

## PS.2LCD System com Micro controller, Double pump controller



### Options



Kompaktschaltschrank Micro-Kompakt



Kompaktschaltschrank  
mit Noteinspeisung und EVU-Anschluß



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## **1.0 Warning and safety information for the installation and commissioning of the device**

### **1.1 Applications**

This switchgear has been designed for domestic and communal sewage, wastewater and rainwater pump stations.



Please note the following as regards pumps implemented in an explosive area: The switchgear itself must be installed outside of the explosive area.

When using external 4 - 20 mA level sensors and float switches installed in the explosive area, it will be necessary to use components with the requisite approvals.

### **1.2 Personnel qualifications**

Personnel entrusted with the installation, commissioning and maintenance of the switchgear must hold the requisite qualifications.

### **1.3 Safety instructions for the operator**

Observe the existing regulations governing accident prevention, VDE specifications and stipulations set forth by the energy supply company. When opening the device (removing cover or terminal cover) or working on the pumps, the control system absolutely must be rendered current-free via the pre-fuse or a separate circuit breaker.

### **1.4 Dangers of non-compliance with safety information**

Non-compliance with the safety information can lead to endangerment for persons and product/system. Non-compliance with the safety information can lead to loss of all rights to damage compensation.

### **1.6 Independent modification and replacement part supply**

Changes to the product are only permissible in coordination with the manufacturer. In the interest of safety, use original replacement parts and accessories authorised by the manufacturer. Using other parts can void liability for the resulting consequences.

### **1.7 Impermissible use**

The operational safety of the product supplied is only guaranteed for proper use as laid out in Section 1.1. The threshold values specified on the data sheet must be met in all cases.

### **1.8 Transport and storage**

Store and transport the switchgear such that damage it won't be exposed to shock, impact and temperatures outside the range of -20°C to +60°C.

## 2.0 General product description, properties and optional functions

### 2.1 Product description

The PS2 system consists of one operator device implemented in the control cabinet door, and one guide device for snapping onto the DIN rail. The PS2 system makes it possible for the control cabinet manufacturer to create a control unit in line with the user's wishes in an affordable manner.

Upon request, the PS2 system's inputs can be configured differently. However, the inputs are configured ex-works, and cannot be modified afterwards. The fill level is optionally determined via dynamic pressure, bubbler system, external sensor (4 - 20 mA) or float switch. There are two relay contacts available for triggering the contactor combinations and four relay contacts available for issuing error reports. Control and configuration are extremely easy. Switch points, times and various functions are configured using a digital potentiometer. All values can be queried on the LC display. The eight LEDs indicate operational status and error reports. There are further keys available for the Manual - 0 - Auto functions.

### 2.2 Properties

- LCD plain text display
- Manual - 0 - Auto functions
- Cancel button
- Forced pump switch on
- Internal acoustic alarm
- High water alarm
- Operating hours counter
- Pump change
- High interference immunity
- Atex mode
- Peak load can be shut off
- Level detection optionally via internal pressure converter, external 4 – 20 mA probe
- Measurement range of external probe configurable in menu
- Error report inputs for various monitoring modules
- Connection to control system via digital and analogue inputs and outputs
- All configurations and various error reports will be stored, regardless of power interruptions
- Thermal monitoring of the pumps
- Pump switch off via turn off point and overrun
- Runtime monitoring
- Variable staggered start (delayed switch on)
- Collective fault message, zero potential
- Memory, no. of pump starts
- Input for high water float switch
- Forced switchover
- Easy to operate
- Service mode
- Interpump delay configurable

- NEW!**
- Analogue outputs 0 - 10V and 4 - 20 mA
  - Last error memory
  - Runtime monitoring

### 2.3 Optional functions and/or components

(only supplied if specifically indicated in the order)

- DIN rail module for connection of external switches (e.g.: toggle switch)
- External locking or dry run protection instead of seal monitoring
- Additional pressure sensor for redundant high water alarm, with the pumps connected in

### 3.0 Configuration, control elements and function displays

3.1 All values and settings can be queried using the digital potentiometer display. If a until is going to be changed, adjust the control unit until the corresponding setting appears on the display. Now press the select / cancel button. The value last saved will start to blink. The digital potentiometer display can now be used to change the setting. Quick turns will change the values more rapidly, while slow turns make it possible to make more precise changes. Once the desired value has been reached, use the select / cancel button to confirm. The value will stop blinking and be stored. Check all values prior to commissioning. The display will automatically return to the default setting after 20 seconds.

**CAUTION!** Operating hours and pump starts are counted continuously, it is not possible to adjust or reset them.

### 3.2 Control elements

- Display            Pressing the digital potentiometer will query all settings, and moving the display knob will query all error reports, operating hours, number of pump starts and motor current. Moreover, settings are made using the digital potentiometer. If the knob is not moved for more than 20 seconds, then the display will jump back to the default setting. (see above, Configuration chapter)
  
- Selection/cancel Button            Pressing this button will confirm the errors over-current, P1 - P2 without load and will confirm thermal error 2 after remediating the cause. Should an error continue, then only the common error report relay and the piezo buzzer will be shut off. This also applies for thermal error 1 and the high water alarm. Settings can still be changed using the button. (see above, Configuration chapter)

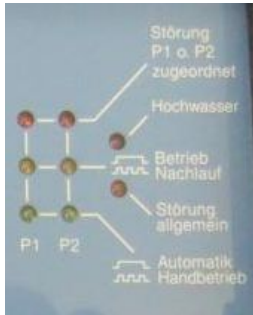
There is one each per pump of each of the following keys and LEDs.



- HAND            Pressing this button will place the pump into manual operation. The green LED will blink. If the pump is being run via the manual function, then it will automatically shut off after 2 minutes.
  
- 0                 The pump is off. The green LED is off.
  
- AUTO            The pump is switched based on level. The green LED stays on.

**CAUTION!** If power is interrupted during manual mode, then the control system will return to automatic mode. The operation modes "auto" and "0" remain stored, regardless of power interruptions.

### 3.3 Function display via light-emitting diodes



- |                                |                                            |
|--------------------------------|--------------------------------------------|
| LED – red                      | = High water alarm, error P1 or P2         |
| LED - solid yellow             | = Pump is in operation                     |
| LED - blinking yellow          | = Pump is running via the overrun function |
| LED - solid green              | = Automatic mode                           |
| LED - blinking green           | = Manual mode                              |
| LED - irregular green blinking | = Manual mode shut off after 2 min.        |

### 3.4 Display

#### Automatic switching off of the background lighting:

If no further settings are actuated on the device, the background lighting switches off automatically after 2 minutes. As soon as the rotary switch or one of the push-buttons is activated, the background lighting switches back on again.

The top line always shows the level. The bottom line shows the operating hours when the pumps are not triggered. If any errors arise, then they will be displayed alternatingly on the display's bottom line:

- P1 :Therm. fault 1** (Terminal 01 / 02 bi-metal contact opened)
- P1 :Therm. fault 2** (Terminal 02 / 03 bi-metal contact opened)
- P2 :Therm. fault 1** (Terminal 06 / 07 bi-metal contact opened)
- P2 :Therm. fault 2** (Terminal 07 / 08 bi-metal contact opened)

**P1: or P2: Over-current** (the respective motor circuit breaker has triggered)

Depending on how the PS2 SYSTEM's inputs are configured, further error reports, e.g. high water float, residual current circuit breaker, DI error or rotary field error will appear (connection assignment is laid out in the wiring diagram).

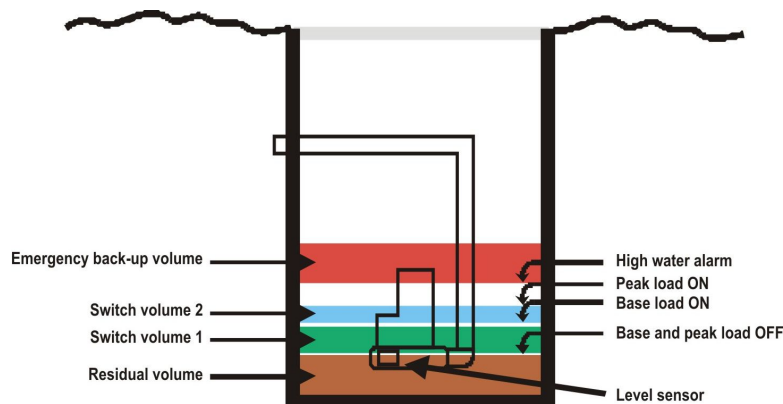
- High water alarm** the level has transgressed the high water setting
- Switch-on point under-switch-off point** the settings for the pump turning on and off overlap
- High water under-switch-on point** the setting for the high water alarm is under the switch-on point
- Switch points check** after the measuring range for the 4 - 20 mA probe has been changed at least one switch point is outside the measuring range.

The following table shows the configuration possibilities. The display's top line shows the option, the bottom line is the value that can be changed.

1. Line in display	Configuration option	Explanation
Basic load ON	0 – 200 (500) cm	This value establishes the switch-on point for the first pump
Basic load OFF	0 – 200 (500) cm	This value establishes the switch-off point for the first pump
Peak load ON	0 – 200 (500) cm	This value establishes the switch-on point for the second pump
Peak load OFF	0 – 200 (500) cm	This value establishes the switch-off point for the second pump
High water	0 – 200 (500) cm	When the configured value is transgressed, the common fault report relay and the high water relay will switch
Running time max	0 – 60 sec.	The value 0 deactivates this function. If the value is set between 1-60 min. the pump shuts off if the set operating time has been exceeded without interruption
Run time altern.	Is deactivated 1 – 60 min	When the configured time is transgressed in basic load mode, there will be a pump change.
Start delay	0 – 900 sec.	After loss of power, the pumps won't start until after the configured time has passed. The display shows the remaining time.
Stop delay	0 – 180 sec.	The basic load pump will continue to run after transgressing the shut off point until the configured time has ended.
Interpump Delay	0 – 60 sec.	When both pumps are triggered, then the 2nd pump won't turn on until after the configured time has passed.
Force activation	Is deactivated, 1 – 10s	Is activated = When the pumps are not triggered for 24 hours, then they will automatically run for the configured
Acoustic alarm	Is deactivated, is activated	Is activated = when there is an error, the internal piezo buzzer will sound
Intermitt. alarm	Is deactivated, is activated	Is activated = The error report relay is clocked. Instead of a blinking light, a more economical solid light can be used.
Pump alternation	Is deactivated, is activated	Is activated = After each use of the basic load pump, there will be a change to the other pump.
P1: therm fault 1	Is deactivated, is activated	Is shut off = On block 31, 32 (pump 1), no bimetal contact (warning contact) is connected.
P2: therm fault 1	Is deactivated, is activated	Is shut off = On block 38, 39 (pump 2), no bimetal contact (warning contact) is connected.
ATEX mode	Is deactivated, is activated	Is activated = If no liquid is configured via level detection, then the pumps cannot be started. This applies for the manual function, as well as for 24-h switch on and remote control systems.
Service mode	is activated, Is deactivated	Is activated = All settings can be modified Is shut off = Settings can be displayed, but cannot be modified
Level control	Internal converter (optional) Float switch 4 – 20 mA Interface	Level detection via dynamic pressure or bubbler system  Level detection via float switch Level detection via external sensor (4 - 20 mA)
20mA => Level	0 – 1000 cm	Display modification to the connected probe
Language	German - English - French - Italian - Spanish - Dutch - Polish - Czech	The country language can be changed on the display.

## 4.2 Supplements to the individual items in the configuration menu

Configuring the switch points



### Lock peak load mode

In order to use the popes exclusively in alternating mode, the switch-on point for peak load mode must be set to zero. The display will show the message *"Peak load on is shut off"*.

### Lowest level configurations (on/off)

If a switch-on point is selected lower than 5 cm, then the software will automatically use 5 cm as the switch-on point. If a switch-off point is selected lower than 3 cm, then the software will automatically use 3 cm as the switch-off point. This also applies for starting overrun time, which will then start at 3 cm. This is necessary for safe operation of the switchgear system.

### Runtime change

A maximum runtime can be configured for the basic load pump. After that time has passed, there will be a change to the other pump. This requires that both pumps be in automatic mode. After three changes without interruption, the alarm is additionally triggered and the display will show the *"runtime alarm"* report.

### **NEW!** Runtime monitoring

The menu can be used to access the item running time max. The default setting is for this value to be zero, i.e. the function is deactivated. If a value of 1 - 60 minutes is set, then the pump will shut off after running longer than the configured value without interruption. Moreover, an alarm will be triggered and a corresponding error report will be shown on the display. The pump will not run again until the error has been confirmed. Runtime monitoring applies to automatic and manual modes.

### Runtime change + runtime monitoring

It makes sense to activate only one of the two functions. If a time is configured in the two functions, then only the function with the lower time setting will be executed.



### **Delay (Stop delay)**

The delay configured will only be active after a loss in power (staggered start in projects). For each further start, the pumps will immediately turn on when triggered via level.

### **Overrun (Start delay)**

Overrun facilitates draining below the level probe, e.g. for dynamic pressure systems.

### **Th. fault 1, Th. fault 2 (both available once for each pump on the menu)**

For pumps whose temperature monitoring consists of only one bimetal contact per pump, thermal error 1 can be deactivated accordingly in the menu. Thermal error 2 cannot be turned off in the menu.

### **Interpump Delay**

When both pumps are triggered, then the 2nd pump won't turn on until after the configured time has passed.

### **NEW! Error memory (last 4 errors)**

The last error to appear will remain stored regardless of power interruptions and can be called up in the menu under "last error". When the error is called up in the menu, it can be deleted from memory using the cancel key.

### **Atex mode**

Atex mode has to be activated for pumps implemented in ex-zones. Atex mode impedes the pumps from being turned on via manual function, via forced switch-on or via remote control system until the switch-off point is met. If pumps are started via overrun time or manual function while the switch-off point is not met, then draining can take place under the switch-off point. The manual function will be automatically interrupted after 2 minutes. When the Atex function hinders pumps from turning on, the display will show the report "*ATEX: Level under switch-off point.*"

### **Service mode**

The default setting is for service mode to be activated, i.e. all setting can be changed. When service mode is turned off in the menu, the settings can only be queried using the digital potentiometer.

**CAUTION!** When service mode is deactivated, no settings can be changed other than country language.

## Level control

It can be selected whether the control system will run over the internal level sensor (dynamic pressure, bubbler system), an external 4 - 20 mA level probe or float switch.

**CAUTION!** The input for the high water alarm (terminal 23 / 24) is always active and can be implemented as redundant monitoring. As soon as terminal 23 / 24 are connected, the high water alarm is triggered and the pumps are switched with a delay.

When using external 4 - 20 mA level sensors and float switches installed in an explosive area, it will be necessary to use components with the requisite approvals.

## 20 mA => Level

This setting adjusts the switch points and level display to a connected external 4 - 20 mA level probe. The processor converts the input signal such that the correct level is displayed. When the measurement range for the 4 - 20 mA probe is changed in the configuration menu, the switch points will have to be re-configured, as they will have changed based on system reasons. Thus, the correct order will always be to first configure the probe's measurement range and then the switch points. For use in an ex-zone, the corresponding requirements must be complied with, i.e. the 4 - 20 mA probe being used must have the corresponding approval and a fitting ex-barrier. If the switch points are outside the level probe's configured range, then the report will be shown "*Check switch points*".

## Country language

The default settings are German / English / French / Italian / Spanish / Dutch / Polish / Czech. The country language can also be changed when service mode is deactivated.

### Error report modules:

**CAUTION!!!** The signal voltage for the inputs supply the control (20V 4mA), the inputs may only be wired externally with zero potential contacts.

The inputs for motor protection, residual current circuit breaker, DI monitoring and phase sequence and/or phase failure (terminals 11 to 22) must be wired with external modules. If a terminal is closed, it means there is an error. External monitoring modules featuring an opening contact should be used to lock the contactor combinations. This delivers additional security, as it is still guaranteed that the pumps will turn off even when the electronic system fails.

Terminals 11 to 20 can optionally also be configured for level detection via float switches. This can only be done by the manufacturer and must be indicated in the order.

When using float switches, a correspondingly modified wiring diagram will be provided.

Analysis of the pumps' bimetal contacts (terminals 01, 02, 03 and 06, 07, 08) can take occur directly, with thermal error 2 for the respective pumps stored regardless of power interruptions. Here, too, it's important to attain additional security through the additional use of thermistor relays and a corresponding pump lock. For pumps over 7.5 KW, it is generally recommended to use thermistor relays in order to secure the pumps are shut off even when the electronic system is out. An external assessment module definitely needs to be used for assessing PTCs.

The inputs for the motor circuit breaker (terminals 04, 05 and 09, 10) are configured such that an error is displayed, the pumps are shut off and corresponding errors are signalled for closed contact. Motor circuit breakers should be used that have an auxiliary contact with one opening contact and one closing contact each. The opening contact is then used for direct locking of the contactor combinations.

### Relay contacts:

All relay outputs are zero potential. The error report relays are designed as changers and drawn on the wiring diagram in an error-free state. The wiring diagram shows the wiring for terminals 26 to 41 (relay outputs).

**The circuit paths are designed such that the relay outputs can be loaded with max. 3A.**

### Analogue outputs:

4 – 20 mA = terminal 44 (+) and 45 (-) burden max. 250 Ohm  
 0 – 10 V = terminal 42 (+) and 43 (-) resistant up to max. 10 mA

The length of the lines for the analogue outputs must not exceed 1.50 m, and must not be laid along with with lines prone to interference.

### Test mode without pumps:

To test the control system without the pumps, please note the following:

- A) It is sufficient to connect PE, N and L1.
- B) Terminal 32 / 33 and 39 / 40 must be bridged, otherwise the report Therm. error 2 will appear.
- C) In the configuration menu, the thermal errors for pump 1 and 2 must be turned off, otherwise the error Therm. error 1 will appear on the display.

### Options:

#### **Operational 2nd pressure sensor:**

Upon request, the PS2 system will come with an additional internal pressure sensor. This makes it possible to have an affordable redundant monitoring system. A second dynamic pressure system is placed in the chamber at a height not reached during normal operation. If the water level reaches transgress this cast socket and/or the enclosed system by more than 8 cm, then an alarm is triggered and the pump is turned on. The system as a fixed hysteresis of 3 cm. If an overrun time is activated, then the pump will additional run for the duration of the overrun time configured. The additional pressure sensor is always active, irrespective of which system has been selected for level detection (dynamic pressure, bubbler system, float switch or external 4 - 20 mA probe).

#### **Float switch:**

The inputs 11, 12 to 17, 18 can be configured for float switches. The display shows which switch is connected. Closing contacts must always be used.

Terminals 11, 13, 15, 17 are internally connected such that it's also possible to work with one joint wire.

**Attention !** In the configuration menu, set level - control = float switch.

### Emergency control:

If the pumps are being run via a pneumatic system (internal sensor) or a 4 - 20 mA probe, then additional emergency control will be possible via a float switch. The input for the high water alarm (23 / 24) is always active, regardless of the system selected for level detection. If terminal 11 / 12 is closed, then it will trigger the high water alarm and both pumps are turned on.

**Attention!!** In sewage applications, regulations regarding ex-zones must be met.

**Installation:**

A section of 136.5 x 136.5 mm is needed for the operating device. The operating device must be implemented in the section and anchored there with two anchor hooks. On the standard model, the operating device comes with the lockable transparent door, thereby meeting protection class IP 45. The cover for the control device absolutely must be installed, for it not only offers protection against physical contact, it simultaneously anchors the plug on the bus cable in its position.



The connection cable between the operating device and the control device is 80 cm long, and must not be extended. Development work placed great emphasis on the bus cable's immunity to interference. The EMT lab then tested and evidenced that the immunity to interference well exceeded the applicable norms. Functional security is definitely established. In order to avoid unnecessary interference peaks on the cable, surplus cable should be rolled up. In general, it's always important to keep power electronics and the electronic system separate to the extent possible. The bus cable should not come into contact with other cables prone to interference, such as those coming from the circuit breaker or from volt and amp metres in a cable harness. The cable does not have to be shielded.

**CAUTION:**

Installation and wiring, as well as commissioning may only be performed by trained technical personnel. Prior to commissioning, all menu points must be checked once again, and corrected as needed.

When wiring external error report modules, to the extent possible, the contactor combinations must be locked such that switch off is guaranteed regardless of the PS2 system. This provides additional safety.

The PS2 system itself is not protected against explosion, and must be installed outside of zones at risk of explosion.

**Technical data:**

Control voltage:	230VAC/50/Hz (L1 , N, PE)
Feed, 4-20mA probe:	20VDC
Voltage, signal inputs:	20VDC
Power consumption:	max. 20 VA
Pressure range:	0 - 2 mWs (0 - 5mWs optional)
Housing:	ABS/polycarbonate
Relay contact potential-free:	3A
Analogue outputs	0-10V and 4-20 mA
Protection class, operating device	
Transparent door:	IP 54
Temperature range:	- 10 to + 60 °C
Operating device dimensions:	144 x 144 x 90 mm (control cabinet section needed 136.5 x 136.5 mm)
Control device dimensions:	290 x 125 x 60 mm
Fuse, control voltage:	5 x 20 mm 100mA time-lag
Operating device lockable	

**Attention !!!**

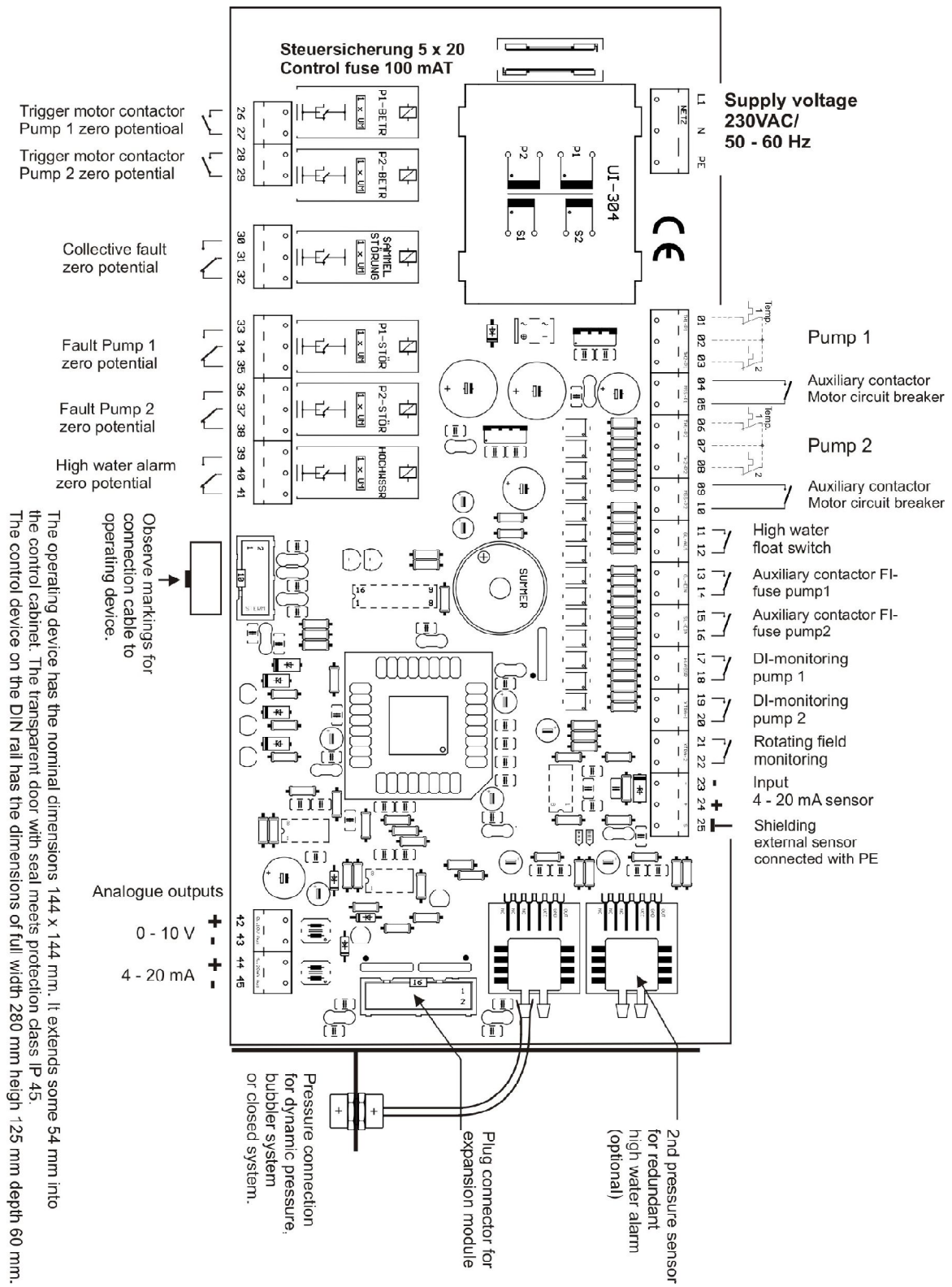
The operating devices and/or supplementary modules are not compatible with version 1.14.

**Technical specifications subject to modification!**

**Norms:**

Applicable EC directives:	EC Low voltage directive 2006/95/EC EC Electromagnetic compatibility directive 2004/108/EC
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Applied harmonised standards in particular:	EN 61000 - 6 - 2: 2005 EN 61000 - 6 - 3:2007 EN 61010 - 1:2001 + Corrigendum 1:2002 + Corrigendum 2:2004
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## weitere Produkte



**PSMEGA1**



**Messglocke V4A**



**LESA Micro-Kompakt**



**PLC TOUCH Grossanlage**



**LESA- GSM 8**



**Kompaktschaltschrank  
LCD2 - System Metall**



**Kompaktschaltschrank  
mit Noteinspeisung  
und EVU-Anschluß**



**PLC TOUCH-System  
Kompaktschrank**

- \* Pumpensteuerungen
- \* Pumpenschaltmodule
- \* Alarmmodule
- \* GSM-Module
- \* Messumformer
- \* Fernwirk- Pumpsysteme
- \* Messglocken
- \* Pneumatische Leitung

- \* Verschraubungen für pneumatische Leitung
- \* Schwimmschalter
- \* Tauchsensoren
- \* Ultraschallsensoren
- \* Stabsonden
- \* Druckschalter
- \* Anzeiger, elektrisch, mechanisch
- \* Kompressoren, Einperltechnik

- \* Schaltanlagenbau - Automatisierung - Fernwirktechnik
- \* Freiluftsäulen komplett bestückt mit PS1.LCD / PS2.LCD
- \* Kompaktschaltschrank LCD2 - System Metall
- \* GfK- Außenschränke / Leersäulen
- \* EVU- Anschlusssäule