

# Operating Instructions

“Ebb-Flow”

Riding Arena Control System

with

Touch TFT Display

Version: 26/01/2021  
GLP: from HW 2.30  
CPU: from HW 1.10  
SW: V0.06

Version: 900 191 Condor GB – V1.0



These operating instructions refer exclusively to the electronic control system and contain important information and safety comments. These operating instructions must be read and followed before the installation, electrical connection and commissioning are completed.

Descriptions and instructions in these operating instructions refer to the standard version of the control system. These operating instructions do not include all design details and variants, nor all possible coincidences and events, that could possibly occur during installation, operation or maintenance. Improper use, any modifications or combination with non-original parts could cause damage to the equipment and/or bodily injury.

The use of skilled personnel is a prerequisite for operating the controls. Please contact the manufacturer if you find that you are missing any information or instructions in these operating instructions.



In the case of failure to comply with these operating instructions the manufacturer assumes no responsibility for the control system.

















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## 1. **General notes**

The control system has been developed according to the state of the art, was manufactured with the greatest of care and is subject to continuous quality controls.

The purpose of these operating instructions is to make it easier to get to know the device and to make full use of its intended applications.

These operating instructions contain important information for a safe, proper and economical operation of the devices. You must follow these operating instructions to ensure a reliable, long service life for the devices and to avoid hazards.

The operating instructions do not take into account any location provisions, which are the responsibility of the operating company, as well as the installation personnel.

The devices must not be operated above the values stated in the technical documentation regarding operating voltage, nominal frequency of the network, ambient temperatures, switching performance and other instructions contained in the operating instructions.

Should there be additional information or instructions required, or in the event of a claim, please contact the manufacturer.

## 2. **Safety instructions**

This documentation refers exclusively to the control system and contains basic instructions that must be observed during the installation, operation and maintenance thereof. Therefore it is essential that these operating instructions are read by the technician and other responsible specialist personnel/operators before installation and commissioning; it must be available at the system's operating site at all times.

You must not only observe the general safety warnings given in the main "Safety" section, but also the special safety warnings included under the following main points.

### 2.1 **Identifying instructions in the operating instructions**

The safety information given in these operating instructions, which can cause danger to persons upon failure to observe, are specially marked with the following symbols.



**Warning of common hazards**



**Warning of high voltage**

### 2.2 **Personnel qualifications**

The operation, maintenance, inspection and installation personnel must have the appropriate qualifications for their specific work. The scope of responsibility, competence and supervision of the personnel must be defined in detail by the operating company. Should the staff not have the proper knowledge, additional training and instructions must be scheduled. Furthermore, the operating company carries the responsibility that the content of these operating instructions is fully understood by the staff.

### 2.3 **Risks in case of non-observance of these safety warnings**

Non-observance of the safety warnings may lead to hazards for personnel, as well as for the system itself. Non-observance of safety warnings will result in loss of any rights to claim damages.

In particular, non-observance may lead to incidents such as the following:

- Failure of key functions of the device
- Failure of prescribed methods for monitoring
- Danger to personnel by electrical forces



## 2.4 Safety awareness at work

The safety warnings listed in these operating instructions, the existing national regulations for the prevention of accidents, and also any additional internal work, operating and safety instructions by the operating company must be observed.



**It is essential to switch off all power before opening the device!**

## 2.5 Safety warnings for the operating company / operator

Any electrical energy hazards are to be prevented (for details, please refer to the country-specific regulations and the regulations of your local energy companies). The operating company is to make sure that the control system is secured against access by unauthorised personnel.

## 2.6 Safety warnings for installation and maintenance work

The operating company has to ensure that all maintenance, inspection and assembly work is performed by trained and qualified personnel which was adequately informed through intensive study of these operating instructions.

As a rule, work on the device may only be performed in a de-energised state. Immediately after completion of this work the safety and protective system must be attached again or their function restored. Before a restart, the points listed in the commissioning section must be observed.

The currently applicable regulations (EN, VDE, ...) as well as all regulation of the local energy suppliers must be observed. Commissioning may only be completed once these have been met.



**For the following tasks, it is essential to follow the documentation of all accessory parts.**

Before the system is put into service and the mains voltage is switched on, the following must be ensured.

- The controls and connection cables must not show any noticeable defects.
- All connection bolts and terminals must be checked for tightness before commissioning and re-tightened to the prescribed torque if necessary.
- Routing and design of all cables and lines has to comply with the current regulations. Particular attention must be paid to avoiding increased mechanical stresses on cable entry plates, e.g. caused by insufficiently fixed or improperly strain-relieved cables.
- The mains connection and the connection of all accessory components, like the pump(s), for instance, have to be implemented by professionals.
- On-site fuse protection has to be done in accordance with valid regulations and particular circumstances.
- All miscellaneous connections are carried out correctly and professionally.
- The device is properly closed and unused cable glands are covered.
- The system is properly protected.

## **2.7 Unauthorised modification and production of spare parts**

Any modifications or changes to the control system are permitted only after consultation with the manufacturer. Original spare parts are provided for safety reasons. The use of other parts can make void the liability for the consequences arising from this.

## **2.8 Impermissible operating modes**

The reliable operation of the control system can only be guaranteed if used as intended only. The limit values given in the documentation must in no case be exceeded.

## **3. Transport and in-transit storage**

### **3.1 Transport**

Professional transport of the device is required. The control system was checked for compliance with all specified data before shipment. The control system is therefore known to be in good electrical and mechanical condition upon receipt. Please check the control system for transport damage upon acceptance. In the event of a complaint, a damage report must be drawn up together with the supplier.

### **3.2 In-transit storage**

In-transit storage must be in a dry place, without jolting and, whenever possible, in the original packaging. The ambient temperatures must not be outside the range of -20°C to +70°C.

## **4. General description of the control system**

The control system automatically regulates the irrigation and de-watering of riding surfaces with a specific substrate (draining system).

The optimal water level is manually adjusted and then automatically regulated by means of a measuring signal from a hydrostatic measuring probe.

This ensures consistent humidity over the entire riding surface.

The unit is operated or configured via a TFT touch colour display.

These operating instructions describe the control functions in particular.

Further information is provided in the documents and drawings included with the control system.



**When parameters or menu settings are changed, it is possible that these are not processed immediately by the control system. In such cases, please reboot the control system.**

## 5. **Installation / assembly**

### 5.1 **Surrounding conditions**

- Dry and frost-proof
- Adequate ventilation
- The control system installation must be flood-proof
- The technical data, especially the maximum permissible ambient temperature, must be observed.
- The control system must not be exposed to direct sunlight.

### 5.2 **Control system assembly notes**

The device is intended for wall mounting. Assembly may take place via the existing holes in the housing or via the associated wall straps, if present. The installer is responsible for selecting the appropriate material for attachment. Make all the necessary electrical connections after assembly.

#### **Attention!**

You must be careful to not let any moisture into the control system during any kind of work on the system. Ingress of moisture must be prevented during assembly and/or as long as the electrical connections of the control system are exposed through an open door, even with only light precipitation, e.g. by covering it with a tarpaulin. After completed installation and also in case of longer breaks, close the cover.



**The enclosure door must be firmly closed to be in compliance with the respective protection rating! Unused fittings must be closed off with a blind plug!**

Should the electrical connection not be completed immediately after the mechanical installation, possible ingress of moisture via open cable fittings must be prevented with temporary bungs.

### 5.3 **Immersion probe assembly notes**

The function of the immersion probe is mostly independent of the installation position.



**The protective cap may only be removed immediately before installation in order to protect the process connection and the pressure diaphragm. To prevent measurement errors and damage, the immersion probe should be installed in a flow- and turbulence-free location, or in a guide tube!**

## 6. Electrical connection of base circuit board

The electrical hook-up to the control system depends on the equipment, the number of pump connections and the desired functionalities. Please refer to the respective chapters or any separately included wiring diagrams for special wiring specifications.

### 6.1 Connection diagram of the front base circuit board (GLP)

Designation	Explanation	
GLP (A2 / X2)	Base circuit board	
F1 / N	Mains connection	2x 230V AC / 1A
F1	Control fuse	230 V / inertia 3.15 A
B11 – B12	Jumper bar	Not used
B21 – B22	Jumper bar	Not used
11 / 12 / 14	Alarm relay 1	Potential-free changeover contacts
21 / 22 / 24	Alarm relay 2	
31 / 32 / 34	Alarm relay 3	
HW+ / HW-	Separate high water float switch	
ME1+ / ME1-	Signal input 1	External shutdown / frost monitor mode
ME2+ / ME2-	Signal input 2	External error
4...20mA	Analogue input	Connection for level probe 4 ... 20 mA
Stagnation pressure	Plug-in base pressure module	Not used
24V+ / 24V-	24V DC outgoing circuit max. 0.5 A	Connection of a flashing signal / horn
DAC+ / DAC-	Analogue output 4..20 mA	Forwarding of the fill level signal



Fig. Terminals X2

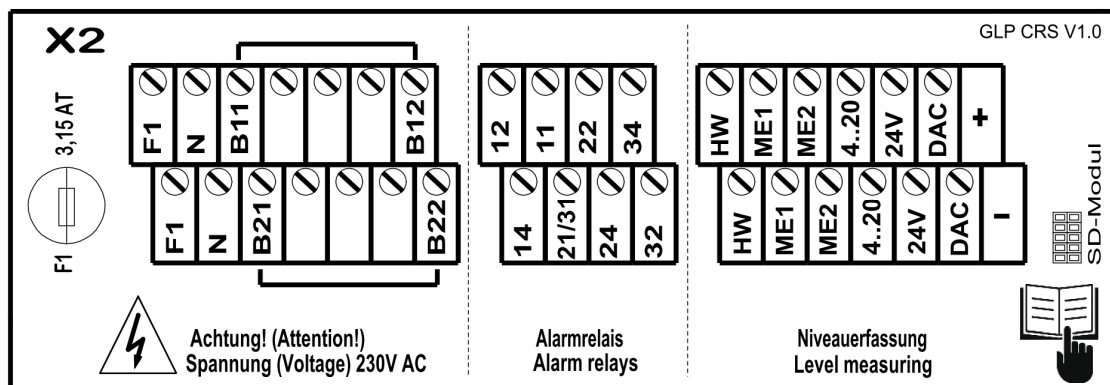


Fig. Terminals X2



**6.2 Back of base circuit board (GLP)**



In case of defect, it may be necessary to replace the base circuit board. This requires function-critical components to be dismantled. Improper handling can cause damage, which is not covered by the warranty. The board should be replaced by the manufacturer if possible. Only trained personnel is allowed to undertake the installation.

Section 1 shows the internal fuse F2 of the control electronics 1AT.

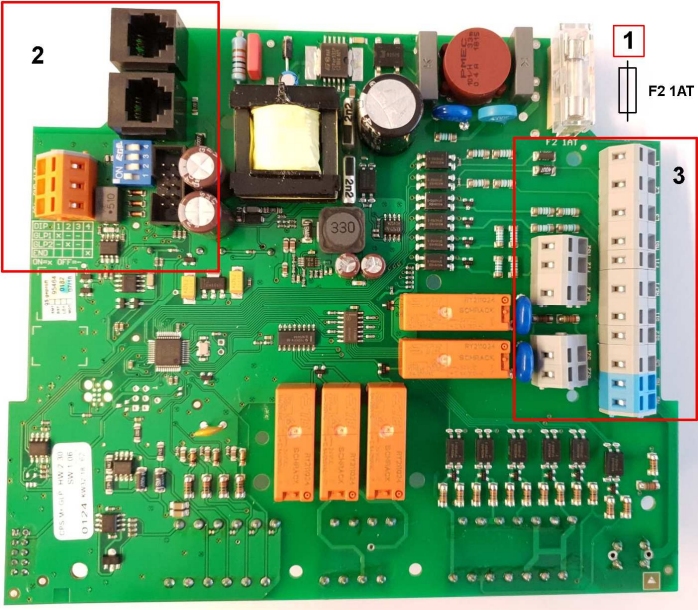


Fig. Back of base circuit board

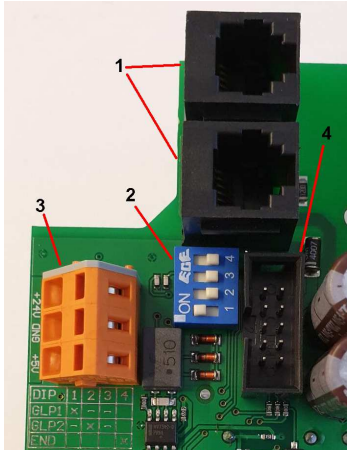


Fig. Image section 2

Description of image section 2			
Item	Designation	Explanation	
1	RJ 12 socket	Connection for control board (CPU) cable	
	RJ 12 socket	Reserve	
2	DIP switch 1	Base circuit board 1 (GLP1)	ON
	DIP switch 2	Reserve	OFF
	DIP switch 3	Reserve	OFF
	DIP switch 4	Set terminal resistance	ON
3	+24V	Voltage output + 24 VDC 50 mA	
	GND	Reference point for voltage outputs + 24 VDC / + 5 VDC	
	+5V	Voltage output + 5 VDC ( <b>do not use</b> )	
4	10-pin box header	Connection for battery module cable	

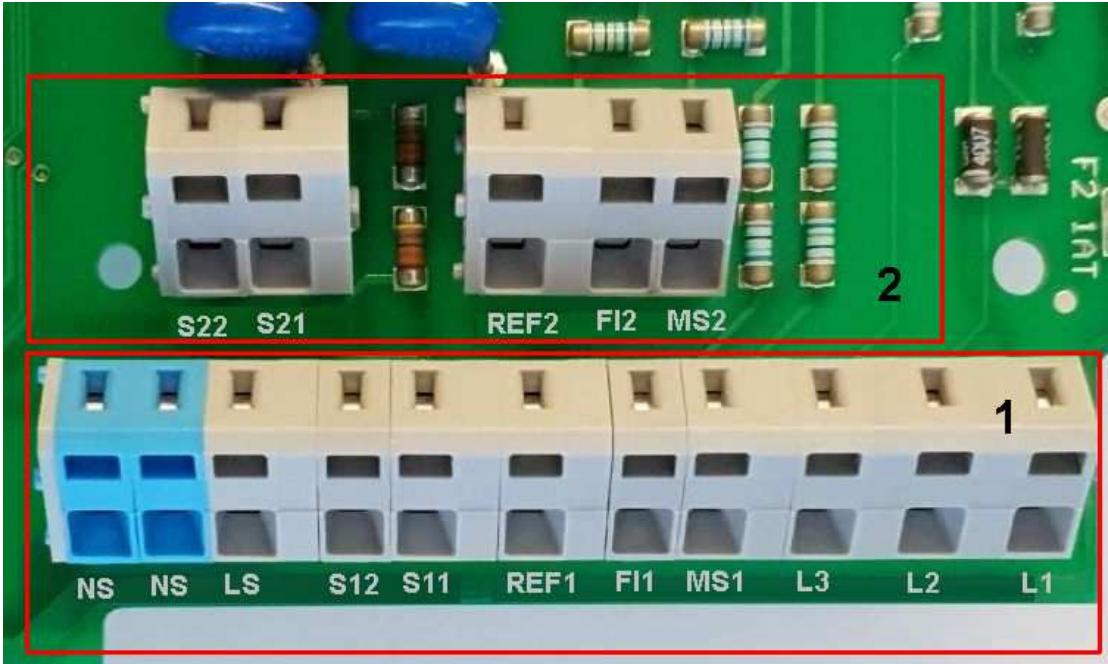


Fig. Image section 3

Description of image section 3			
Item	Designation	Explanation	Description
1	L1	Not used	Reserve
	L2	Not used	Reserve
	L3	Not used	Reserve
	MS1	Signal input 1	Infeed fuse faulty
	FI1	Signal input 2	Residual current circuit breaker 1
	REF1	Reference point	Signal inputs 1 & 2
	S11	Continuous voltage output (230 V)	Pump-out
	S12	Output switched (230 V)	Pump-out
	LS	Control voltage input (230 V)	GLP supply voltage
	NS	Neutral conductor	
2	MS2	Signal input 3	Pump-out fuse faulty
	FI2	Signal input 4	Overvoltage protection triggered
	REF2	Reference point	Signal inputs 3 & 4
	S21	Continuous voltage output (230 V)	Infeed
	S22	Output switched (230 V)	Infeed

### 6.3 Wiring colours

Colour	Application
black	L1, L2, L3
light blue	N and PEN
green/yellow	PE
red	Control voltage >50 V AC
Dark blue	Control voltage <50 V DC
orange	External voltage
white	Measuring and control voltage / analogue signals
brown	Control voltage <50 V AC
light blue with explosion protection	Intrinsically safe circuit

### 6.4 External shutdown / remote shutdown / dry run protection

The control system can be caused to carry out a stop function via an external operating point. The contacts (ME1+ / ME1-) must be closed via a potential-free contact for this. All infeed and pump-out functions are disabled for the time during which the contacts are closed.

*Please note the further descriptions in Chapters 6.1, 11.2 and 12.0.*



**Attention! Terminal voltage 24 VDC.**

### 6.5 External alarm

If the contact (ME2 + / ME2-) is closed via a potential-free contact, the error message "External alarm" appears on the control system and is shown on the display. Further functions of the control systems are not influenced by the error message.

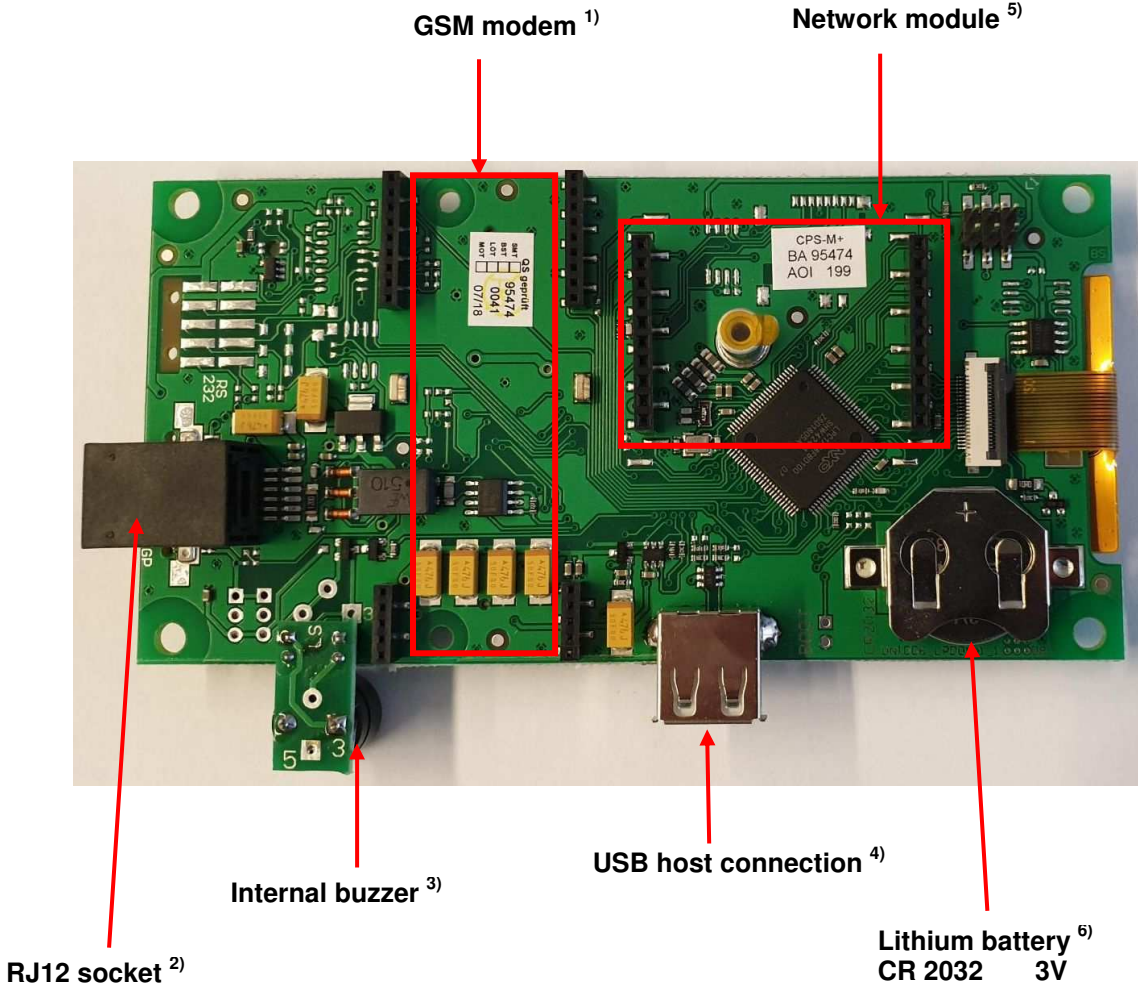
If necessary, the message can be forwarded via an alarm relay available in the control system. If a GSM modem is installed in the control system, forwarding via text message or e-mail is also possible.




**Attention! Terminal voltage 24 VDC.**

**7. Operation and displays of the control board (CPU)**

**7.1 Overview of back of control board**



1)	GSM modem	Slot for an optional retrofittable GSM modem	Chapter 11.2
2)	RJ12 socket	For connection of signal line to base circuit board	Chapter 6.2
3)	Internal alarm buzzer	If a fault occurs an alarm tone will sound	Chapter 11.4
4)	USB host connection	For data exchange and software update via USB stick	Chapter 11.6
5)	Network module	Not used	
6)	Lithium battery 3 V, type CR2032	Power reserve for clock and date	

*We recommend replacing the battery every five years. According to the Battery Act (BattG), waste batteries and old batteries are to be returned to the retailer or to collection points.*



7.2 Overview of front of control board

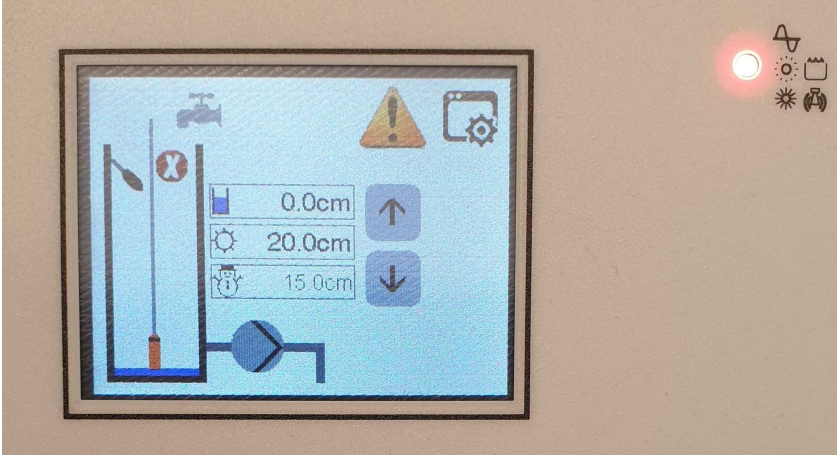


Fig. Touch TFT display with LED fault (red)

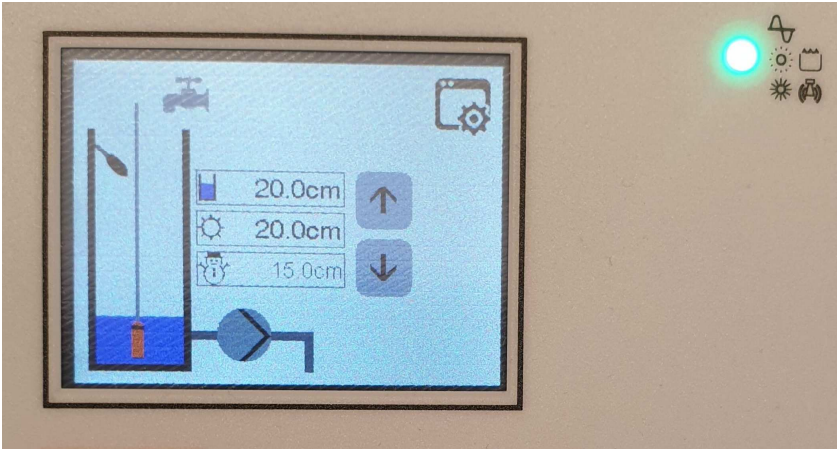
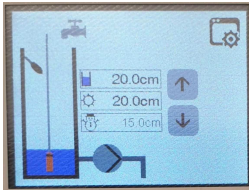
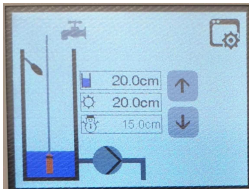


Fig. Touch TFT display with LED ready (green)

## 7.3 Operation



**TFT display:** Messages are rendered as symbols and plain text via the colour display, in the selected language.



**Operation:** Using a stylus or finger, slight pressure is applied to the display and the symbols. This is how individual functions and settings are selected.



**Main/load switch:** This switch is used to turn the control system on/off. See also Chapter 9.4.



**Emergency switch – Water infeed:** In case of failure of the control electronics, the switch can be actuated to manually open (spring-return) or switch off the valve for the water supply. In normal operation, the automatic @ switch position should be selected.

Mains voltage and a working backup fuse are required.



**Emergency switch – Pumping out:** In case of failure of the control electronics, the switch can be actuated to manually switch the pump(s) on or off. In normal operation, the automatic @ switch position should be selected!

Mains voltage and a working backup fuse are required.




**After changing the parameters/menu settings, it is possible that the control system initially fails to apply them. Reboot the control system for the changes to take effect. This means that the supply voltage and any installed battery module must be switched off first. After restarting successfully, all parameters are overwritten with the new data.**





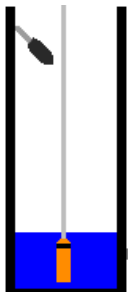





























**Operation as well as the user interface depends on the actual equipment of the control system. Some functions are only available after prior activation or with optional hardware.**

**7.4 Main display – Symbols**

A detailed explanation and settings are shown in Chapter 10.

	<p>The main display informs the operator of the current status of the infeed, pump-out, fill level in the pump shaft, pending faults and advanced functions.</p> <p>Click on the symbol to access additional functions or information.</p> <p>Some of the functions described here are only available after prior activation or with the optional hardware!</p>
	<p><b>Main menu:</b> Pressing this symbol will open the main menu, which contains further submenus. All relevant settings are made here.</p>
	<p><b>Battery charge level*:</b> This symbol indicates the battery charge. A flash is displayed over the symbol during charging. When the charge is decreasing, the colour changes from green 100% &gt; light green 75% &gt; orange 50% &gt; red 25%. Click on the symbol for additional information.</p>
	<p><b>Fault signals:</b> If a fault occurs during operation of the control system, this symbol is shown in the main display. Press this symbol to open the error message menu.</p>
	<p><b>Maintenance/service due:</b> If a previously set maintenance date/service is due, this symbol is shown and an interval tone sounds. Click on the symbol for additional information.</p>
	<p><b>GSM modem<sup>1)</sup>:</b> If the control system is equipped with a GSM module, this symbol is displayed after activation. Click on the symbol to open the status display for further information.</p>
	<p><b>Network module<sup>1)</sup>:</b> </p>










<sup>1)</sup> Optional accessories required.

	<p><b>Infeed symbol:</b> The “Infeed” submenu opens when the symbol on the display is pressed. One of the functions available here is manual mode.</p>												
	<p><b>Pump-out symbol:</b> The “Pump-out” submenu opens when the symbol on the display is pressed. One of the functions available here is manual mode.</p>												
	<p><b>Fill level display:</b> The fill level in the pump shaft is graphically displayed as a bar graph here. The value next to the pump shaft shows the current fill level and the set setpoint.</p> <p>Press the shaft symbol to access the level monitoring submenu. <i>See Chapter 10.4 for more details</i></p> <table border="1" data-bbox="430 853 1420 1108"> <tr> <td data-bbox="528 853 735 913">  20.0cm         </td> <td data-bbox="735 853 1420 913">Current fill level in the pump shaft</td> </tr> <tr> <td data-bbox="528 913 735 974">  20.0cm         </td> <td data-bbox="735 913 1420 974">Normal operation setpoint <i>Chapter 10.4</i></td> </tr> <tr> <td data-bbox="528 974 735 1034">  20.0cm         </td> <td data-bbox="735 974 1420 1034">Summer mode setpoint <i>Chapter 12.0</i></td> </tr> <tr> <td data-bbox="528 1034 735 1108">  15.0cm         </td> <td data-bbox="735 1034 1420 1108">Winter operation setpoint <i>Chapter 12.0</i></td> </tr> </table>	 20.0cm	Current fill level in the pump shaft	 20.0cm	Normal operation setpoint <i>Chapter 10.4</i>	 20.0cm	Summer mode setpoint <i>Chapter 12.0</i>	 15.0cm	Winter operation setpoint <i>Chapter 12.0</i>				
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 20.0cm	↑												
 20.0cm													
 15.0cm	↓												
 19.3cm	↑												
 20.0cm													
	↓												
	<p><b>Alarm sound OFF:</b> If this symbol is displayed, the alarm sound can be switched off by pressing the symbol. Previously selected alarm relays are also reset. Faults are not acknowledged.</p>												
	<p><b>Fault symbol:</b> This fault symbol appears if a fault is present in the area of the control or measuring system.</p>												


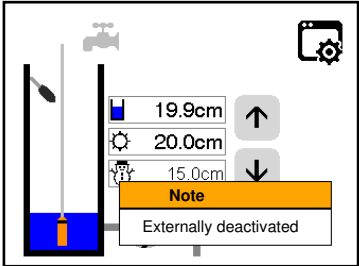








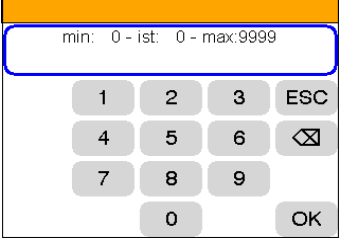
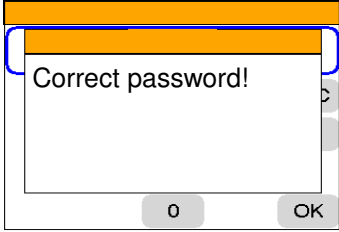
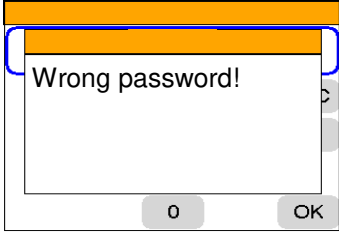
## 7.5 Main menu – Symbols

A detailed explanation and settings are shown in Chapter 11.




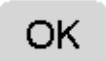





	<p><b>Setup:</b> Settings that are rarely changed are configured in the setup menu during commissioning. e.g.: language, time and various optional special functions.</p>
	<p><b>Servicing:</b> This menu is used to set maintenance dates based on operating hours or by date. Also located here is the fault list, information on operating hours or switching cycles.</p>
	<p><b>Alarms:</b> This menu is used to configure the alarm relays and their functioning. It is also possible to change alarm sounds and fault settings.</p>
	<p><b>GSM modem*:</b> If the control system is supplemented with an optional GSM module, all relevant settings for operating the modem can be made here.</p> <p><i>*Detailed explanations are provided in the separate operating instructions for the GSM modem!</i></p>
	<p><b>Network module:</b> </p>
	<p><b>Admin:</b> Factory menu. No settings possible!</p>
	<p><b>USB:</b> This symbol appears if a USB stick is plugged into the USB host port during operation of the control system. Data can now be written to or read from the stick via this menu.</p>
	<p><b>Back:</b> Press this symbol to exit the menu and return to the main menu or main display.</p>

7.6 Display release and password

 <p>Mains delay 9 sec. Tap to cancel</p>	<p><b>Mains delay:</b> After a restart or a mains failure, the control system will only start up after the set time has elapsed.</p> <p>The countdown can be cancelled by tapping this field.</p>
	<p><b>Externally deactivated:</b> The control system has been deactivated by an external <u>potential-free</u> contact on the ME1 input. After opening the contact, the control system starts with the countdown of the mains delay.</p> <p><i>Faults are still detected and reported. Observe the description in Chapter 6.4.</i></p>
 <p>Alarm sound off</p>	<p><b>Alarm sound off:</b> The internal alarm sound is turned off by tapping on this field.</p> <p>If the alarm relays are set to "reset with buzzer", any external visual alarms and horns are also switched off.</p>
<p>The display is protected against unintended operation through an automatic key lock. The next three sections describe the available options of the display release.</p>	
 <p>Enable operation</p>	<p><b>Enable operation:</b> If no password has been entered for the control system, the field shown is displayed after actuating the display.</p> <p>Operation is enabled by pressing on this field.</p> <p>If no input is made for a certain amount of time, the key lock is reactivated automatically.</p>
 <p>Enter password</p> 	<p><b>Enter password:</b> If the control system is protected by a password stored in the setup menu, the field shown is displayed after actuating the display.</p> <p>After tapping the symbol, the field for inputting the password appears.</p> <p>Operation is enabled after correct password entry.</p> <p>The key lock is activated automatically.</p>
 <p>Enable limited operation?</p> 	<p><b>Enable limited operation:</b> When pressing the symbol, only limited operation is enabled. Functions such as clock/date, language, set point water level, manual-0-automatic mode and error messages can be changed or operated.</p> <p>All other functions can be read, but they are protected by the stored password.</p>










	<p><b>"Password" input field:</b> If the shown "Password" input field is displayed, the four-digit code for unlocking the user interface can be entered here and confirmed with OK.</p>
	<p><b>Correct password:</b> If the correct password has been entered, this message appears and the control system is enabled.</p>
	<p><b>Wrong password!:</b> The message shown on the left is displayed if the wrong password code is entered.</p> <p>You can then retry with the correct password. If the wrong code is entered again, "Enable limited operation" is initiated.</p>

## 7.7 Selection and function keys

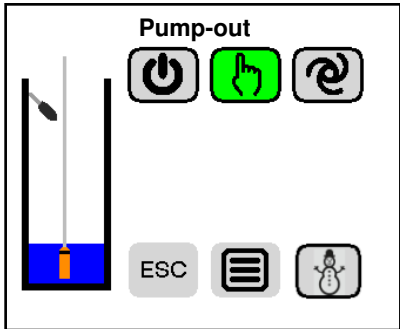



















	<p>Return to the previously selected menu or abort if an entry is made.</p>
	<p>Switch off internal acoustic alarm.</p>
	<p>Resolved fault messages can be reset.</p>
	<p>Confirmation of changed parameters.</p>
	<p>Scroll menu up / In the main menu "Adjust water level setpoint upwards"</p>
	<p>Scroll menu down / In the main menu "Adjust water level setpoint downwards"</p>
	<p>Delete entry</p>
	<p>Additional information and settings</p>
	<p>Activate modem test function<sup>1)</sup></p>

<sup>1)</sup> Optional accessories required, functional description in the operating instructions for the GSM modem.








## 7.8 Pump-out symbols and their meaning

	<b>Pump-out symbol:</b> The symbol changes colour depending on the operating mode, thus indicating the current status. The “Pump-out” submenu opens when the symbol is pressed.	
Colour	Operating mode	Explanation
 Grey	Ready	<b>Pump-out</b> Set point level reached. Waiting for request.
 Red		
 Yellow	Off	<b>Manual pump-out off</b> The function was manually switched off in the pump-out menu.
 Green		
 Green	Manual mode	<b>Pump-out manual mode switched on</b> The function was manually started in the pump-out menu. Manual operation is limited to 1...120 seconds. The function is then stopped and switched to automatic mode. <i>See Chapter 10.2.</i>
 Blue		
 Blue	Winter operation	<b>Pump-out switched off</b> The pump shaft is emptied to the set level and the infeed function is switched off. <i>See Chapter 12.0.</i>
 Blue		

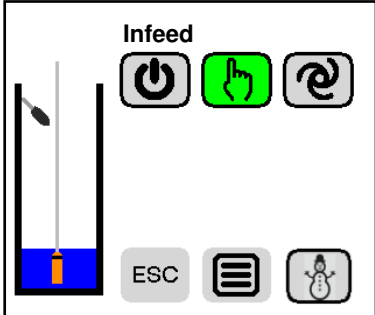



















## 7.9 Pump-out operating mode

	<p>The submenu shown on the left opens when the  symbol is actuated in the main display. The operating mode for pumping out can now be changed here. After actuation and if there are any faults on the pump, the keys change their colour, among other things.</p>																		
	<table border="1"> <tr> <td></td> <td>Manual pump-out off</td> <td>see also Chapter 7.8</td> </tr> <tr> <td></td> <td>Manual pump-out on</td> <td>see also Chapter 7.8</td> </tr> <tr> <td></td> <td>Automatic pump-out mode</td> <td>see also Chapter 7.8</td> </tr> <tr> <td></td> <td>Pump-out fault</td> <td>see also Chapter 17.0</td> </tr> <tr> <td></td> <td>Pump-out menu</td> <td>see also Chapter 10.2</td> </tr> <tr> <td></td> <td>Winter operation</td> <td>see also Chapter 12.0</td> </tr> </table>		Manual pump-out off	see also Chapter 7.8		Manual pump-out on	see also Chapter 7.8		Automatic pump-out mode	see also Chapter 7.8		Pump-out fault	see also Chapter 17.0		Pump-out menu	see also Chapter 10.2		Winter operation	see also Chapter 12.0
	Manual pump-out off	see also Chapter 7.8																	
	Manual pump-out on	see also Chapter 7.8																	
	Automatic pump-out mode	see also Chapter 7.8																	
	Pump-out fault	see also Chapter 17.0																	
	Pump-out menu	see also Chapter 10.2																	
	Winter operation	see also Chapter 12.0																	

## 7.10 Infeed symbols and their meaning

	<b>Infeed symbols:</b> The symbol changes colour depending on the operating mode, thus indicating the current status. The “Infeed” submenu opens when the symbol is pressed.	
Colour	Operating mode	Explanation
 Grey	Ready	<b>Infeed</b> Setpoint level reached Waiting for request
 Red	Fault	<b>Infeed faulty</b> Circuit breaker has tripped. Check the corresponding valve. <i>See Chapter 17.0.</i>
 Yellow	Off	<b>Manual infeed off</b> The function was manually switched off in the infeed menu.
 Green	Automatic mode	<b>Infeed switched on</b> The level has fallen below the set level and the infeed function was automatically switched on.
 Green	Manual mode	<b>Infeed manual mode switched on</b> The function was manually started in the infeed menu. Manual operation is limited to 1...120 seconds. The function is then stopped and switched to automatic mode. <i>See Chapter 10.3.</i>
 Blue	Winter operation	<b>Infeed switched off</b> The pump shaft is emptied to the set level and the infeed function is switched off. <i>See Chapter 12.0.</i>

## 7.11 Infeed mode

	<p>The submenu shown on the left opens when the  symbol is actuated in the main display.</p> <p>The operating mode for feeding in can now be changed here. After actuation and in the event of errors in the infeed, the keys change their colour, among other things.</p> <table border="1" data-bbox="662 1738 1393 2056"> <tr> <td></td> <td>Manual infeed off</td> <td>Also see Chapter 7.10</td> </tr> <tr> <td></td> <td>Manual infeed on</td> <td>Also see Chapter 7.10</td> </tr> <tr> <td></td> <td>Infeed automatic mode</td> <td>Also see Chapter 7.10</td> </tr> <tr> <td></td> <td>Infeed fault</td> <td>see also Chapter 17.0</td> </tr> <tr> <td></td> <td>Infeed menu</td> <td>see also Chapter 10.3</td> </tr> <tr> <td></td> <td>Winter operation</td> <td>see also Chapter 12.0</td> </tr> </table>		Manual infeed off	Also see Chapter 7.10		Manual infeed on	Also see Chapter 7.10		Infeed automatic mode	Also see Chapter 7.10		Infeed fault	see also Chapter 17.0		Infeed menu	see also Chapter 10.3		Winter operation	see also Chapter 12.0
	Manual infeed off	Also see Chapter 7.10																	
	Manual infeed on	Also see Chapter 7.10																	
	Infeed automatic mode	Also see Chapter 7.10																	
	Infeed fault	see also Chapter 17.0																	
	Infeed menu	see also Chapter 10.3																	
	Winter operation	see also Chapter 12.0																	

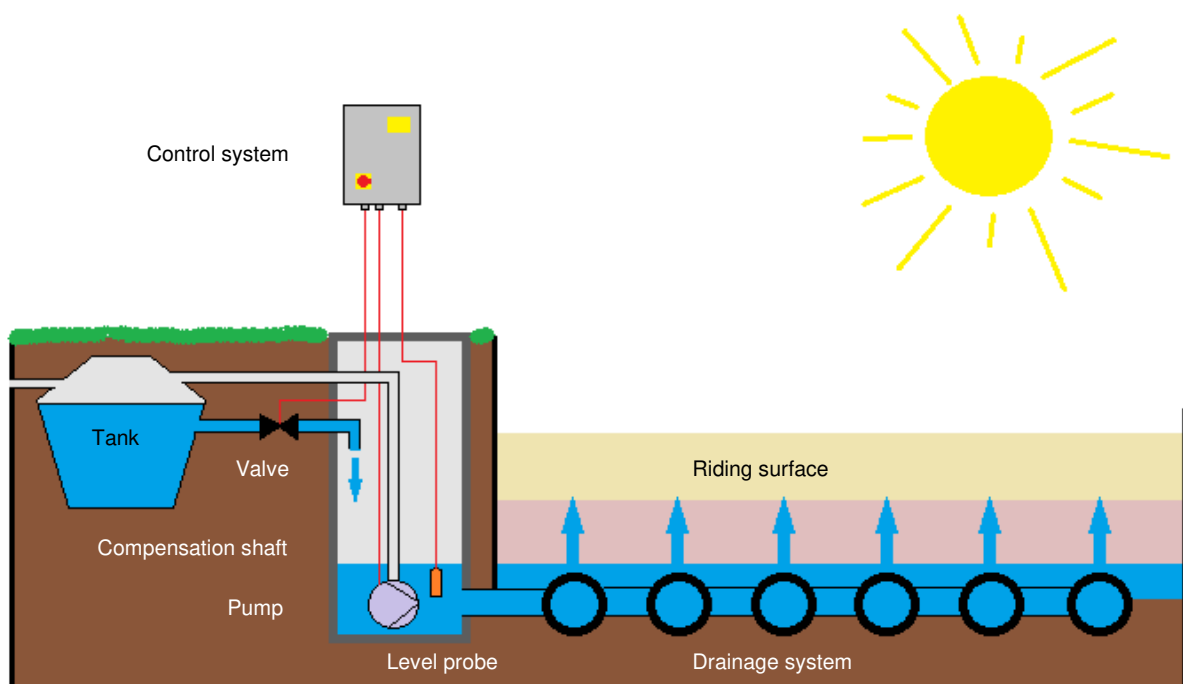
## 8. Functional description

“Ebb-flow” means that water is removed from the riding surface in ‘ebb’ mode (pump-out) and fed to the riding surface in ‘flow’ mode (infeed).

When it rains, the excess water is pumped out fully automatically down to a previously manually set setpoint level, which means that there is no prolonged moisture in the riding arena.

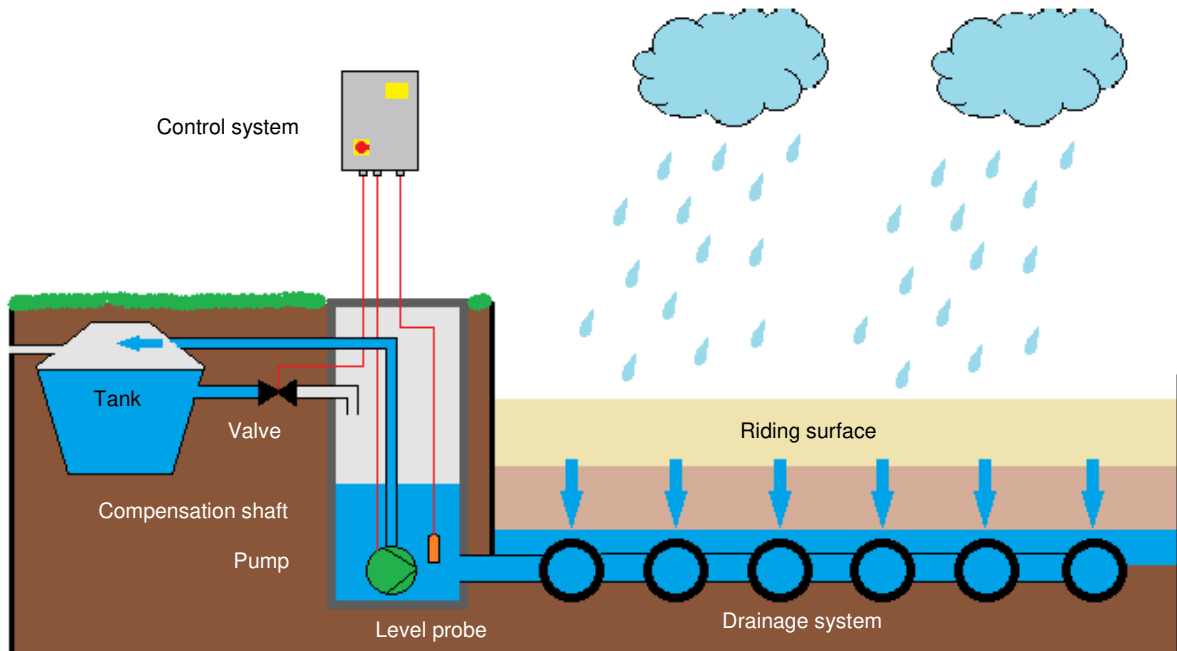
If the riding surface is too dry, for example due to extreme sunshine and heat, water is automatically fed to it up to the set setpoint level.

### 8.1 Infeed






The actual water level in the shaft is measured via a fill level probe, which is built into the compensation shaft, and forwarded to the control system. If the water level falls below the set setpoint value and the set infeed hysteresis, a corresponding valve is opened. From a water reservoir, water is now fed into the equalisation shaft and the drainage pipes. From there the water is absorbed by the dry riding surface. If the setpoint level is exceeded again, the valve is closed again.

## 8.2 Pump-out

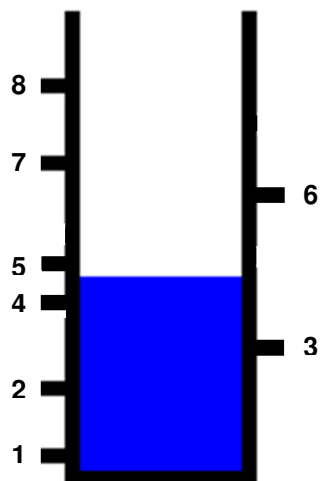


When it rains, the excess water from the riding surface is channelled back into the equalisation shaft via the drainage pipes. If the set setpoint value and the pump-out hysteresis are exceeded, the control system switches on the pump installed in the shaft. Excess water is now pumped out until the setpoint level has been reached again. If the fill level falls below the setpoint level, the pump in the equalisation shaft is switched off.

### 8.3 Level settings

Item	Definition	Factory settings*
8	High water level	90 cm
7	Maximum water level	60 cm
6	Pump-out hysteresis	3 cm
5	Water level setpoint 	20 cm
	Water level setpoint 	20 cm
4	Water level setpoint 	15 cm
3	Infeed hysteresis	3 cm
2	Minimum water level	10 cm
1	Dry run	0 cm

\*These measuring ranges are for 0...100 cm and may need to be adapted to the local conditions. See also Chapter 10.4



### 8.4 Fault messages and alarms

The control system monitors the connected systems (see also the separate Chapter 17.0 "Fault list") for possible faults.

Faults are signalled via a red LED, a built-in buzzer or via up to three potential-free alarm relays.

The control system features three alarm relays, which can be used to output the alarms flexibly. You may program which alarm is assigned to which relay as well as the switching behaviour of the relay contacts.



## 9. Fuse protection and optional accessories

### 9.1 Power unit

The power unit of the control system depends on the equipment. Please check the relevant circuit diagram of the control system.

### 9.2 Fuse protection provided by customer

The power supply of the control system has to have an all-pole protection on-site via a suitable pre-fuse that is appropriate for the current ratings of the control system. The max. permissible values can be found on the type plate or the enclosed documents and wiring diagrams. The tripping characteristics have to match the current conditions.

### 9.3 24 VAC transformer

Depending on the configuration of the control system, a transformer can be installed to connect the appropriate solenoid valves or electrical actuators.



**The maximum connected load of the corresponding transformer must be observed. This information is provided in the accompanying circuit documentation.**

### 9.4 Circuit breaker, emergency off

If the control system is equipped with a circuit breaker, the control system can be switched on or off via the circuit breaker. The circuit breaker has an emergency stop function and switches off the entire control system in the event of danger, even under load. The circuit breaker can be secured against unauthorised access by using a padlock in the OFF position.



**Terminals in front of the switch will carry voltage, even when the circuit breaker is turned off!**



**If the control system is equipped with a battery module, the control electronics will be operational even when the main switch is switched off, as long as the batteries are charged; the pumps and valves will not be working.**

### 9.5 Residual current circuit breaker (RCCB)

The control system is equipped with a residual current circuit breaker. If an insulation fault occurs, the residual current circuit breaker trips and disconnects the pumps and valves from the power supply. The error is shown as a fault message in the control's TFT display. After the error has been rectified, the residual current circuit breaker must be switched on again manually.

### 9.6 Overvoltage protection

We recommend installing suitable overvoltage protection, particularly for control systems operated in the open or those connected to supply networks from overhead lines or other environments in which overvoltage can be expected. It may also be necessary to use overvoltage protection for the measuring lines of the level controls.

### 9.7 Battery module\*

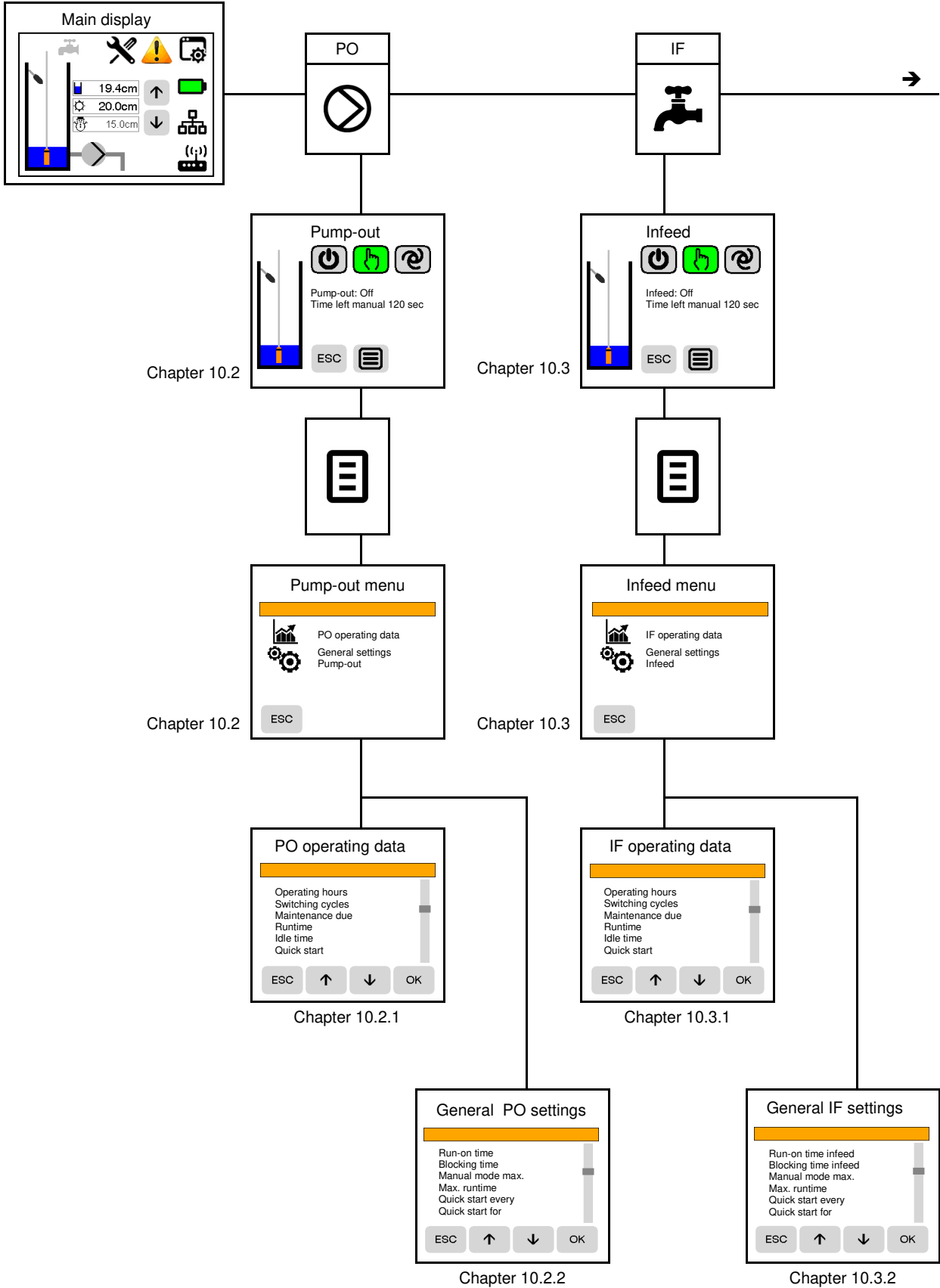
The control system can be operated with a battery module. If the control voltage fails, the control system will continue to operate. Settings can be changed in the control system's menu. **However, the pumps and valves are not operated!**

The batteries are charged via the control system and can be used via the 24 V connection and the potential-free alarm relay to enable signalling of the alarm (indicator lamp/horn) even in the event of a power failure.

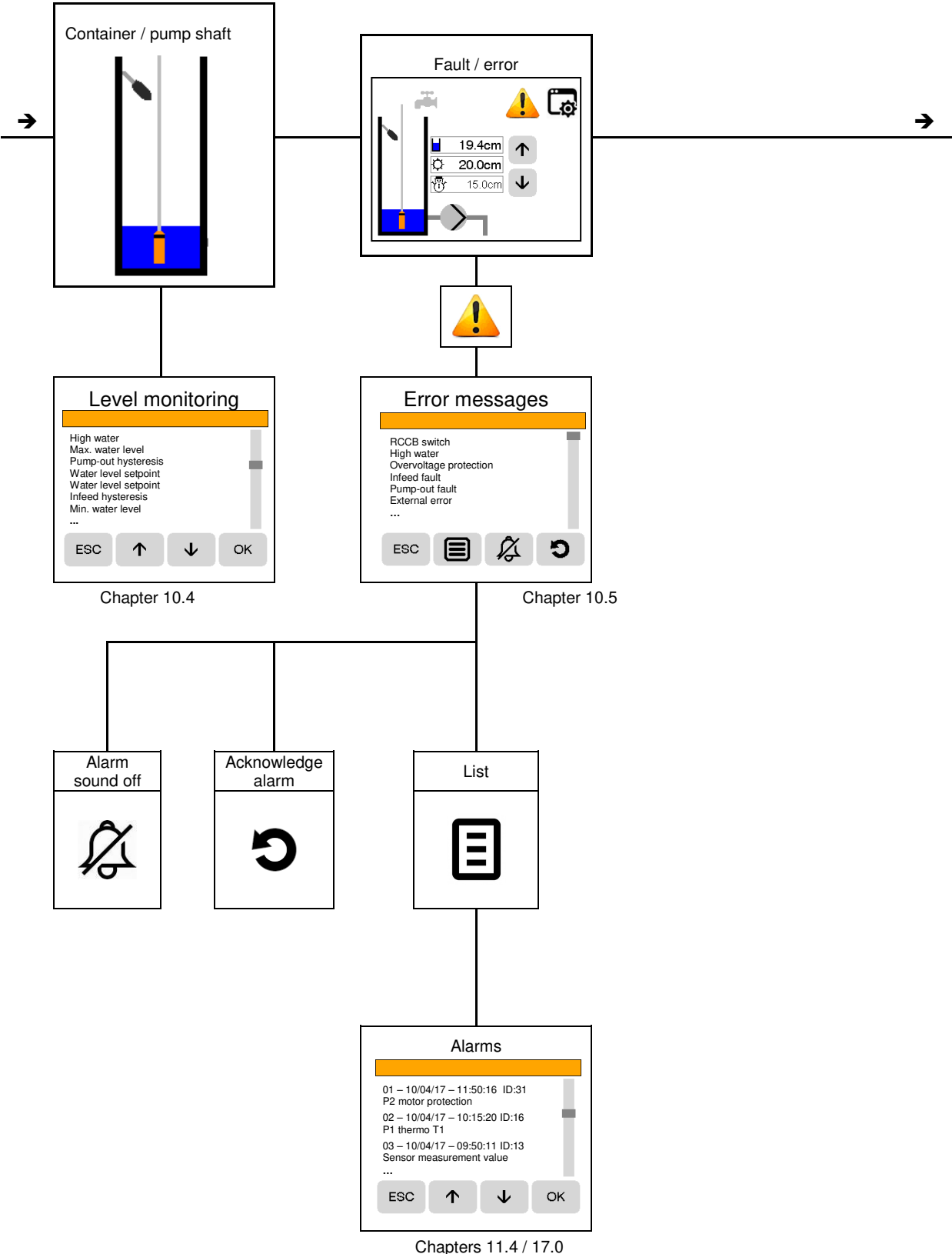
\*Please also read the separate operating instructions for the battery module!

## 10. Main display

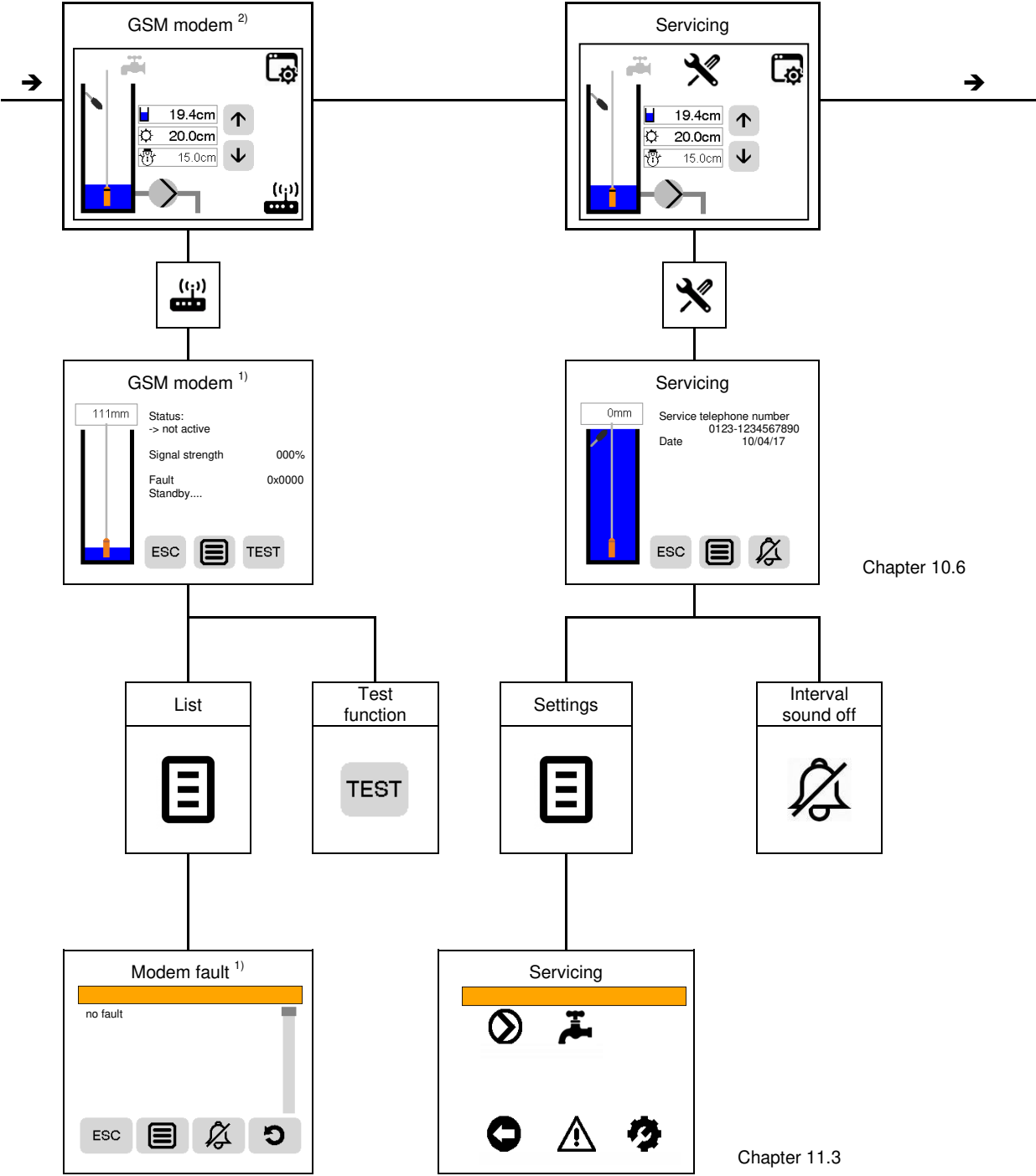
### 10.1 Main display overview



**Main display overview:**



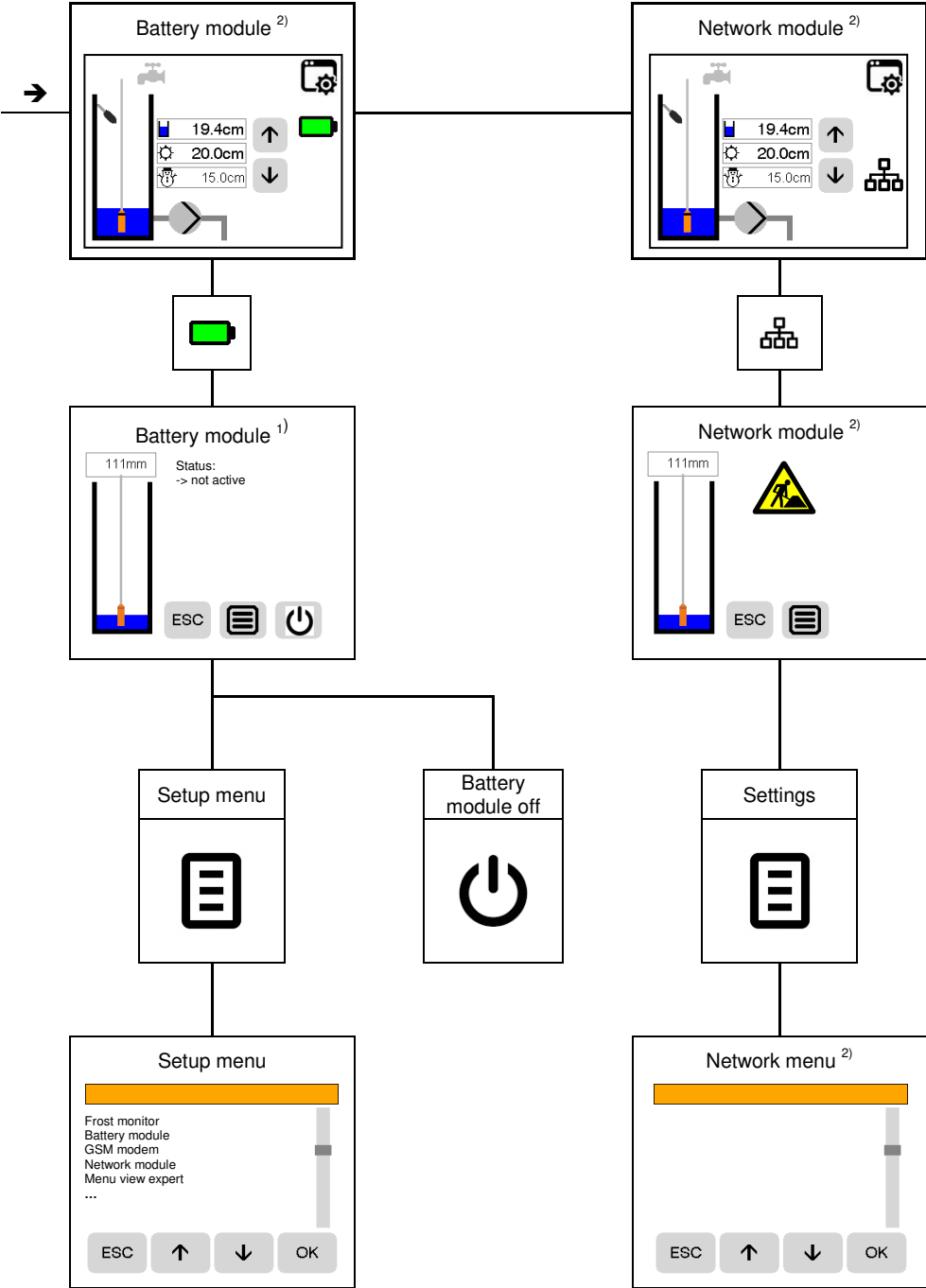
Main display overview:



1) Please observe the separate operating instructions for the GSM modem.

2) Advanced option, additional hardware required.



**Main display overview:**




Chapter 11.2


1) Please read the separate operating instructions for the battery module.  
 2) Advanced option, additional hardware required.


## 10.2 Pump-out

Symbol	Designation	Explanation
	Pump-out operating data	The operating data for the pump-out function can be read off in this menu item.
	General settings Pump-out	Further settings for the pump-out function can be adjusted in this menu item.



### 10.2.1 Pump-out function operating data

Function	Explanation	
Operating hours	The current operating hours of the pump-out function are displayed here. If needed, the counter can be reset by pressing the <b>OK</b> key in the expanded menu.	
Switching cycles	The current switching cycles of the pump-out function are displayed here. If needed, the counter can be reset by pressing the <b>OK</b> key in the expanded menu.	
Maintenance due	Disabled	A maintenance notification is issued
	Enabled	After activation, the operating hours for the pump(s) can be entered here. If these are exceeded, a maintenance message appears in the main display and a corresponding interval sound is emitted.
<p>The interval sound can be interrupted for 24 hours by pressing the  button.</p> <p>The maintenance interval is reset by means of a service deployment in conjunction with entering the new accumulated hours.</p> <p><i>Further functions are described in Chapter 10.6.</i></p>		
Runtime	Seconds	Displays the last runtime of the pump(s).
Idle time	Seconds	Shows the last idle time of the pump(s).
Quick start	Seconds	Shows the time for the last quick start of the pump(s).
The above times are used to determine the data for the pump-out function.		




10.2.2  General pump-out settings

Function	Explanation	
Pump-out run-on time	1 – 999 seconds	0 seconds > function off
	After falling below the setpoint level, the pump remains in operation for the set time.	
Pump-out blocking time	1 – 999 seconds	0 seconds > function off
	After the end of the pump-out process, it remains blocked for the set time.	
Max. manual pump-out operation	1 – 120 seconds	0 seconds > function off
	In this menu item the max. runtime for “Manual on” can be set for the pump-out function. <i>See Chapter 7.8.</i>	
Max. runtime	1 - 9999 minutes.	0 minutes > function off
	<u>0000min Alarm:</u> If the pump-out function runs longer than the entered time without interruption, an alarm <i>Pump-out runtime</i> is triggered. The pump(s) is (are) still in operation. If pumping-out is stopped, the alarm will also stop.	
	<u>0000min Stop:</u> If the pump-out function runs longer than the entered time without interruption, an alarm <i>Pump-out runtime</i> is triggered. The pump(s) is (are) stopped. Pumping out does not continue until the error has been manually acknowledged on the control system.	
<p>If pumps are not used for a longer period of time, they may be stuck the next time they are started. A quick start for the pump(s) can be set in the following menu items. If the pumps have not been operated during the set time, they are put into operation for the set number of seconds. An intermediate pumping process resets the time counter.</p> <p> <b>Attention! If the water level falls below the minimum, this function will not be switched off. Dry run of the pump(s) possible!</b></p>		
Quick start every...	1 – 9999 hours	0 hours > function off
	Set the waiting time in hours after which the forced start-up is to take place.	
Quick start for...	1 – 9999 seconds	
	After the waiting time has elapsed, the pump(s) is (are) activated for the set time.	


### 10.3 Infeed


Symbol	Designation	Explanation
	Infeed operating data	The operating data for the infeed function can be read off in this menu item.
	General settings Infeed	Further settings for the infeed function can be adjusted in this menu item.

#### 10.3.1 Infeed function operating data

Function	Explanation	
Operating hours	The current operating hours of the infeed function are displayed here. If needed, the counter can be reset by pressing the  key in the expanded menu.	
Switching cycles	The current switching cycles of the infeed function are displayed here. If needed, the counter can be reset by pressing the  key in the expanded menu.	
Maintenance due	Disabled	A maintenance notification is issued
	Enabled	After activation, the operating hours for the water infeed can be entered here. If these are exceeded, a maintenance message appears in the main display and a corresponding interval sound is emitted.
<p>The interval sound can be interrupted for 24 hours by pressing the  button.</p> <p>The maintenance interval is reset by means of a service deployment in conjunction with entering the new accumulated hours.</p> <p><i>Further functions are described in Chapter 10.6.</i></p>		
Runtime	Seconds	Shows the last runtime of the water infeed.
Idle time	Seconds	Shows the last idle time of the water infeed.
Quick start	Seconds	Shows the time for the last quick start of the water infeed.
The above times are used to determine the data for the infeed function.		



10.3.2  General infeed settings

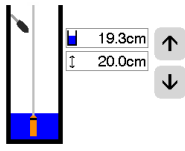
Function	Explanation	
Run-on time feed	1 – 999 seconds	0 seconds > function off
	After exceeding the setpoint level, the infeed remains open for the set time.	
Blocking time feed	1 – 999 seconds	0 seconds > function off
	After the end of the infeed process, it remains blocked for the set time.	
Max. manual infeed operation	1 – 120 seconds	0 seconds > function off
	In this menu item the max. runtime for “Manual on” can be set for the infeed function. <i>See Chapter 7.1</i>	
Max. runtime	1 - 9999 minutes.	0 minutes > function off
	<u>0000min Alarm</u> : If the infeed function runs longer than the entered time without interruption, an alarm <i>Infeed runtime</i> is triggered. The water infeed remains open. If the infeed is stopped, the alarm also stops.	
	<u>0000min stop</u> : If the infeed function runs longer than the entered time without interruption, an alarm <i>Infeed runtime</i> is triggered. The water infeed is stopped. The infeed will not continue until the error has been manually acknowledged on the control system.	
<p>If valves are not used for a longer period of time, they may be stuck the next time they are started. A quick start-up for the pump(s) can be set in the following menu items. If the valves have not been operated during the set time, they are put into operation for the set number of seconds. An intermediate infeed process resets the time counter.</p> <p> <b>Attention! Exceeding the maximum water level does not switch off this function. Flooding may result!</b></p>		
Quick start every...	1 – 9999 hours	0 hours > function off
	Set the waiting time in hours after which the forced start-up is to take place.	
Quick start for...	1 – 9999 seconds	
	After the waiting time has expired, the valves are activated for the set time.	

## 10.4 Level monitoring – 4...20mA

Using a graphically illustrated pump shaft in the main display, the operator is informed about the current level and the measuring system.

First, the measuring range, the level unit and, if applicable, the high water float switch in the setup menu.

*More detailed information about the setup menu is provided in Chapter 11.2.*

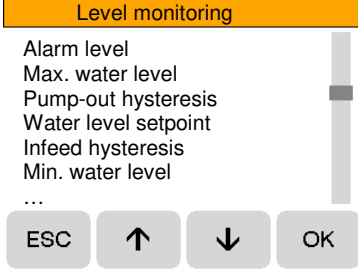
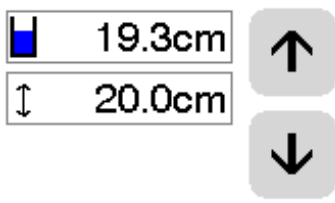


Chart	Description	Explanation
	<ul style="list-style-type: none"> <li>- Measuring method 4...20 mA</li> <li>- Level unit "cm"</li> <li>- High water float</li> </ul>	<p>After pressing the symbol, the "Level monitoring" menu appears.</p> <p>The fill level for the respective switching points can be entered here.</p> <p>The zero adjustment for the measuring system can also be performed here.</p>

The scaling of the graphical level indicator is based on the alarm level defined in the "Level monitoring" menu.


The measured level value is shown in the display as an actual value next to the shaft symbol.


Located below is the display for the manually specified setpoint value.

If an **additional high water float switch** is installed in the system and connected to the control system (beyond the standard measuring system), it must be enabled in the setup menu. It is then displayed in the shaft symbol.

 <p><i>Manual adjustment of the setpoint value on the main display</i></p> 	<p><b>Setting range:</b> min. 1 cm (1 mm) – max. 400 cm (4000 mm)</p>
	<p><b>Alarm level:</b> The alarm level can be set up in this menu item. An alarm is issued if the level is exceeded (high water). The value must be adapted to the local conditions.</p>
	<p><b>Maximum water level:</b> The maximum adjustable fill level for the setpoint value water level is set here. Manual adjustment  of the setpoint via the main display is only possible up to this value.</p>
	<p><b>Pump-out hysteresis:</b> In order to delay the activation of the pump-out function, a value between 2–10 cm (20–100 mm) must be set in this menu item.</p>
	<p><b>Water level setpoint:</b> The setpoint value for the water level in the equalisation shaft which is used to regulate the level is specified in this menu item.</p> <p>If necessary, the value can be adjusted up or down using the two arrow keys on the main display.</p> <p>If this setpoint value is exceeded or fallen short of, the infeed or pump-out process is stopped.</p>
	<p><b>Infeed hysteresis:</b> In order to delay the activation of the infeed function, a value between 2–10 cm (20–100 mm) must be set in this menu item.</p>
	<p><b>Minimum water level:</b> The minimum fill level that can be set for the setpoint value water level is set here. Manual adjustment  of the setpoint via the main display is only possible up to this value.</p>
<p><b>Dry run:</b> A dry run level can be entered in this menu item. An alarm is issued if this value is fallen short of.</p>	

**Perform zero adjustment:** A zero adjustment of the measuring system used is carried out in this menu item. When calibrating the measuring system must not be in the water. You must also ensure that the measuring system is at rest during the calibration procedure. The zero balance calibration can be repeated at any time.



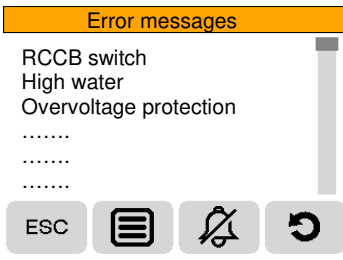

10.5  Error messages


If the control system detects a fault during operation, the status is displayed through this symbol  in the main display.

Press this symbol to open the “error message” menu.

The following functions can be executed there and the following information is available:

*Further functions on the topic of faults and alarms are described in Chapter 11.3 and 11.4.*

Symbol / chart	Explanation
	<p><b>Alarm sound off:</b> The internal alarm tone is switched off by pressing the button with this symbol. Previously selected alarm relays are also reset. Faults are not acknowledged.</p>
	<p><b>Acknowledge alarm/fault:</b> By pressing the key with this symbol, faults are manually acknowledged as soon as the fault is rectified or no longer pending.</p>
	<p><b>Error messages:</b> In case of a fault, all currently present faults are displayed in the display field “Error messages”.</p> <p>Further information on the individual faults/malfunctions is provided in the table “Fault list” in Chapter 16.0.</p>
	<p><b>Alarms:</b> Pressing the field with this symbol opens the fault list. This menu displays the fifty most recently faults. No entries can be made in this menu.</p>

10.6  Maintenance

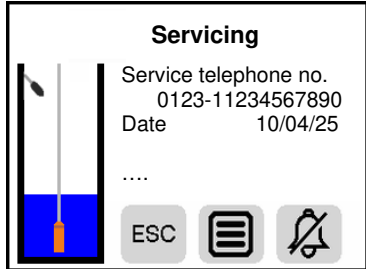
The control system features a maintenance menu, in which a maintenance interval can be programmed, if needed.

If a condition is reached by date, the symbol  is displayed in the main display and an acoustic interval tone sounds.

Click on the symbol to open the status display for further information.

*More detailed information and further functions in the maintenance menu are described in Chapter 11.3.*

The messages in the "Maintenance" status message are described in more detail in the following table.



<b>Service telephone number</b>	If a service telephone number is entered in the maintenance menu, this is shown here in the case service is due.
<b>Date</b>	Indicates that service is due on this date.



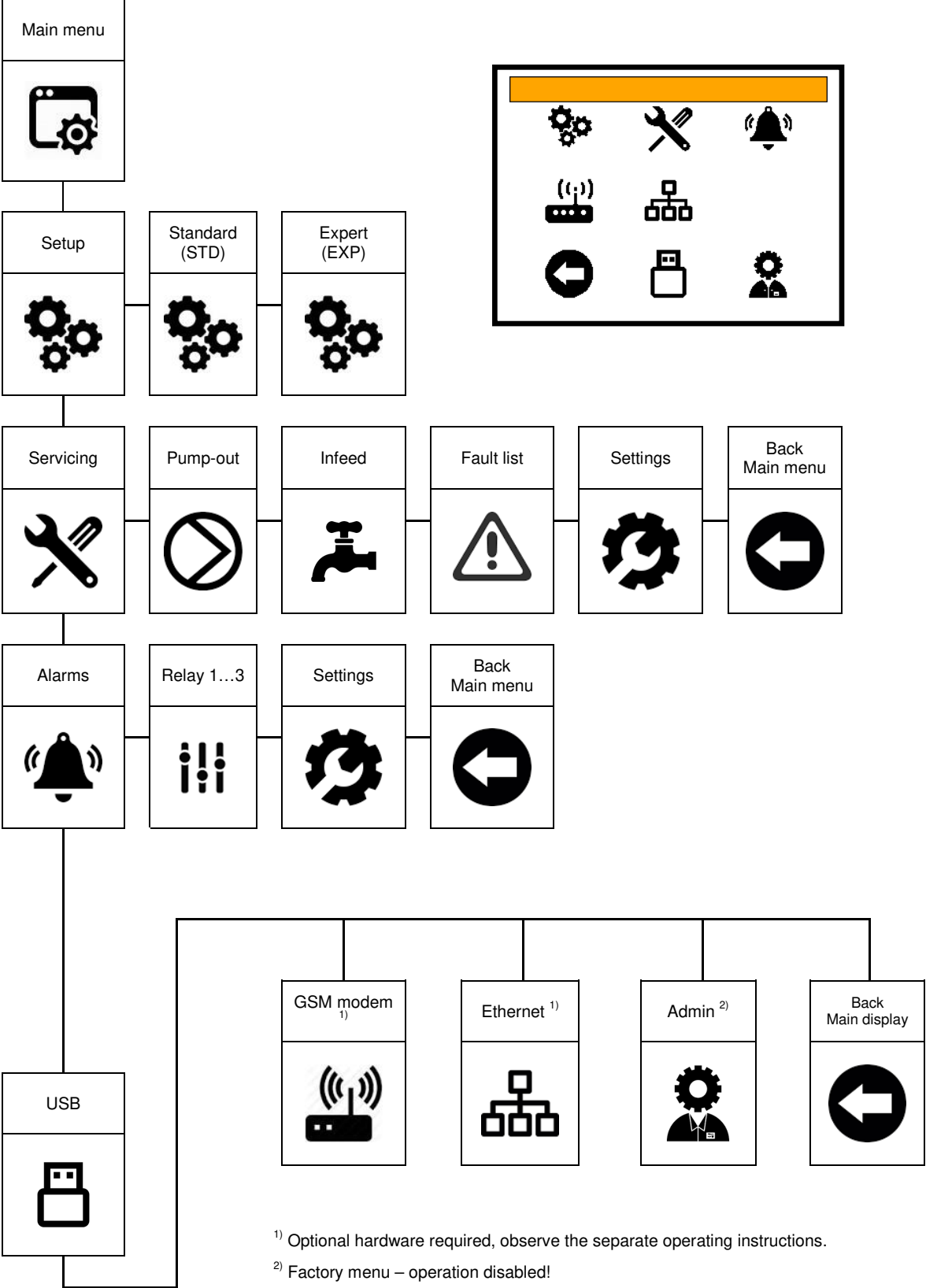
**Interval tone off:** The interval sound can be interrupted for 24 hours by pressing the button.  
 The maintenance interval is reset via a service call in combination with the specification of a new service appointment.  
*Further functions for maintenance are described in Chapter 11.3.*



**Servicing:** Pressing this button will open the maintenance menu.  
 The operating data for pumping out / filling as well as the fault message list can be opened here, among other things.  
*Further functions are described in Chapter 11.3.*

# 11. Main menu

## 11.1 Main menu overview




<sup>1)</sup> Optional hardware required, observe the separate operating instructions.

<sup>2)</sup> Factory menu – operation disabled!


## 11.2 Setup submenu

All basic settings of the control system are made in the setup menu during initial commissioning. Changes are possible at any time later.

 **Note!** The setup menu is separated into the menu settings "Standard (STD)" and "Expert (EXP)".

	Function	Explanation/setting options	
STD	Language	This menu item allows you to select the user interface language. All text will appear in the language selected.	
		German (D)	German (D) English (GB) Dutch (NL) French (F) Italian (I)
STD	Date	The current date is entered in this menu item.	
		dd/mm/yy	Day/Month/Year
STD	Time	The current time is entered in this menu item.	
		hh:mm:ss	Hours:Minutes:Seconds
STD	S/W automatic	If you press the "OK" button here, the summer/winter time settings are automatically updated.	
		Automatic switch-over: <input checked="" type="checkbox"/> on, <input type="checkbox"/> off	
EXP	Display illumination	If the display is not actuated for an extended period of time, it may be switched off after a specified time. The following functions are available.	
		always on	Switch off after: 1 - 30 minutes.
STD	Password	In this menu you can change the four-digit password of the control system. The password should be noted in a safe place. <i>Please also observe Chapter 7.6.</i>	
		0000	max. 9999
EXP	Mains delay	After a mains failure the control system will only start up after the time set here has elapsed.	
		1 – 1000 seconds	0 seconds > function off
EXP	Key acknowledgement	The acknowledgement tone for the keys can be switched on or off here.	
		<input checked="" type="checkbox"/> Button sounds ON	<input type="checkbox"/> Button sounds OFF





EXP	Level unit	The display unit for the level evaluation can be selected in this menu.	
		mm	Millimetre
		cm	Centimetre
STD	Measuring range	If 4...20 mA was selected as the measuring method, then the measuring range of the connected probe must be entered in this menu item. Information on the measuring range can be found on the respective probe (e.g. 0...4 mWs) The unit of measure automatically adjusts to the previously selected level unit.	
		1 – 4.000 mm	1 – 400 cm
EXP	High water float	If an additional float switch is connected to the high water float switch, then its function must be enabled in this menu item. Once enabled, the HW float symbol is shown on the main display graphic. <i>Further information on level monitoring can be found in Chapter 10.4</i>	
		<input checked="" type="checkbox"/> High water float ON	<input type="checkbox"/> High water float OFF
EXP	Winter operation	The winter operation function is enabled in this menu item. After activation, the setpoint value display is shown in the main display and in the “Level monitoring” menu. <i>For more information on the function, see below and Chapter 11.5</i>	
		<input checked="" type="checkbox"/> Winter operation on	<input type="checkbox"/> Winter operation off
EXP	Frost monitor	The connection message input 1 (ME1) can be used to connect a frost monitor / temperature sensor for winter operation. This menu item is only available after activating the “Frost monitor” function. If the “Frost monitor” function is not used, signal input 1 is enabled for external shutdown of the control system. <i>Please also observe the information in Chapters 6.4 and 11.5.</i>	
		<input checked="" type="checkbox"/> Frost monitor on	<input type="checkbox"/> Frost monitor off
EXP	Battery module	If the control system is equipped with an optional battery module, the module must be enable in this menu item. After activation, the battery symbol appears in the main display. <i>Further information on the battery module is provided in the separate operating instructions.</i>	
		<input checked="" type="checkbox"/> Battery module ON	<input type="checkbox"/> Battery module OFF

EXP	<b>GSM modem</b>	The control system can be optionally retrofitted with a GSM modem for sending fault and status messages. If the GSM module is used, it must be enabled in this menu item. After activation, the modem symbol is displayed in the main menu. <i>Further information on the GSM module is provided in the separate operating instructions.</i>	
		<input checked="" type="checkbox"/> GSM modem ON	<input type="checkbox"/> GSM modem OFF
EXP	<b>Network module</b>		
		<input checked="" type="checkbox"/> Network module ON	<input type="checkbox"/> Network module OFF
STD	<b>Menu view expert</b>	The setup menu is separated into a standard view and an expert view. The expert menu view is enabled in this menu.	
		<input checked="" type="checkbox"/> Expert menu view ON	<input type="checkbox"/> Expert menu view OFF
STD	<b>Software CPU</b>	Current software on the CPU (display only, no setting possible)	
STD	<b>Software GLP</b>	Current software on the GLP (display only, no setting possible)	



11.3  Maintenance submenu

**All settings for the service are to be made in the maintenance menu.**  
**The pump data and faults can also be queried here.**  
*Further functions are described in Chapter 10.6.*

Symbol	Explanation / setting options																														
 Pump-out	The data of the pump-off function can be read off in this submenu item. If necessary, these can also be deleted here.  <i>The functional descriptions in Chapter 10.2.1 Pump-out must be observed.</i>																														
 Infeed	The data of the infeed function can be read off in this submenu item. If necessary, these can also be deleted here.  <i>The functional descriptions in Chapter 10.3.1 Infeed must be observed.</i>																														
 Settings	This menu item is used to enable the maintenance or service view. Here you can specify the date on which the maintenance indication is shown on the display. The service telephone number is also entered here.  <i>The functional descriptions in chapter 10.6 Maintenance must be observed.</i> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <div style="background-color: #ffcc00; text-align: center; padding: 2px;"><b>Service</b></div> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Service tel. no. 0130-331331</p> <p>Station name Riding arena 1</p> <p>Date 1 2 3 4/12/05</p> </div> <div style="width: 50%;"> <p>ESC</p> <p>4 5 6 7 &lt;X&gt;</p> <p>8 9 : ; 0Aa&amp;</p> <p>&lt; = &gt; ? OK</p> </div> </div> </div> <p>A station name may also be entered here. When entering the station name, the function key 0Aa&amp; be used to switch to the individual letters and special characters.</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p>[0-9] ; &lt;=&gt;?    @ [A-O]</p> <p>[P-Z] [ ] ^ _    ' [a-o]</p> <p>[p-z] {   } ~    ! " # \$ % &amp; ' ( ) * + , - /</p> </div>																														
 Fault list	This submenu item lists the most recent faults. These are displayed as follows. <div style="margin: 10px 0;"> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="6" style="background-color: #ffcc00; text-align: center; padding: 2px;">Alarms</th> </tr> </thead> <tbody> <tr> <td style="width: 5%; text-align: center;">1</td> <td style="width: 30%;">01- 03/05/17 - 13:10:54</td> <td style="width: 15%; text-align: center;">ID:06</td> <td style="width: 5%;"></td> <td style="width: 15%; text-align: center;">4</td> <td style="width: 30%;"></td> </tr> <tr> <td></td> <td>ABCDEFGH</td> <td></td> <td></td> <td style="text-align: center;">5</td> <td></td> </tr> <tr> <td style="text-align: center;">2</td> <td>02- 02/05/17 - 22:05:10</td> <td style="text-align: center;">ID:31</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>IJKLMNOP</td> <td></td> <td></td> <td style="text-align: center;">6</td> <td></td> </tr> </tbody> </table> </div> <div style="margin: 10px 0;"> <p>ESC    ↑    ↓    OK</p> </div> <ol style="list-style-type: none"> <li>1. Last fault</li> <li>2. Second to last fault</li> <li>3. Date of fault</li> <li>4. Fault ID code</li> <li>5. Time the fault occurred</li> <li>6. Fault definition</li> </ol>	Alarms						1	01- 03/05/17 - 13:10:54	ID:06		4			ABCDEFGH			5		2	02- 02/05/17 - 22:05:10	ID:31					IJKLMNOP			6	
Alarms																															
1	01- 03/05/17 - 13:10:54	ID:06		4																											
	ABCDEFGH			5																											
2	02- 02/05/17 - 22:05:10	ID:31																													
	IJKLMNOP			6																											

11.4  Alarms submenu

In the "Alarms" menu the detected faults or malfunctions are assigned to the three alarm relays available in the control system.




**Relay 1...3**

Function	Explanation / setting options								
Function	The switching behaviour of the alarm relay can be selected in this menu item.								
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">NC</td> <td>Opens on alarm or when the control system is de-energised.</td> </tr> <tr> <td>NO</td> <td>Closes on alarm.</td> </tr> <tr> <td>NC + flashing</td> <td>Opens on alarm and flashes and/or opens when the control system is de-energised.</td> </tr> <tr> <td>NO + flashing</td> <td>Closes on alarm and flashes.</td> </tr> </table>	NC	Opens on alarm or when the control system is de-energised.	NO	Closes on alarm.	NC + flashing	Opens on alarm and flashes and/or opens when the control system is de-energised.	NO + flashing	Closes on alarm and flashes.
	NC	Opens on alarm or when the control system is de-energised.							
	NO	Closes on alarm.							
	NC + flashing	Opens on alarm and flashes and/or opens when the control system is de-energised.							
NO + flashing	Closes on alarm and flashes.								
Reset with buzzer	<p>The reset function of the relays can be configured in this submenu. If the corresponding relay is set to "Reset with buzzer", the relay will switch with the corresponding fault, and the relay will switch back when the "alarm sound off" function is activated. This can be used to deactivate external alarm installations (horn, warning light) which are switched via the relay. If this function is not used, the relay switches back only after acknowledging the fault.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td><input checked="" type="checkbox"/> reset with buzzer ON</td> <td><input type="checkbox"/> reset with buzzer OFF</td> </tr> </table>	<input checked="" type="checkbox"/> reset with buzzer ON	<input type="checkbox"/> reset with buzzer OFF						
<input checked="" type="checkbox"/> reset with buzzer ON	<input type="checkbox"/> reset with buzzer OFF								
Reported faults...	<p>This menu item contains a list of all faults identified by the control system. The faults which are to be reported via the relay if a corresponding fault has occurred can now be selected from the list.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td><input checked="" type="radio"/> Fault is reported</td> <td><input type="radio"/> Fault is not reported</td> </tr> </table>	<input checked="" type="radio"/> Fault is reported	<input type="radio"/> Fault is not reported						
<input checked="" type="radio"/> Fault is reported	<input type="radio"/> Fault is not reported								






**Settings**

Function	Explanation / setting options				
Alarm buzzer	The alarm sound of the internal buzzer can be changed or switched off in this menu item.				
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">off</td> <td style="width: 15%;">Sound sequence 1</td> <td style="width: 15%;">Sound sequence 2</td> <td style="width: 15%;">Sound sequence 3</td> <td style="width: 35%;">Sound sequence 4</td> </tr> </table>	off	Sound sequence 1	Sound sequence 2	Sound sequence 3
off	Sound sequence 1	Sound sequence 2	Sound sequence 3	Sound sequence 4	

<p>Fault settings</p>	<p>A delay time can be set for the individual fault messages in this menu item.                  You may also select which error message can be acknowledged (reset) only manually.</p> <p>If a GSM modem is activated in the control system, remote acknowledgement can also be enabled for the corresponding faults.</p> <p><i>Further information for remote acknowledgement is provided in the operating instructions for the GSM modem and/or Ethernet module.</i></p>	
<p>Select respective faults from the list...</p>		<p><b>Attention! Automatic or remote acknowledgement is not possible in some cases, either because the hardware must be manually reset on site or because a regulation (ATEX) does not allow this!</b></p>
	<input checked="" type="checkbox"/> Automatic acknowledgement	<input type="checkbox"/> Manual acknowledgement
	<input checked="" type="checkbox"/> Remote acknowledgement: yes	<input type="checkbox"/> Remote acknowledgement: no
	Delay time	0 seconds > function off      1 – 999 seconds
<p>Alarm repetition 24 hours</p>	<p>If the buzzer or alarm relay is acknowledged in the event of an alarm but the fault is not acknowledged, a new alarm can be triggered after 24 hours, depending on the selection.</p>	
	<input checked="" type="checkbox"/> Alarm repetition 24 hours: yes	<input type="checkbox"/> Alarm repetition 24 hours: no

11.5  **USB submenu**

<p>The control system must be equipped with a USB host port. This is located on the back of the control board. The housing must be opened for this.</p> <p>See Chapter 7.1.</p>	
	<p>The control system must be in operation in order to use this USB port. Since the switch cabinet door is opened for this, it must be ensured that any danger from electrical energy can be ruled out. If necessary, live components should be covered. The operator must also ensure that only qualified personnel are tasked.</p> <p>We recommend using a USB-Y or USB extension cable between the control system and the USB stick to connect the control system to the USB stick.</p>
  USB	<p>To load data from a USB stick to the control system or save from the device to the USB stick, proceed as follows. Open the control system and switch on the mains voltage. Insert a suitable USB stick into the USB 2.0 host port. The control system provides acoustic confirmation if the USB stick has been detected. The USB menu is then opened in the main menu and the following functions are enabled by pressing the symbol.</p>
Functions / explanations	
Save the configuration to the stick	
<p>The data and setting parameters can be saved from the control system to the USB stick with this selection.</p>	
Read configuration from the stick	
<p>Data and setting parameters are loaded from the USB stick to the control system with this selection. Make sure the data is compatible with the hardware. Data from a 2-pump control system should not be loaded on a 1-pump control system, as this would cause functional faults.</p>	
Save the operating data on the stick	
<p>The operating data (fault list, operating hours and switching cycles) can be saved on the USB stick in this selection menu. This data can then be opened and further processed in a spreadsheet application (MS Excel).</p>	
Software update from stick	
<p>If this function is selected, the control system searches for an update file on the USB stick. If a suitable file is found, this is read from the control system after a prompt is confirmed, and the software is updated.</p> <p><b>This point is recommended when the manufacturer has made available a software update. The file name of this software should not be changed.</b></p> <p><b>Attention!</b> It is to be noted that the control system will automatically initiate the software update if the USB stick is plugged in and the power turned on, without prompting the user!</p>	
	<p><b>Attention!</b> After the data has been exchanged, remove the USB stick from the control system! It should not remain plugged into the control system. Switch off the mains voltage, remove the USB stick and close the control housing again. Switch on the mains voltage.</p>

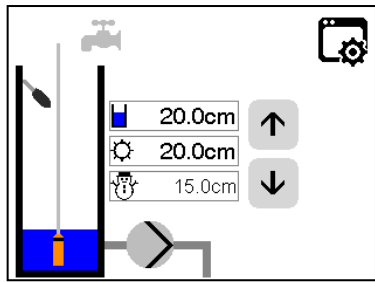
12.  **Functional description winter operation**

The control system has a "Winter operation" function, in which the water level in the equalisation shaft can be lowered over the winter months and the infeed function deactivated.

After activating the "Winter operation" function in the setup menu, an additional target value display is activated in the **main display** and **level monitoring**.

If necessary, the "Frost monitor" function can also be selected in the setup menu.

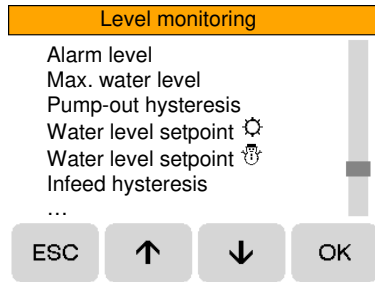
See also Chapters 6.1 and 11.2 for a description.





When the "Winter operation" function is switched on, this is displayed in the main menu as shown on the left.

**The currently active setpoint is shown in bold in the display.**

For a further description of the function, see Chapter 7.4



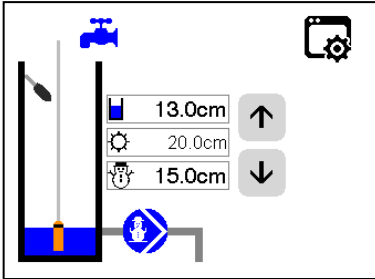
The target level for winter operation  must now be entered in the level monitoring menu. The hysteresis value for the pump-out function must be added.







The setting range should be between the min. water level and the setpoint water level in summer operation .

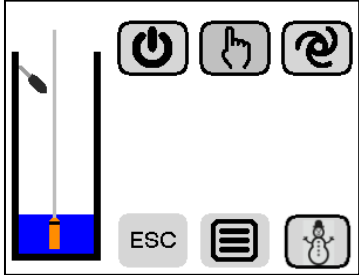

















See Chapter 10.4

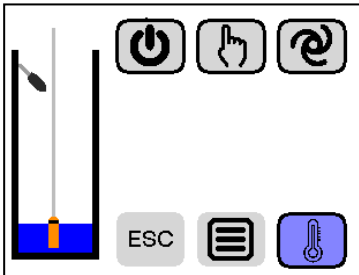
















Winter operation / frost monitor mode active

See also Chapters 7.8–7.10



	Infeed function switched off. No other function possible.
	Pump(s) switched off, winter setpoint reached. Press to go to the submenu "Pump-out"
 13.0cm	Actual value in the pump shaft
 20.0cm	Setpoint value summer operation inactive
 15.0cm	Setpoint value winter operation active
	The setpoint level can be adjusted manually using the two arrow keys. Changes in the target level are made after 15 sec. accepted and saved.

<p>12.1 Manual control</p>	<p>To <i>manually</i> control winter operation, proceed as follows.        In the setup menu, Chapter 11.2, enable winter operation by checking <input checked="" type="checkbox"/>.</p>								
	<p>Press one of the two symbols in the main display to open the “Infeed” or “Pump-out” submenu.  </p> <table border="1" data-bbox="608 618 1393 887"> <tr> <td></td> <td>Winter operation OFF</td> </tr> <tr> <td></td> <td>Manual winter operation ON</td> </tr> <tr> <td></td> <td rowspan="3"><b>End winter operation by selecting one of the function keys</b></td> </tr> <tr> <td></td> </tr> <tr> <td></td> </tr> </table>		Winter operation OFF		Manual winter operation ON		<b>End winter operation by selecting one of the function keys</b>		
	Winter operation OFF								
	Manual winter operation ON								
	<b>End winter operation by selecting one of the function keys</b>								
									
									

<p>12.1 Automatic control</p>	<p>To <i>automatically</i> control winter operation, proceed as follows.        In the setup menu, Chapter 11.2, enable winter operation by checking <input checked="" type="checkbox"/>.        Then activate the enabled menu item “Frost monitor” as well by checking <input checked="" type="checkbox"/>.</p>								
	<p>A thermostat with a potential-free contact must be connected to the connection terminals ME1 + and ME1- , which closes when the temperature falls below a set temperature. </p> <p>For a description, see Chapter 6.1 and the circuit diagram attached to the control system.</p> <table border="1" data-bbox="608 1361 1393 1630"> <tr> <td></td> <td>Manual winter operation OFF</td> </tr> <tr> <td></td> <td>Automatic winter operation ON</td> </tr> <tr> <td></td> <td rowspan="3">No function. Manual control is only possible if the frost monitor (thermostat) has <b>not</b> switched.</td> </tr> <tr> <td></td> </tr> <tr> <td></td> </tr> </table>		Manual winter operation OFF		Automatic winter operation ON		No function. Manual control is only possible if the frost monitor (thermostat) has <b>not</b> switched.		
	Manual winter operation OFF								
	Automatic winter operation ON								
	No function. Manual control is only possible if the frost monitor (thermostat) has <b>not</b> switched.								
									
									

### 13. Commissioning / recommissioning

Please also generally observe the operating instructions for the accessories not described in these instructions.

- The control system is installed in a dry, frost-proof and flood-proof area.
- The connections are carried out in accordance with the associated wiring diagram.
- The on-site pre-fusing meets the specifications of the respective associated wiring diagram.
- The power supply corresponds to the requirements stated in the respective associated wiring diagram. If necessary, the control transformer connection must be adapted to the local conditions (input voltage  $\pm 5\%$ ).
- Before the mains voltage is switched on, you must make sure that there will not be an unintended start-up of the system.

- **Only then turn on the mains voltage!**



- Set the parameters to your requirements.
- Finally carry out a function test.

### 14. Decommissioning

You must ensure during the decommissioning of the system that no unintentional consequential losses occur (i.e. like an accidental overflow, etc.). When working on the control system and/or components of the control system, the 5 safety rules of electrical engineering, among others, must be observed.



1. **Disconnecting (turning off the power supply)**
2. **Secure against restart.**
3. **Testing for zero-potential (use the appropriate instrument).**
4. **Earthing and short-circuiting.**
5. **Covering adjacent live parts (potential-free contacts can carry external voltage).**

When working on the pump and/or the measuring system, or on the entire system for that matter, the possibility of an unintentional pump start-up must be prohibited.



**It is important to note that when working on the control system, or even on the system as a whole, you must prevent personnel hazards.**

### 15. Servicing

We recommend checking the control system and all its accessory parts (or also the complete system) at regular intervals, depending on application and environmental influences.

- Visual inspection of the system and the removal of any contaminants.
- Visual inspection of the system and replacement of any damaged components.
- Perform an operational check.
- Inspect measuring systems.
- Batteries must be changed no later than every 5 years.

## 16. Technical data


Operating voltage	3x230V / (400V) AC 50-60 Hz
Power consumption of control system (without power unit)	max. 25 VA; type 6.5 VA
Control fuse	Miniature fuse 5 x 20 mm 3.15AT (EN 60127-2/III)
Level sensor entry	4...20 mA (two-wire)
Level sensor supply voltage	Type. 24V=
Measuring accuracy at level sensor entry	$\pm 1\%$ v.E. $\pm 1$ cm Wc per 100 cm Wc
Measurement range level sensor input	Adjustable between 0...4000 mm Wc, 0...400 cm Wc
Display resolution for Level sensors	1mm / 1cm
Short circuit current signal input 1, 2, HW	< 1,5mA
Switching voltage signal input 1, 2, HW	Type. 24V=
Short circuit current analogue input	< 25mA
Switching voltage analogue input	24 V=
Required ext. fuse protection for potential-free alarm relay	max. 8A / 250VAC
Maximum switching voltage for potential-free alarm relay	max. 250V AC / 30V DC
Switching voltage of potential free alarm relay	max. 8A (AC21A)
2x voltage output	230 V / 50 Hz / max. 1A
1x voltage output	24V= / max. 0.5A
Measuring accuracy of operating hours counter	<0.06% of the actual value
Drift of software clock	$\pm 20$ ppm - 0,04ppm/°C
Temperature range short-term operation	0...55°C / 30% RH*
Temperature range continuous operation (DIN EN 60204-1)	0...40°C / 50% RH*
Storage temperature range	-20 ... 70°C
Humidity (DIN EN 60204-1)	0...20°C / 90% RH (non-condensing)*
Protection class	min. IP54**
Lithium battery for clock's power reserve	Type CR2032 / 3V

\* Harmful effects from occasional condensation and temperature changes must, if necessary, be avoided by suitable additional measures (e.g. built-in heating devices, ventilation, air conditioning systems).

\*\* Information on the degree of protection can be found on the nameplate of the control unit.



## 17. List of faults and declaration

ID	Fault	Control system fault description
00	High water	If the separate high water float switch switches, this error is reported. The pump-out function is switched on immediately when high water occurs, as long as no fault is pending. <i>Further information in Chapter 10.4.</i>
01	Dry run	If the measured level is below the set dry running level, this fault is reported. <i>Further information can be found in Chapters 6.4, 8.3 and 10.4</i>
02	Level logic	A fault has occurred in the level measuring system. The entered switching levels at 4... 20 mA are not plausible, e.g. the switch-off point is above the switch-on point. <i>Further information in Chapter 8.3.</i>
03	Overvoltage	Overvoltage protection has triggered (if installed in the control system).
04	RCCB switch	The residual current circuit breaker (RCCB) built into the control system has tripped. Check the components of the infeed and pump-out for faults in the insulation. After the fault has been rectified, the circuit breaker can be switched on again.
05	Battery voltage	Battery voltage too low. The battery voltage is less than 25%. The battery is not yet properly charged or almost empty in battery mode. <i>Please observe the information in the operating instructions for the optional battery module.</i>
06	Mains voltage	No control voltage available on the control system. The control system is running, in battery mode if available.
07	Real-time clock	The control system was without power for an extended period of time and the date/time may be incorrect. The battery on the back of the CPU control board for the clock's power reserve may need to be replace.
08	Modem	There is a GSM modem malfunction. <i>Please observe the further information in the operating instructions for the optional GSM modem.</i>
09	Ext. error/fault	External error message. The message input (ME2) on the control unit is closed. <i>Further information in Chapter 6.4.</i>
10	Network/SD card	
11	File system SD	
12	Bus error	Connection error between base circuit board and control board.
13	Sensor measurement value	A fault has occurred in the level measuring system. Short circuit or open circuit on lines of the level sensor (4...20 mA).
21	Infeed runtime	The max. opening time of the water infeed has been exceeded. <i>Further information in Chapter 10.3.2</i>
27	Infeed fault	Check circuit breaker or fuse for the infeed function
33	Pump-off runtime	The max. runtime of the pump(s) has been exceeded. <i>Further information in Chapter 10.2.2</i>
39	Pump-out fault	Check circuit breaker or fuse for the pump-out function
64	Control system restart	A log entry is made in the fault list if the control system is restarted.
65	no fault	This item is for display only.

## 18. Declaration of conformity

### **EU-Konformitätserklärung** **EU-Declaration of Conformity** **EU-Déclaration de Conformité**

Diese Konformitätserklärung entspricht der Europäischen Norm EN 17050-1 "Allgemeine Anforderungen für Konformitätserklärungen von Anbietern".

This declaration of conformity complies with the European standard EN 17050-1 "General requirements for supplier declarations of conformity".

Cette déclaration de conformité correspond à la Norme Européenne EN 17050-1 "Exigences générales pour les déclarations de conformité des fournisseurs".

Der / The / Le Anbieter / Supplier / Fournisseur

erklärt, dass das Produkt / declares that the product / déclare que le produit

### **Pumpensteuerung** **Pump Controls** **Commande de pompe**

auf das sich diese Erklärung bezieht, mit den folgenden Normen übereinstimmt:

to which this declaration relates is in conformity with the following standards:

auquel se réfère cette déclaration est conforme aux norms:

EN 61000-6-3 (2012-11)

EN 61000-6-2 (2019-11)

EN 60204-1 (2019-06)

EN 60730-1 (2017-05)

Gemäß den Bestimmungen der Richtlinie(n)

Following the provisions of Directive(s)

Conformément aux dispositions de Directive(s)

2014 / 30 / EU

2014 / 35 / EU

2011 / 65 / EU

EMV-Richtlinie, Guideline, Derective

Niederspannungsrichtlinie, Low voltage guideline, Directive de basse tension

RoHS-Richtlinie, Guideline, Derective

