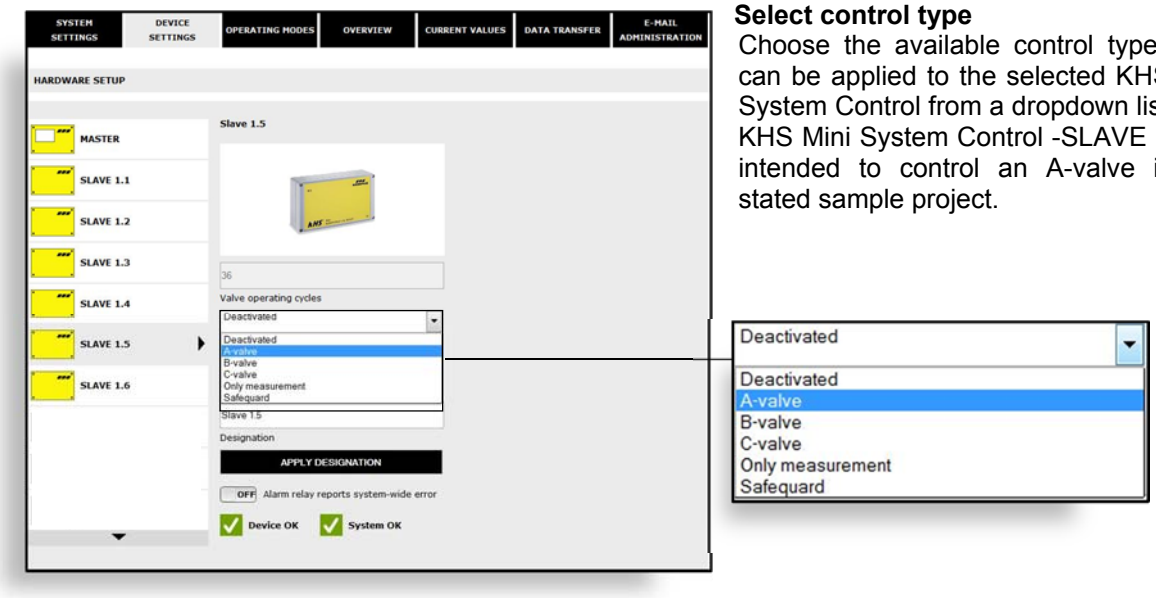
Select sensor
The possible sensors are selected from a dropdown list. In the sample project being used, the KHS Mini System Control -SLAVE 1.4- should trigger a KHS Pt 1000 temperature sensor.





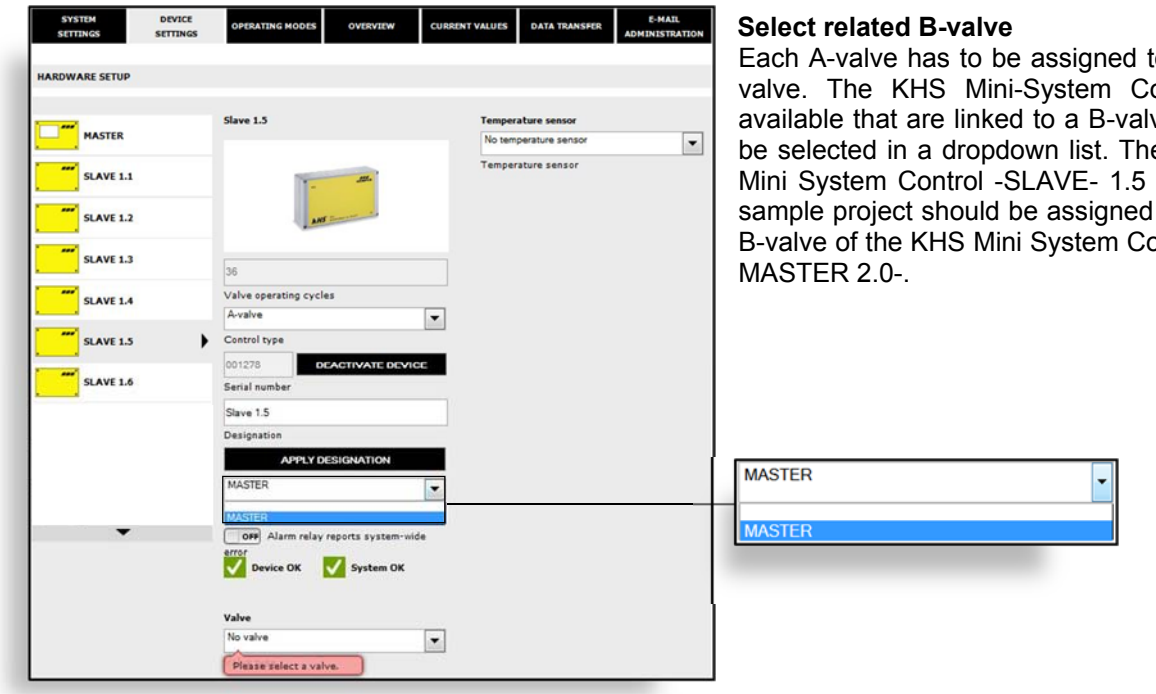
Save settings
To effect the new parameters of the input box, click the WRITE IN CONTROL button to save the settings.

Configuration of SLAVE 1.5 (A-valve)



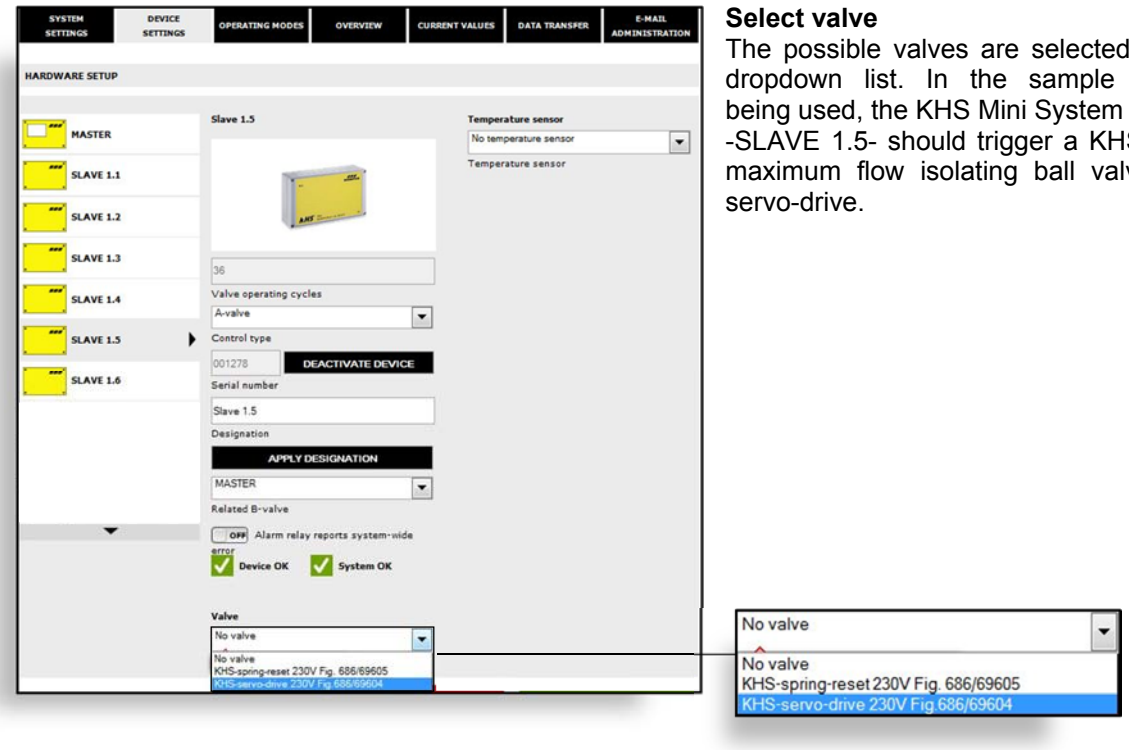
Select control type

Choose the available control types that can be applied to the selected KHS Mini System Control from a dropdown list. The KHS Mini System Control -SLAVE 1.5- is intended to control an A-valve in the stated sample project.



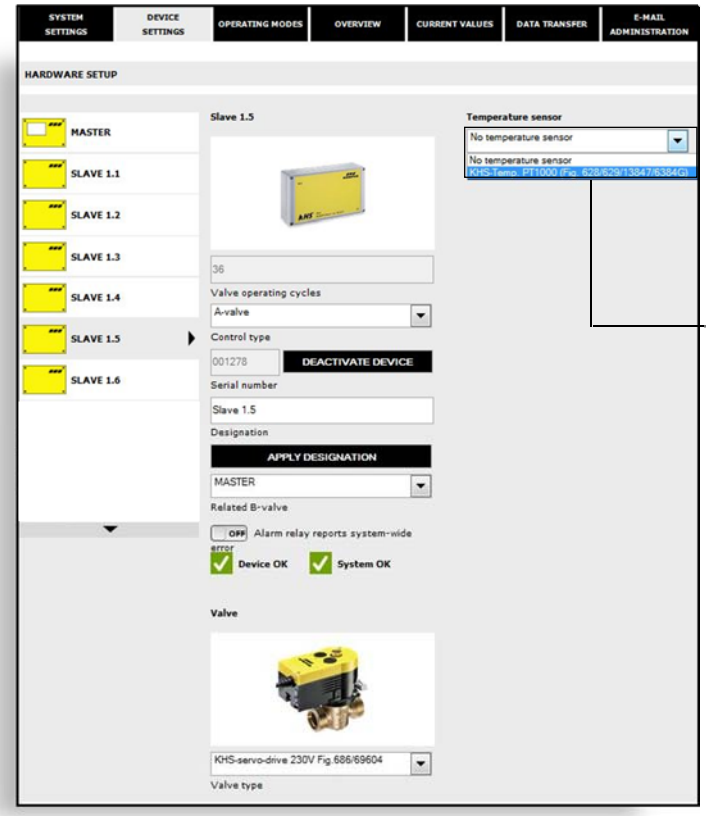
Select related B-valve

Each A-valve has to be assigned to a B-valve. The KHS Mini-System Controls available that are linked to a B-valve can be selected in a dropdown list. The KHS Mini System Control -SLAVE- 1.5 in this sample project should be assigned to the B-valve of the KHS Mini System Control -MASTER 2.0-.



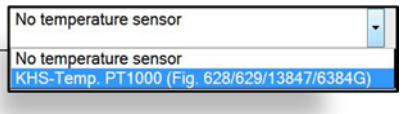
Select valve

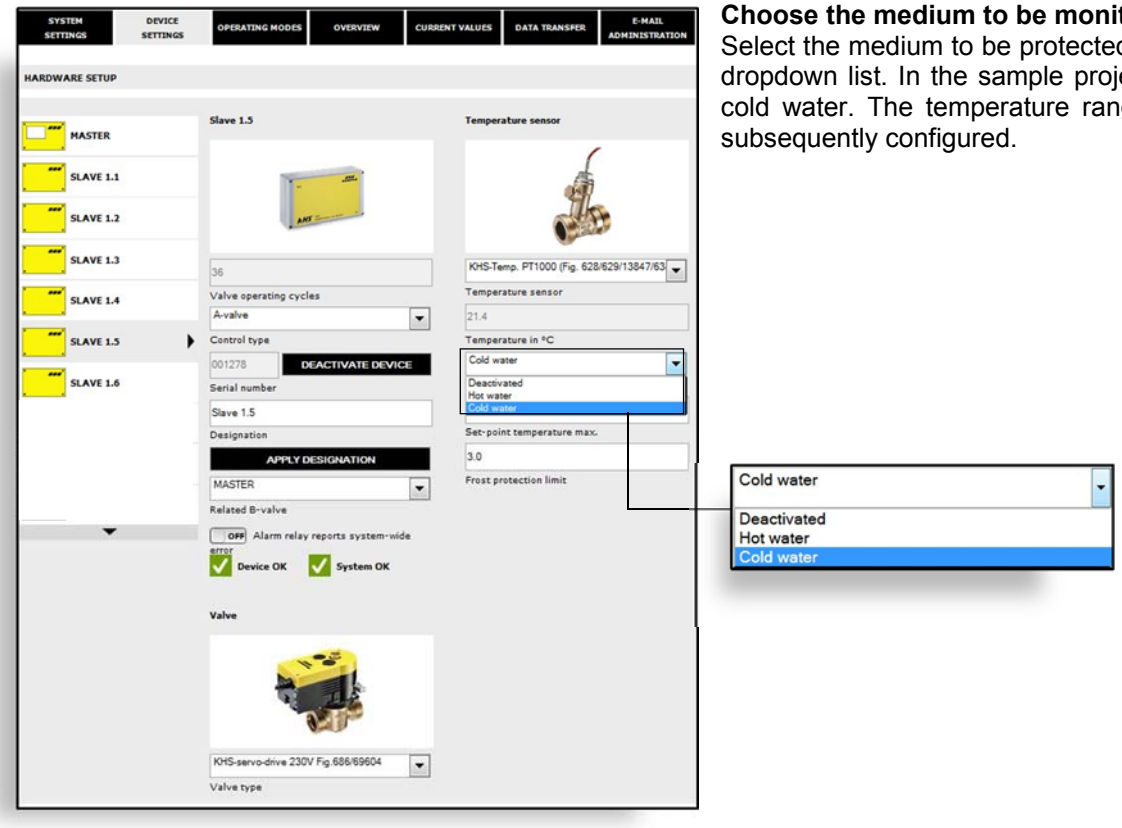
The possible valves are selected with a dropdown list. In the sample project being used, the KHS Mini System Control -SLAVE 1.5- should trigger a KHS VAV-maximum flow isolating ball valve with servo-drive.



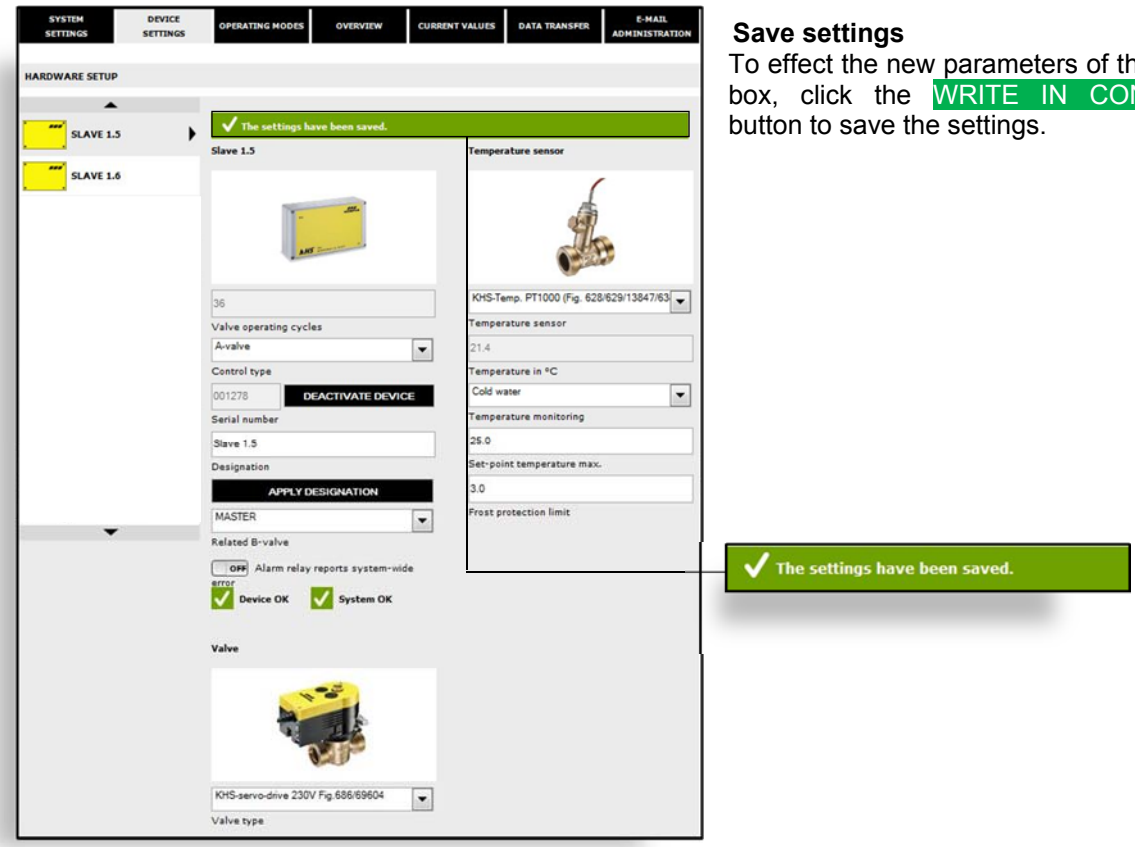
Select sensor

The possible sensors are selected from a dropdown list. The KHS Mini System Control -SLAVE- 1.5 in this sample project should trigger a Pt 1000 temperature sensor.



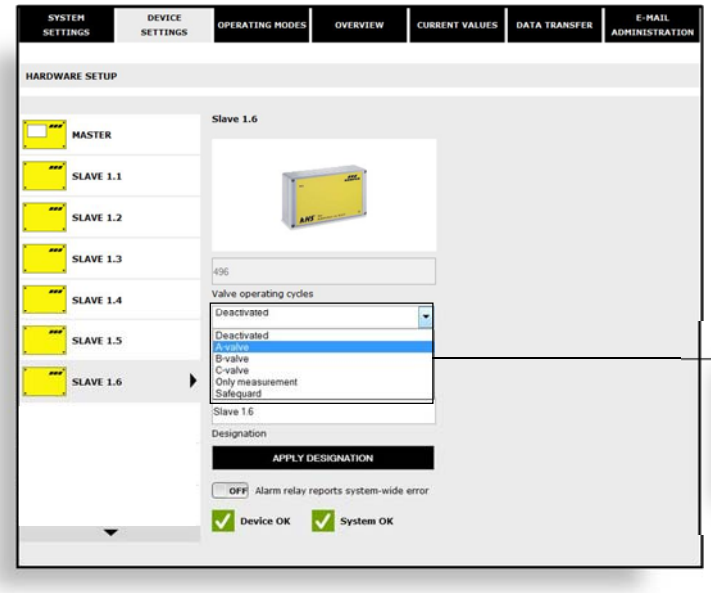


Choose the medium to be monitored
Select the medium to be protected from a dropdown list. In the sample project, it is cold water. The temperature ranges are subsequently configured.



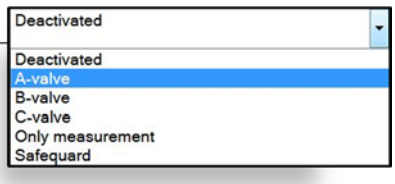
Save settings
To effect the new parameters of the input box, click the WRITE IN CONTROL button to save the settings.

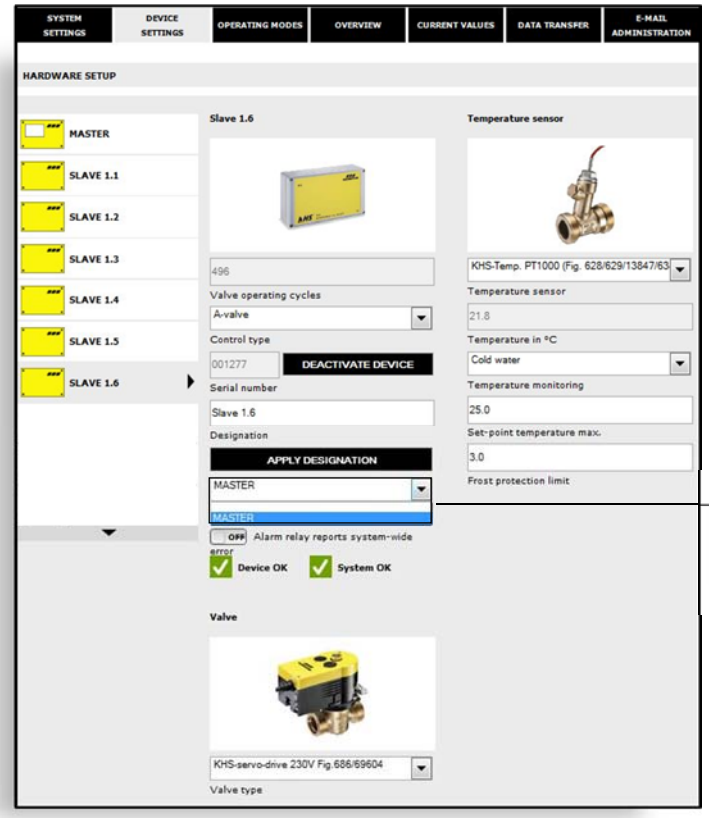
Configuration of SLAVE 1.6 (A-valve)



Select control type

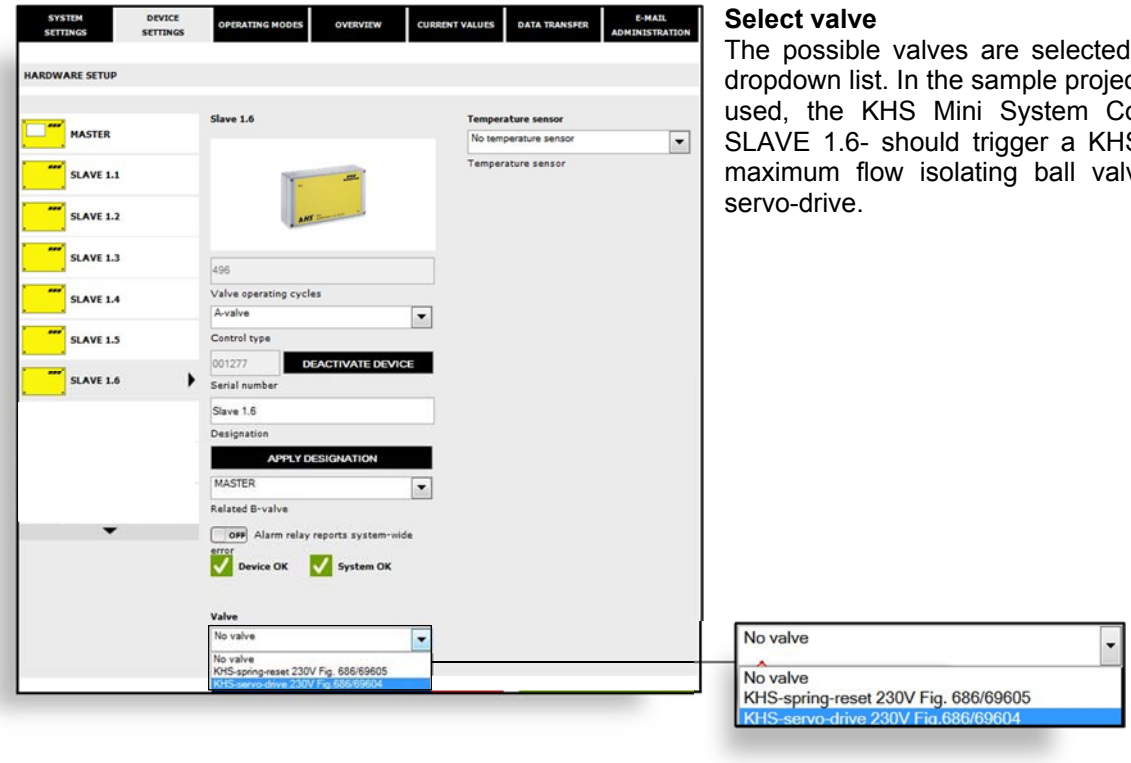
Choose the available control types that can be applied to the selected KHS Mini System Control from a dropdown list. The KHS Mini System Control -SLAVE 1.6- is intended to control an A-valve in the stated sample project.





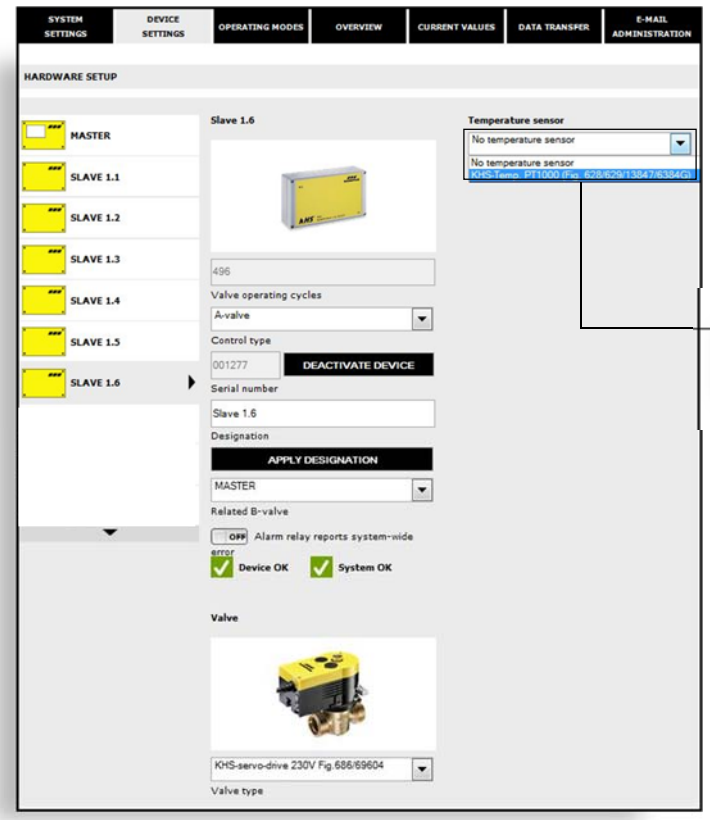
Select related B-valve

Each A-valve has to be assigned to a B-valve. The KHS Mini-System Controls available that are linked to a B-valve can be selected in a dropdown list. The KHS Mini System Control -SLAVE- 1.6 in this sample project should be assigned to the B-valve of the KHS Mini System Control -MASTER 2.0-.



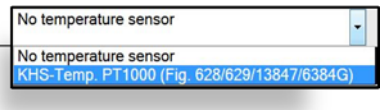
Select valve

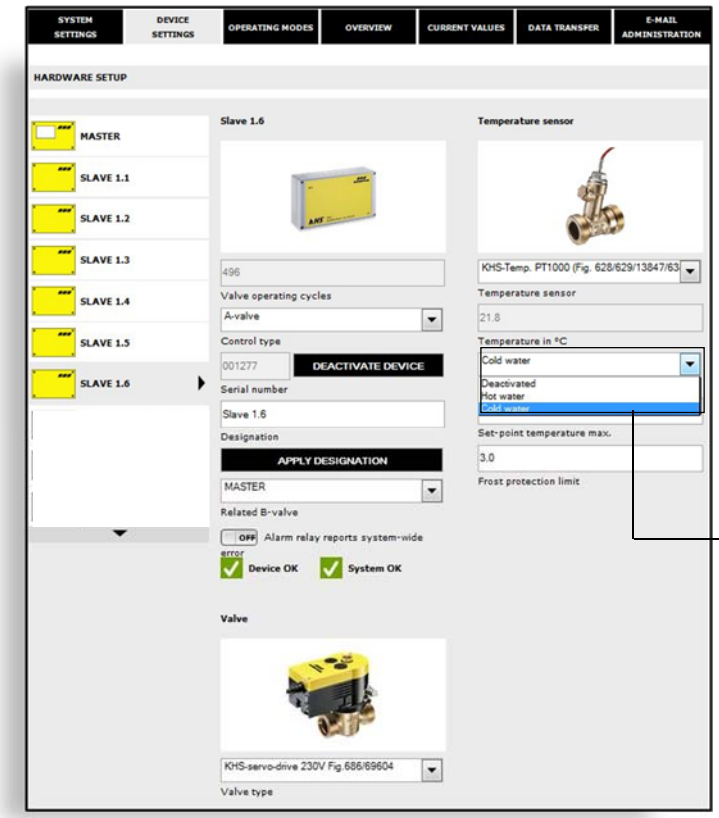
The possible valves are selected with a dropdown list. In the sample project being used, the KHS Mini System Control -SLAVE 1.6- should trigger a KHS VAV-maximum flow isolating ball valve with servo-drive.



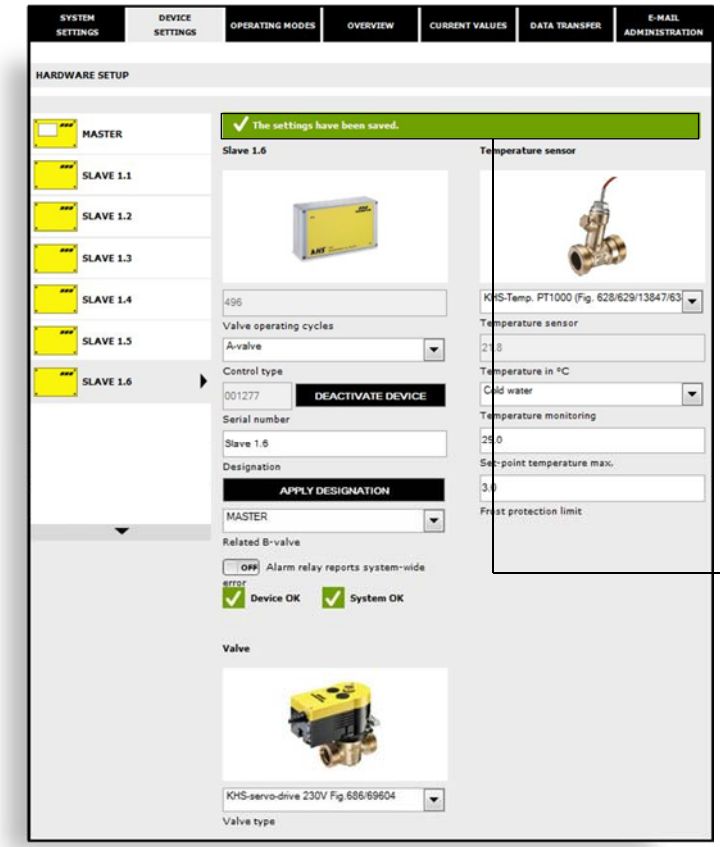
Select sensor

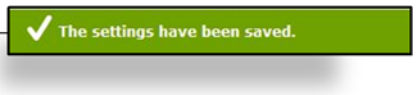
The possible sensors are selected from a dropdown list. The KHS Mini System Control -SLAVE- 1.6 in this sample project should trigger a KHS Pt 1000 temperature sensor.





Choose the medium to be monitored
Select the medium to be protected from a dropdown list. In the sample project, it is cold water. The temperature ranges are subsequently configured.





Save settings
To effect the new parameters of the input box, click the WRITE IN CONTROL button to save the settings.

8.2.4 OPERATING MODES

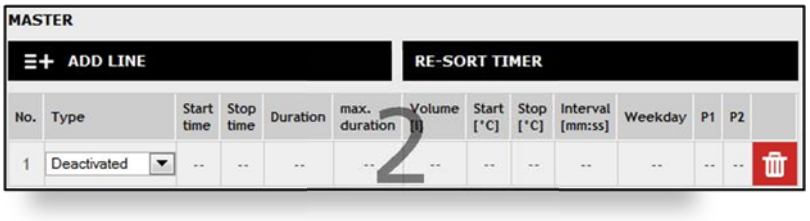
In the "OPERATING MODES" menu interface, the control-specific TIMERS are configured for the KHS Mini System Controls. One TIMER**,** depending on the control type, devices the flushing times, measurement intervals, protection times, routine intervals, temperature flushings, etc.

Selection interface

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

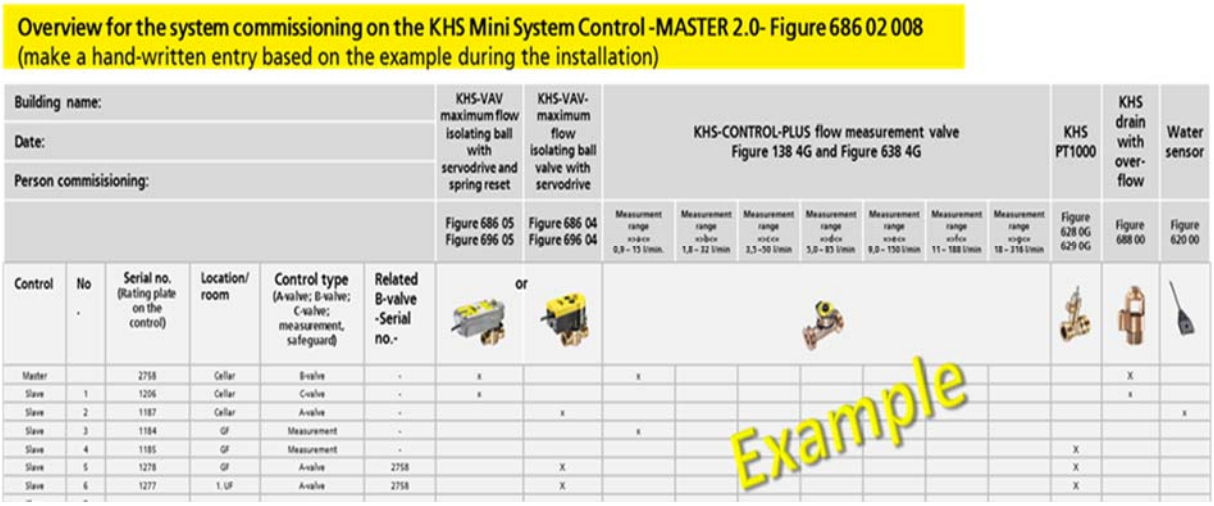
Note:
The changes must be written into the control after every change in the input box. If another KHS Mini System Control is selected immediately after a change in the selection interface, the changes are discarded.

Input box



If a KHS Mini System Control is selected in the selection interface, the related input box opens on the right side. Click on the ADD LINE button to add up to 16 lines to the TIMER. Press the button to delete the respective lines from the TIMER. Click on the RESORT TIMER to delete all deactivated lines and to push empty lines to the back. The remaining input facilities in the lines are explained below.

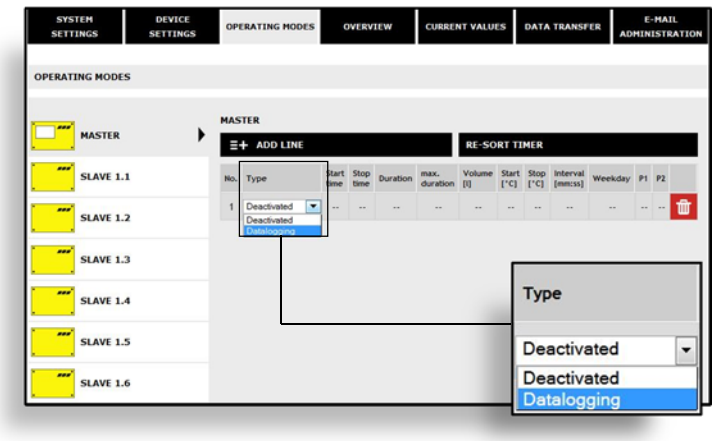
The following configuration steps are discussed based on the sample project from Illustration 8.1 (Page 17).



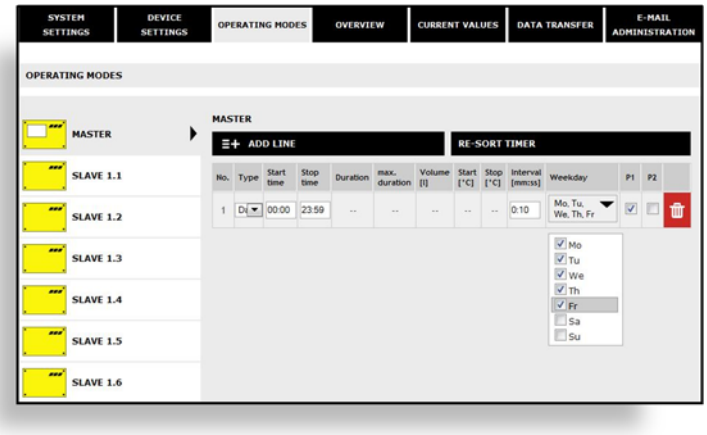
Ill. 8.53 Overview for the system commissioning of the sample project

> Attention:
> The selected lines 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 use as intended is maintained for the system.

Configuration MASTER (datalogging)

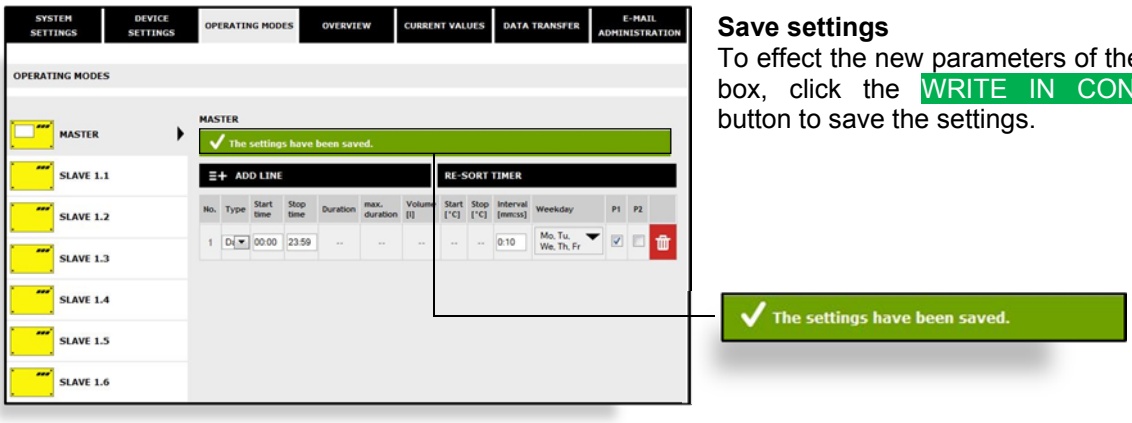


Select type
After adding a line with ADD LINE select the line type. The KHS Mini System Control -MASTER 2.0- in the presented sample project is connected to a KHS-CONTROL-PLUS flow measurement valve. To record the flow measurement valve measurement data at the same time, the "Datalogging" line type has to be selected from a dropdown list.



Define times

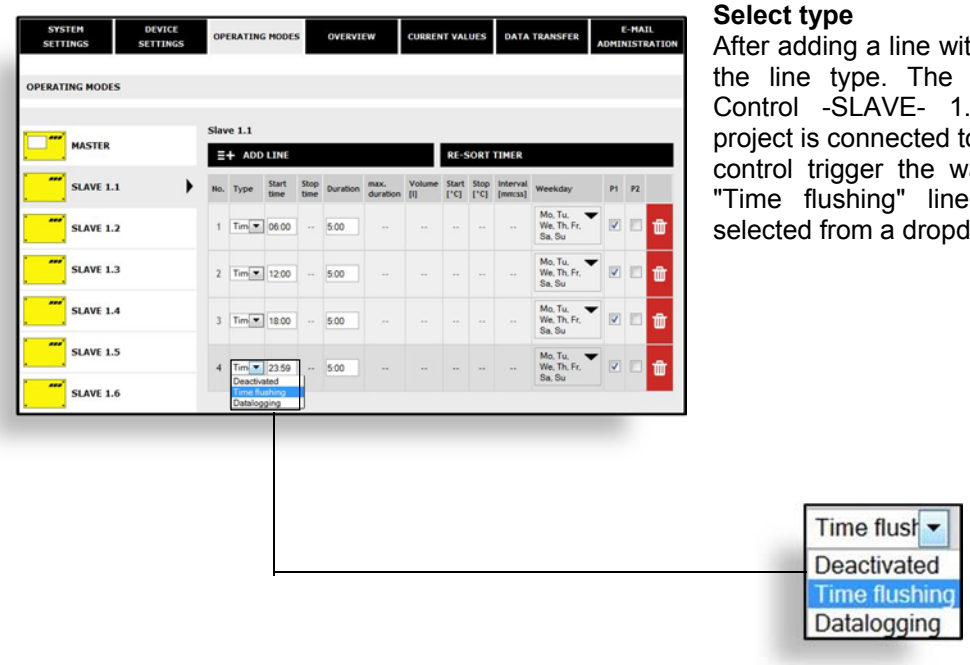
After a line type has been selected, define the times. A starting and stopping time has to be stated for the "Datalogging" line type. Furthermore, the desired weekday can be selected through a dropdown list. Click in the box of the respective weekday to activate it with a checkmark. The interval time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



Save settings

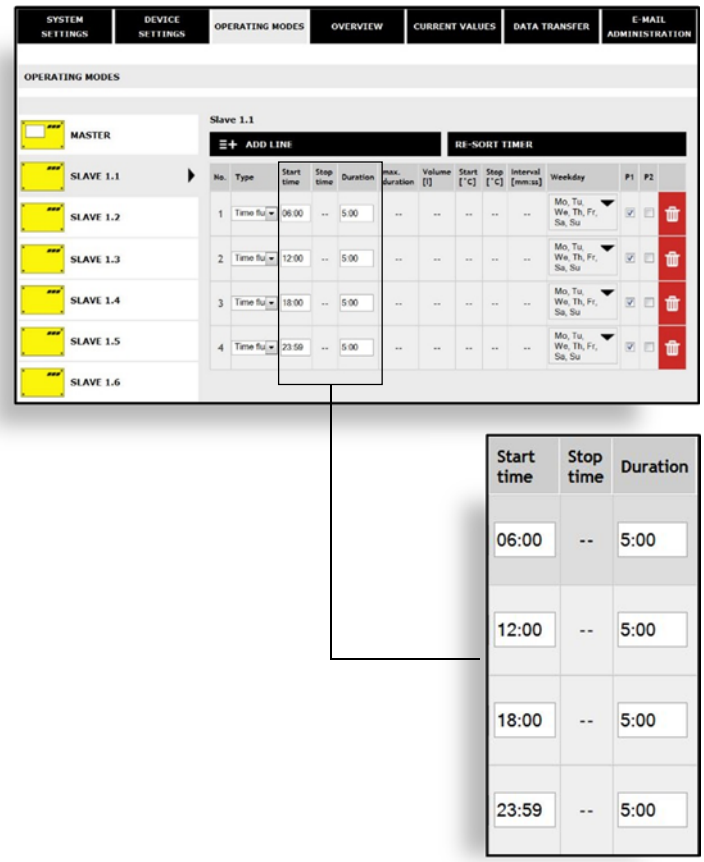
To effect the new parameters of the input box, click the WRITE IN CONTROL button to save the settings.

Configuration of SLAVE 1.1 (time control)



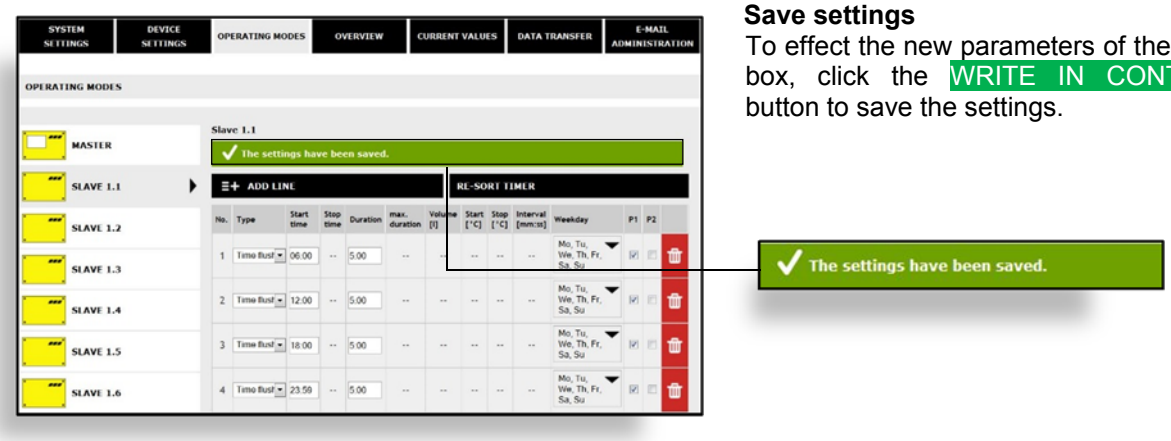
Select type

After adding a line with ADD LINE select the line type. The KHS Mini System Control -SLAVE- 1.1 in this sample project is connected to a C-valve. To time control trigger the water exchange, the "Time flushing" line type has to be selected from a dropdown list.



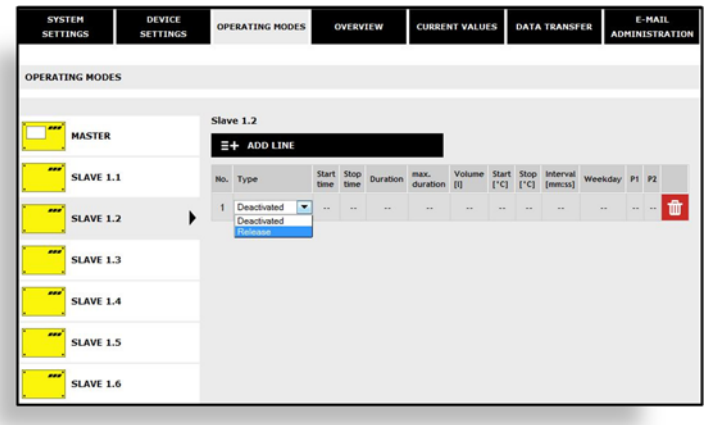
Define times
After a line type has been selected, define the times. In the "Time control" line type, a starting time and the duration of the water exchange need to be stated. Furthermore, the desired weekday can be selected through a dropdown list. Click in the box of the respective weekday to activate it with a checkmark.

For the sample project, a water exchange interval of 6 hours was selected.

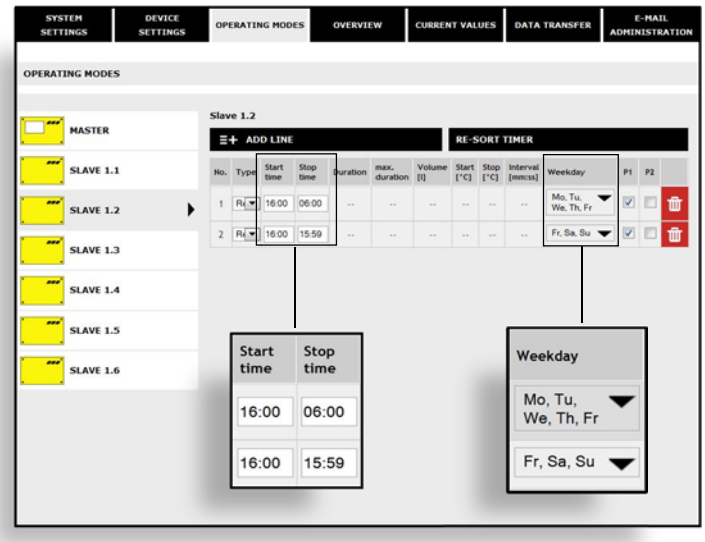


Save settings
To effect the new parameters of the input box, click the WRITE IN CONTROL button to save the settings.

Configuration of SLAVE 1.2 (safeguard)



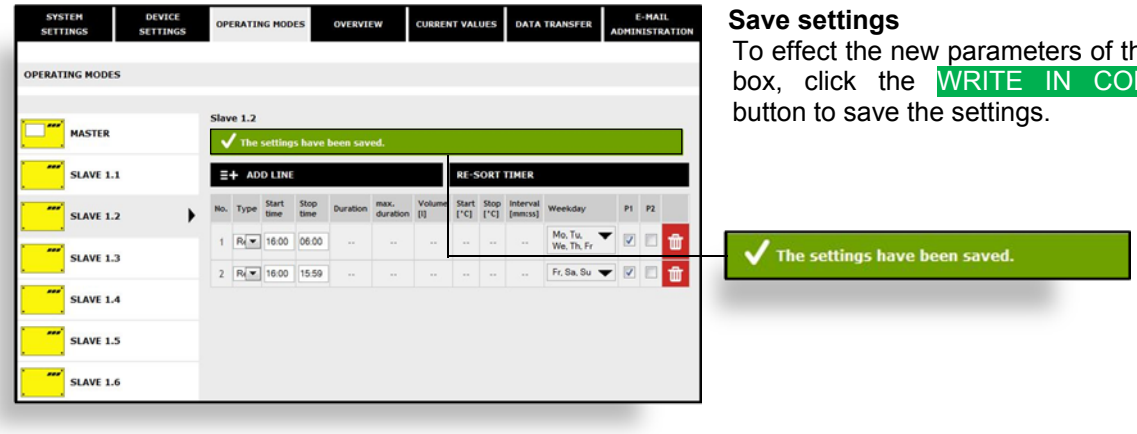
Select type
After adding a line with ADD LINE select the line type. The KHS Mini System Control -SLAVE- 1.2 in this sample project is planned as a safeguard SLAVE. The safeguard is always activated using a water sensor. Use the "Release" line type to trigger the linked valve to block the water outside the usage hours. That in turn achieves more protection against water damages.



Define times

After a line type has been selected, define the times. A starting and stopping time has to be stated for the "Safeguard" line type. Furthermore, the desired weekday can be selected through a dropdown list. Click in the box of the respective weekday to activate it with a checkmark.

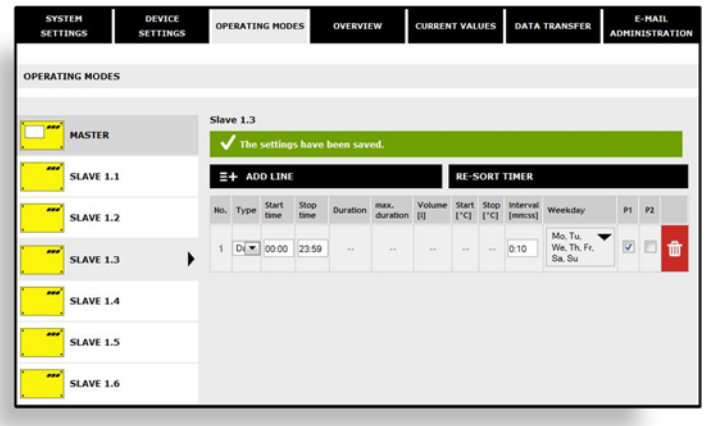
For the sample project, the safeguard - SLAVE should block on the weekends and workdays from 4 pm.



Save settings

To effect the new parameters of the input box, click the WRITE IN CONTROL button to save the settings.

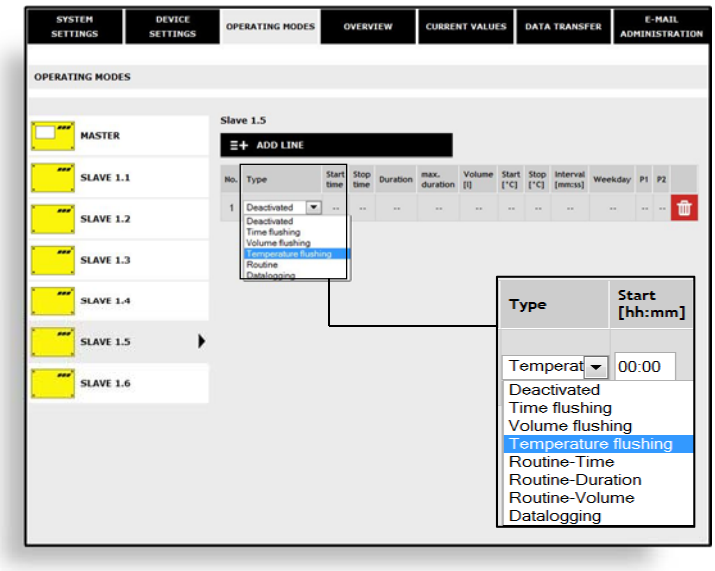
Configuration of a SLAVE 1.3 and 1.4 (datalogging)



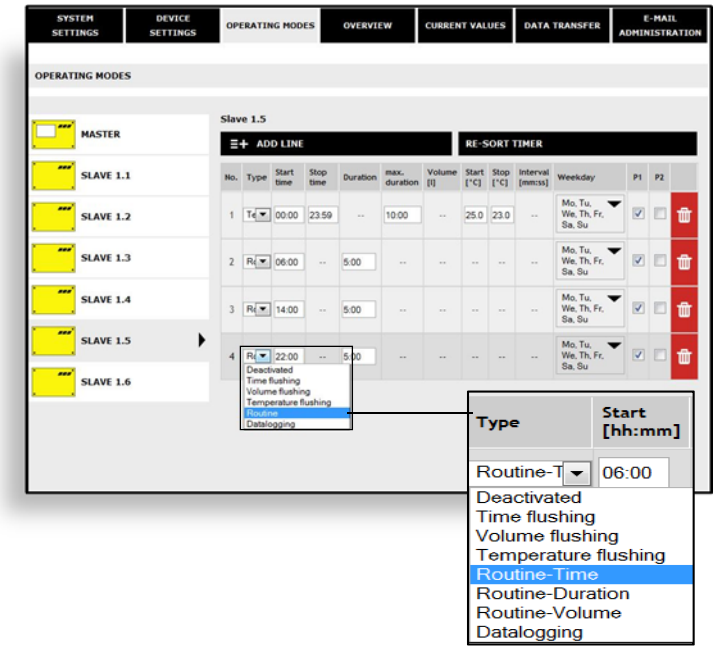
Select type

After adding a line with ADD LINE select the line type. The KHS Mini System Control -SLAVE- 1.3 and 1.4 in this sample project is planned as a measurement SLAVE. Please refer to the -**MASTER- configuration** for the settings for the "Datalogging" line type.

Configuration of a SLAVE 1.5 and 1.6 (temperature flushing)



Select type (temperature flushing)
After adding a line with ADD LINE select the line type. The KHS Mini System Control -SLAVE- 1.5 and 1.6 in the sample project are linked to a temperature measurement valve. To time control trigger the water exchange, the "Time flushing" line type has to be selected from a dropdown list.



The sample project is a cold-water line in which the cold-water temperature in the winter, for instance, could always lie below the set starting temperature. To prevent an impermissible stagnation, after the configuration of the temperature flushing, a routine flushing of the KHS Mini Control System is automatically always stored. The routine flushing "Routine time" is preset for this; however a selection can also be made between "Routine duration" and "Routine volume" as an alternative. Please note that only one routine flushing can be stored with one KHS Mini System Control.

Routine time

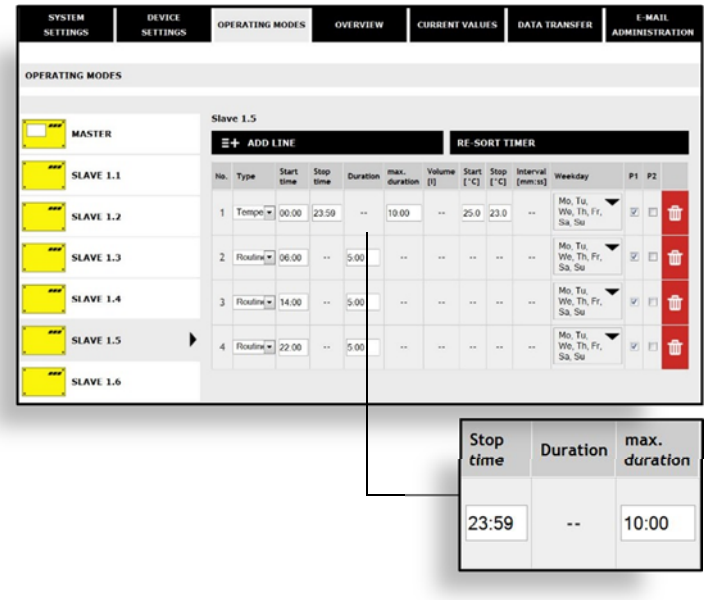
If there is no temperature flushing within 7 days, the water exchange is guaranteed through the "Routine time" operating mode. For the "Routine time" operating mode, the starting time, the duration and the weekdays of the water exchange can be stored for that.

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

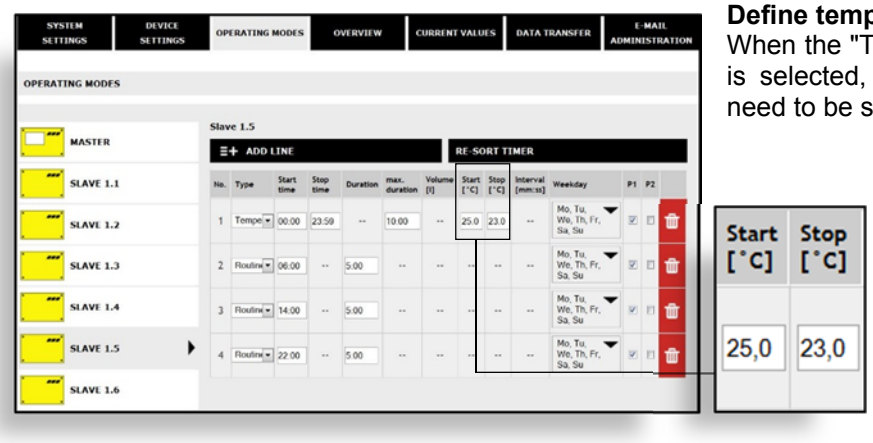
Routine volume

If there is no temperature flushing within the configured interval, the water exchange is guaranteed through the "Routine volume" operating mode. To accomplish that, the decisive interval (max. 168 h), the volume and the maximum flushing time of the water exchange can be stored in the "Routine volume" operating mode.



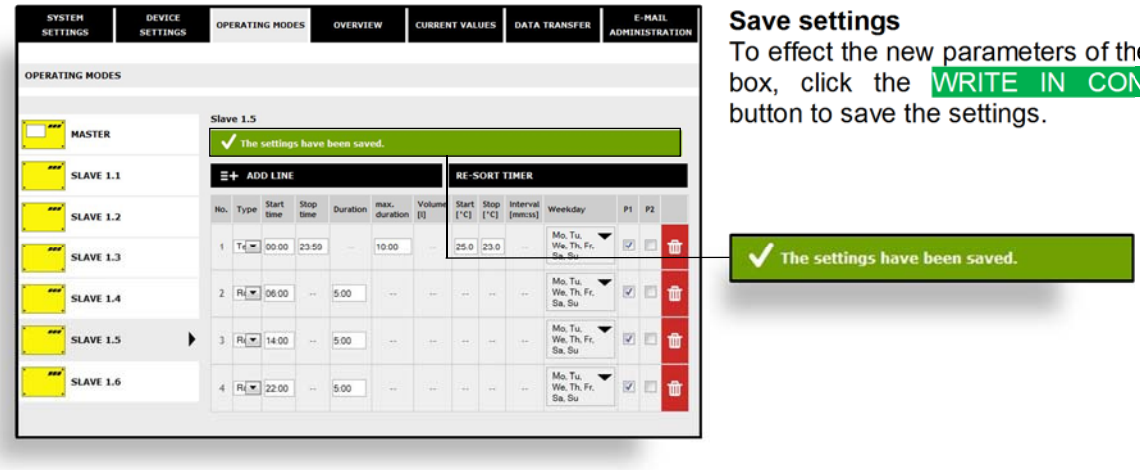
Define times

After a line type has been selected, define the times. A starting and stopping time has to be stated for the "Temperature control" line type. In the "Routine" line type, a starting time and the duration of the routine water exchange need to be stated. Furthermore, the desired weekday can be selected through a dropdown list. Click in the box of the respective weekday to activate it with a checkmark. Routine only runs when there was no temperature flushing between the set days.



Define temperatures

When the "Temperature control" line type is selected, starting and stopping times need to be selected.

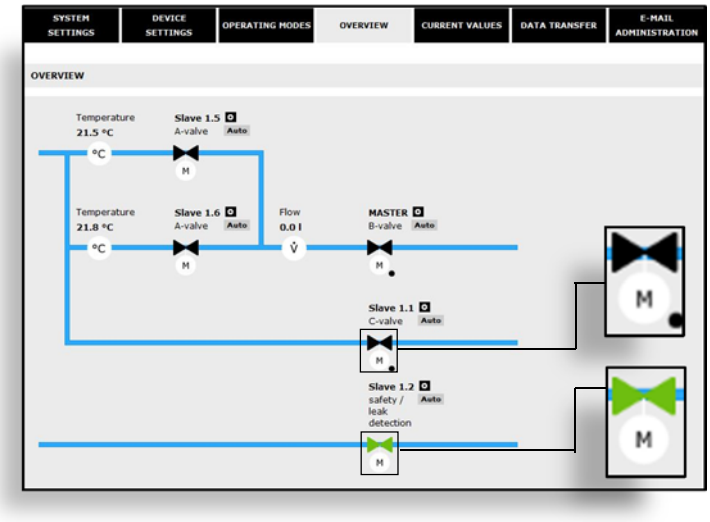


Save settings

To effect the new parameters of the input box, click the WRITE IN CONTROL button to save the settings.

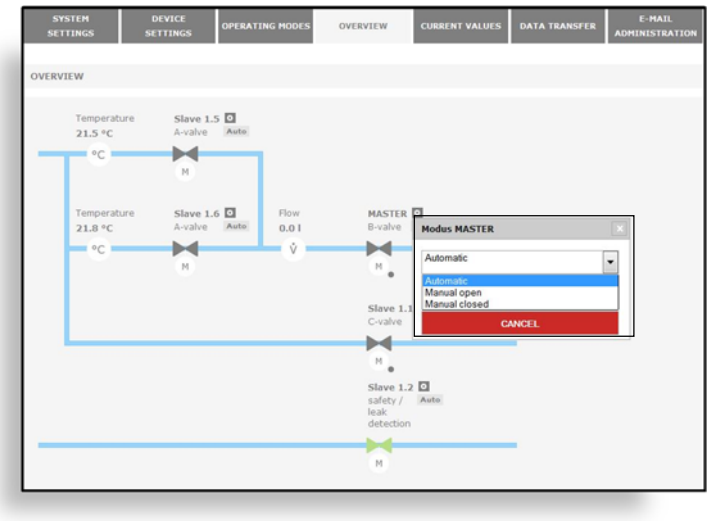
8.2.5 OVERVIEW

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".



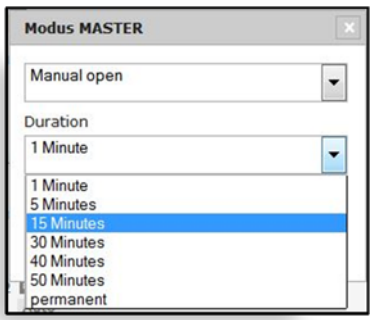
Overview
The overview merely shows the current states. It is not possible to make any configurations in this interface. Click on the component to open the input box of the "SYSTEM SETTINGS" menu interface of the selected component.

If the valve is marked in black that means it is closed. If the valve is shown in grey, it is open. If the valve is red, there is a fault.



Manual mode / Automatic
The actuators can be manually controlled. Click the button ⚙ to open a selection window. Use the selection window to choose between three settings in a dropdown list. The button ✕ indicates a fault in the system.

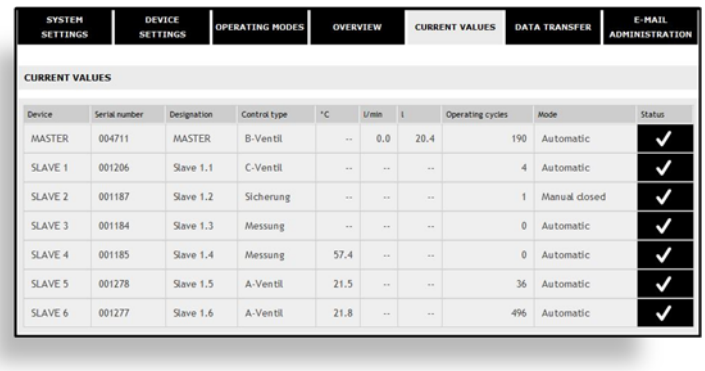
Automatic = Standard setting
Manual OPEN = Valve opens
Manual CLOSE = Valve closes
Group OPEN = For the A-valve, an additional B-valve opens
Group CLOSED = Both close again



After selecting a setting, the duration of the setting can be defined. Use the APPLY button to apply the setting. Press the CANCEL button to discard the action.

8.2.6 CURRENT VALUES

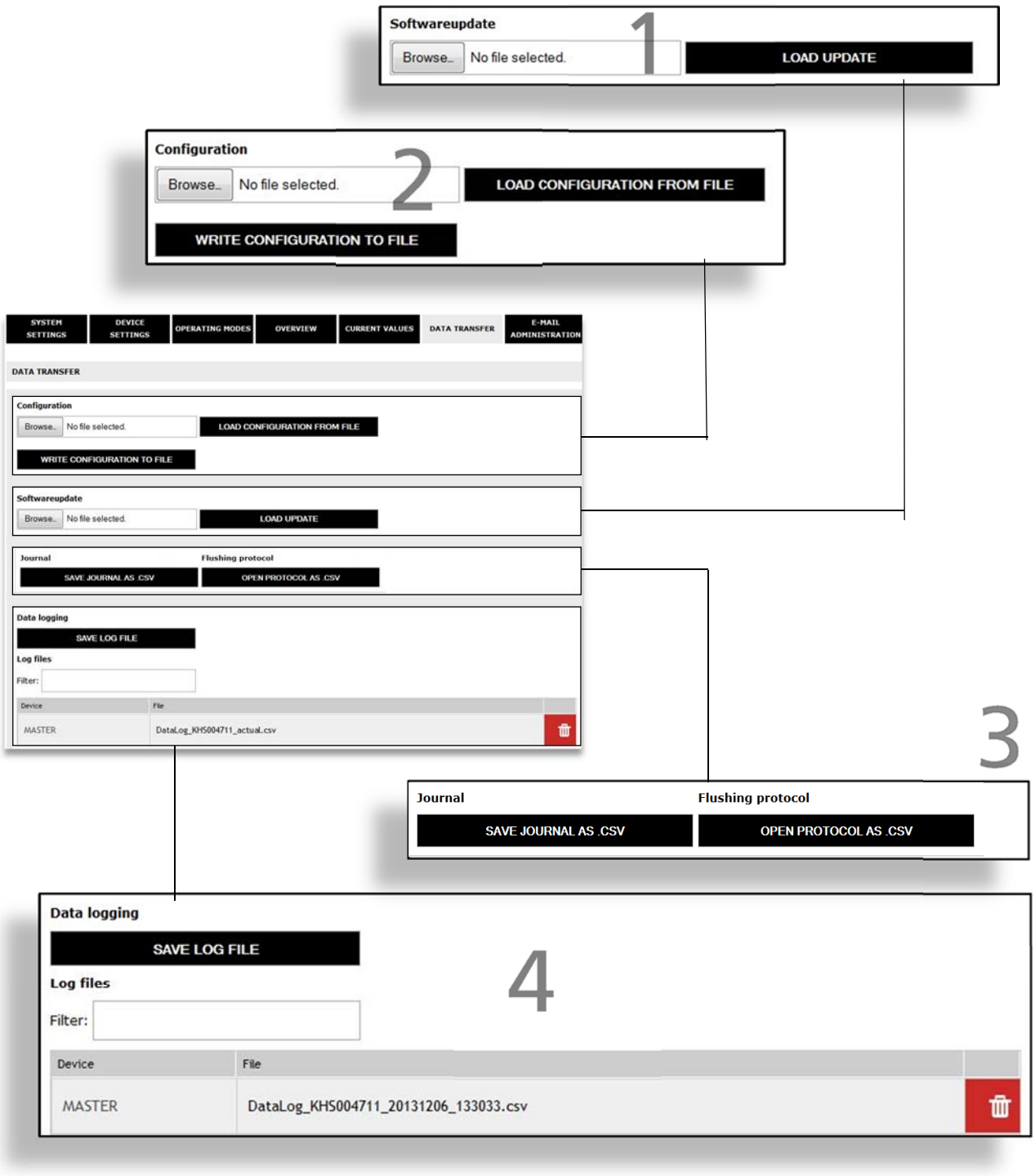
The "CURRENT VALUES" menu interface shows the current values of the connected KHS Mini System Controls and their sensors.



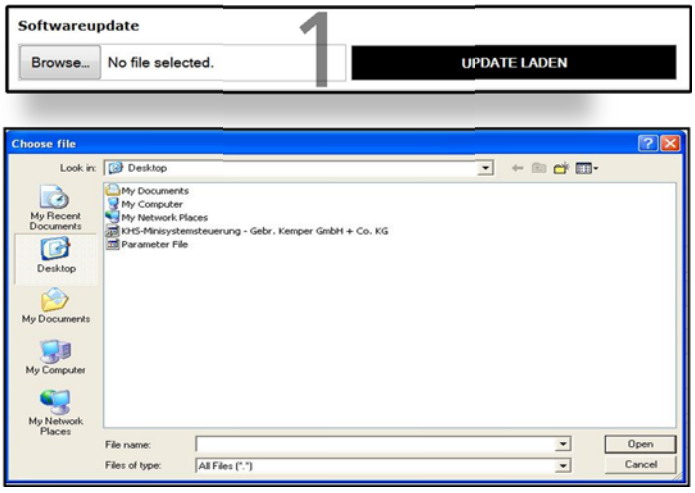
Click the button ✓ to open the input box of the "DEVICE SETTINGS" menu interface of the selected KHS Mini System Control.

8.2.7 DATA TRANSFER

You can use the "DATA TRANSFER" menu interface to load the configurations, software updates, journal entries and the created datalogging files.

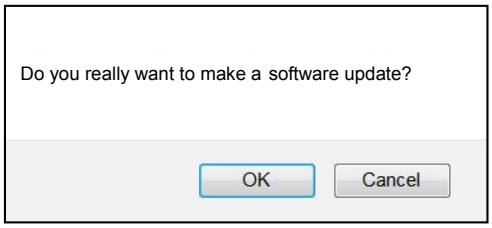


Software update



The "Software update" function can be used to install a software update on the connected KHS Mini System Control. To do that, click the search button. The UPE files open in the window, see Illustration 8.55. After pressing the LOAD UPDATE button, a confirmation appears as shown in Illustration 8.56. Click on the button OK to load the selected setup from the system control.

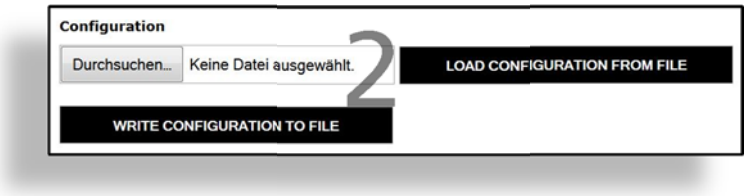
Ill. 8.55 Selection dialogue "Upload setup file"



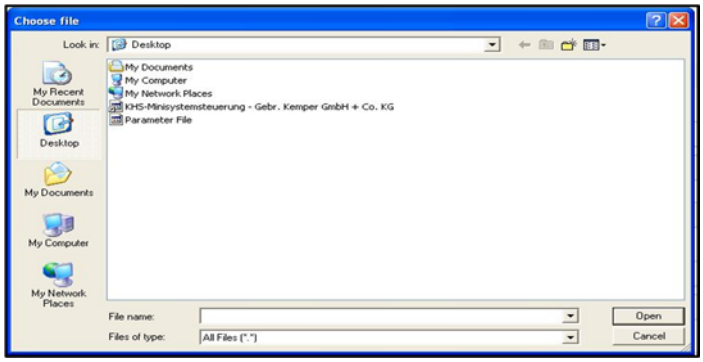
Ill. 8.56 "Delete software update" confirmation

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

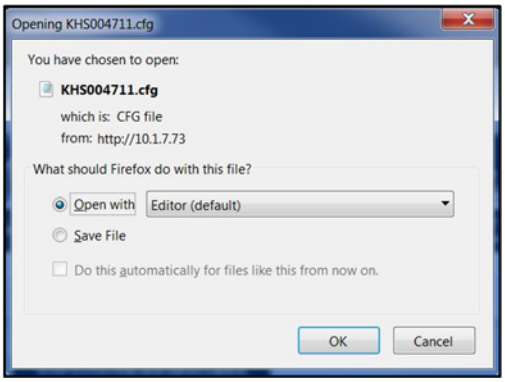
Configuration



Uploading a configuration from a file
The "Software update" function can be used to install an existing configuration from the connected KHS Mini System Control. To do that, click the search button. The CFG files open in the window, see Illustration 8.57. After pressing the LOAD CONFIGURATION FROM FILE button, the selected configuration is loaded into the system control.



Ill. 8.57 Selection dialogue "Upload configuration file"



Ill. 8.58 Selection dialogue "Backup configuration file"

Configuration
You can use the "Configuration" function to backup configured configurations of the connected KHS Mini System Control to your PC. To do that, click the WRITE CONFIGURATION IN FILE button. The window, see Illustration 8.58, backs up the CFG file to the desired folder on your PC.

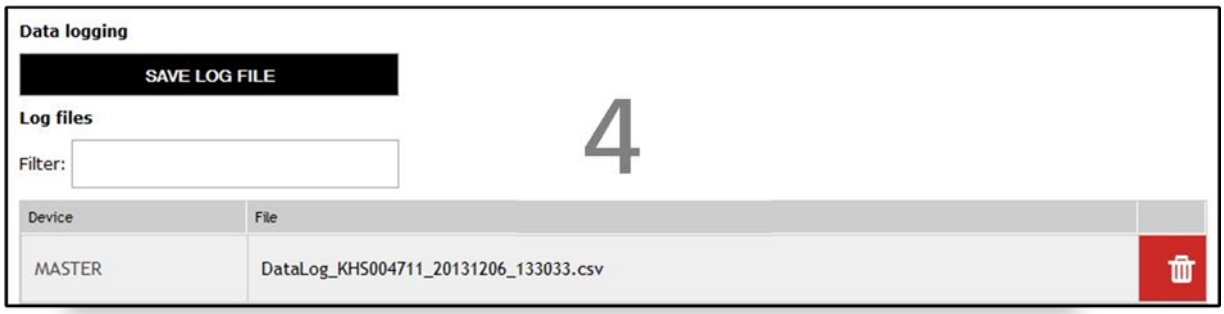
Note:
After successfully configuring your system controls, it is recommended to save the configuration as a backup file. If the KHS Mini System Control -MASTER 2.0- is defective it can be quickly replaced and the configuration can be read in. That saves having to configure everything again.

Journal/Flushing log

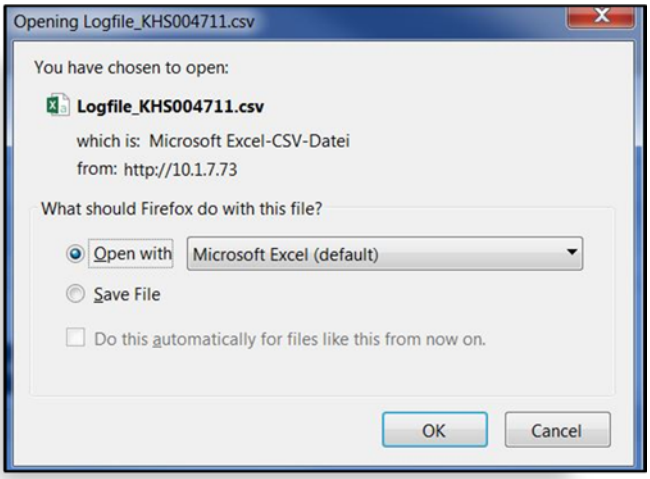
Ill. 8.58 Opening the CSV log file dialogue

You can use the "Journal" function to open and save the event log as a CSV file. The event log documents the water exchange procedures, error messages and parameter changes performed by the KHS Mini System. Based on the documentation about the locality, duration of the water exchange and the temperatures, recordings can be made across a defined time period and verify the hygienic state of the drinking water system. To open the CSV file, click OPEN JOURNAL 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 Illustration 8.58). You can use the "Flushing log" function to open and save the flushing log as a CSV file. The procedure is the same as for the "Journal" function.

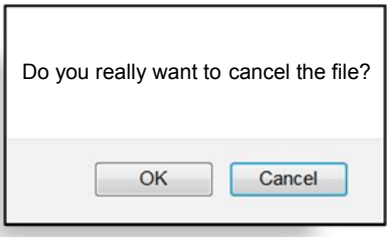
Datalogging



The KHS Mini System Controls have a facility to be used as measuring instruments. To do that, the system controls that are connected to a sensor are configured as described in Chapter 8.2.4. 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 on the GENERATE LOG FILE to generate the current CSV file, which is not completely full yet. Click on the CSV file to open a dialogue as shown in Illustration 8.59. Here you can select if the flush log should be saved or immediately opened. Use the button to open a query as shown in Illustration 8.60. Click OK to delete the selected file.



Ill. 8.59 Opening the CSV datalog



Ill. 8.60 "Delete file" confirmation

Illustration 8.61 shows a part of a CSV log file. In the 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.

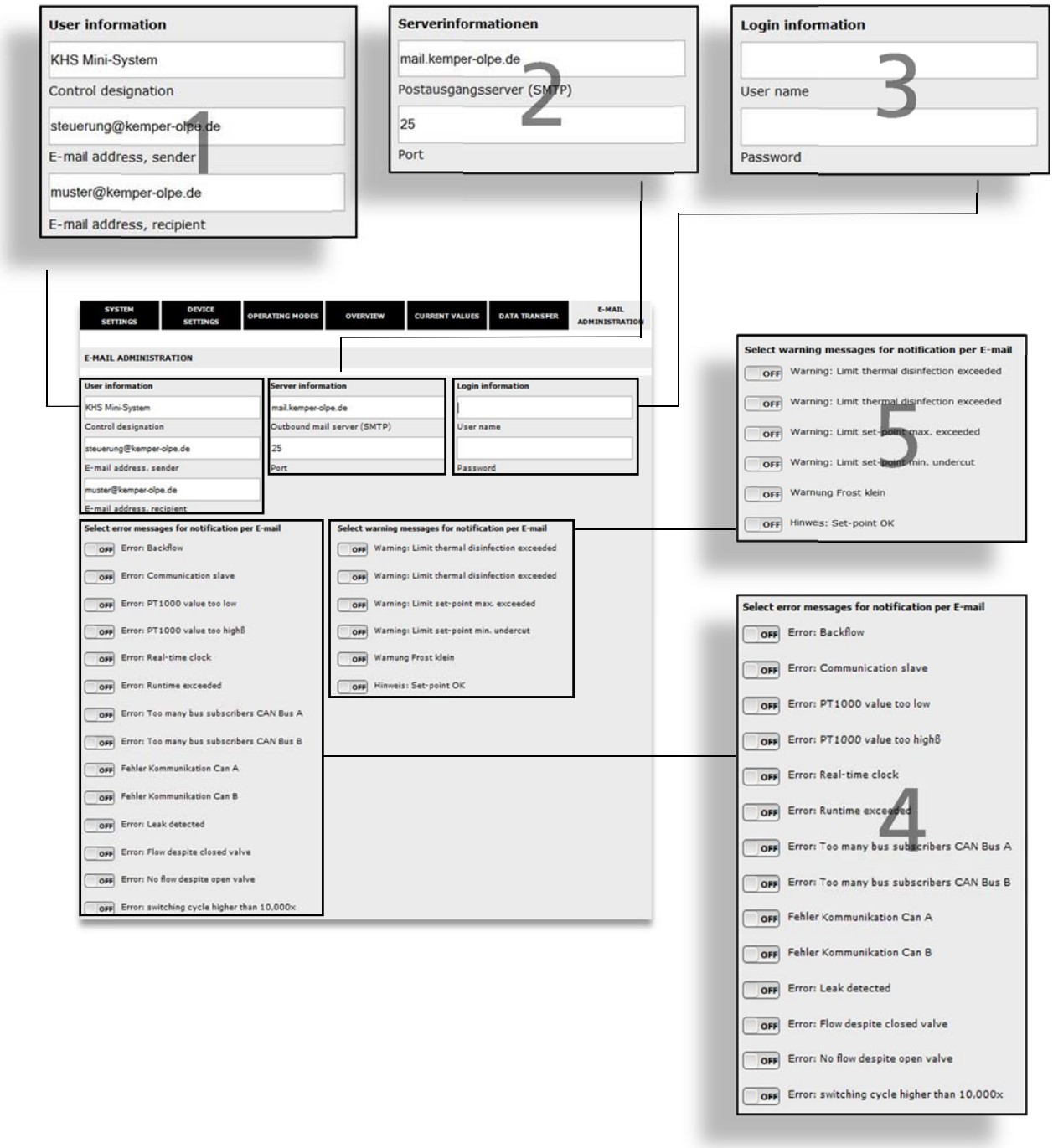
Date	Time	Index	Name	T(min)/°C	T(max)/°C	T(avg)/°C	Q(min)/L/min	Q(max)/L/min	Q(avg)/L/min	V/Liter
22.11.2013	11:48:10	Master	MASTER C-Ventil	0,00	0,00	0,00	0,00	0,00	0,00	0,00
22.11.2013	11:48:20	Master	MASTER C-Ventil	0,00	0,00	0,00	0,00	0,00	0,00	0,00
22.11.2013	11:48:30	Master	MASTER C-Ventil	0,00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

Ill. 8.61 Illustration of a part of the CSV log file

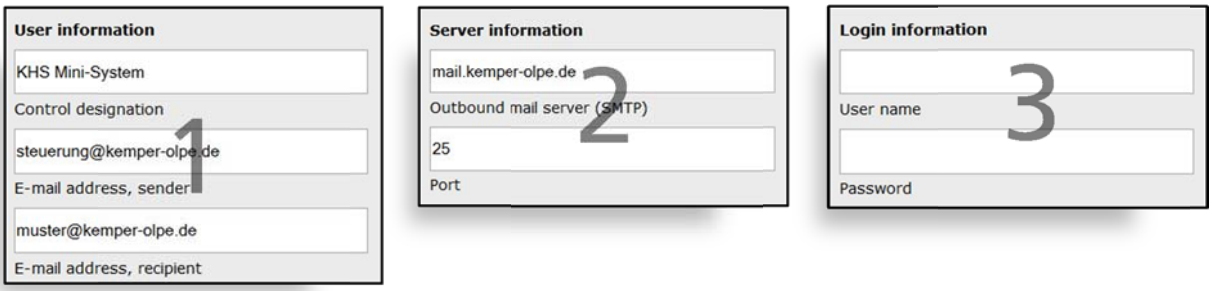
Note:
The storage rate of the measurement values can, as described in Chapter 8.2.4, be set using the "OPERATING MODES" menu interface.

8.2.8 EMAIL ADMINISTRATION

If errors or warning messages occur, the KHS Mini System Control -MASTER 2.0- sends them directly to the plant operator via email. In the "EMAIL ADMINISTRATION" menu interface, a selection of the error and warning messages can be individually configured. Furthermore, the email configurations are set with the user, server and logging information functions.

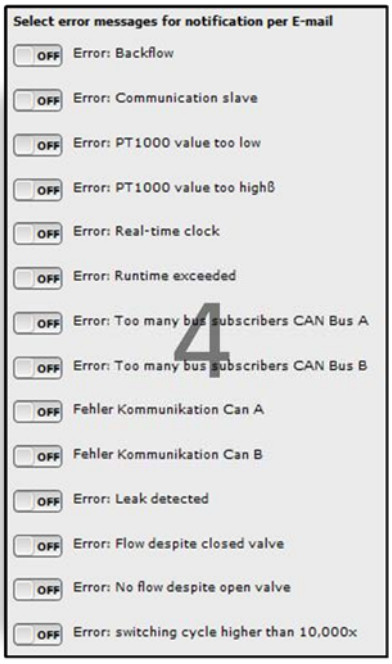


User information / Server information / Login information



To enable the KHS Mini System Control -MASTER 2.0- to send error and warning messages to the plant operating organisation, the email settings need to be configured. While doing so, a company-internal email account or an independent provider can be used. An exact location, e.g. Cologne Gymnastics Hall can be allocated as the control name.

Select error messages for notification per email



If the OFF button is set to ON, the respective notification about a possible error is activated. If an error occurs, an error message is sent to the plant operator via email.

Select warning messages for notification per email

If the OFF button is set to ON, the respective notification about a possible warning is activated. If a warning occurs, an error message is sent to the plant operator via email.

9. Description of malfunctions and malfunction repair

Table 9.1: Error description / Error handling

Error description / Error handling				
Status LED	***Error***	***Potential cause***	***Measures***	***Impact***
		General error		
Flashes red	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 false time/date.
	"Flow with closed valve detected"	Flow is detected by the vortex flow sensor with the valve closed	Check the functioning of the flush valve	Error message! The involved valve is blocked.
	"No flow detected although valve is open"	No flow is detected during a flushing process.	Check the flushing line and the flushing valve	Error message! The involved valve is blocked.

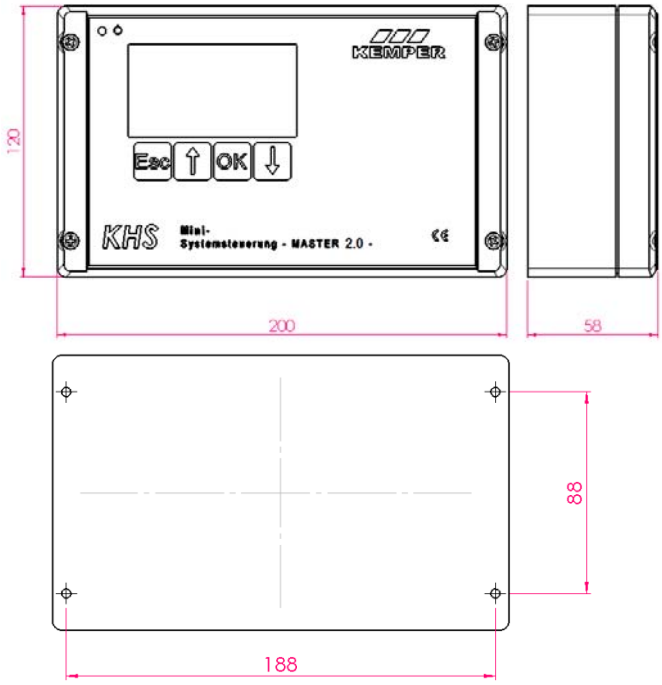
Error description / Error handling				
Status LED	**Error**	**Potential cause**	**Measures**	**Impact**
		Bus error		
Flashes orange	No response from the SLAVE	Cable break, false installation, interference fields	Check CAN bus cables and installation	Faulty SLAVE does not function
	No response from the 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, false 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 or 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 or 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, false installation, interference fields	Check CAN Bus A cables and installation	Affected SLAVEs do not function
	Communication error CAN Bus B	Cable break, false installation, interference fields	Check CAN Bus B cables and installation	Affected SLAVEs do not function

Table 9.2: Description of warnings / notices

Description of warnings / notices				
Status LED	**Error**	**Potential cause**	**Measures**	**Impact**
		Warnings		
Flashes red	Operating cycles exceed 10,000	The VAV on the defective SLAVE has performed more than 10,000 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	Limit thermal disinfection exceeded	The monitored temperature has exceeded the set limit value.	Check to see if it needs to be set otherwise.	Entry in journal and optional message via email.
	Limit set-point max. exceeded	The monitored temperature has exceeded the set limit value.	Check to see if it needs to be set otherwise.	Entry in journal and optional message via email.
	Limit set-point min. undercut	The monitored temperature has undercut the set limit value.	Check to see if it needs to be set otherwise.	Entry in journal 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 journal and optional message via email.
		Notes		
No influence	Set-point OK	Notice that the monitored temperature is in the target range.	No action needed!	Entry in journal and optional message via email.
Illuminates 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 journal.

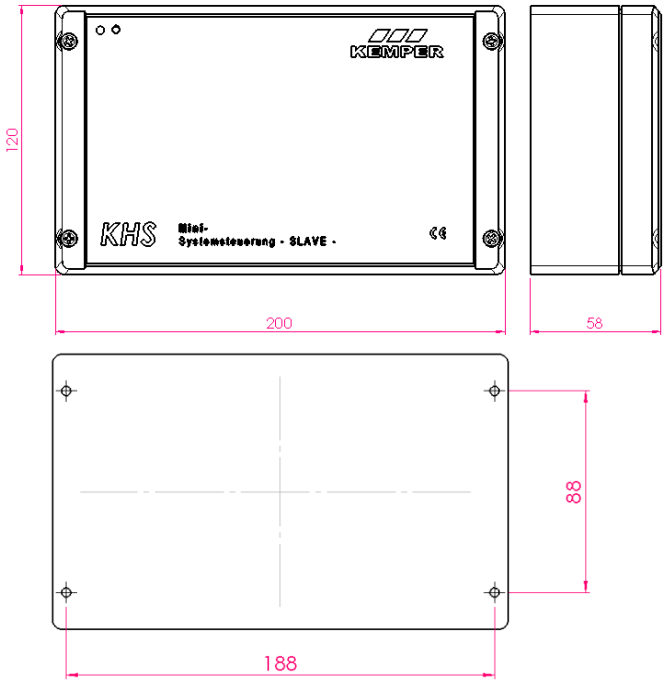
10. Dimensions, attachment dimensions

Hole clearances -MASTER 2.0-



Ill. 10.1 Dimensions and hole clearances for attachment holes on the -MASTER 2.0-

Hole clearances -SLAVE-



Ill. 10.2 Dimensions and hole clearances for attachment holes on the -SLAVE-

11. Accessories

Tab. 11.1 Optionally available accessories

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

12. Wiring instructions for components with electrical connection

Tab. 12.1 Wiring instructions for components with electrical connection

Designation	For KEMPER order no.	Cable cross-section mm²	Max. cable length m	Cable type*
KHS-VAV plus maximum flow isolating ball valve with spring-reset servo drive (230 V)	68605015…032 69605015	3 x 1.5²	9500	NYM-J 3 x 1.5mm²
KHS-VAV maximum flow isolating ball valve with servo drive (230 V)	68604015…032 69604015	4 x 1.5²	9500	NYM-J 4 x 1.5mm²
KHS drain with overflow monitor	68800020...032	2 x 0.25²	150	J-Y(ST)Y 1x2x0.6mm² or NYM-J 3x1.5mm²
Kemper Control-plus Flow measurement valve Vortex principle	6384G015…025 1384G015…050	7 x 0.34² **	300	J-Y(ST)Y 4x2x0.6mm²
KHS temperature sensor fitting PT 1000	6280G015...050 6290G015...050	4 x 2 x 0.6	10,000	J-Y(ST)Y 4x2x0.6mm²
CAN bus cable'*** The application is based on the ISO 11898 international standard.	68602005 68602006	1 x 2 x 0.25² ... 0.34² 1 x 2 x 0.34² ... 0.5² 1 x 2 x 0.50² ... 0.6² 1 x 2 x 0.75² ... 0.8²	0 m … 40 m 40 m … 300 m 300 m … 600 m 500 m … 1000 m	CAN bus cable
Leakage water sensor	6200000100	2x0.75²	0-50 50-500	Standard cable UL-LIYCY

* Possible cable type for fixed routing
** Shielded cable supply line
*** (To be provided by construction site)

Version: 21/11/2013

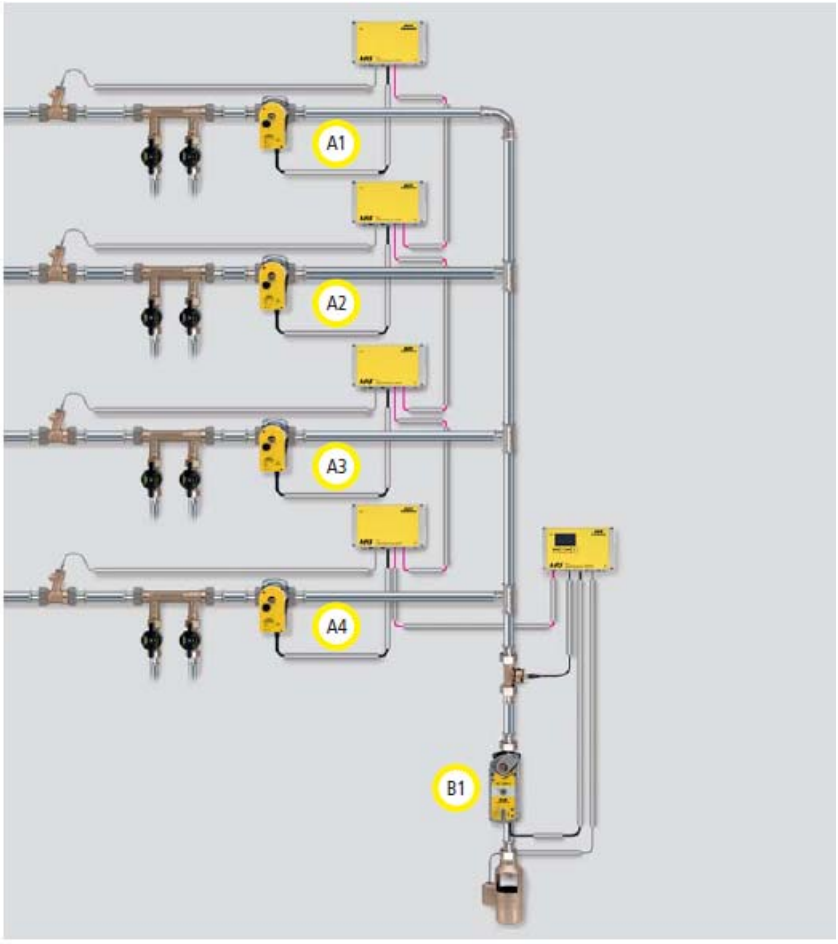
13. Appendix

13.1 Valve technologies

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

13.1.1 A/B valve technology

In the A/B valve technology, several riser branches or valve lines are connected to one, mutual flushing line. Here, one each A-valve and the B-valve are successively opened and closed together. That guarantees that there is no idling in the flushing lines and there is no water exchange between the pipelines.



Example for a flushing process:

Open A1 and B1 in accordance with the defaults, close A1 and B1

Open A1 and B1 in accordance with the defaults, close A1 and B1

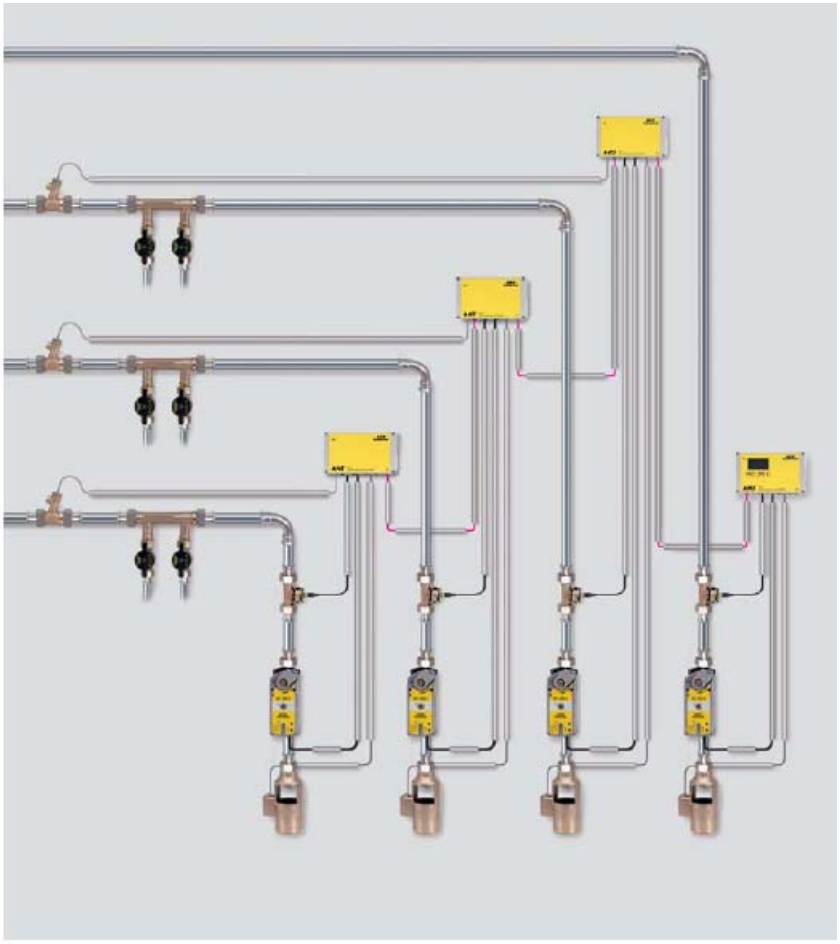
Open A1 and B1 in accordance with the defaults, close A3 and B1

Open A4 and B1 in accordance with the defaults, close A3 and B1

A-Ventil	B-Ventil
KHS-VAV maximum flow isolating ball valve with servo drive Figure 686 04 230 V AC Figure 696 04 230 V AC (Discharge water limited max. 2 l/min)	KHS-VAV maximum flow isolating ball valve with servo drive and spring reset Figure 686 05 230 V AC Figure 696 05 230 V AC (Discharge water limited max. 2 l/min)

13.1.2 C-valve technology

The C-valve technology enables exchanging the water of an individual riser line or one individual distribution line without dependence on the other water exchanging valves.



C-Ventil

KHS-VAV maximum flow isolating ball valve with servo drive

Figure 686 04 230 V AC
Figure 696 04 230 V AC

(Discharge water limited max. 2 l/min)

C-Ventil

KHS-VAV maximum flow isolating ball valve with servo drive and spring reset

Figure 686 05 230 V AC
Figure 696 05 230 V AC

(Discharge water limited max. 2 l/min)

KHS® KEMPER - HygieneSystem

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www.kemper-olpe.de

Overview for the system commissioning on the KHS Mini System Control -MASTER 2.0- Figure 686 02 008

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

Building name:						KHS-VAV maximum flow isolating ball with servodrive and spring reset	KHS-VAV-maximum flow isolating ball valve with servodrive	KHS-CONTROL-PLUS flow measurement valve Figure 138 4G and Figure 638 4G							KHS PT1000	KHS drain with over-flow	Water sensor
Date:																	
Person commisisioning:																	
						Figure 686 05 Figure 696 05	Figure 686 04 Figure 696 04	Measurment range =>a<= 0,9 – 15 l/min.	Measurement range =>b<= 1,8 – 32 l/min	Measurement range =>c<= 3,5 –50 l/min	Measurement range =>d<= 5,0 – 85 l/min	Measurement range =>e<= 9,0 – 150 l/min	Measurement range =>f<= 11 – 188 l/min	Measurement range =>g<= 18 – 316 l/min	Figure 628 0G 629 0G	Figure 688 00	Figure 620 00
Control	No.	Serial no. (Rating plate on the control)	Location/ room	Control type (A-valve; B-valve; C-valve; measurement, safeguard)	Related B-valve -Serial no.-		or										
Master																	
Slave	1																
Slave	2																
Slave	3																
Slave	4																
Slave	5																
Slave	6																
Slave	7																
Slave	8																
Slave	9																
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Slave	28																

KHS®

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Overview for the system commissioning on the KHS Mini System Control -MASTER 2.0- Figure 686 02 008

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

						Figure 686 05 Figure 696 05	Figure 686 04 Figure 696 04	Measurment range =>a<= 0,9 – 15 l/min.	Measurement range =>b<= 1,8 – 32 l/min	Measurement range =>c<= 3,5 –50 l/min	Measurement range =>d<= 5,0 – 85 l/min	Measurement range =>e<= 9,0 – 150 l/min	Measurement range =>f<= 11 – 188 l/min	Measurement range =>g<= 18 – 316 l/min	Figure 628 0G 629 0G	Figure 688 00	Figure 620 00
Control	**No.**	**Serial no.** (Rating plate on the control)	**Location/ room**	**Control type** (A-valve; B-valve; C-valve; measurement, safeguard)	**Related B-valve -Serial no.-**		or										
Slave	29																
Slave	30																
Slave	31																
Slave	32																
Slave	33																
Slave	34																
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Slave	62																

KEMPER

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