

Operating manual

Condor

Modular pump control CPSM

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This documentation refers exclusively to the control unit and contains basic information that must be adhered to during installation, operation and maintenance. The fitter who installs the equipment, as well as any technical staff/operators must read this manual before installation and operation. The manual must also always be available at the equipment's place of installation.

The control unit is available with different equipment options. This operating manual specifically describes the control functions. Depending on the configuration of the control unit, some of the functions described in this operating manual may not be available. In particular, the one-pump version of the control unit does not have all the functions and features of the two-pump control unit.

The personnel in charge of operation, maintenance, inspection and installation must have the qualifications required for these activities. Areas of responsibility, competences and monitoring of personnel must be clearly defined by the operator.

Non-compliance with any of the safety information results in a loss of any right to claim damages.



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1. General information

This control unit has been designed using the latest technology, manufactured with great care and is subject to continuous quality control.

The aim of this operating manual is to simplify the process of getting to know the device and making use of its possible end-uses in accordance with its intended purpose.

This operating manual contains important information required to operate the device safely, correctly and economically. Adhering to this information is necessary to ensure the reliability and long life of the device as well as to avoid risks.

The operating manual does not take local regulations into account. It is the operator's responsibility to ensure compliance with these regulations, including by installation personnel.

This device must not be operated if the values stipulated in the technical documentation for operating voltage, rated mains frequency, ambient air temperature, switching capacity and other information contained in this operating manual are exceeded.

If additional information or advice is required, as well as in the event of a claim, please contact the manufacturer.

2. Notes on safety

This documentation refers exclusively to the control unit and contains basic information that must be adhered to during installation, operation and maintenance. The fitter who installs the equipment, as well as any technical staff/operators must read this manual before installation and operation. The manual must also always be available at the equipment's place of installation.

As well as the general safety information found in this section "Notes on safety", the specific safety information found in the subsequent sections must also be observed.

2.1 **Identification of information in the operating manual**

The safety information contained in this operating manual, which, if not complied with, could result in danger to people, is marked with the following symbols.



Warning - general hazards



Warning - electrical voltage

2.2 **Workers' qualifications**

The personnel in charge of operation, maintenance, inspection and installation must have the qualifications required for these activities. Areas of responsibility, competences and monitoring of personnel must be clearly defined by the operator. Staff who do not possess the necessary knowledge must be trained and duly instructed. The operator must also ensure that the contents of this operating manual have been fully understood by all personnel involved.

2.3 **Dangers of non-compliance with the safety information**

Non-compliance with the safety information could result in danger to people as well as to the equipment. Non-compliance with any of the safety information results in a loss of any right to claim damages.

Specifically, non-compliance could lead to the following:

- Failure of important functions of the device
- Failure of prescribed monitoring methods
- Electrical danger to personnel



2.4 Safety-conscious working

The safety information in this operating manual, existing national regulations on accident prevention as well as the operator's internal work, operation and safety regulations must be observed.



Switch off all power to the equipment before opening it.

2.5 Safety information for the operator / operative

Any possible risks associated with electricity must be eliminated (detailed information can be found in national regulations and the regulations of local energy supply companies). The operator is responsible for ensuring that the control unit is protected against unauthorised access.

2.6 Safety information for installation and maintenance work

The operator must ensure that all maintenance, inspection and installation activities are carried out by qualified personnel, equipped with all necessary information through thorough study of this operating manual.

As a basic principle, work on the device should only be carried out when the power has been switched off. Once the work has been completed, all safety and protective equipment must be re-attached or re-started. Before restarting operation of the equipment, the guidelines found in the "Start-up" section must be observed.

Any relevant applicable regulations (EN, VDE, ...) as well as regulations provided by the local energy supplier must be observed. Start-up can only occur when they have been fulfilled.



When carrying out the following work, it is essential to refer to the appropriate connection and wiring diagrams of the control unit and the documentation for all accessories, such as the pumps.

Before starting up the unit and switching on the power supply it is necessary to ensure the following:

- The control unit and the connector cables should not show any signs of damage.
- The terminal screws and terminals should be inspected before operation and tightened if necessary.
- The type and laying of all cables and wires must comply with the relevant regulations. Special care must be taken to ensure that the cable feeds are not subjected to high mechanical stresses, such as might occur through insufficiently fixed or strain-relieved cables.
- The mains connection and the connection to all accessories, such as the pump, must be of a professional standard.
- The fuses are installed for the required nominal current.
- All other connections have been carried out correctly to a suitably professional standard.
- The equipment is closed in accordance with the regulations and any unused cable fittings are closed off.
- The equipment is professionally secured.



Gases from the shaft must not be allowed to enter the control unit. It is therefore necessary to hermetically seal the cable / air hose entry hole leading from the container to the control unit.



2.7 Unauthorized alterations and spare parts

The control unit may only be altered or changed with the manufacturer's agreement. It is only safe to use original spare parts. Use of other parts may remove liability for any resulting consequences.

2.8 Improper forms of operation

Operational safety of the control unit is only guaranteed if it is used in accordance with its intended purpose. The limits provided in this documentation should not be exceeded under any circumstances.

2.9 Use in explosion hazardous areas

Individual areas within the plant may be potentially explosive.

It must be ensured that the electronic controller is installed outside these explosion hazardous areas.

Any equipment used in explosion hazardous areas must be suitable for their specific use and application.

Any specific regulations or special conditions for the use of equipment in explosion hazardous areas must also be observed.

It is particularly emphasised that it is the operator's responsibility to

- guarantee compliance with the existing regulations.
- carry out installation in accordance with the relevant existing regulations.
- carry out the required inspections and provide corresponding documentation.
- only install appropriate and authorised components (such as pumps, level sensors,...)

Dynamic pressure measuring system for Zone 2: The dynamic pressure measuring system can be used in Zone 2 without any problems, since this measuring system is considered safe during normal operation.

Dynamic pressure measuring system for Zone 1: Generally, the use of this system in Zone 1 is classified as critical because it does not offer a high level of safety, even with regard to malfunctions that are to be expected under normal conditions. It is necessary to distinguish between the different types of dynamic pressure measuring systems:

Open dynamic pressure measuring system with "measuring bell release" and closed dynamic pressure measurement system for Zone 1: This is not generally recommended, as common faults (e.g. damage to the pneumatic hose) may allow potentially explosive gases to reach the control unit, resulting in a change in the Zone.

Open dynamic pressure measuring system with an "air bubbling system" for Zone 1: This system is frequently used for Zone 1. Whether this system offers a high level of safety is evaluated on a case-by-case basis. With this system, two errors need to occur (e.g. air compressor malfunction **and** damage to the pneumatic hose) for potentially explosive gases to reach the control unit, resulting in a change in the Zone. As the air compressor can stop working when the minimum pressure is polled and this is reported as a fault, the possibility of an error remaining unnoticed and a second error also occurring is reduced.

Dynamic pressure measuring system for Zone 0: No dynamic pressure measuring system provides enough protection for Zone 0, since it is not considered safe with 2 unrelated faults.

3. Transportation and interim storage

3.1 Transportation

Transportation of the equipment must be carried out to a professional standard. The control unit will have been inspected before dispatch to ensure it complies with the agreed specifications. The control unit should therefore be in a flawless electrical and mechanical state on arrival. Please check the control unit on arrival for possible damage during transportation. To make a claim, a damage assessment should be drawn up with the supplier.

3.2 Interim storage

The equipment must be stored in a dry place that is free from vibrations and, if possible, kept in the original packaging. The ambient air temperature should be between -20°C and $+70^{\circ}\text{C}$.

4. General description of the control unit

The control unit with graphic display for up to two pumps was specially designed for use in the sewage sector. The control unit measures and monitors the level of the medium and activates one or two pumps, depending on the level. The control unit monitors the motor circuit breaker and thermal contacts as well as the level measuring system, rotary field direction and phase failure (phase failure detection at $U_e=0\text{V}$). The control unit also has integrated systems for measuring the current and counting the number of operating hours and operating cycles as well as a flexible alarm messaging system.

The control unit is available with different equipment options. This operating manual specifically describes the control functions. Depending on the configuration of the control unit, some of the functions described in this operating manual may not be available. In particular, the one-pump version of the control unit does not have all the functions and features of the two-pump control unit.

5. Installation / assembly

5.1 Environmental conditions

- dry and frost-proof
- sufficient ventilation
- the control unit must be installed in a flood-proof area.



The control unit is not explosion-proof and must therefore be installed outside the explosion hazardous area.

5.2 Installation instructions

The device should be installed on a wall. To install, open the lid and screw the device tightly in place. After installation make the necessary electrical connections. Close the lid and screw it shut.



The casing door must be tightly closed to ensure the required level of protection. Any unused screw holes must be filled with dummy plugs.

6. Connections

The wiring and connection diagrams depend on the configuration of the control unit and are not part of this operating manual. The relevant wiring and connection diagrams are supplied with the control unit.

Control board

Use the circuit diagram to connect the control unit. The following figures show the configuration of the X2 terminals on the control board. For a one-pump control unit, the DAC +/- terminals are also available as an analog 4-20mA output.

F1 = control fuse 230V AC - 3,15AT

1. Control board front page

Order reference	Declaration	
GLP 1P	Base circuit board	One Pump control
GLP 2P	Base circuit board	Two Pump control
GLP 2PV	Base circuit board	Two Pump control complete assembled
F1 / N	230V AC Main connection	
M1 oder M2 Corresponding terminals of the respective pump		
TL / TM	Thermal contact 1	Hardware shutdown restart programmable
TM / TH	Thermal contact 2	Hardware shutdown with restart protection
Aux 1 / Aux 2	Hardware shutdown of the pump control	
11 / 12 / 14	Alarm relay 1	Isolated SPDT
21 / 22 / 24	Alarm relay 2	Isolated SPDT
31 / 32 / 34	Alarm relay 3	Isolated SPDT
HW +/-	Separate high water float switch	
SW 1 +/-	Float switch 1	Low switching level / external cut-out
SW 2 +/-	Float switch 2	Middle (upper) switching level / external alarm
SW 3 +/-	Float switch 3	Upper switching level
NVS +/-	Level sensor	
12V +/-	Output 400mA	
DAC	Digital Output 4-20mA	
DI1 / DI2	Not used	

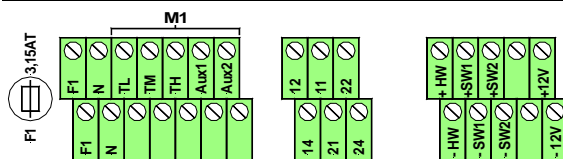


Fig. Terminals X2 for a one-pump control (GLP 1P)

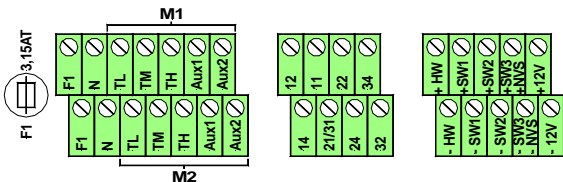


Fig. Terminals X2 for a two-pump control (GLP 2P)

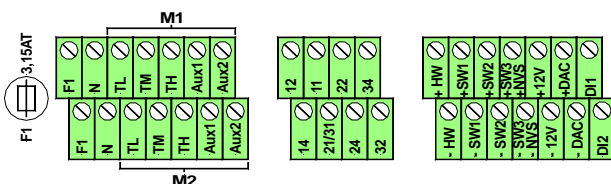


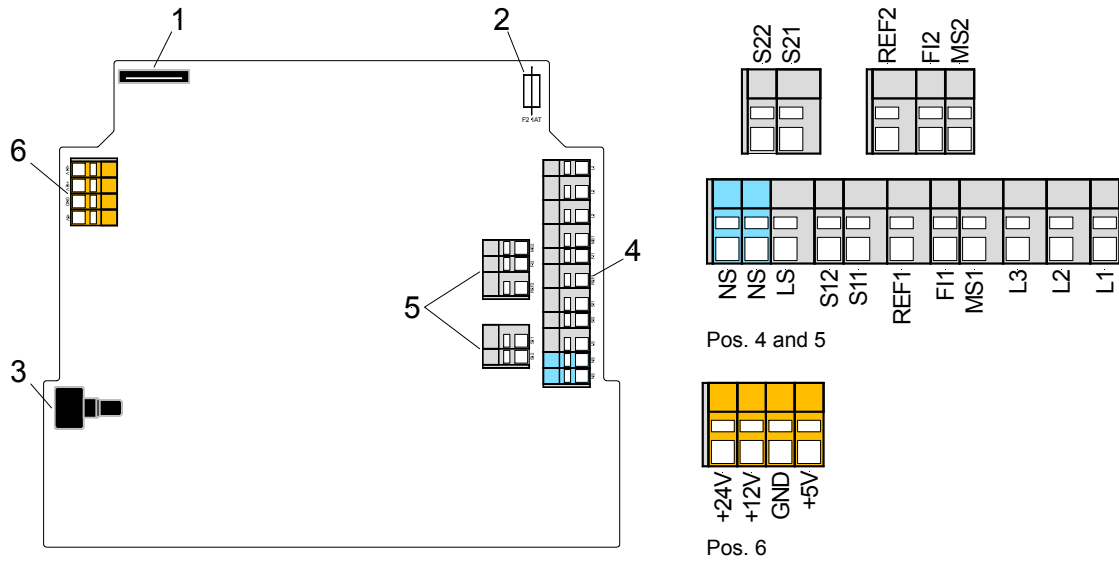
Fig. Terminals X2 for a two-pump control complete assembled (GLP 2PV)

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2. Control board back side



Pos	Description	Declaration
1	-	Connecting ribbon cable CPU
2	F2	Securing internal power supply 1AT
3	-	Pressure sensor
4	L1	Phase sequence detection L1
	L2	Phase sequence detection L2
	L3	Phase sequence detection L3
	MS1	Interpretation / Signal input Manual Motor Starter P1
	FI1	Interpretation / Signal input RCCB P1
	REF1	Reference point Interpretation / Signal input Manual Motor Starter and. RCCB P1
	S11	Output safety chain P1 230V
	S12	Output pump control P1 230V
	LS	Control voltage input 230V
4	NS	Neutral conductor
	NS	Neutral conductor
5	MS2	Interpretation / Signal input Manual Motor Starter P2
	FI2	Interpretation / Signal input RCCB P2
	REF2	Reference point Interpretation / Signal input Manual Motor Starter and. RCCB P2
	S21	Output safety chain P2 230V
	S22	Output pump control P2 230V
6	+24V	Voltage output +24V DC 50mA
	+12V	Voltage output +12V DC / 1,85A
	GND	Reference point for Voltage output +24V DC / +12V DC / +5V DC
	+5V	Voltage output +5V DC (Do not use)

Only in two-pump control



AUX inputs

Each pump has an AUX input via which the pump can be switched off independently of the control unit. During normal operation this input must be bridged. If the input is open, the associated pump is stopped and an AUX1 fault is detected.

The function is independent of the electronics of the control unit and affects the control circuit of the pump directly. This can be used to switch off / activate the pump via a coupling relay independently of the control unit.

External deactivation

If the control unit is set to a dynamic pressure or 4-20mA level sensor level measuring system, it is possible to stop the control unit and turn it to standby via the SW1 input. Both pumps switch off if the input is closed. If the input is opened again, the control unit starts up with the preset starting delay. If this function is activated, the second line of the display will read "external OFF".

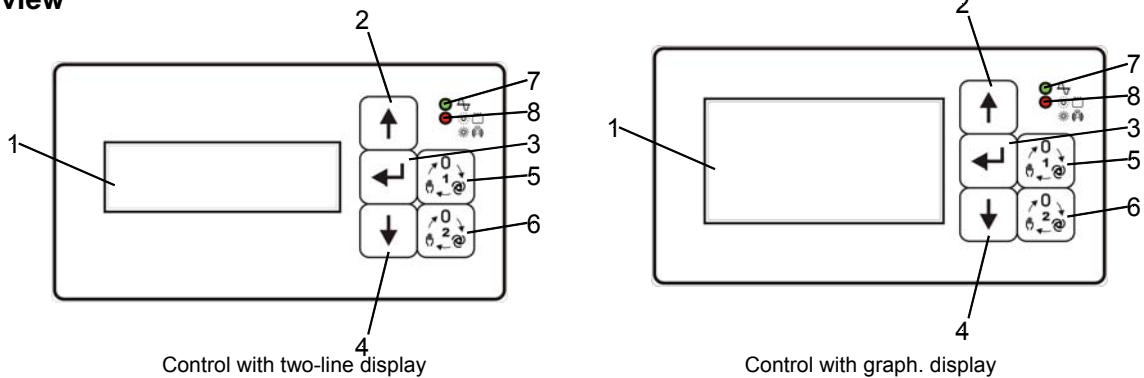
External Alarm¹


If the control unit is set to a dynamic pressure or 4-20mA level sensor level measuring system, it is possible to activate an external alarm via the SW2 input. If the input is closed, an external alarm is activated. This is shown on the display. The activation sequence of the pump(s) is not affected by this alarm. However, the alarm message can be transmitted like any other alarm via alarm relays or, if available, reported via the communication system (Modem / SMS).


¹ only applicable to 2-pump control units


7. Operation and Displays


Overview





1.  **Two-line display:** messages are presented in clear text on a two-line LCD display with 16 characters per line in the chosen language.


1.  **Graphic display:** messages are presented in clear text in the chosen language.


2.  **“Scroll up” system key:** Use this key to scroll upwards through the system menu or to change a parameter in the sub-menus.


3.  **„Confirm“ system key:** Use this key to access the selected sub-menus or to confirm a changed parameter

4.  **Scroll down“ system key:** Use this key to scroll downwards through the system menu or to change a parameter in the sub-menus.

5.  **“Pump 1 operating mode” function key:** Use this function key to choose the operating mode of pump 1 (manual – 0 – automatic). The selected operating mode is shown on the display. Whether the equipment has this key depends on the control unit model.

6.  **“Pump 2 operating mode” function key:** Use this function key to choose the operating mode of pump 2 (hand – 0 – automatic). The selected operating mode is shown on the display. Whether the equipment has this key depends on the control unit model.

7.  **Indicator LED green “ready to operate”:** This green LED signals that the control unit is ready to operate. If the control unit is ready to operate, this LED flashes regularly.

8.  **Indicator LED red “fault”:** This red LED signals a fault in the control unit.
 - LED flashes = High water
 - LED continuously lit = General fault

Additional indicator lights and switches

Depending on the model, the control unit may be fitted with additional indicator lights or manual-0-automatic switches (manual - momentary contact /automatic - maintained contact).



Fig. 7.2.1

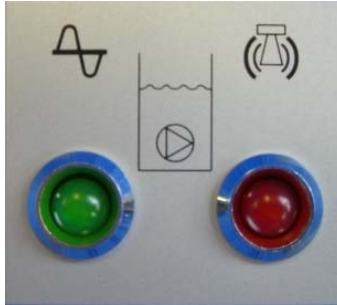


Fig. 7.2.2



Fig. 7.2.3

Fig. 7.2.1: External zero-hand-automatic selector switch for each pump

Fig. 7.2.2: Additional operating and fault indicator lights for each pump

Fig. 7.2.3: Additional fault indicator of the control

Main display controller with two-line display

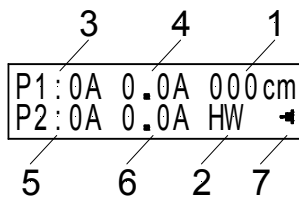


Fig. 7.2.1 Display at 4-20mA or impact pressure

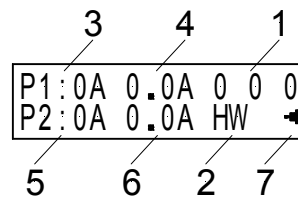


Fig. 7.2.2 Display at float switch operation

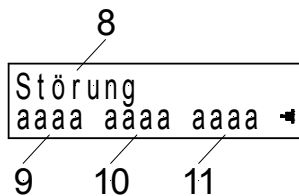




Fig. 7.2.1 Display for faults

1. Level height in cm (for level measurement: 4-20mA or impact pressure
or
Float switch 1 - 3 (for level measurement: float switch)
2. High water float switch
3. Operating status pump 1: 0 (A) Pump 1 is in automatic mode not controlled
I (A) Pump 1 is in automatic mode controlled
I (M) Pump 1 is in manual mode turned
0 (M) Pump 1 is in manual mode off
4. Current consumption pump 1
5. Operating status pump 2: 0 (A) Pumpe 2 is in automatic mode not controlled
I (A) Pumpe 2 is in automatic mode controlled
I (M) Pumpe 2 is in manual mode turned
0 (M) Pumpe 2 is in manual mode off
6. Current consumption pompe 2
7. Symbol  flashes: Control in operation
Symbol  : Control on battery

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Failure mode, the display changes cyclically back and forth between the main display and the fault indicator and fro (see separate chapter "fault list).

8. Fault indication
9. Display of the first Error as an error code
10. Display of the second Error as an error code
11. Display of the third Error as an error code

Main display controller with graph. display

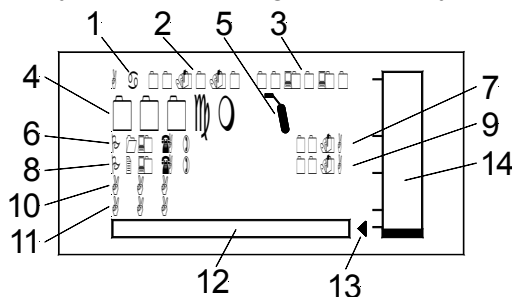


Fig.7.2.1 Display at 4-20mA or impact pressure

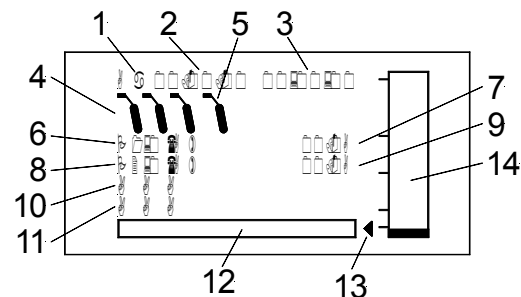


Fig. 7.2.2 Display at float switch operation

1. Day of the week
2. Date
3. Time adjustable
4. Level height in cm (for level measurement: 4-20mA or impact pressure (#065))
or
Float switch 1 - 3 (for level measurement: float switch (#065))
5. High water float switch
6. Operating status pump 1: 0 (A) Pump 1 is in automatic mode not controlled(#033)
I (A) Pump 1 is in automatic mode controlled (#033)
I (M) Pump 1 is in manual mode turned (#033)
0 (M) Pump 1 is in manual mode off (#033)
7. Current consumption pump 1
8. Operating status pump 2: 0 (A) Pump 2 is in automatic mode not controlled(#034)
I (A) Pump 2 is in automatic mode controlled (#034)
I (M) Pump 2 is in manual mode turned (#034)
0 (M) Pump 2 is in manual mode off (#034)
9. Current consumption pump 2
10. Fault indication
11. Modem indication
12. Symbol field (see also section symbol definition)
13. Symbol flashes: Control in operation
14. Graph. level control (for level measurement: 4-20mA or impact pressure (#065))

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Pump operating modes

The pump operating mode can be switched between automatic, manual ON and manual OFF. The control units are available in three different configurations:

- Operating mode changed via sub-menu #033 (pump 1) and #034 (pump 2)
- Operating mode changed via (an) additional control key(s)
- Operating mode changed via (an) additional external switch(es)

Switching is carried out electro-mechanically, independently of the control unit, and therefore works even if the control unit has broken down.



In the case of later installation it is important to ensure that the 230V AC voltage tap for the manual function is connected via the correct connection points on the back of the circuit board. In this way, the function of the thermal contacts is maintained.



If the pump(s) is(are) switched to manual ON, it(they) will only operate if there is no pump fault. If, in two-pump operating mode, one pump is switched to OFF, the control unit continues functioning as a one-pump control unit, if the other pump is set to “automatic”.



Manual operation: The function of the thermal contacts is still guaranteed. This means that if the thermal contacts are open (temperature too high), manual operation is not possible.

Messages after system start-up

When the control unit is switched on, it first tests the program memory. A number of messages appear concerning its internal configuration, state of the software, etc., followed by a control unit self-test. After a start-up delay period, the control unit starts up automatically.

8. Functional description

Level measurement methods

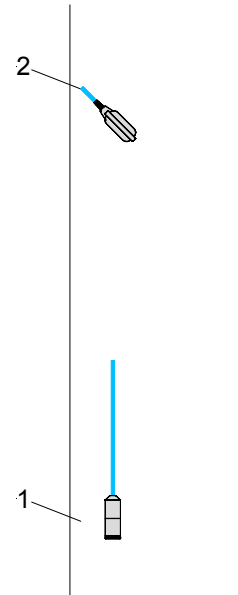
The control unit can be operated using different methods of level measurement:

1. External level sensor

- Measuring range up 0 ... 1m WS to 0 ... 10mWS / Water level (adjustable);
- 4... 20mA Output signal
- Additionally, a float switch as a high-water monitor

This method uses a pressure measurement cell in a sealed container that is suspended in the medium. The level pressure acts directly on the piezo sensor and is transmitted via a cable as an analog electrical signal of 4-20mA. As an extra safety precaution, an additional high water float should also be used, which switches the pump(s) on if a certain high water mark is reached and turns the pumps off again once the level is below this mark.

- | | |
|-----------------|------------|
| 1. Level sensor | |
| 2. Float switch | High-water |

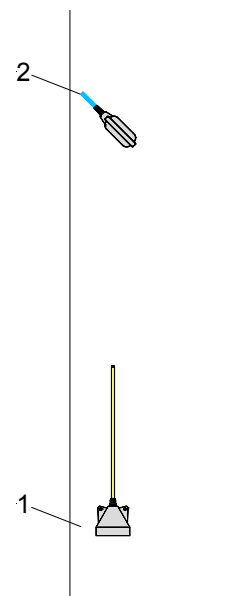


2. Impact pressure level sensor

- Measuring range 0 ... 2 m WS / Water level
- For connection of a wet bell with a pneumatic tube
- Additionally, a float switch as a high-water monitor

With the dynamic pressure measurement system, a pressure change occurs in the measurement system when the water level changes. This pressure difference is detected by the control unit's sensors, which use it to determine the water level. As an extra safety precaution, an additional high water float should also be used, which switches the pump(s) on if a certain high water mark is reached and turns the pumps off again once the level is below this mark.

- | | |
|-----------------|------------|
| 1. Wet bell | |
| 2. Float switch | High-water |



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3. Float switch

Depending on the water level and whether the float switch is activated, the pump(s) is (are) switched on or off. As an extra safety precaution, an additional high water float should also be used, which switches the pump(s) on if a certain level is reached, regardless of the activation status of the general float switch.

Operating mode	One Float switch	Two Float switches	Three Float switches
One pump operation	●	●	-
Two-pump operation	-	●	●
1/1- pump operation	●	●	-

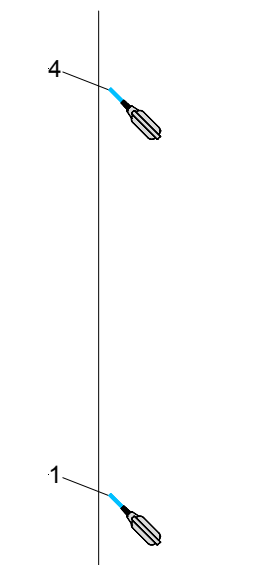


Fig. One-pump control with a float switch

- 1. Float switch
 - 2. Float switch
 - 4. Float switch
- 1
2
High water

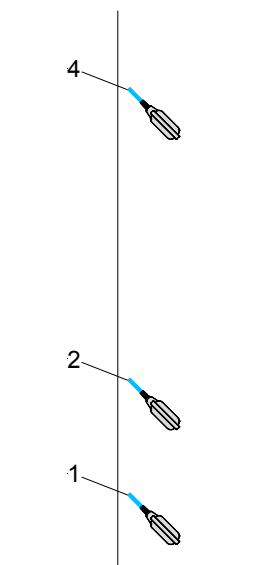


Fig. One-pump control with two float switches

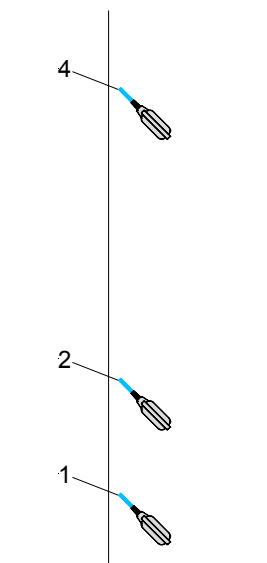


Fig. Two-pump control with two float switches

- 1. Float switch
 - 2. Float switch
 - 3. Float switch
 - 4. Float switch
- 1
2
3
High water

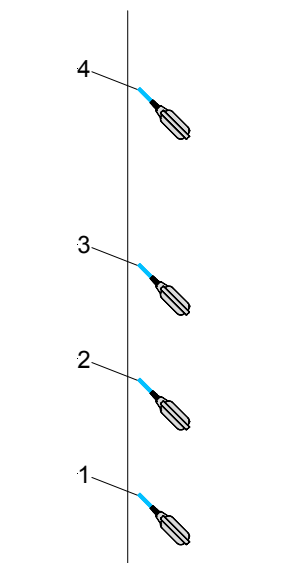


Fig. Two-pump control with three float switches

Pump control

Pump control for normal operation

The control unit can operate with either one or two pumps. Generally, the following procedure applies: if the medium rises above an (adjustable) level, the pump is switched on. If the medium sinks below an (adjustable), level the pump is switched off.

Pump control for high water operation

a) Evaluation via a level measuring system:

When the predetermined high water level (alarm level) has been exceeded, the corresponding pump(s) is(are) switched on. This is followed by a visual and acoustic alarm signal. Depending on the setting of the alarm masks, an additional alarm signal can be sent via a potential-free contact. Once the medium goes below the alarm and deactivation level the pump(s) is(are) switched off again.

b) Evaluation via a separate high water float and a functioning level measuring system:

If the separate high water float is activated, the relevant pump(s) is(are) switched on. This is followed by a visual and acoustic alarm signal. Depending on the setting of the alarm masks, an additional alarm signal can be sent via a potential-free contact. Once the float switch has been switched off and the medium sinks below the deactivation level, the pump(s) is(are) switched off again.

c) Evaluation via a separate high water float and a faulty level measuring system:

If the separate high water float is activated, the relevant pump(s) is(are) switched on. This is followed by a visual and acoustic alarm signal. Depending on the setting of the alarm masks, an additional alarm signal can be sent via a potential-free contact. After switching off the float switch, the pump(s) is(are) switched off again.

Fault messages and alarms

In addition to the fault messages associated with the pumps (see "Fault list" section), the control unit monitors whether the following faults have occurred:

- High water
- Loss of mains phase or phase error (wrong phase sequence)
- Faults in the measurement system (short circuit or interruption in the cables connecting the level sensor, inconsistent activation status of the float)
- Loss of control voltage
- Accumulator voltage too low
- Additional "AUX" alarm per pump
- "External" error (only 2-pump control units with continuous level assessment)

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

The control unit has three alarm relays, via which the alarms can be flexibly distributed. It is possible to programme which alarm(s) are associated with which relay as well as the activation sequence of the relay contacts.

Pump activation sequence

The activation levels determine when the pump(s) is(are) switched on or off. If the control unit is run with a continuous level measuring system (level sensor or dynamic pressure system), the measured levels are directly processed and analysed. If the control unit works with a float, the activation state of the float determines whether the pump(s) are activated.

For consistent level values, the following conditions must be fulfilled:

- a) The highest set level must be lower than the set measurement range of the level measuring system.
- b) For one-pump control units and alternating two-pump control units:
Deactivation level of 1st pump < activation level of 1st pump < alarm level
- c) For two-pump control units (peak load operation):
Deactivation level of 1st pump < deactivation level of 2nd pump < activation level of 1st pump < activation level of 2nd pump < alarm level

The high water alarm is triggered if a level higher than the alarm level is measured.

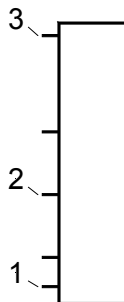
The following tables show the activation sequence of two-pump control units in peak load operation mode and the one-pump control unit or two-pump control unit in alternating mode with continuous level measurement and with floats.



The basic principle is: If a deactivation signal is given due to a change in level or because a change in the position of the float, the pump does not switch off immediately. It switches off after an optionally adjustable shutting down time has expired.

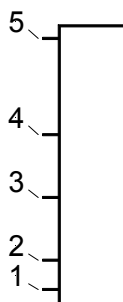
1. Switching behavior level- and impact pressure measurement methods:

One-pump operation and 1/1- Operation:



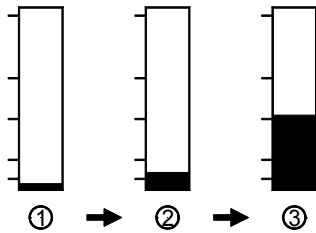
Pos.	Definition
1	Switch-off-point 1 pump
2	Switch-on-point 1 pump
3	High water level

Two-pump operation:



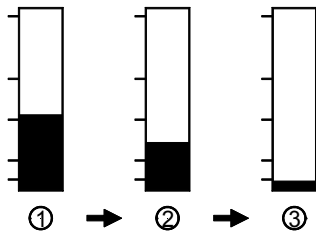
Pos.	Definition
1	Switch-off-point 1 pump
2	Switch-off-point 2 pump
3	Switch-on-point 1 pump
4	Switch-on-point 2 pump
5	High water level

1.1.1 Increasing level at single-pump operation:



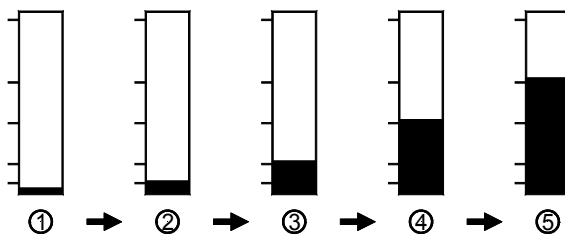
Pos.	Description	Status pump
①	Level below the switch-off-point 1 pump	Off
②	Level exceeds the switch-off-point 1 pump	Off
③	Level exceeds the switch-on-point 1 pump	On

1.1.2 Falling level at single-pump operation:



Pos.	Description	Status pump
①	Level above the switch-on-point 1 pump	On
②	Level below the switch-on-point 1 pump	On
③	Level below the den switch-off-point 1 pump	Off

1.2.1 Increasing level at two-pump operation:



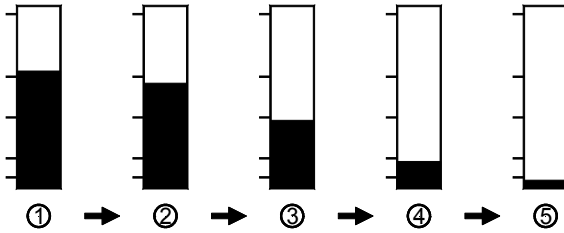
Pos.	Description	Status first pump	Status second pump
①	Level below the switch-off-point 1 pump	Off	Off
②	Level exceeds the switch-off-point 1 pump	Off	Off
③	Level exceeds the switch-off-point 2 pump	Off	Off
④	Level exceeds the switch-on-point 1 pump	On	Off
⑤	Level exceeds the switch-on-point 2 pump	On	On

Operating manual

Modular pump control CPSM

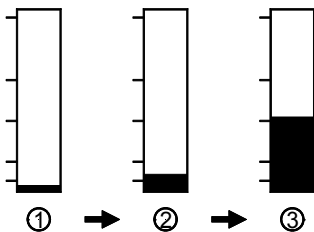


1.2.2 Falling level at two-pump operation:



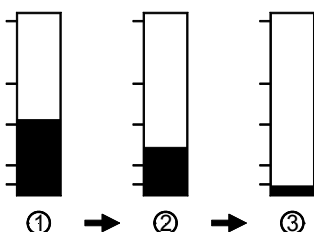
Pos.	Description	Status first pump	Status second pump
①	Level above the switch-on-point 2 pump	On	On
②	Level below the switch-on-point 2 pump	On	On
③	Level below the switch-on-point 1 pump	On	On
④	Level below the switch-off-point 2 pump	On	Off
⑤	Level below the switch-off-point 1 pump	Off	Off

1.3.1 Increasing level at 1/1- pump operation:



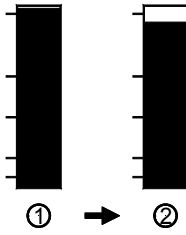
Pos.	Description	Status first pump	Status Second pump
①	Level below the switch-off-point 1 pump	Off	Off
②	Level exceeds the switch-off-point 1 pump	Off	Off
③	Level exceeds the switch-on-point 1 pump	On	Off
		Off	On

1.3.2 Falling level at 1/1- pump operation:



Pos.	Description	Status first pump	Status second pump
①	Level above the switch-on-point 1 pump	On	Off
		Off	On
②	Level below the switch-on-point 1 pump	On	Off
		Off	On
③	Level below the switch-off-point 1 pump	Off	Off

1.4.1 Rising/falling level over set high water level:

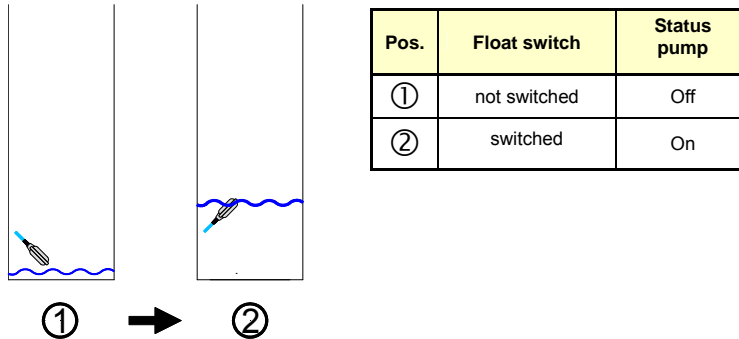


Pos.	Description	Operating mode	Status first pump	Status second pump
①	Level above the high water switch-on-point	One pump operation	On	-
②	Level below the high water switch-on-point	One pump operation	Off *	-
①	Level above the high water switch-on-point	Two-pump operation	On	On
②	Level below the high high water switch-on-point	Two-pump operation	Off *	Off *
①	Level above the high water switch-on-point	1/1- pump operation	On or Off	Off On
②	Level below the high high water switch-on-point	1/1- pump operation	Off *	Off *

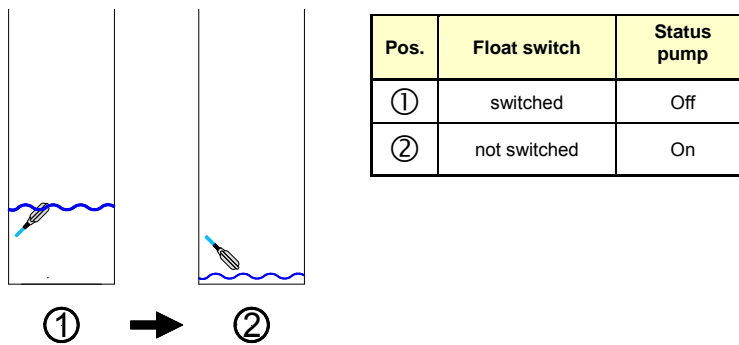
* during normal operation (measurement system functional) the relevant pump(s) remain(s) set to "on" until the level falls below the deactivation point of the relevant pump. If the measurement system is "faulty", the pumps are switched off after the level falls below the high water activation level.

2. Switching behavior Float switches:

2.1.1 Increasing level for one-pump operation with a float switch:

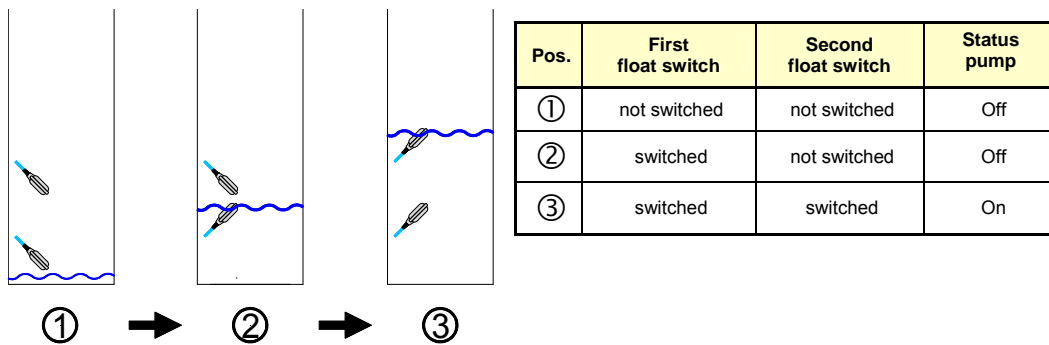


2.1.2 Falling level for one-pump operation with a float switch:

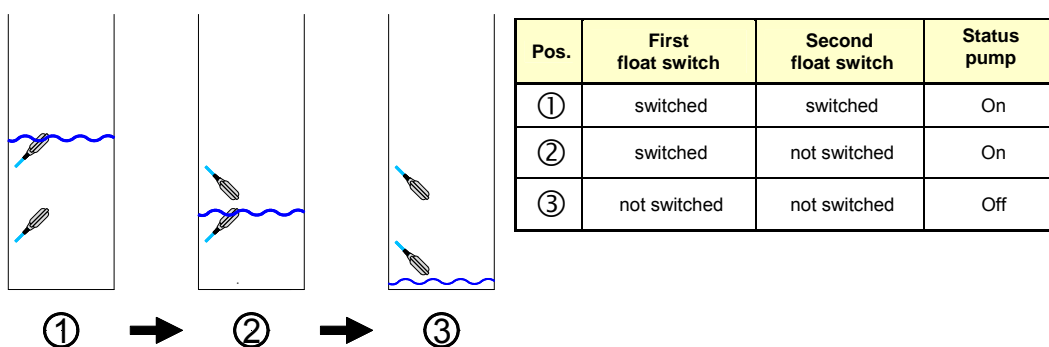


one-pump operation

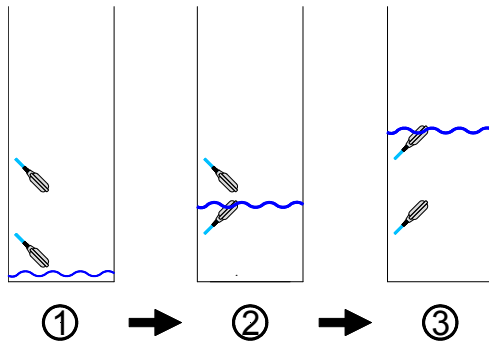
2.2.1 Increasing level for one-pump operation with two float switches:



2.2.2 Falling level for one-pump operation with two float switches:

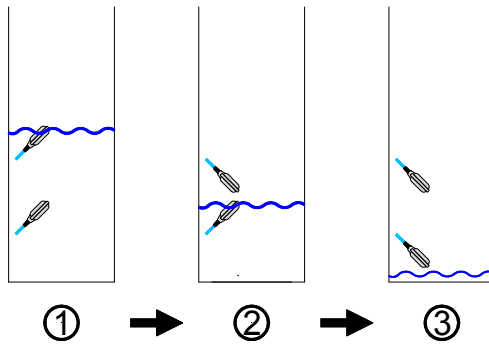


2.3.1 Increasing level for two-pump operation with two float switches:



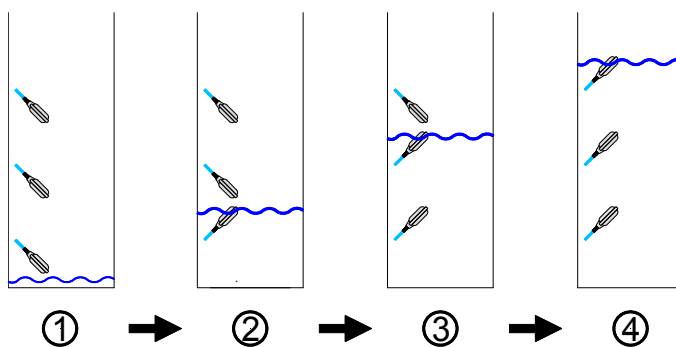
Pos.	First float switch	Second float switch	Status first pump	Status second pump
①	not switched	not switched	Off	Off
②	switched	not switched	On	Off
③	switched	switched	On	On

2.3.2 Falling level for two-pump operation with two float switches:



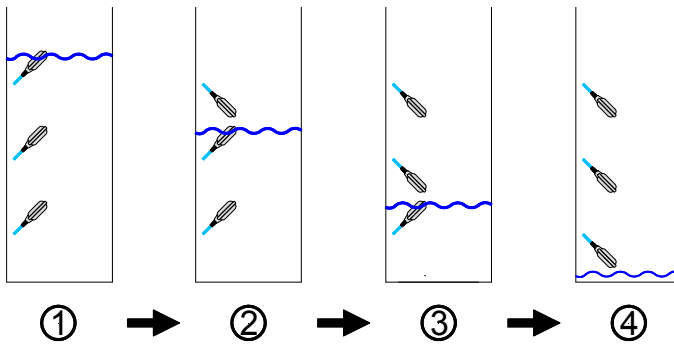
Pos.	First float switch	Second float switch	Status first pump	Status second pump
①	switched	switched	On	On
②	switched	not switched	On	On
③	not switched	not switched	Off	Off

2.4.1 Increasing level for two-pump operation with three float switches:



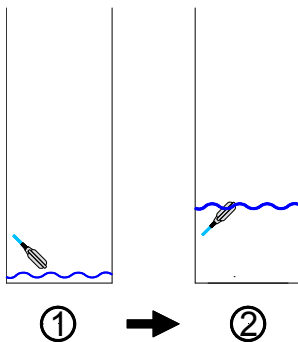
Pos.	First float switch	Second float switch	Third float switch	Status first pump	Status second pump
①	not switched	not switched	not switched	Off	Off
②	switched	not switched	not switched	Off	Off
③	switched	switched	not switched	On	Off
④	switched	switched	switched	On	On

2.4.2 Falling level for two-pump operation with three float switches:



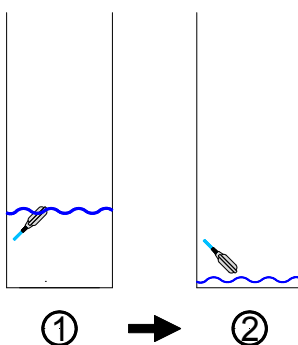
Pos.	First float switch	Second float switch	Third float switch	Status first pump	Status second pump
①	switched	switched	switched	On	On
②	switched	switched	not switched	On	On
③	switched	not switched	not switched	On	Off
④	not switched	not switched	not switched	Off	Off

2.5.1 Increasing level for 1/1-pump operation with a float switch:



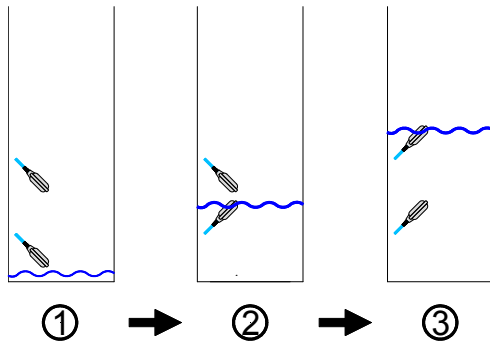
Pos.	Float switch	Status first pump	Status second pump
①	not switched	Off	Off
②	switched	On	Aus
		Off	On

2.5.2 Falling level for 1/1-pump operation with a float switch:



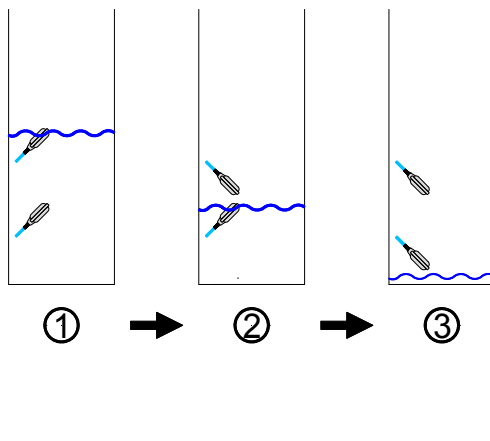
Pos.	Float switch	Status first pump	Status second pump
①	switched	On	Off
		Off	On
②	not switched	Off	Off

2.6.1 Increasing level for 1/1-pump operation with two float switches:



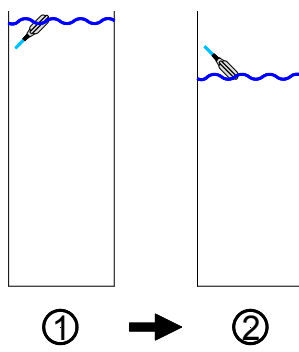
Pos.	First float switch	Second float switch	Status first pump	Status second pump
①	not switched	not switched	Off	Off
②	switched	not switched	Off	Off
③	switched	switched	On or Off	Off or On

2.6.2 Falling level for one-pump operation with two float switches:



Pos.	First Operating mode	Second float switch	Status first pump	Status second pump
①	switched	switched	On or Off	Off or On
②	switched	not switched	On or Off	Off or On
③	not switched	not switched	Off	Off

2.7.1 Increasing / falling level of adjusted high water level with HW-float switch:



Pos.	HW – float switch	Operating mode	Status first pump	Status second pump
①	switched	One pump operation	On	-
②	not switched	One pump operation	Off *	-
①	switched	Two-pump operation	On	On
②	not switched	Two-pump operation	Off *	Off *
①	switched	1/1- pump operation	On or Off	Aus or On
②	not switched	1/1- pump operation	Off *	Off *

* during normal operation (measurement system functional) the relevant pump(s) remain(s) set to "on" until the level falls below the deactivation point of the relevant pump. If the measurement system is "faulty", the pumps are switched off after the level falls below the high water activation level.

9. Power unit

The power unit of the control unit depends on the configuration and pump performance. Please refer to the relevant circuit diagram of the control unit.

On site fuse protection

The power supply of the control unit must be protected on site by appropriate all-pole pre-fusing according to the current values of the control unit. The maximum permitted values can be found in the appropriate circuit diagram. The tripping characteristic must be adjusted to the local conditions.

Control unit transformer

Depending on the setting of the control unit, a control unit transformer may be installed



Before starting up the control unit, the mains input voltage of the control unit must be checked (voltage measurement) and the connection of the control unit transformer adjusted, if necessary. (input voltage $\pm 5\%$)

Main switch

If the control unit has a main switch, the control unit can be switched on/off via the main switch. Depending on the type of main switch used, the casing lid can only be opened if the main switch is in the OFF position. The main switch has an emergency off function and switches off the pumps. The main switch can be locked in the OFF position with a padlock.

Note: Even when the main switch is off, the terminals before the main switch are still live. If the control unit is equipped with an accumulator, the control unit electronics continue to function even when the main switch is off, as long as the accumulator is charged; the pumps, however, are no longer in operation.



Note: Even when the main switch is off, the terminals before the main switch are still live



If the control unit is equipped with an accumulator, the control unit electronics continue to function even when the main switch is off, as long as the accumulator is charged; the pumps, however, are no longer in operation.

Changeover switch

Depending on the model of control unit, a changeover switch may be installed. This changeover switch can switch between two power supplies (mains and emergency electricity supply) or switch off the control unit.



The changeover switch does not have a main switch function and does not replace it.



Note: Even when the changeover switch is off, the terminals before the changeover switch are still live.



If the control unit is equipped with an accumulator, the control unit electronics continue to function even when the changeover switch is off, as long as the accumulator is charged; the pumps, however, are no longer in operation.

Fault interrupt switch

The control unit may be equipped with one or more fault interrupt switches. If a fault interrupt switch is triggered, the pump(s) is(are) switched off and the fault is shown in the control unit. The fault interrupt switch must be switched on manually once the fault has been removed.

Surge protection

Especially for installations in the open, when connected to a supply from overhead lines or in other environments where surges may occur, the installation of suitable surge protection is recommended. Surge protection may also be necessary in the supply cable to the float / level sensor.

Motor circuit breaker

Depending on the model, the control unit may be equipped with one motor circuit breaker per pump. The current value is set directly at the motor circuit breaker and should be set according to the pump specification (identification plate). This setting takes place independently of the nominal current settings of the motor circuit breakers in the control unit

If the motor circuit breaker is triggered by a surge, the fault is displayed in the control unit. The motor circuit breaker must be switched on manually once the fault has been removed.

Soft starting

Depending on the setting of the control unit a soft start device can be installed in the control unit. This means the activation current of the pump(s) (activation current limit) is reduced and the powered mechanical components of the pump are protected from excessively high torques and acceleration. Care must be taken not to select a value for the starting time that is too high, as otherwise the pumps may be damaged, depending on the type used. When starting up the control unit, the preset soft start-up parameters may need to be checked and adapted to the local conditions.



Refer to the separate operating manuals for the soft start device and for the particular pump.

Frequency converter

Depending on the model of control unit, a frequency converter may be installed in the control unit. The frequency converter controls the pump(s) based on the information it receives via measurements and parameter settings or via the control inputs and outputs of the control unit. By using a frequency converter in the control unit, it is possible to regulate the rpm of the pump(s). The activation current of the pump(s) can also be limited.



The separate operating manuals for the frequency converter and for the particular pump and the resulting installation and wiring requirements (e.g. use of a shielded motor wire, etc.) need to be observed. Note: AC/DC fault interrupt switches may be necessary.

Accumulator

The control unit can be operated with an accumulator, which keeps the device in operation if there is a loss of control voltage. This means that level measurement continues, alarm messages are displayed and that settings and parameters in the menu can still be changed. However, the pumps no longer operate. The accumulator is charged via the control unit and may be used in connection with the potential-free changeover contact of the alarm relay, in order to enable signalling by the alarm even if there is a power failure.



The polarity of the accumulator will affect how it is connected. (read connecting wire = +; blue connecting wire = -). If the polarity is wrong, the accumulator and control unit may be destroyed.



Batteries / accumulators cannot be thrown into the household rubbish. The consumer is legally obliged to return used batteries / accumulators. Old batteries / accumulators can be returned to the public collection points provided by the local government.

Intrinsically safe circuits

Intrinsically safe circuits are necessary to fulfil explosion protection requirements with regard to the separation of circuits. This separation is intended to prevent the entry of energy, voltage or current capable of causing ignition in an explosive atmosphere.



The control unit must not be installed in an explosion hazardous area, but only in so-called safe areas.

To prevent the evaluation electronics igniting in the hazardous area, the activation circuit of the sensor includes a Zener barrier or isolating switching amplifier, whereby the intrinsically safe circuit can run separately from the safe area into the explosion hazardous area.

Thermal contacts

Sewage pumps generally have one or two thermal contacts (Klixon) that are triggered at different temperatures. Triggering the thermal contact causes a fault and stops the pump. Once the first thermal contact has been triggered, the pump will re-start up to 10 times (depending on the settings), before the alarm remains activated and needs to be confirmed by the user, before the pump is free to be used again. The allowed number of restarts can be programmed. If the second thermal contact is set off, the alarm remains activated and must first (if so desired) be confirmed by the user, before the pump is free to be used again.

Compressor or agitator

Depending on the menu settings there is also an option of controlling a compressor or agitator via the control unit. The first alarm relay, as well as the external alarm input, is then no longer accessible. The compressor or agitator can be chosen to run before/after the pumps or in parallel with them. The length of time and activation frequency can also be adjusted. The compressor or agitator is always controlled via alarm relay 1 of the control unit. If the control unit starts the compressor, the relay is activated. The external alarm input (input float switch 2) serves as a fault message input for the compressor or agitator. A closed input is interpreted as a fault. If the bimetallic relay of the compressor goes off, for example, the fault message "RW/external" is shown and the compressor switches off. Other functions are not affected.

Operating manual

Modular pump control CPSM



Communication

A control unit equipped with a communication function can:

- send an SMS message to a recipient if a fault occurs or on demand.
- set up data communication via the Watertel protocol with a PC and exchange all control parameters and values with it when a fault occurs.
- be called up by a PC with an appropriate modem, to exchange data.
- exchange data and parameters with a PC via a direct serial connection.

The communication of the CPS module can occur via:

- a GSM modem.
- a serial connection (V24/ RS232C).

For voice messages an additional TTS voice module is required.

Prerequisites for using a GSM modem:

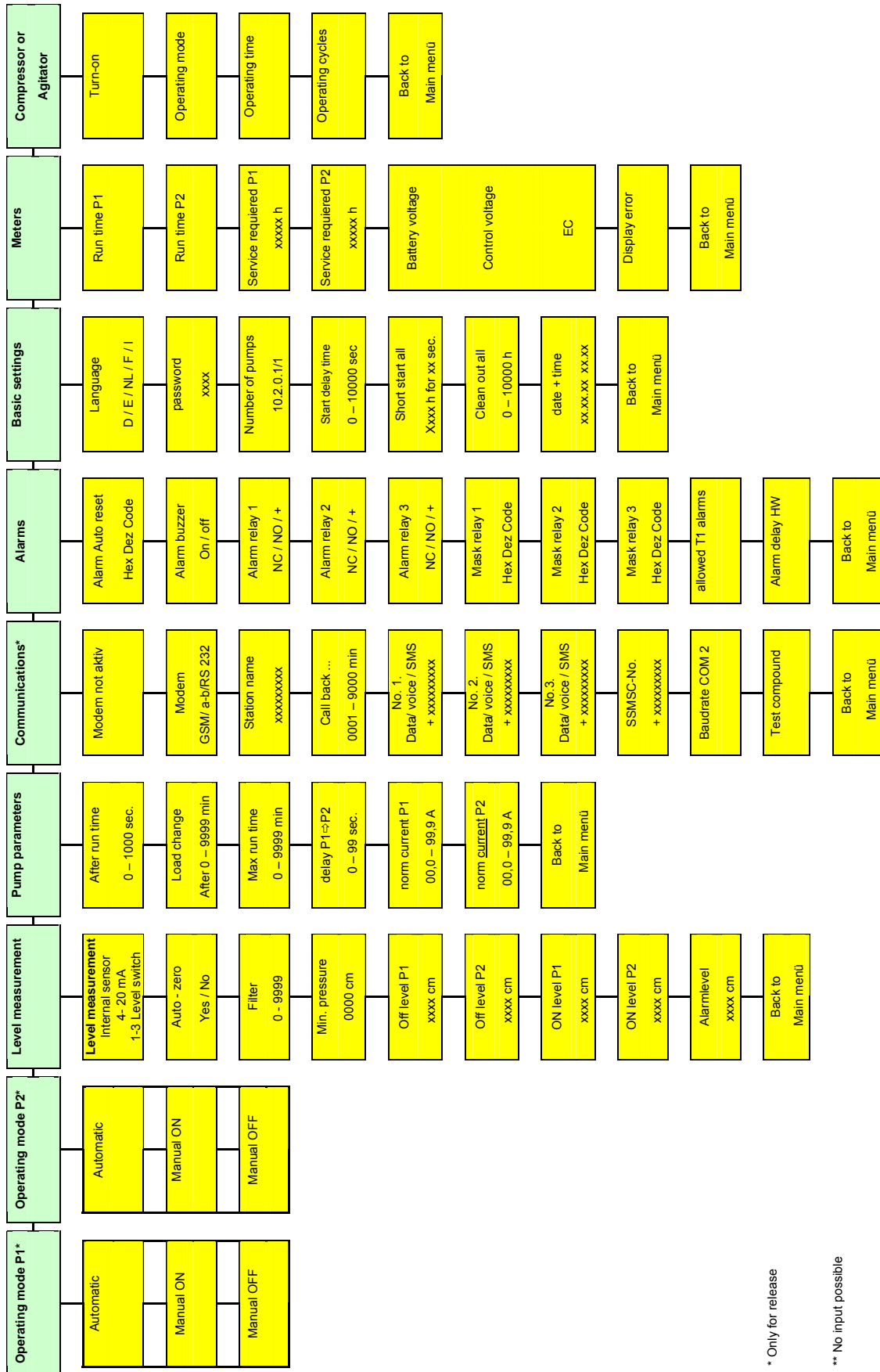
- an unlocked, data and SMS-compatible SIM card for the D or E network *Caution: only use 3V SIM cards*
- the CPS module / antenna is set up in a location with adequate reception field strength.

Prerequisites for using a direct PC connection:

- a serial connection cable (null modem cable).
- a free COM port on the PC.



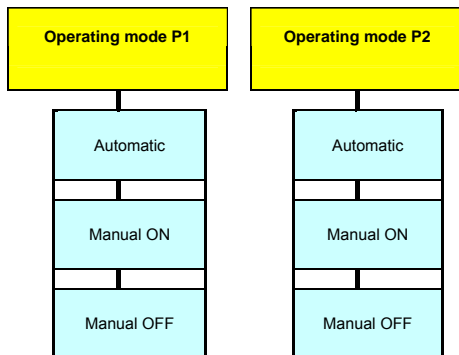
10. System menu / parameter settings for a control unit with a two-line display Overview Main Menu



* Only for release

** No input possible

Sub-menu „Operating mode P1“ and „Operating mode P2“



P1 Operating mode; P2 operating mode: This menu item sets the operating mode of pump 1 or pump 2. The selected mode of operation is displayed in this menu as well as in the main display (including its activation state).

Automatic: The pumps are switched ON or OFF automatically depending on the level set.

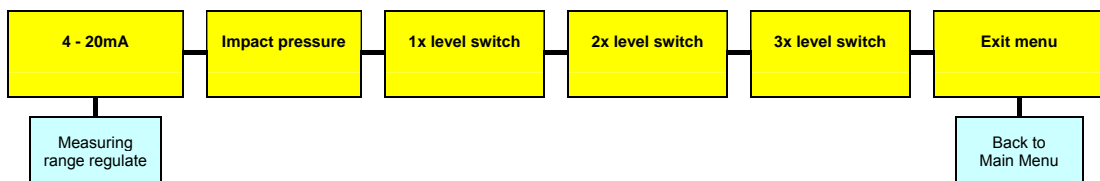
Manual ON: The pumps remain in operation until they are switched off by hand. If Atex mode has been selected, the pumps remain in operation until the lower deactivation level is reached.



If Atex mode is not selected, the pumps may run dry.

Manual OFF: The pumps are switched off. Even if a change in the level sends a signal to the pumps, the pumps remain switched off.

Sub-menu „Level measurement method“



Choice of measuring method: This menu item allows you to choose the measuring method.

- Level measurement: 4... 20mA Interface over Level sensor
- Impact pressure (measuring range 0 ... 200cm WS)
- 1x float switch
- 2x float switch
- 3x float switch (only in two-pump operation possible)

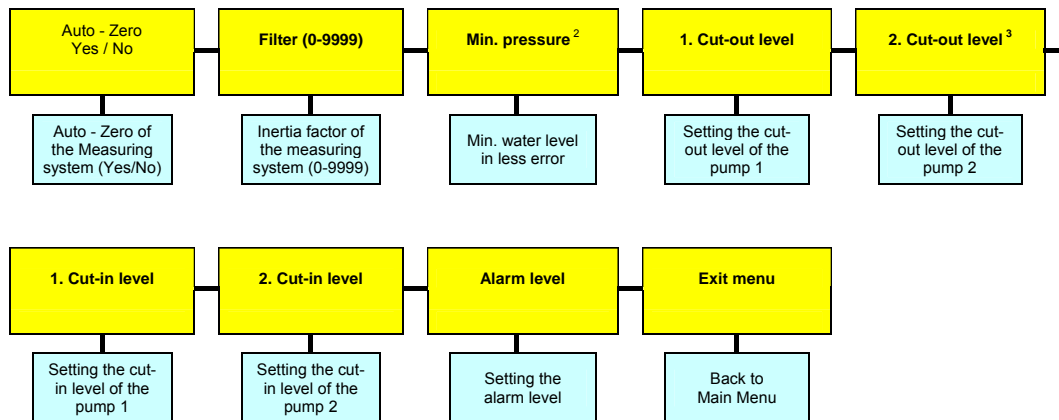
If 4-20mA (Level sensor) is selected as the measuring method, the measuring range of the attached sensor must be entered in cm after selecting the measuring method.

Operating manual

Modular pump control CPSM



The following sub-menus are only activated if measuring system “4-20mA” and “dynamic pressure” are selected:



Zero balancing: This menu item carries out a zero balancing adjustment of the measuring system used. During balancing, the measuring system cannot be in the water. Ensure that the measuring system is kept still during the balancing procedure. Zero balancing can be repeated at any time.

Filter: For widely fluctuating water levels, the level display may become unstable. By using a low-pass filter, it is possible to compensate for this, making the level assessment more sluggish.

“0000” = filter OFF, “0001” = weak (rapid) filter ... “9999” strong (slow) filter



Warning: If a filter is switched on, the level display may become so sluggish that the measured level differs significantly from the actual level in the shaft. The shaft may already be empty, whereas the measured value shows a level above the deactivation value, meaning the pump can run dry. Pump performance, activation levels and filter values therefore have to be carefully adjusted in relation to each other.

Note: Not necessary for normal applications.

Minimum pressure⁴: This menu item allows you to set a minimum pressure for the measuring system in cm. The value entered can be monitored by the control unit. If the level measurement sinks below the set pressure, a fault message is issued. If the value is set to “0000cm”, the minimum pressure monitoring system is switched off. This function can also be used if the level should not fall below a certain minimum level or if air bubbles from a small compressor need to be monitored.

² only displayed when using the “dynamic pressure” measuring system.

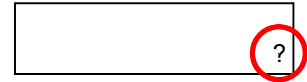
³ only displayed if menu item (#131) is set to 2 pumps.

⁴ only displayed if menu item (#131) is set to 2 pumps.

1st deactivation level; 2nd deactivation level⁵: This menu item allows you to set the respective deactivation levels of the pump in cm. The values must be adjusted to the specific local conditions.



Warning: The deactivation levels must be lower than the activation levels (“OFF” < “ON”). The control unit automatically checks these values against the values for the activation levels. If the levels are incorrect, the display of the "Level measurement" sub-menu displays a "?". The values entered must be corrected.

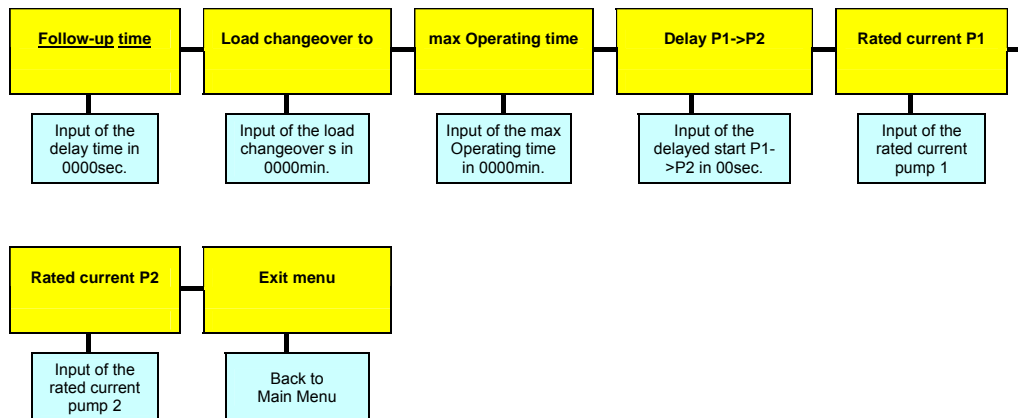


1st activation level; 2nd activation level⁶: This menu item allows you to set the respective activation levels of the pumps in cm. The values must be adjusted to the specific local conditions.

Alarm level: This menu item allows you to set the alarm level. The value must be adjusted to the specific local conditions.

Exit menu: Back to the Main Menu.

Sub-menu “Pump data”



Run-on time: This menu item allows you to set the run-on time of the pumps in sec. This is the time the pumps will continue to operate after the deactivation level has been exceeded. The setting range is freely adjustable between “000 – 9999sec”. A value of “0000sec.” switches off this function.



If the run-on time is too long, the pumps may run dry and be damaged as a result.

⁵ only displayed if menu item (#131) is set to 2 pumps.

⁶ only displayed if menu item (#131) is set to 2 pumps.

Operating manual

Modular pump control CPSM



Load alternation after...: This menu item allows you to set the load alternation behaviour of the control unit in minutes. If a value of "0000min." is set, the load alternation is only carried out after both pumps have been switched off. If a value between "0001 and 9998min." is selected, load change occurs after both pumps switch off, but at the latest after the time set here. A value of "9999min." switches off the load alternation function, meaning the control unit generally starts with pump 1 and that pump 2 is always the peak load pump.



Warning: If in menu item #131 the operating mode 1/1 is selected, a value of "9999min." means that pump 2 never switches on automatically.

Max. running time: This menu item allows you to limit the max. running time of the pump to a time between "000-999min." If the pump(s) is(are) activated continuously for longer than the time set here, it(they) is switched off and an alarm is triggered. In a two-pump control unit where one pump is activated, the control unit will switch to the other pump once the time has elapsed and an alarm is triggered. When the pump that has just switched on also reaches the running time limit, it is switched off and a further alarm is activated. A value of "0000min." switches off this function.

P1->P2 delay: This menu item allows you to set the delay time between pump 1 and pump 2 in sec. This time should be chosen so that the second pump only switches on after the first pump has shut down. To prevent a possible overloading of the mains supply due to the pumps' starting currents, the second pumped is switched on after a short delay.

Nominal current of P1; nominal current of P2⁷: This menu item allows you to set the nominal operating current of the pumps for electronic current monitoring. If the current exceeds the nominal value, the alarm is set off after a short time. If the measured current is less than half the nominal current, an undercurrent alarm is set off⁸. To ensure reliable operation, the value entered should be around 10% higher than the current displayed on the screen (under normal operating conditions). A value



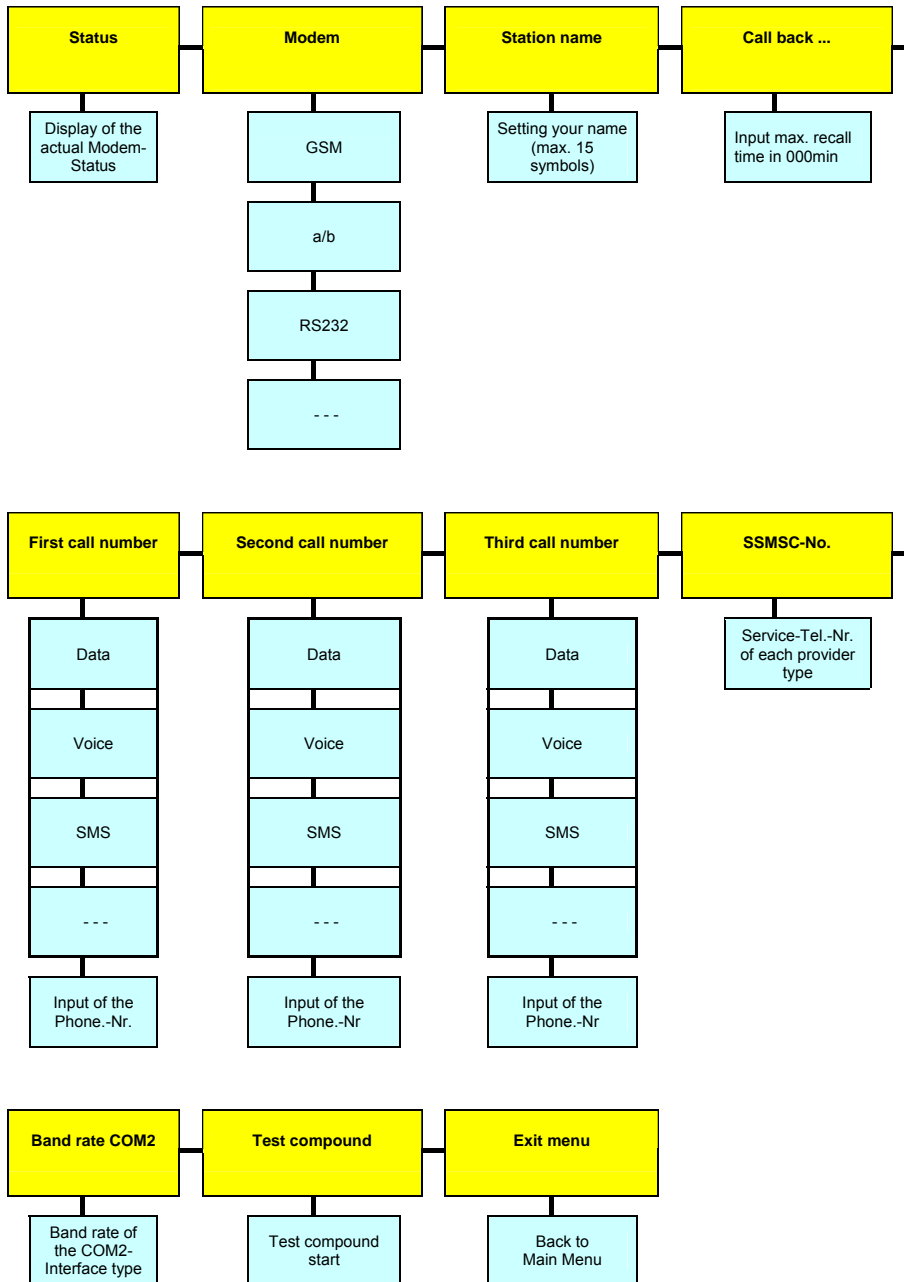
If the pump, the values in this menu item should not be set. If the control unit is equipped with a motor circuit breaker for each. The display then simply acts as a amperemeter.

Exit menu: Back to the Main Menu.

⁷ only displayed if 2-pumps or 1/1-pumps is selected in menu item (#131)

⁸ not in units with manual manual – zero – automatic switches

Sub-menu „Communication“



Status display: This menu item displays the current modem status.

Modem: This menu item allows you to choose, depending on the modem connected, between GSM, a/b, RS232 and ---- (no modem).

Station name: This menu item allows you to enter the relevant station name of the control unit. This station name is indicated in every message and serves to distinguish the different control units from each other. The station name may consist of up to 15 characters.

Call-back after ...: This menu item allows you to set the call-back time in min. When faults or an alarm occur, the first call number entered is rung. If there is no acknowledging call within the call-back time entered, the same call number is rung another two times. If after these two attempts there is still no return call (confirmation), the second call number entered is rung a maximum of 3 times, after which the third telephone number is rung a maximum of 3 times. If there is no return call to the maximum number of nine attempts, the control unit switches to "Now Answer" and there are no further attempts.
You should not enter 000min. (undefined condition)

1st telephone number; 2nd telephone number, 3rd telephone number: In this menu item you can enter a maximum of three telephone numbers for the respective call recipients. In each menu you must first choose the desired form of data transfer from the following options: data (data exchange via the specialist communications software "Watertel"), voice (voice message), SMS (text message) and --- (no form of transmission). The call recipient's particular telephone number (15 characters max.) is then entered.

Entering the telephone number by GSM modems:

496789112233445
1/ 2/ 3/

1. Country cod (without +)
e.g. 49 for Germany
2. Area code for each call recipient (without 0),
e.g. 6789
3. Telephone number of each call recipient,
e.g. 112233445



Warning: Do not enter any spaces,
e.g. 499876112233445

Entering the telephone number by a/b-Modem:

06789112233445
1/ 2/

1. Area code for each call recipient
e.g. für 06789
2. Telephone number of each call recipient
e.g. 112233445



Warning: Do not enter any spaces,
e.g. 06789112233445

SSMSC No.: The SSMSC No. of your provider is entered in this menu item (15 characters max.). The SSMSC number is necessary to send a text message. Your provider can inform you of your valid SSMSC No. A list with the most important SSMSC Nos can be found in the section "SSMSC Nos".

0189112233445
1/ 2/

1. Area code for each SSMSC-No.
e.g. 0189
2. Telephone number of each SSMSC-No.
e.g. 112233445



Warning: Do not enter any spaces,
e.g. 0189112233445)

Operating manual

Modular pump control CPSM



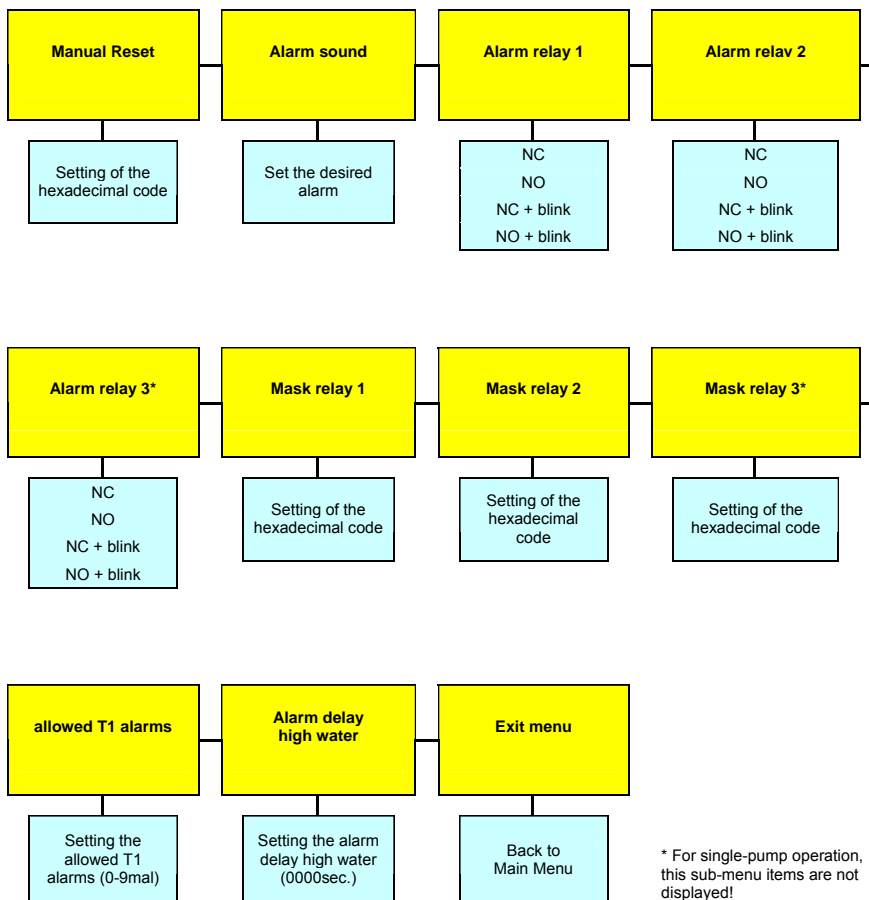
Baud rate COM2: This menu item allows you to choose the transmission speed of the COM2 interface. The following values are predetermined and can be changed according to the actual possible transmission speeds.

- - -	19 200	76 800
4 800	28 800	115 200
9 600	38 400	
1 4400	5 7600	

Test connection: When this menu item is selected, a test message with the current status of the control unit is sent to the first call number.

Exit menu: Back to the Main Menu.

Sub-menu „Alarms“



Operating manual

Modular pump control CPSM



Man. reset: This menu item allows you to set which of the alarms can only be confirmed (reset) manually. If manual confirmation is not chosen for a particular alarm, it is immediately reset as soon as the alarm (fault) is no longer present. The relevant entry is made by means of a hexadecimal code for the chosen error message. Refer to section “Error code table” for information on how to convert the hexadecimal codes.

Alarm sound: This menu item allows you to choose the sound of the alarm.

Alarm relay 1⁹; alarm relay 2; alarm relay 3¹⁰: These sub-menus allow you to choose the activation sequence of the alarm relays.

NC	Normally closed	Opens at alarm
NO	Normally open	Closes on Alarm
NC blink	Normally closed + flashing	Opens at alarm and flashing
NO blink	Normally open + flashing	Closes on Alarm and flashing

This function can be individually selected for each of the relays. This function is important to determine the behaviour if an alarm is triggered during a mains power failure.

Relay mask 1; relay mask 2; relay mask 3¹¹: These sub-menus allow you to choose for each alarm relay with which alarm they should be activated. This makes it possible to freely assign the relay functions to the fault situations. This means that each relay can be assigned groups of faults. The appropriate entry is made by means of a hexadecimal code for the chosen error message. Refer to section “Error code table” for information on how to convert the hexadecimal codes.

Permitted T1 alarms If during operation, a T1 alarm is triggered frequently (by thermal contact T1), for example due to overloading, this menu item allows you to prevent the control unit from not restarting again automatically after an adjustable number of alarms, once the pump has cooled down, since it can be assumed that there is a systematic error. The maximum number of times the T1 thermal contact is triggered can be set here. If the T1 fault has occurred more frequently since the last time the alarms were confirmed than the value entered here, the control unit will stop and “nxT1” will appear on the display. If this mode is not used, this value should be set to 0.

High water alarm delay: This sub-menu allows you to set the time in sec that must elapse before the high water alarm is triggered after the high water level has been exceeded or after activation of the high water float. This means that short-term high water levels do not lead to an alarm being triggered. However, the display does show the message “(HW)” immediately. The delay period is evident due to the flashing red LED. If the time is exceeded the LED stops flashing and stays red continuously, “HW” is displayed and the alarm buzzer sounds.

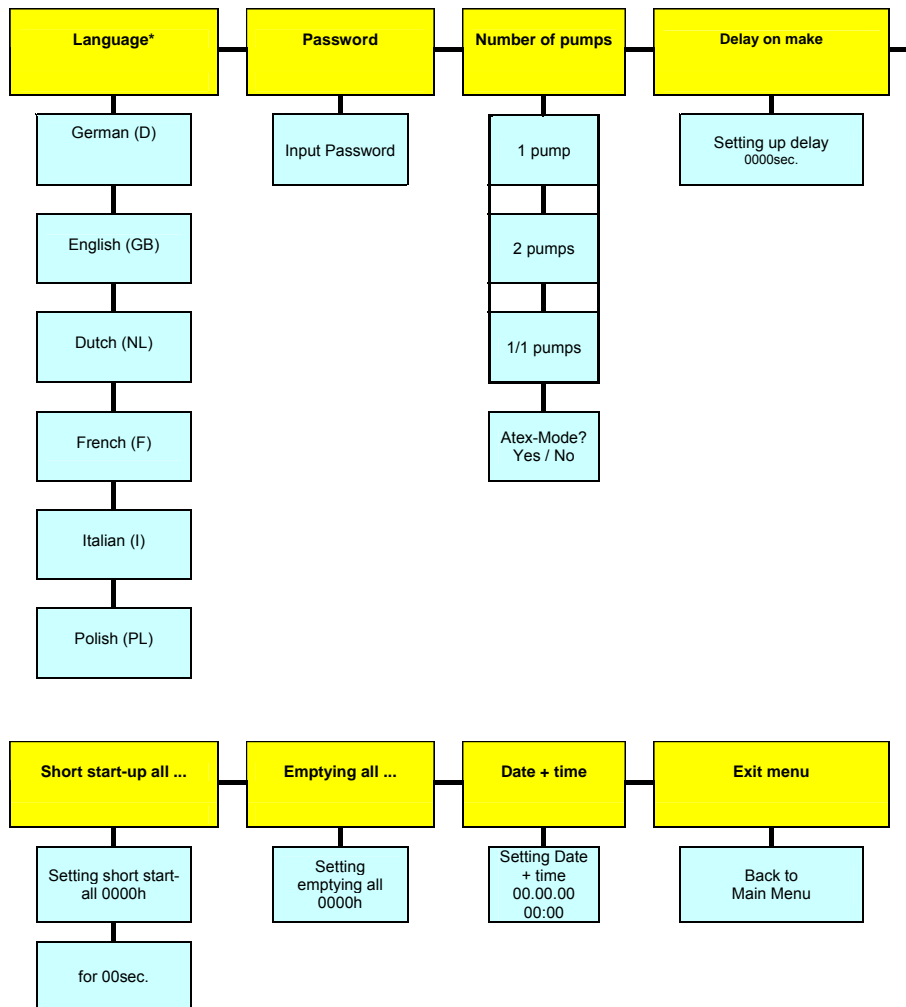
Exit menu: Back to the Main Menu.

⁹ if compressor or agitator was chosen as a factory setting, alarm relay 1 has a different function (see section: Sub-menu compressor or agitator (#192))

¹⁰ in one-pump operation these sub-menu items are not shown

¹¹ in one-pump operation these sub-menu items are not shown

Sub-menu “Basic settings“



* possibly other languages on request

Language: This sub-menu allows you to choose the language of the user interface. All text is displayed in the chosen language.

Password: This sub-menu allows you to change the password of the control unit¹². The password should be noted in a safe area, since without it access to the system menu of the control unit is no longer possible.



If the password is lost, the control unit must be reconfigured by the factory, since for safety reasons no changes to the setting can be made without the password.

Number of pumps¹³: This sub-menu allows you to determine whether the control unit works as a one- or two-pump control unit.

- **1** - one pump
- **2** - peak load operation two pumps
- **1/1** - alternating operation of two pumps (load alternating mode – only one pump is ever running)

¹² the password is set to 0000 by the factory.

¹³ only displayed, if the factory setting is set to two-pump control. With one-pump control units Atex mode can be selected in the sub-menu item #131

Operating manual

Modular pump control CPSM



Start-up delay: In this sub-menu the start-up delay of the control unit can be set in sec. After switching on the control unit, the unit does not start up immediately, but is only activated after the time entered here. Even after a mains or phase error, the control unit is only (re)activated after this time has passed. A value of 0000sec. switches off this function. If the value is set to 1000sec., the time for each start-up is chosen randomly (between 0 and 59sec). After a power failure affecting many control units, this setting can prevent all the control units from switching on at the same time (current peak).

Quick start every ...: Pumps that are not in operation for a long time, may require starting at regular intervals. This sub-menu allows you to set a compulsory start-up of the pumps. The quick start allows you to start the pumps every h for a few sec. If the pumps have been inactive for the time entered, they will be activated after the time has elapsed for the number of seconds entered. If a pump is normally operated via the level control unit, the quick start timer begins counting again from (0000h).

The following table shows an example of the activation sequence during a quick start:

Short start-up		Stop level of the respective pump	Switching behavior of the respective pump
all 024h	for 10sec.	below	Pump in operation for 10 seconds every 24 hours
		not below	Pump every 24 hours in operation, was to undercut each stop level.

Empty pumps every ...: In the case of installations that are only used infrequently, the activation level may not be reached for relatively long periods of time. However, it may be undesirable for the wastewater to remain in the shaft for this length of time. This sub-menu allows you to set a time in h. If after the time set (depending on the last pumping cycle), the activation level has not been reached, the shaft will be pumped off until the relevant deactivation level has been reached. A value of 0000h. switches off this function.



For installations with the “open immersion bell” level system with no air bubbling system, releasing the immersion bell is only possible if the run-on time is specified.

Date + Time: This menu item allows you to set the current date and current time.

00.00.00

00:00

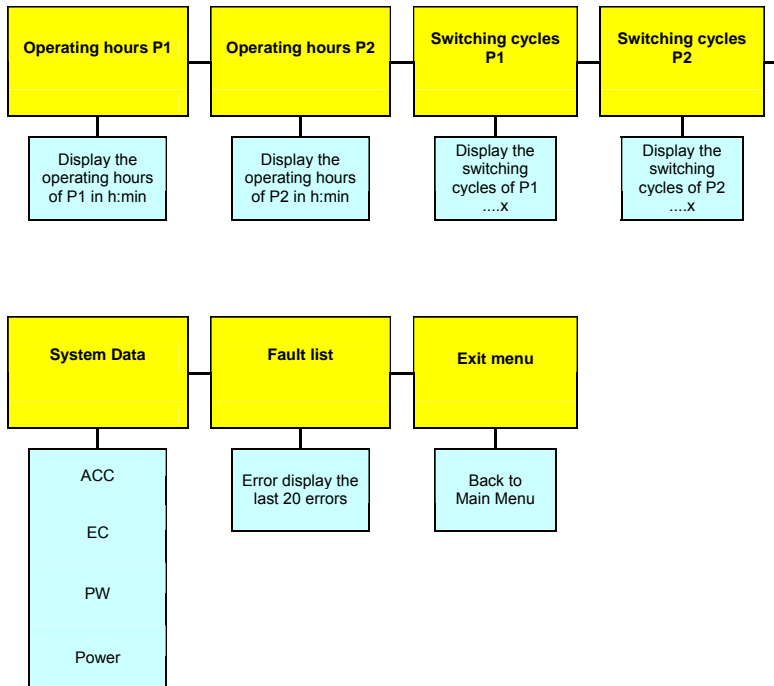
1/ 2/

1. Enter the date as day, month, year
2. Enter the time as hours, minutes

Date and time are not needed for normal operation of the control unit. They are only used to save faults with a time and date, thus enabling a more accurate fault analysis. The clock is monitored by the software. If the clock battery is empty, faulty or not inserted, a CLOCK fault is identified, if the control unit was switched off for a while and the clock was without power supply. This error is also shown if the clock has not been set at least once after installation of a new battery. The clock on a newly delivered CPS must therefore be set to remove the CLOCK error message.

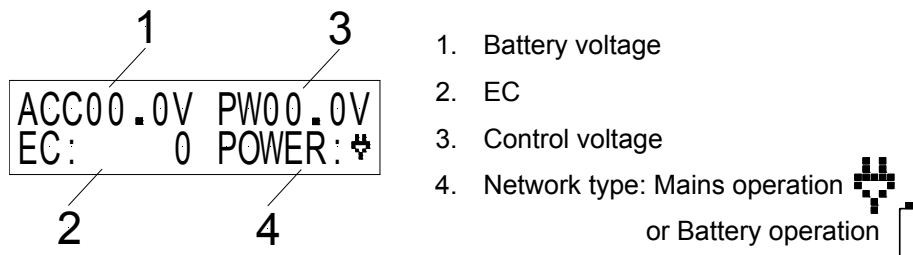
Exit menu: Back to the Main Menu.

Sub-menu „Timer“

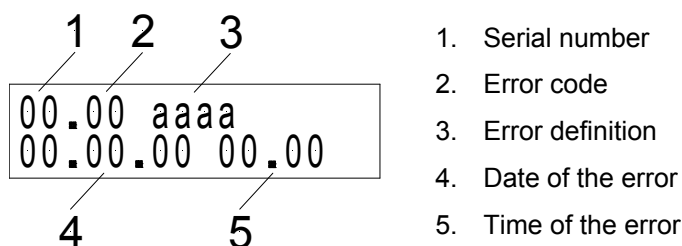


Operating hours of P1; operating hours of P2; switching cycle of P1; switching cycle of P2: These sub-menus display the data concerning the operating hours and switching cycles of the individual pumps. It is not possible to enter information into these sub-menus.

System data: This sub-menu displays the current system data of the control unit. It is not possible to enter information into this sub-menu.



Fault list: This menu item contains the last 20 saved faults. It is not possible to enter information into this sub-menu.



The exact description of the faults can be found in the fault list (see separate chapter).

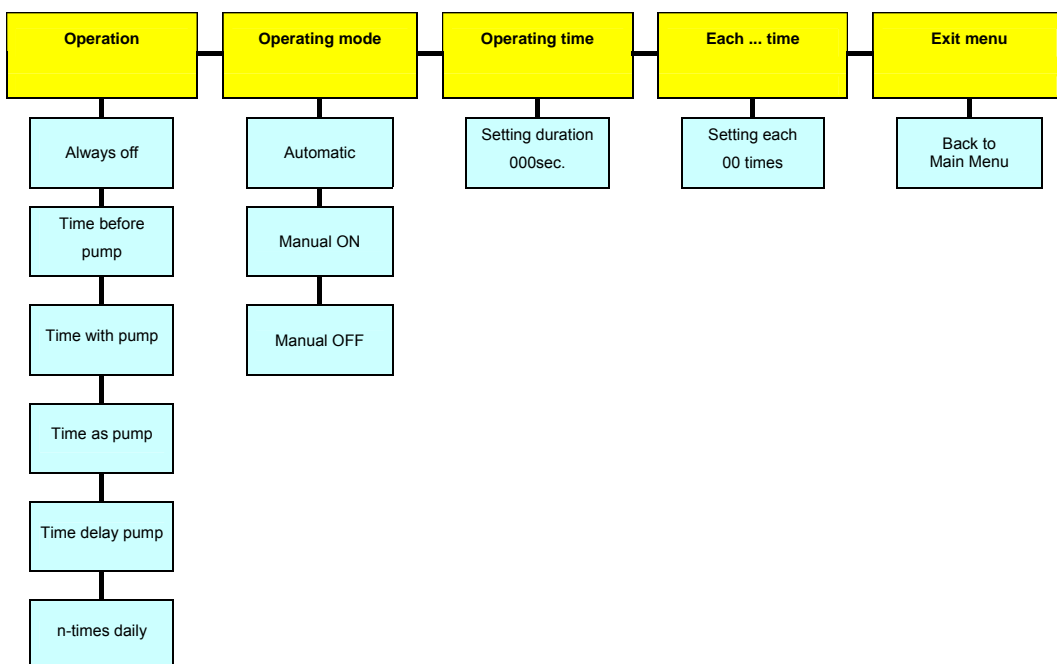
Exit menu: Back to the Main Menu.

Sub-menu “Compressor or agitator”¹⁴:



If the compressor or agitator function is used, alarm relay 1 is no longer available, nor is the external alarm input. The compressor or agitator is then connected to alarm relay 1.

If the compressor or agitator is switched to "always off", alarm relay 1 operates as normal. Note: This means that no compressor or agitator should be connected to the relay. In order to switch off a connected compressor or agitator when necessary, the operating mode should be set to "switch OFF" and the running time to "000sec.". Please note that faults that were reported via alarm relay 1 are no longer active. Alarm relays 2 and 3 must be used for this purpose. The alarm settings must be adjusted accordingly.



Function: This sub-menu allows you to determine how the compressor or agitator operates.

- **Always off:** The compressor or agitator is deactivated and will not be activated automatically. The control unit will operate like a standard control unit. Even manual activation of the agitator is not possible. Alarm relay 1 can therefore be used as an alarm relay.
- **Time before pump:** The agitator is activated once the activation level has been reached before the pumps start and will run for the time set. Once this time has elapsed the pump(s) start.
- **Time with pump:** The agitator starts with the pump(s) and runs for the set running time.
- **Time as pump:** The agitator starts with the pump(s) and runs for the same length of time as the pump(s).
- **N-times per day:** The compressor or agitator starts n-times per day and runs for the set running time.

¹⁴ Only shown if compressor or agitator has been selected in the factory settings.

Operating manual

Modular pump control CPSM



Operating mode: This menu item allows you to select the operating mode of the compressor or agitator.

Automatic: The compressor or agitator is switched ON or OFF automatically according to the parameters set.

Manual ON: The compressor or agitator remains in operation until it is switched off by hand.

Manual OFF: The compressor or agitator is switched off.

Running time: This menu item allows you to set the running time of the compressor or agitator to a max. duration of "000-999sec." If "time as pump" has been selected in the Function menu, the time must be set to 001sec. The running time of the agitator is then determined by the running time of the pump (!) and the agitator runs for at least as long as the pump. A value of "000sec." switches off this function.

every ... time: This sub-menu allows you to set how often the compressor or agitator should start in the form of the "00 time". If, for example, 03 time is chosen, two pump cycles are run without the compressor or agitator; the compressor or agitator only starts up on the third pump cycle. If a value of "00 time" or "01 time" is chosen in this menu, the compressor or agitator operates during every pumping cycle.

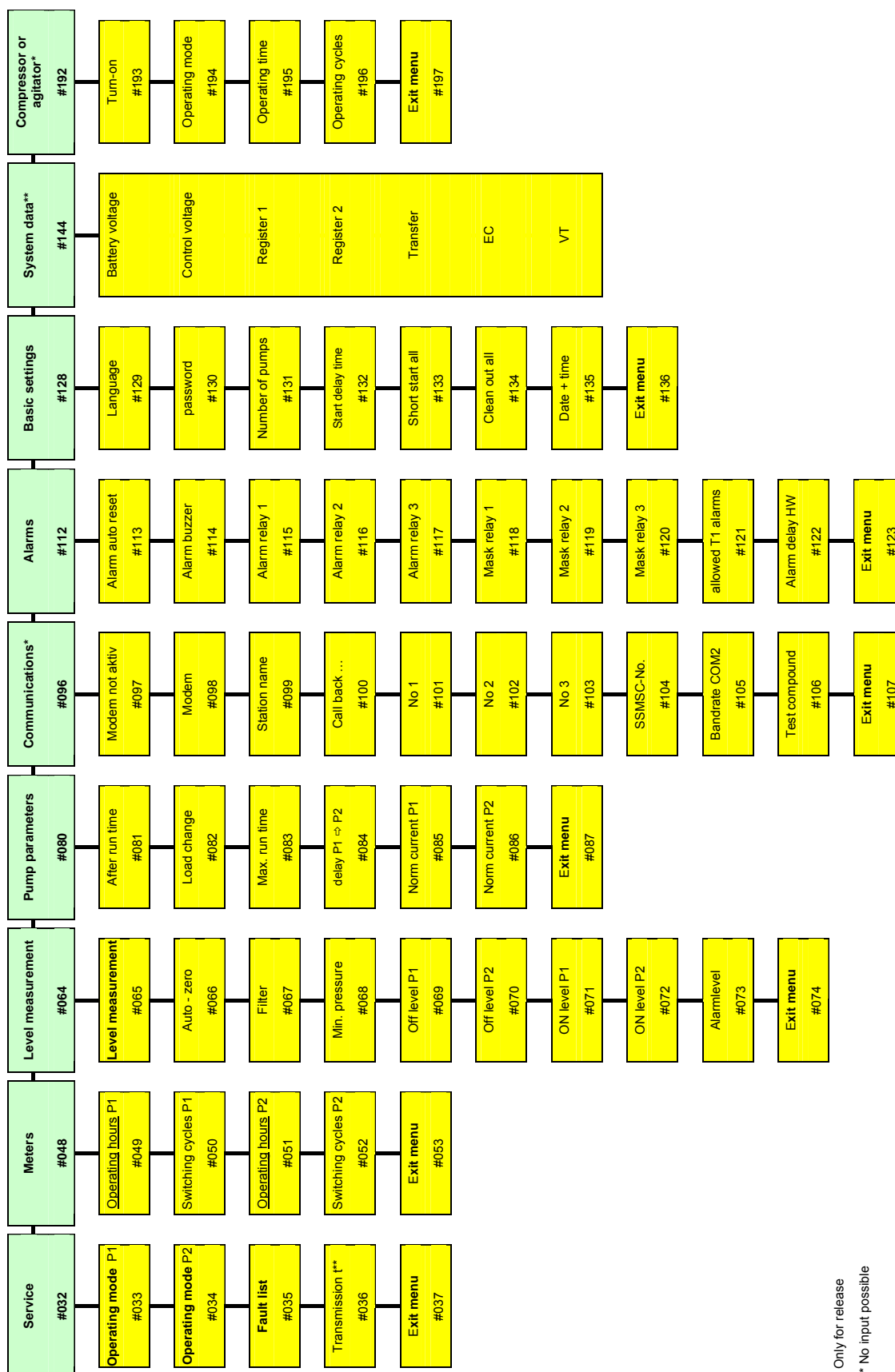
Exit menu: Back to the Main Menu.

Operating manual

Modular pump control CPSM



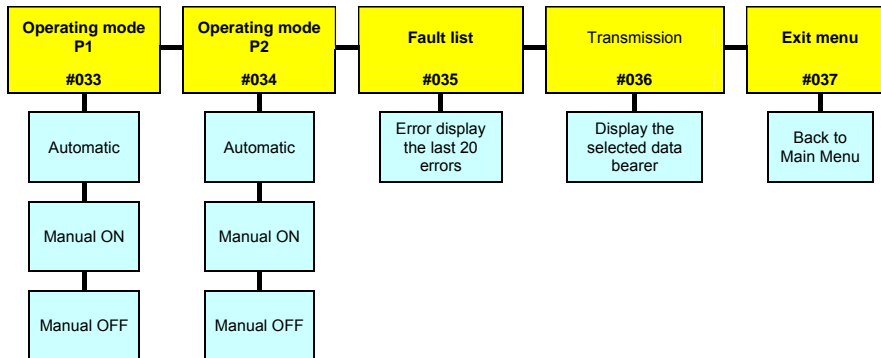
11. System menu / parameter settings for a control unit with a graph. display Overview Main Menu



* Only for release

** No input possible

Sub-menu „Service“ (#032)



P1 Operating mode (#033); P2 operating mode: (#034): This menu item sets the operating mode of pump 1 or pump 2. The selected mode of operation is displayed in this menu as well as in the main display (including its activation state).

Automatic: The pumps are switched ON or OFF automatically depending on the level set.

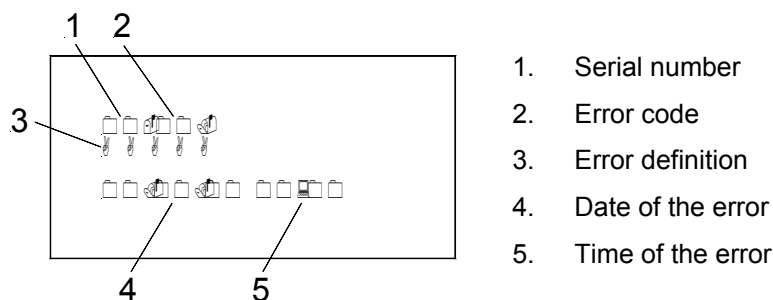
Manual ON: The pumps remain in operation until they are switched off by hand. If Atex mode has been selected, the pumps remain in operation until the lower deactivation level is reached.



If Atex mode is not selected, the pumps may run dry.

Manual OFF: The pumps are switched off. Even if a change in the level sends a signal to the pumps, the pumps remain switched off.

Fault list (#035): This menu item displays the last twenty saved faults. It is not possible to enter information in this menu item.



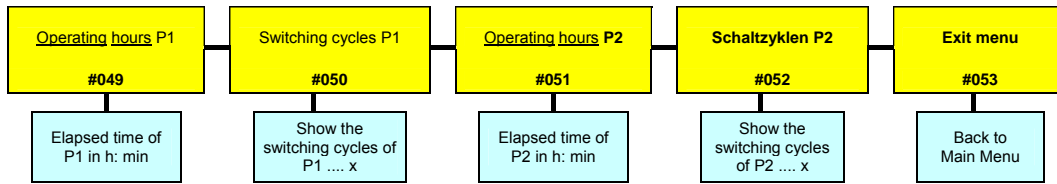
Exact fault descriptions can be found in the fault list (see separate chapter).

Transfer mode (#036)¹⁵: This menu item displays the optionally set form of remote data transfer. It is not possible to enter information in this menu item.

Exit menu (#037): Back to the Main Menu.

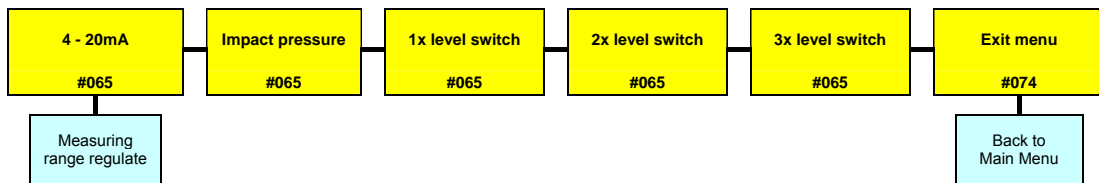
¹⁵ only displayed if a modem is selected (#098).

Sub-menu „Timer“ (#048)



In this submenu, the data are displayed in terms of operating hours and cycles of the pumps.

Sub-menu „Level measurement method“ (#064)

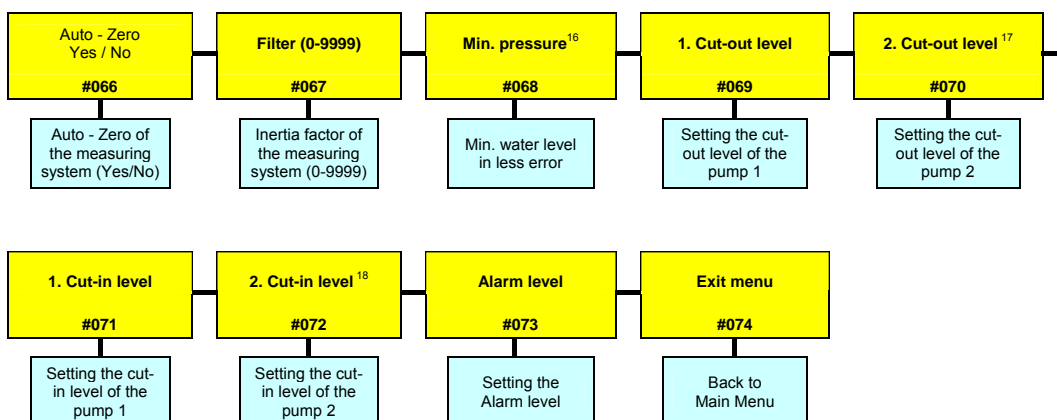


Select measuring system (#065): This menu item allows you to choose the measuring system used.

- Level measurement: 4... 20mA Interface over Level sensor
- Impact pressure (measuring range 0 ... 200cm WS)
- 1x float switch
- 2x float switch
- 3x float switch (only in two-pump operation possible)

If a 4-20mA (level sensor) measuring system is selected, it is necessary to enter the measurement range of the connected sensor after selecting the measuring system.

The following sub-menus are only activated if the "4-20mA" and "dynamic pressure" measuring systems are selected:



¹⁶ only displayed if "dynamic pressure" measuring system has been selected.

¹⁷ only displayed if 2 pump mode has been selected in menu item (#131)

¹⁸ only displayed if 2 pump mode has been selected in menu item (#131)

Zero balancing (#066): This menu item allows you to carry out a zero balancing adjustment of the measuring system in operation. The measuring system must not be in the water during adjustment. It is also necessary to ensure that the measuring system remains inoperative during the balancing procedure. Zero balancing can be repeated at any time.

Filter (#067): When water levels are unstable, the level display may also be unstable. A low-pass filter helps to stabilise the display and causes the level measuring system to react more slowly.
0000" = filter OFF, "0001" = weak (rapid) filter ... "9999" strong (slow) filter



Warning: If the filter is activated, the level display may become so sluggish that the measured level differs significantly from the actual level in the shaft. The shaft may already be empty whereas the measured value shows a level above the deactivation level, meaning the pump could run dry. Pump performance, activation levels and filter values therefore have to be carefully adjusted in relation to each other.

Not necessary for normal use

Minimum pressure (#068)¹⁹:

This menu item allows you to set a minimum pressure for the measuring system in cm. This set value can be monitored by the control unit. If the level measurement falls below the pressure set here, a fault message is issued. If the value "0000cm" is set, the minimum pressure monitoring system is switched off. This function can also be used if the level should not sink below a certain minimum level or if air bubbles from a small compressor need to be monitored.

1st deactivation level(#069); 2nd deactivation level (#070)²⁰: This menu item allows you to set the respective deactivation levels of the pumps in cm. The values must be adjusted to the specific local conditions.



Warning: The deactivation levels must be lower than the activation levels ("OFF" < "ON"). The control unit automatically checks these values against the activation levels. If the levels are incorrect, the "level measurement" sub-menu displays a "?" and the values entered need to be corrected.



1st activation level (#071); 2nd activation level (#072)²¹: This menu item allows you to set the respective activation levels of the pump in cm. The values must be adjusted to the specific local conditions.

Alarm level (#073):: This menu item allows you to set the alarm level. The values need to be adjusted to the specific local conditions.

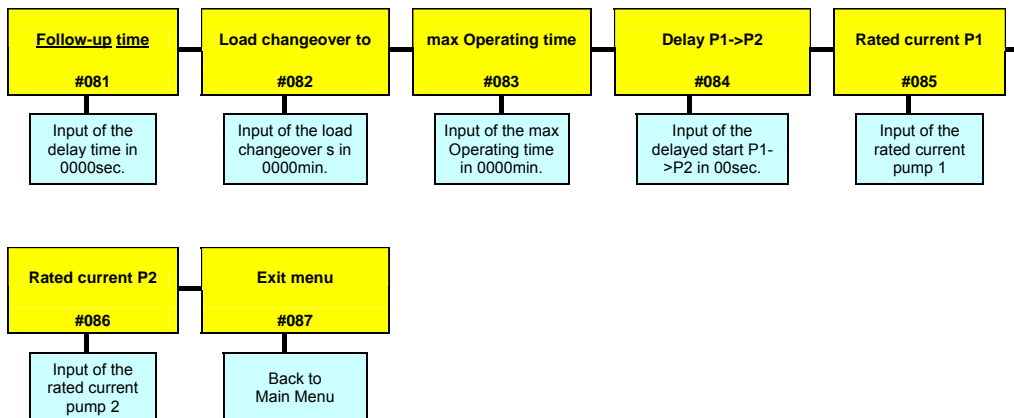
Exit menu (#074) : Back to the Main Menu.

¹⁹ only displayed if "dynamic pressure" measuring system has been selected.

²⁰ only displayed if 2 pump mode has been selected in menu item (#131)

²¹ only displayed if 2 pump mode has been selected in menu item (#131)

Sub-menu “Pump data” (#080)



Run-on time (#081): This menu item allows you to set the run-on time of the pumps in sec. This is the time the pumps will continue to operate after the deactivation level has been reached. The setting range can be freely adjusted between “000 – 9999sec”. A value of “0000sec.” switches off this function.



If the run-on time is too long, the pumps may run dry and suffer damage as a result.

Load alternation after ... (#082): This menu item allows you to set the load alternation behaviour of the control unit in minutes. If a value of “0000min.” is set, the load alternation is only carried out after both pumps have been switched off. If a value between “0001 and 9998min.” is chosen, load alternation occurs after both pumps are deactivated, but at the latest after the time set here. A value of “9999min.” switches off the load alternation function, meaning the control unit generally starts with pump 1 and pump 2 is always the peak load pump.



Warning: If, in menu item #131, operating mode 1/1 is selected, a value of “9999min.” means that pump 2 never switches on automatically.

Max. running time (#083): This menu item allows you to limit the max. running time of the pump(s) to a time between “000-999min.” If the pump(s) is(are) activated continuously for longer than the time set here, it(they) will be switched off and an alarm will sound. If, in a two-pump control unit, one pump is activated, the control unit switches to the other pump once this time has elapsed and an alarm is set off. When the pump that was switched on also reaches the running time limit, it is also switched off and a further alarm is sounded. A value of “0000min.” switches off this function.

Operating manual

Modular pump control CPSM



P1->P2 delay (#084): This menu item allows you to set the delay time between pump 2 and pump 1 in sec. This time should be chosen so that the second pump only switches on after the first pump has shut down. The second pumped is switched on after a short delay to prevent a possible overloading of the mains supply due to the pumps' starting currents.

Nominal current of P1 (#085); nominal current of P2 (#086)²²: This menu item allows you to set the nominal operating current of the pump for the electronic current control unit. If the current exceeds the nominal value, the alarm is set off after a short time. If the measured current is less than half of the nominal current, an undercurrent alarm is set off²³. To ensure reliable operation, the value entered should be around 10% higher than the current displayed on the screen (under normal operating conditions). A value of 00.0A switches current monitoring off.



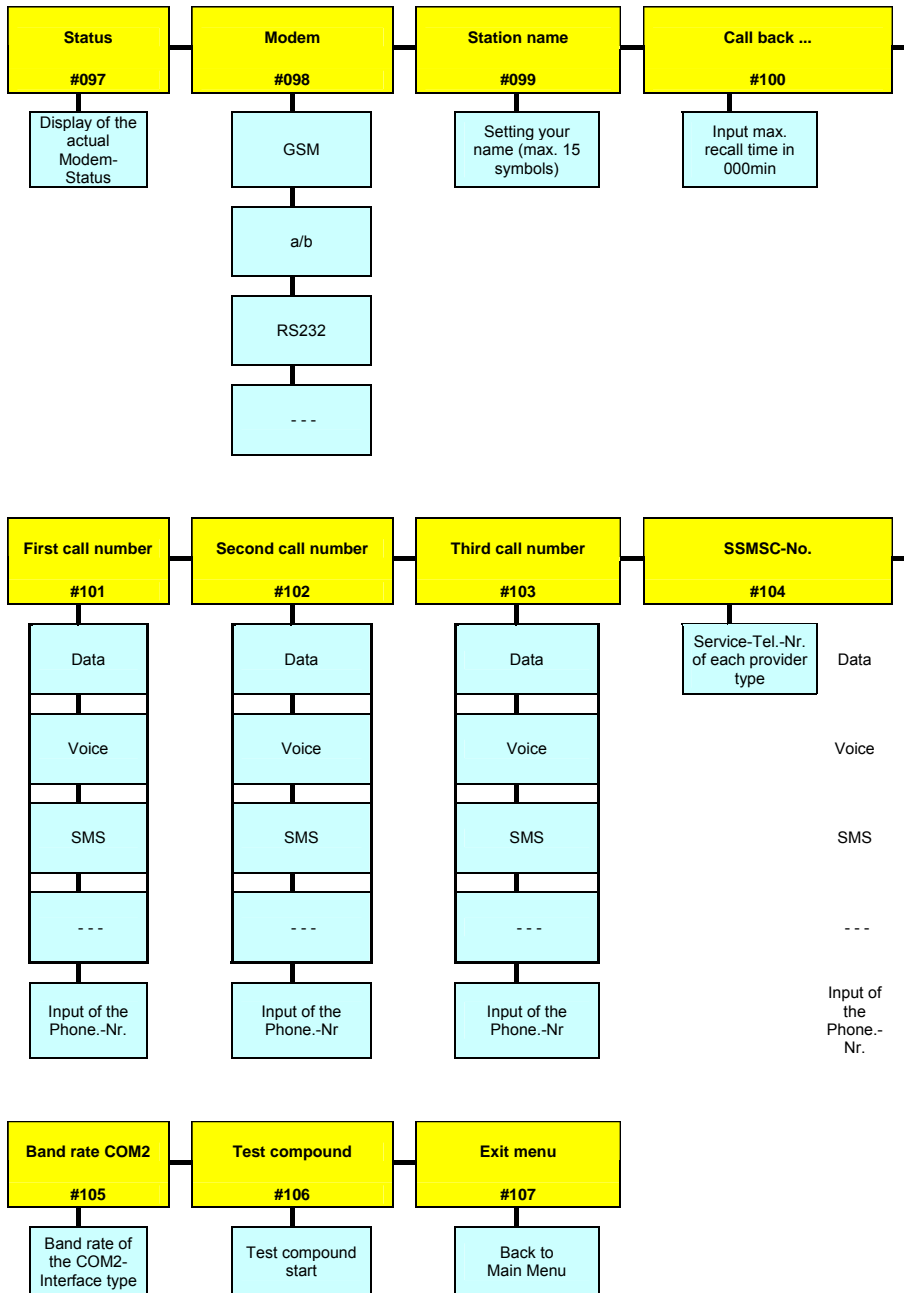
If the control unit is equipped with a motor circuit breaker for each pump, the values in this menu item should not be set. The display then simply acts as an amperemeter.

Exit menu (#087): Back to the Main Menu.

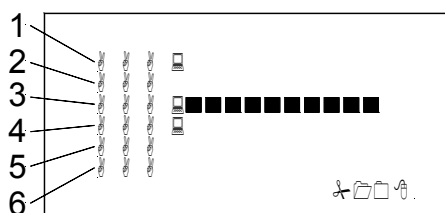
²² only displayed if 2 pumps or 1/1 pumps has been selected in menu item (#131)

²³ not in control units with manual manual-0-automatic switches

Sub-menu „Communication“ (#096)



Status display (#097):



1. Modem type
2. Indication of the provider
3. Signal strength
4. Modem status
5. Current function of the modem
6. Current reviews of the modem

Operating manual

Modular pump control CPSM



Modem (#098): This menu item allows you to choose, depending on the modem connected, between GSM, a/b, RS232 and ---- (no modem).

Station name (#099): This menu item allows you to enter the relevant station name of the control unit. This station name is indicated in every message and serves to distinguish the different control units from each other. The station name may consist of up to 15 characters.

Call-back after ... (#100): This menu item allows you to set the call-back time in min. When faults or an alarm occur, the first call number entered is rung. If there is no acknowledging call within the call-back time entered, the same call number is rung another two times. If after these two attempts there is still no return call (confirmation), the second call number entered is rung a maximum of 3 times, after which the third telephone number is rung a maximum of 3 times. If there is no return call to the maximum number of nine attempts, the control unit switches to "Now Answer" and there are no further attempts.
You should not enter 000min. (undefined condition)

1st telephone (#101); 2nd telephone (#102); 3rd telephone number: In this menu item you can enter a maximum of three telephone numbers for the respective call recipients. In each menu you must first choose the desired form of data transfer from the following options: data (data exchange via the specialist communications software "Watertel"), voice (voice message), SMS (text message) and --- (no form of transmission). The call recipient's particular telephone number (15 characters max.) is then entered.

Entering the telephone number by GSM modems:

49 6789 112233445
1/ 2/ 3/

4. Country cod (without +)
e.g. 49 for Germany
5. Area code for each call recipient (without 0),
e.g. 6789
6. Telephone number of each call recipient,
e.g. 112233445



Warning: Do not enter any spaces,
e.g. 499876112233445

Entering the telephone number by a/b-Modem:

06789 112233445
1/ 2/

3. Area code for each call recipient
e.g. für 06789
4. Telephone number of each call recipient
e.g. 112233445



Warning: Do not enter any spaces,
e.g. 06789112233445

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SSMSC No.: The SSMSC No. of your provider is entered in this menu item (15 characters max.). The SSMSC number is necessary to send a text message. Your provider can inform you of your valid SSMSC No. A list with the most important SSMSC Nos can be found in the section "SSMSC Nos".

0189112233445

1/ 2/

3. Area code for each SSMSC-No..
e.g. 0189
4. Telephone number of each SSMSC-No..
e.g. 112233445



Warning: Do not enter any spaces,
e.g. 0189112233445)

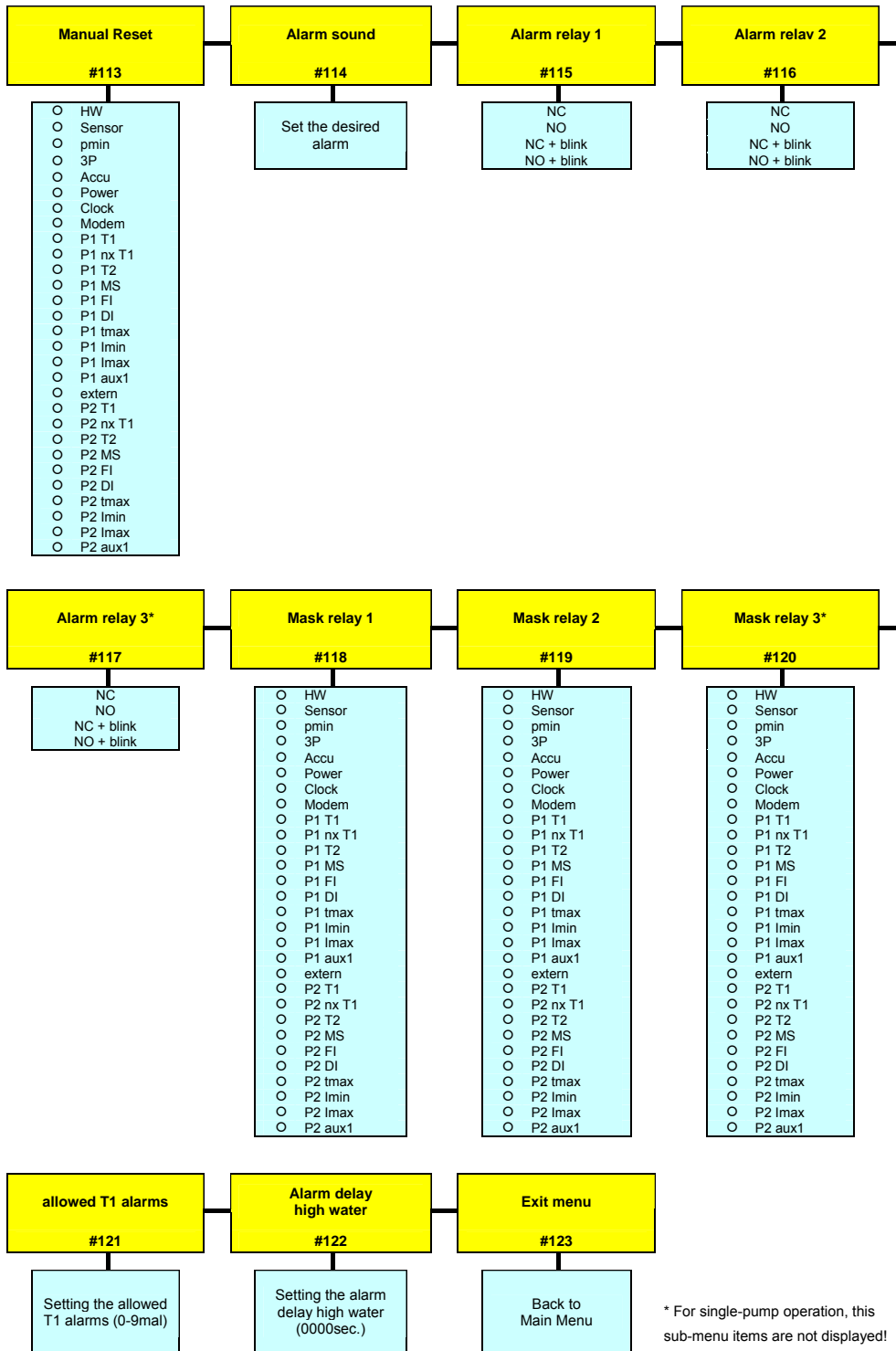
Baud rate COM2 (#105): This menu item allows you to choose the transmission speed of the COM2 interface. The following values are predetermined and can be changed according to the actual possible transmission speeds.

---	19 200	76 800
4 800	28 800	115 200
9 600	38 400	
14 400	57 600	

Test connection (#106): When this menu item is selected, a test message with the current status of the control unit is sent to the first call number

Exit menu (#107): Back to the Main Menu.

Sub-menu „Alarms“ (#112)



Man. reset (#113): This menu item allows you to select which of the alarms can only be confirmed (reset) manually. If manual confirmation is not selected for a certain alarm, it is immediately reset as soon as the alarm (fault) is no longer present.

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Alarm sound (#113): This menu item allows you to choose the desired alarm sound.

Alarm relay 1 (#115)²⁴; alarm relay 2 (#116); alarm relay 3(#117)²⁵:: These sub-menus allow you to choose the activation settings of alarm relays.

NC	Normally closed	Opens at alarm
NO	Normally open	Closes on Alarm
NC blink	Normally closed + flashing	Opens at alarm and flashing
NO blink	Normally open + flashing	Closes on Alarm and flashing

This function can be chosen individually for each of the relays. This function is important to determine the behaviour if an alarm is triggered during a mains power failure.

Relay mask 1 (#118); relay mask 2(#119); relay mask 3(#120)²⁶:: These sub-menus allow you to choose for each alarm relay with which alarm they are meant to activate. You can therefore freely assign the relay functions to the fault situations. This means that each relay can be assigned groups of faults. The appropriate entry is made by means of a hexadecimal code for the chosen error message. Refer to section "Error code table" for information on how to convert the hexadecimal codes.

Permitted T1 alarms (#121): If during operation, a T1 alarm is frequently sounded (thermal contact T1 sets it off), for example due to overloading, this menu item allows you to prevent the control unit not restarting again automatically after an adjustable number of alarms, once the pump has cooled down, since it can be assumed that there is a systematic error. The maximum number of times the T1 thermal contact is triggered can be set here. If the T1 fault has occurred more frequently since the last time the alarms were confirmed than the value entered here, the control unit will stop and show the message "nxT1" on the display. If this mode is not used, this value should be set to 0.1

High water alarm delay (#122): This sub-menu allows you to set the time in sec. that must elapse after the high water level is exceeded or after activation of the high water float, before the high water alarm is triggered. This means that short-term high water levels do not lead to an alarm being triggered. However, the display does show the message "(HW)" immediately. The delay period is evident due to the flashing red LED. If the time is exceeded, the LED is continuously lit, "HW" is displayed and the alarm buzzer sounds.

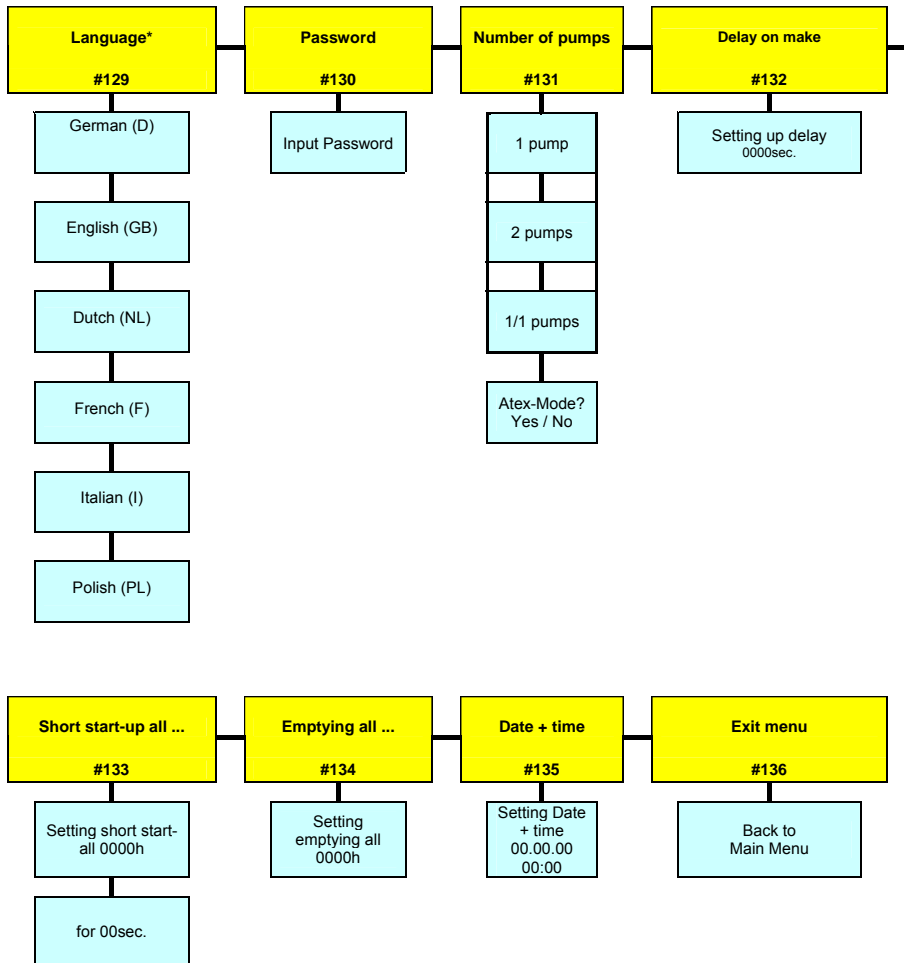
Exit menu (#123): Back to the Main Menu.

²⁴ if compressor or agitator has been selected in the factory settings, alarm relay 1 has a different function (see section: Compressor or agitator sub-meni (#192))

²⁵ in one-pump operation these sub-menu items are not shown

²⁶ in one-pump operation these sub-menu items are not shown

Sub-menu “Basic settings“ (#128)



* possibly other languages on request

Language (#129): This sub-menu allows you to choose the language of the user interface. All text is displayed in the chosen language.

Password (#130): This sub-menu allows you to change the password of the control unit²⁷. The password should be noted in a safe area, since without it access to the system menu of the control unit is no longer possible.



If the password is lost, the control unit must be reconfigured by the factory, since for safety reasons no changes to the settings can be made without the password.

Number of pumps (#131)²⁸: This sub-menu allows you to determine whether the control unit works as a one- or two-pump control unit.

- **1** - one pump
- **2** - peak load operation two pumps
- **1/1** - alternating operation of two pumps (load alternating mode – only one pump is ever running)

²⁷ the standard password set by the factory is 0000.

²⁸ only displayed if the factory setting is set to two-pump control. With one-pump control units, Atex mode can be chosen in sub-menu item #131

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Start-up delay (#132): In this sub-menu the start-up delay of the control unit can be set in sec. After the control unit is switched on, it waits the stipulated time before actually starting up. Even after a mains or phase error, the control unit is only (re)activated after this time has passed. A value of 0000sec. switches off this function. If the value is set to 1000sec., the time for each start-up is chosen randomly (between 0 and 59sec). After a power failure affecting many control units, this setting can prevent all the control units from switching on at the same time (current peak).

Quick start every ... (#133): If the pumps remain inactive for a long time, it may be necessary to start the pumps at regular intervals. This sub-menu allows you to select a compulsory start-up of the pumps. The quick start allows you to start the pumps every h for a few sec. If the pumps have been inactive for the time set, they will be activated after the time has elapsed for the number of seconds entered. If a pump runs normally via the level control unit, the quick start timer begins counting again from (0000h).

The following table shows an example of the pumps' activation sequence during a quick start:

Short start-up		Stop level of the respective pump	Switching behavior of the respective pump
all 024h	for 10sec.	below	Pump in operation for 10 seconds every 24 hours
		not below	Pump every 24 hours in operation, was to undercut each stop level.

Empty pumps every ... (#134): In the case of installations that are rarely used, the activation level may not be reached for relatively long periods of time. It may nevertheless be undesirable for the sewage to remain in the shaft for a long time. This sub-menu allows you to set a time in h. If after the time set (depending on the last pumping cycle), the activation level hasn't been reached, the shaft will be pumped off until the relevant deactivation level has been reached. A value of 0000h. switches off this function.



For installations with the open immersion bell level system with no air bubbling system, releasing the immersion bell is only possible if the run-on time is specified.

Date + Time (#135): This menu item allows you to set the current date and current time.

00.00.00

00:00

1/ 2/

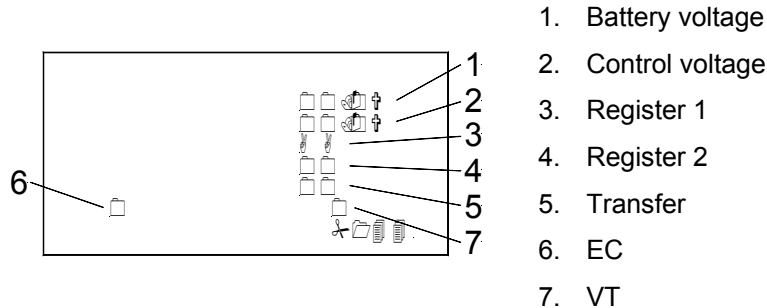
3. Enter the date as day, month, year
4. Enter the time as hours, minutes

Date and time are not needed for normal operation of the control unit. They are only be used to save faults with a time and date, thus enabling a more accurate fault analysis. The clock is monitored by the software. If the clock battery is empty, faulty or not inserted, a CLOCK fault is identified, if the control unit was switched off for a while and the clock was without power supply. This error is also shown if the clock has not been set at least once after installation of a new battery. The clock on a newly delivered CPS must therefore be set to remove the CLOCK error message.

Exit menu (#136): Back to the Main Menu.

Sub-menu “System data“ (#144)

This sub-menu displays the current system data of the control unit. It is not possible to enter information into this sub-menu.

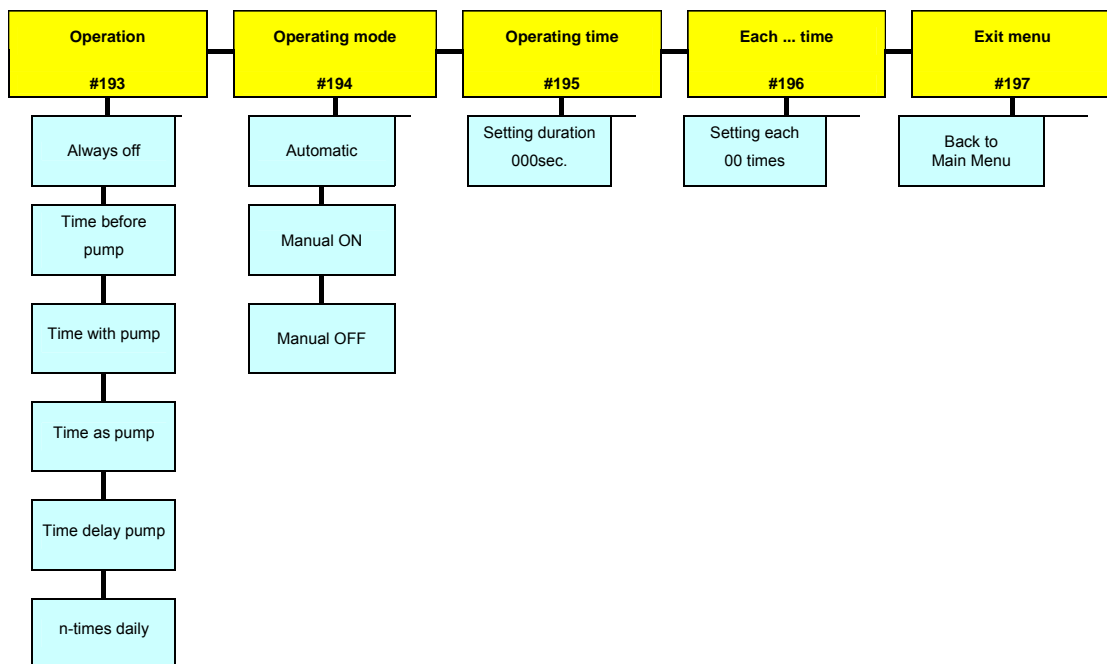


Sub-menu “Compressor or agitator“ (#192)²⁹:



If the compressor or agitator function is used, alarm relay 1 is no longer available, nor is the external alarm input. The compressor or agitator is then connected to alarm relay 1.

If the compressor or agitator is switched to "always off", alarm relay 1 operates as normal. Note: This means no compressor or agitator should be connected to the relay. In order to deactivate a connected compressor or agitator when necessary, the operating mode should be set to "switch OFF" and the running time to "000sec.". Please note that faults that were reported via alarm relay 1 are no longer active. Alarm relays 2 and 3 must be used for this purpose. The alarm settings must be adjusted accordingly.



²⁹ only displayed if compressor or agitator has been selected in the factory settings

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Function (#193): This sub-menu allows you to determine how the compressor or agitator operates

- **Always off:** The compressor or agitator is deactivated and will not be activated automatically. The control unit will operate like a standard control unit. Even manual activation of the agitator is not possible. Alarm relay 1 can therefore be used as an alarm relay.
- **Time before pump:** The agitator is activated once the activation level has been reached before the pumps start and will run for the time set. Once this time has elapsed the pump(s) start.
- **Time with pump:** The agitator starts with the pump(s) and runs for the set running time.
- **Time as pump:** The agitator starts with the pump(s) and runs for the same length of time as the pump(s).
- **N-times per day:** The compressor or agitator starts n-times per day and runs for the set running time.

Operating mode (#194): This menu item allows you to chose the operating mode of the compressor or agitator.

Automatic: The compressor or agitator is switched ON or OFF automatically according to the parameters set.

Manual ON: The compressor or agitator remains in operation until it is switched off by hand.

Manual OFF: The compressor or agitator is switched off.

Running time (#195): This menu item allows you to set the running time of the compressor or agitator to a max. duration of "000-999sec." If "time as pump" has been chosen in the Function menu, the time must be set to 001sec. The running time of the agitator is then determined by the running time of the pump (!) and the agitator runs for at least as long as the pump. A value of "000sec." switches off this function.

every ... time (#196): This sub-menu allows you to set how often the compressor or agitator should start in the form of the "00 time". If, for example, 03 time is chosen, two pump cycles are run without the compressor or agitator; the compressor or agitator only starts up on the third pump cycle. If a value of "00 time" or "01 time" is chosen in this menu, the compressor or agitator operates during every pumping cycle.

Exit menu (#197): Back to the Main Menu.

12. Start-up / re-start

Please also refer to the operating manual for the pumps.

- Install the control unit in a dry, frost-free area that is protected from flooding
- Make the connections according to the relevant circuit diagram.
- Ensure pre-fusing of the equipment on-site corresponds to the guidelines in the relevant accompanying circuit diagram.
- The power supply corresponds to the information in the relevant circuit diagram. The connection to the control unit transformer may have to be adapted to the local conditions (input voltage $\pm 5\%$)
- The motor circuit breaker(s) setting must be compared to the nominal value of the pump(s) (pump identification plate) and corrected if necessary.
- Before switching on the power supply it is necessary to ensure that the equipment cannot be used for purposes other than those for which it was intended. The relevant motor circuit breakers of the control unit are switched off. The pumps are set via the operating mode (relevant P1 or P2 operating mode switch and/or sub-menu (#033 or #034) to "0".



Only at this point, is the power supply switched on

- Set the parameters as required.
- Check the direction of rotation of the connected pump. Switch on the motor circuit breaker(s). The pumps are set via the operating mode (relevant P1 or P2 operating mode switch and/or sub-menu (#033 or #034) to "**manual operation**" for a short time. Please note that the connected pump is not damaged by an inadvertent dry run.
- The pumps are set via the operating mode (relevant switch P1 or P2 operating mode switch and/or sub-menu (#033 or #034) to "**automatic operation**".
- Then carry out a functional test.

13. Removal from service

After taking the equipment out of service, you must ensure that switching it off cannot lead to any consequential damages (such as unintended overflow, etc.). When working on the control unit and/or the components of the control unit, amongst others, the 5 safety rules of electrical engineering must be observed.

1. **Disconnection (switching off the mains power)**
2. **Secure against re-activation.**
3. **Ensure that the voltage is zero (suitable measuring device).**
4. **Earth and short-circuit.**
5. **Cover adjacent, live parts (potential-free contacts may carry voltage from a separate source).**

When working on the pump(s) and/or on the measuring system or on the installation as a whole, unintended activation of the pump(s) must be prevented.



Please note that while working on the control unit, the pump(s) and/or the measuring system or the installation as a whole, people must never be placed at risk.

14 Changing the Lithium battery (CR2032)

The battery is located on the back of the CPU.
If the control unit is equipped with a main switch, switch the control unit off via the main switch. The casing lid can only be lifted when the main switch is in the OFF position. The main switch has an emergency off function and switches the pump(s) off.



Warning

Although the main switch is off, the terminals before the main switch remain live

Advice: If the control unit is equipped with a battery, the control unit electronics remain functional even when the main switch is off, as long as the battery is charged. However, the pumps cannot be switched on.

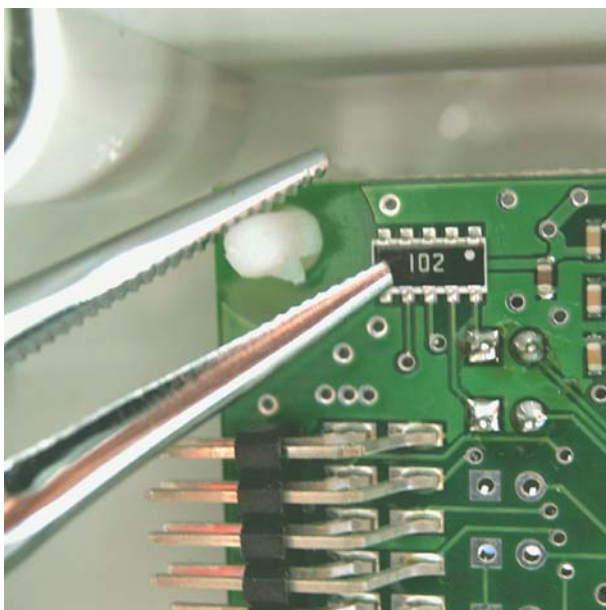


Warning

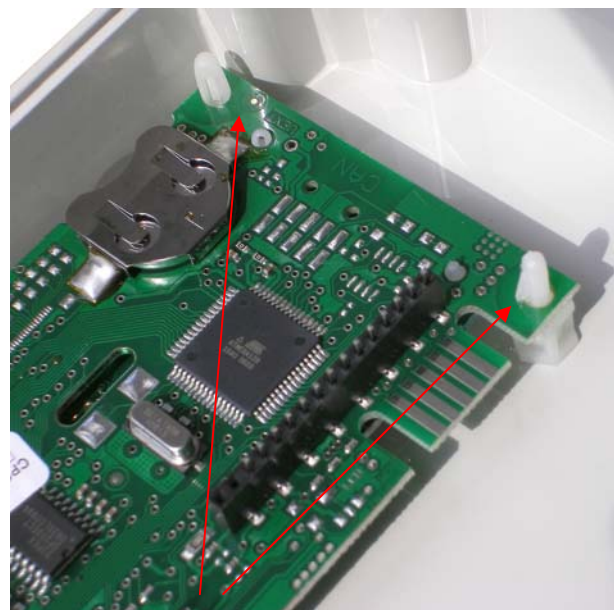
If the control unit is not equipped with a main switch, it must be de-energized before the lid is opened

14.1 After opening the casing lid the wires on the accumulator, if present, should be removed.

14.2 To exchange the battery, first of all press back the clasps on the two attaching points on the right with suitable needle-nose pliers or a small screwdriver. At the same time, slip a finger behind the circuit board and lift it carefully on the right side.



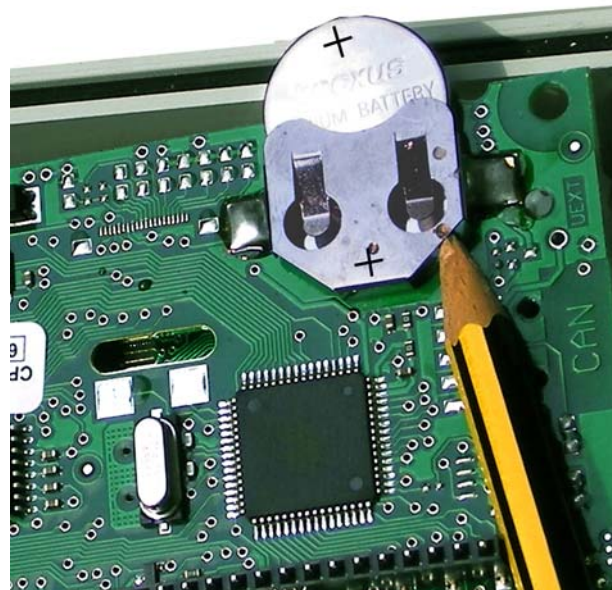
Push in the clasps



Release the fastenings in the lid



Lift the circuit board from the clasps



Removing the battery

- 14.3 Then push the battery from its fitting with a blunt, non-metallic object and remove it.
- 14.4 Push the new battery (type CR2032, 3V / 200mAh) into its fitting. Observe the polarity (+ side of the battery at the top).
- 14.5 Press the circuit board into the two fastenings in the lid, so that the clasps click into place.
- 14.6 Attach the battery connections, if necessary. Close the casing lid and re-start operation of the control unit.
- 14.7 Set the current date and time in the basic settings system menu.

15 Maintenance

We recommend that the control unit and all accessories (or even all the equipment) are checked at regular intervals depending on where they are used and what environmental influences they are subjected to.

- Visual inspection of the equipment and removal of any sedimentation.
- Visual inspection of the equipment and replacement of damaged components.
- Functional testing should be carried out.
- Inspection of measuring systems.
- The accumulator must be replaced at least every 5 years.

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






Modular pump control CPSM








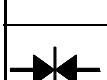




16 Technical data

Operating voltage	3 x 230V/400V 50 Hz +/- 10%
Power control (without power supply)	max. 29VA; Typ. 10VA
Control fuse	Microfuse 5 x 20 mm 3,15AT (EN 60127-2/III)
Input level sensor	4 ..20 mA (2-wire)
Supply voltage level sensor	Typ. 24V=
Measuring accuracy input level sensor	± 1% v.E. ± 1cm WS
Measuring range input level sensor	adjustable between 0... 100cm WS and 0...1000cm
Measuring accuracy impact pressure	Typ. ±1,5% v.E. ± 2cm
Measuring range impact pressure	0 ... 200 cm WS
Display resolution level control	1cm
Short circuit current float switch input 1, HW	< 1mA
Switching voltage float switch input 1, HW	13,6 V=
Short circuit current float switch input 2,3	< 25mA
Switching voltage float switch input 2 ,3	24 V=
Short circuit current input thermal contact	< 10mA
Switching voltage input thermal contact	230VAC
Max. switching voltage isolated alarm relay	max. 230V AC / 24V DC
Switching current isolated alarm relay	5 A max.(AC1)
Measuring accuracy hourmeter	< 0,06% from current value
Real time clock accuracy	±20ppm - 0,04ppm/°C
Required external fuse isolated alarm relay	max. 5A G
Operating temperature range	0 ... 50°C
Permissible storage temperature	-20 ... 70°C
Air humidity	0 ... 90% RH (non condensing)
Input phase failure / phase sequence monitoring	3 x 230/400V +/-10% 50Hz
Threshold for phase failure detection:	< 40V bei 50Hz
Battery:	Lead-Gel batteries, 12V, 1,2Ah
Battery charge current	Max. 100 mA
Battery charge voltage	13,8V
Degree of protection	IP54 (with the lid closed)

17 Symbol Definition

Symbols: Operating manual and control	
	Warning - general hazards
	Warning - electrical voltage
	Control mode "Manual mode"
	Control mode "OFF"
	Control mode "Automatic mode"
	Pump
	Operation
	Error
M1	Pump 1
M2	Pump 2
	red LED flashing, high water
	red LED lit, general fault
Symbols: display	
HW	high water
	waiting, no input possible
	flashing, when the control unit is running
	Battery operation

Symbols: two-line display	
	Mains operation
	Voice link active
Symbols: graph. display	
	Mains operation
	Float switch "not active"
	Float switch "active"
	Actual display with the selected activation and deactivation levels
	display field strength GSM modem
	establishing a connection
	voice connection active
	data connection active

18 Fault list

Bit	Errorcode	Error
00	HW	High water If the measured level is above the selected alarm level or if the high water float is activated, this error message is triggered after the alarm delay time has elapsed. The pump(s) are switched on immediately once the high water enters, if there is no fault in the pump(s).
01	SENSOR/ ??? cm	Fault in the measuring system There is a fault in the level measuring system. (Short circuit or interruption in the wiring to the level sensor, inconsistent activation status of the float) The pumps are switched off. If in this situation the high water float happens to be activated, the pumps are switched on if there is no fault in the pump(s).
02	pmin	Minimum pressure exceeded If taking level measurements via the internal dynamic pressure sensor, an alarm will be set off if the pressure falls below the minimum pressure.
03	3P/3~	Faulty rotary field, phase failure Mains or phase error. This fault occurs if the phasing is wrong when the control unit is being connected or if at least one phase fails.
04	Accu	Accumulator voltage too low The accumulator voltage of the control unit is under 10.5V, the accumulator has not been charged properly or has nearly run out if it is in operation
05	Power	No mains There is no control voltage to the control unit; the control unit will operate if an accumulator is present.
06	Clock/CLK	Real time clock error The clock was without power for a long time and the date / time may be wrong / the clock is not running / the clock has not been set since the accumulator was installed.
07	Modem	Communication error There is an error in the data communication system
08	P1T1	Thermal contact 1 has been triggered The first thermal contact on pump 1 has been triggered. The pump is switched off. If the "Reset alarm" menu is set to AUTO, the control unit switches on automatically once the pump has cooled down.
09	P1nxT1	Thermal contact 1 has been triggered repeatedly The first thermal contact on pump 1 has been triggered more than n times. The pump is switched off. This fault needs to be confirmed at the control unit.
10	P1T2	Thermal contact 2 has been triggered The second thermal contact on pump 1 has been triggered. The pump is switched off. This fault needs to be confirmed at the control unit. This fault is saved after a power cut, even if there is a complete loss of power.
11	P1MS	Motor circuit breaker has been activated The motor circuit breaker of pump 1 has been activated. The pump is switched off. If the alarm auto reset mask is set to AUTOMATIC, the control unit restarts automatically after activation of the motor circuit breaker.
12	P1FI	Fault interrupt switch has been activated The fault interrupt switch of pump 1 has been activated. The pump is switched off. If the alarm auto reset mask is set to AUTOMATIC, the control unit restarts automatically after activation of the fault interrupt switch.
13		(reserved)
14	P1tmax	Running time exceeded The max running time for the pumps has been exceeded.
15	P1Imin	Pump current too low The electronic motor protection measures the motor current on pump 1, which is less than half the nominal current.
16	P1Imax	Pump current too high The electronic motor circuit breaker of pump 1 has been activated by an excessive current. The pump is switched off. If the alarm auto reset mask is set to AUTOMATIC, the control unit automatically restarts after the delay period has elapsed.

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Bit	Errorcode	Error
17	P1aux1	AUX1 error The AUX11 and AUX12 contacts on the terminal strip are not connected (open) P1 is switched off. If necessary the pump can be switched off via an auxiliary relay.
18		(reserved)
19	external fault/ Rw ext.	external alarm The SW2 input (not during float operation) is closed.
		Note: Error bits 20 – 31 only with CPSm2
20	P2T1	Thermal contact 1 has been triggered The first thermal contact on pump 2 has been triggered. The pump is switched off. If the "Reset alarm" menu is set to AUTO, the control unit switches on automatically once the pump has cooled down.
21	P2nxT1	Thermal contact 1 has been triggered repeatedly The second thermal contact on pump 1 has been triggered. The pump is switched off. This fault needs to be confirmed at the control unit. This error is saved after a power cut, even if there is a complete loss of power.
22	P2T2	Thermal contact 2 of pump 2 has been triggered The second thermal contact on pump 2 has been triggered. The pump is switched off. This fault needs to be confirmed at the control unit. This error is saved after a power cut, even if there is a complete loss of power.
23	P2MS	Motor circuit breaker of pump 2 has been triggered The motor circuit breaker of pump 2 has been triggered. The pump is switched off. If the alarm auto reset mask is set to AUTOMATIC, the control unit automatically restarts after activation of the motor circuit breaker.
24	P2FI	Fault interrupt switch of pump 2 has been activated The fault interrupt switch of pump 2 has been activated. The pump is switched off. If the alarm auto reset mask is set to AUTOMATIC, the control unit automatically restarts after activation of the fault interrupt switch.
25		(reserved)
26	P2tmax	Running time pump 2 exceeded The max running time for the pump has been exceeded.
27	P2Imin	Pump current pump 2 too low The electronic motor circuit breaker measures the motor current on pump 2, which is less than half the nominal current.
28	P2Imax	Pump current too high The electronic motor circuit breaker of pump 2 has been activated by an excessive current. The pump is switched off. If the alarm auto reset mask is set to AUTOMATIC, the control unit automatically restarts after the delay period has elapsed.
29	P2aux1	AUX1 error The AUX21 and AUX22 contacts on the terminal strip are not connected (open) P2 is switched off. If necessary the pump can be switched off via an auxiliary relay.
30		(reserved)

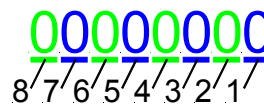
19 Error code table (mask codes) for control units with two-line displays

Bit	Error short text	Group	BIN in group	Error
General Error				
0	HW	Group 1	0001	High water
1	SENSOR		0010	Error in the measurement system
2	pmin		0100	Minimum pressure drops below
3	3P		1000	Incorrect phase sequence, phase loss
4	Accu	Group 2	0001	Battery voltage too low
5	Power		0010	No mains voltage
6	Clock		0100	Real time clock error
7	Modem		1000	Communication errors
Pump 1 Error				
8	P1T1	Group 3	0001	Thermal contact 1 has tripped
9	P1nxT1		0010	Thermal contact 1 has multiple tripped
10	P1T2		0100	Thermal contact 2 has tripped
11	P1MS		1000	Manual motor starter has tripped
12	P1FI	Group 4	0001	RCCB has tripped
13	-		0010	(reserved)
14	P1tmax		0100	Running time out
15	P1lmin		1000	Pump current to low
16	P1lmax	Gruppe 5	0001	Pump current to high
17	P1aux1		0010	(reserved)
18	P1aux2		0100	(reserved)
External fault trip 2 (only in the two-pump operation)				
19	extern	Group 5	1000	Input float switch 2 has switched
Pump error 2 (only in the two-pump operation)				
20	P2T1	Group 6	0001	Thermal contact 1 has tripped
21	P2nxT1		0010	Thermal contact 1 has multiple tripped
22	P2T2		0100	Thermal contact 2 has tripped
23	P2MS		1000	Manual motor starter has tripped
24	P2FI	Group 7	0001	RCCB has tripped
25	-		0010	(reserved)
26	P2tmax		0100	Running time out
27	P2lmin		1000	Pump current to low
28	P2lmax	Group 8	0001	Pump current to high
29	P2aux1		0010	(reserved)
30	-		0100	(reserved)
31	-		1000	-

Table of error bits

BIN	HEX	BIN	HÉX
0000	0	1000	8
0001	1	1001	9
0010	2	1010	A
0011	3	1011	B
0100	4	1100	C
0101	5	1101	D
0110	6	1110	E
0111	7	1111	F

Conversion of the group bits into a hexadecimal number



Group position of the hexadecimal bits

Explanation:

In each case, 4 bits are combined into one group. There are a total of 8 groups. Four error bits are coded in each group (0000, 0001, ...). These are summarised and converted to a hexadecimal number (0, 1, 2, ..., E, F) via the conversion table. This hexadecimal number is entered in the group position of the chosen mask. If the bit is not put into the mask, the error is detected and processed by the control unit, but it is not transmitted to the relevant relay.

Example:

In the first group, the errors HW (0001), sensor (0010) and 30 (1000) should be activated. This results in the bit 1011 for group 1. Using the conversion table, the group bit 1011 becomes the hexadecimal number B. This is entered in group position 1 of the relevant mask.

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20 SMSC-No. - Liste

Country	Operater	SMSC-number
Austria	max.mobil	+43676021
	Mobilkom A1	+436640501
		+433340501
	Connect One	+436990001999
	T mobil	+43676021
	tele.ring	+4365009000000
Belgium	Orange	+32486000005
	Proximus	+3275161612
		+3275161616
	Mobistar	+3295955205
Bosnia Herzogovina	PTT GSM	+38790225522
Cyprus	Cyprus	+3579700000
Croatia	Cronet	+385980501
	Vipnet	+385910401
Czech rep	Radiomobil	+420603051
	Eurotel	+420602909909
Denmark	Telia DK	+4528187000
	Mobilix	+4526265151
	TeleDanmark	+4540390999
	Sonofon	+4540590000
Estonia	Ritabell	+3725509911
	Radiolinja	+372568771010
	EMT	+3725099000
Finland	Radiolinja	+358508771010
	Sonera	+358405202000
France	SFR	+33609001390
	Itineris	+3368900458
		+33689004431
		+33689004000
	Bouygues	+33660003000
Germany	E-Plus	+491770600000
		+491770610000
		+491770620000
	T-Mobile D1	+491710760000
		+491715990000
	Vodafone D2	+491722270000
		+491722270042
		+491722270111
		+491722270010
		+491722270222
		+491722270333
	O2	+491760000443
		+491760000433
	Mobilcom D1	+491710760315
	Mobilcom D2	+4917202270880
	Mobilcom E-Plus	+491770610000
	D1 Talkline	+491710760900
D2 Talkline	+491722270258	
Debitel	+491722270222	
IC3S	+491722270201	
Dr Materna	+491722270111	
E2	+491760000443	
Greece	Cosmote	+3097100000
	Telestet	+3093599000
		+3093597000
	Panafon	+3094219000

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Country	Operater	SMSC-number
Hungary	Pannon	+36209300099
		+36309610000
	Westel900	+36309888000
		+36309303100
	Vodafone	+36709996500
Ireland	Eircell	+35387699989
		+35387699985
	Esat	+353868002000
Italy	Omnitel	+393492000200
		+393492000300
		+393492000400
		+393492000500
	TIM	+393359609600
		+39338980000
		+393359608000
	Wind	+39338960960
Island	Landssimi	+393205858500
	Tal	+3548900100
Isle of man	Pronto GSM	+3546999099
Latvia	LMT	+447624499955
	Baltcom	+3719202020
Lithuania	Omnitel	+3719599994
	Bite GSM	+3709899992
Luxembourg	PTT	+3709950115
	Tango	+352021100003
		+352091000030
Netherlands	Telfort	+31626000230
	PTT	+31653131313
	Libertel	+316540881000
Norway	NetCom	+479208977
		+4792001000
	TeleNor	+4790002100
		+4790007777
Poland	Era GSM	+48602951111
		+48602951112
	Polkomtel	+48601000310
		+48601000311
IDEA Centertel	+48501200777	
Portugal	Telcel	+351911616161
	TMN	+351936210000
	Optimus	+35193121314
Romania	Connex	+4092004000
	Dialog	+4094946000
Russia	North West	+78129600096
	MTS	+70957699100
Serbia	MobTel	+38163100100
		+38163100300
	PTT Telekom	+381650000900
		+381640000900
Slovakia	Eurotel	+421903333000
	Globtel	+421905303303
Slovenia	Mobitel	+38641001333
	Si.Mobil	+38640441000
Spain	Telefonica	+34609090909
	Amena	+34656000311
	Airtel	+34607133000
+34607003110		

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Country	Operater	SMSC-number
Sweden	Comviq	+46707773078
		+46707990001
		+46707990002
		+46707990003
	Telia	+46705008999
Switzerland	Europolitan	+46708000708
	diAX	+41765980000
	Swisscom	+41794999000
		+4179191
		+4189191
Orange	+41787777070	
Turkey	Telsim	+905429800033
	Turkcell	+905329010000
		+905329020000
		+905329030000
		+905329040000
United Kingdom	Vodafone	+44385016005
	One2One	+447958879879
	Virgin Mobile	+447958879890
	Orange	+44973100973
		+44973100974
	CellNet	+44802000332
	Isle of Man Pronto	+447624499955
Jersey	+447797704444	
Ukraine	UMC	+38050000501
	Kyivstar	+380672020000
	Golden Telecom	+380444990000
	Wellcome	+380442517777
Yugoslavia	Mob Tel	+38163100100
		+38163100200
		+38163100300
		+38163100400
	PTT Telekom Serbia	+381650000900

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21 Declaration of Conformity



since 1893

Condor Pressure Control

Controls & Solutions

...vom Erfinder des Druckschalters!

Condor Pressure Control GmbH · Warendorfer Str. 47-51 · D-59320 Ennigerloh

Konformitätserklärung Declaration of Conformity Déclaration de Conformité



Diese Konformitätserklärung entspricht der Europäischen Norm EN 45014 "Allgemeine Kriterien für Konformitätserklärungen von Anbietern".
This Declaration of Conformity complies with the European Standard EN 45014 "General criteria for the supplier's declaration of conformity".
Cette déclaration de conformité correspond à la Norme Européenne EN 45014 "critères généraux pour des déclarations de conformité des soumissionnaires".

Wir / We / Nous Condor Pressure Control GmbH, D-59320 Ennigerloh (Germany)

erklären in alleiniger Verantwortung, dass das Produkt
declare under our sole responsibility that the product
déclarons sous notre seule responsabilité que le produit

Pumpensteuerung
Pump Control Unit
Équipement des pompes

CPS-m, CPS-B1 und CPS-B2 mit 2 x 16 LCD
CPS-m, CPS-B1 und CPS-B2 mit graphischem LCD

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 normes.

EN 60204-1 (2007)
EN 61000-6-3 (2007)
EN 61000-6-1 (2007)
EN 61000-3-2 (2006)

Gemäß den Bestimmungen der Richtlinie(n)
Following the provisions of Directive(s)
Conformément aux dispositions de Directive(s)

2006/95/EG (Niederspannungsrichtlinie, Low-voltage guideline, Directive de basse tension)
2004/108/EG (EMV – Richtlinie, Guideline, Directive)

Westkirchen, den 30.11.2009


Condor Pressure Control GmbH
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59320 Ennigerloh
Dipl. Ing. Stefan Köster

Name und Unterschrift des Befugten
Name and signature of authorized person
Nom et signature de l'autorisé

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Steuer-Nr. 366/5880/3464
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Registergericht Münster HRB 9734

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Modular pump control CPSM





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