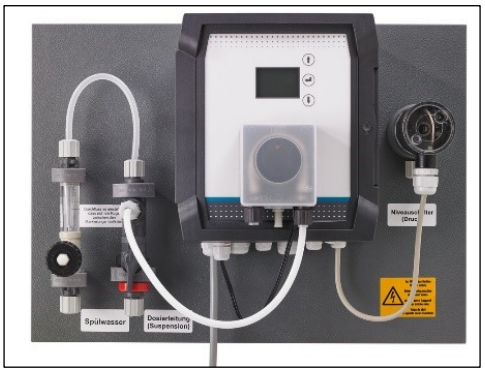
Werner Dosiertechnik

EN

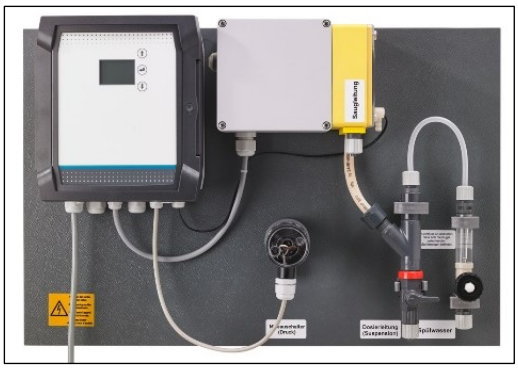
Operating and Installation Instructions

PAKDOS Dosing System

Type PAKDOS Mini-CB36



Dosing line 4.8



Dosing line 10



Suspension unit, (PAKDOS 100 to 500)

Code No. 27975: Dosing line PM Sa-4.8 l with flushing
Code No. 27976: Dosing line PM Sa-10 l with flushing
Code No.: 17676-1 (100l), 18650+18650-1 (200l), 16605+22560 (300l), 18082 (500l)

Table of contents

1 About these instructions / general 4
1.1 Scope of applicability 4
1.2 Target group 4
1.3 Symbols used 4
1.4 Warranty 5
1.5 Additional information 5
1.6 Information regarding support queries 5
2 Safety 6
2.1 Intended use 6
2.2 Safety notices 6
2.2.1 Handling of chemicals, risks to humans and the environment 6
2.2.2 Protective measures and rules of conduct 6
3 Product description – Functional description – (scope of delivery) 8
3.1 Scope of delivery / accessories 8
3.2 Product description - Function 8
3.2.1 Control unit 12
3.2.2 Peristaltic pumps 12
3.2.3 Level detection / Pressure switch of the suspension unit 12
3.2.4 Flow indication and dosing position 13
3.2.5 Dosing valve 1SK 13
3.2.6 Suspension tank 13
3.2.7 Stirrer unit 13
3.3 Identification of the device / Identification plate 14
3.4 Technical data 15
3.5 Transport/storage 15
4 Installation 16
4.1 Selecting the installation site 16
4.2 Installation instructions / installation 16
4.3 Mechanical installation 17
4.3.1 Setup / installation of the suspension unit 17
4.3.2 Installing the dosing line 18
4.3.3 Installing the dosing valve 18
4.4 Hydraulic installation 19
4.5 Electrical installation 20
5 Commissioning 21
5.1 Commissioning - Remarks 21
5.2 Inserting/replacing the peristaltic pump's roller carrier - dosing line 4,8 21
5.3 Inserting/replacing the peristaltic pump's roller carrier - dosing line 10 22
5.4 Establishing the power supply 22
5.5 Preparing the suspension 23
6 Operation / Use 24
6.1 General 24
6.2 Preparing the suspension 24
6.3 Control unit - Software 24
6.4 Switching on the PAKDOS Mini / Start query 24
6.5 Calculating the dosing performance / Dosing performance tables 25
6.6 The control unit 29
6.6.1 Operation mode menu 29
6.6.2 Dosing time menu 30
6.6.3 Pause time menu 30
6.6.4 Maintenance menu 31
6.6.5 Test outputs menu 31
6.6.6 Test inputs menu 31
6.6.7 Language menu 31
6.6.8 Set date+time menu 31

6.6.9 Time switch / Switch times menu 32
6.6.10 Hose rupture menu 32
6.6.11 Contrast menu 32
6.6.12 Info menu 32
6.6.13 Reset to factory settings menu (password-protected) 32
6.6.14 Config user password menu (password-protected) 33
6.6.15 Data log menu 33
6.7 Setting the dosing line's flushing volume 33
7 Maintenance, care, fault 34
7.1 Device maintenance 34
7.1.1 Opening and closing the control housing 34
7.1.2 Checking/replacing the hose kit for dosing line 4.8 35
7.1.3 Checking/replacing the hose kit for dosing line 10 36
7.1.4 Opening and closing the housing of the peristaltic pump 10 l 37
7.2 Cleaning of the level detection 38
7.3 Cleaning the suspension tank 38
7.4 Fault removal 38
8 Decommissioning – Storage – Disposal 39
8.1 General 39
8.2 Disposal of used parts and operating materials 39
8.3 Decommissioning the PAKDOS Mini 39
9 Documents 40
9.1 Declaration of conformity 40
9.2 Wiring diagrams 41
9.2.1 Wiring diagram for the motor 41
9.2.2 Wiring diagram 1 42
9.2.3 Wiring diagram 2 43
9.3 Commissioning protocol / Instruction 44
9.4 Operation data sheet 45
9.5 Maintenance protocol 47
9.6 Spare parts list 48
Dosing technology general 48
10 Appendices 50

Imprint:

All rights reserved
© Copyright by WDT – Werner Dosiertechnik GmbH & Co KG
Edition: see footer
Reproduction of any kind and translation into other languages, even in excerpts, is only permitted with the express authorisation of the company WDT - Werner Dosiertechnik GmbH & Co. KG. Subject to technical modifications
These operating instructions are an English translation of the original German version by the company WDT.

Responsible for the content:
Co. WDT - Werner Dosiertechnik GmbH & Co. KG
Hettlinger Str. 17; D-86637 Wertingen-Geratshofen
Phone: +49 (0) 82 72 / 9 86 97 – 0 Fax: +49 (0) 82 72 / 9 86 97 – 19
Email: info@werner-dosiertechnik.de

1 About these instructions / general

1.1 Scope of applicability

These instructions describe the functioning, installation, commissioning and operation of the powdered activated carbon dosing type **PAKDOS Mini** along with the corresponding accessories.
The Operating Instructions must be read carefully before use and kept on the device for direct use!

1.2 Target group

Only our authorised partners and people who have been trained in the device functions are permitted to work on the device, provided that they have read and understood these Operating Instructions.
Electrical connection work may only be carried out by appropriately trained specialists!

1.3 Symbols used

This document uses the following types of safety notices as well as general notices:



DANGER!
“DANGER” denotes a safety notice which, if disregarded, may lead to serious or life-threatening injuries, or serious material damage!



CAUTION!
“CAUTION” denotes a safety notice which, if disregarded, may lead to injury, damage to health or material damage!



ATTENTION!
“ATTENTION” denotes a safety notice which, if disregarded, may lead to material damage!



CORROSIVE!
“Corrosive” denotes a safety notice which, if disregarded when handling chemicals, may lead to injuries or material damage.



ESD SENSITIVE!
“ESD SENSITIVE” denotes electronic components that may be damaged by electrostatic discharges. The generally accepted safety precautions for ESD-sensitive devices must be observed when handling the devices!



NOTICE!
A notice denotes information which, if disregarded, may lead to malfunctions.



Tip!
A “Tip” denotes information that may result in improvements in the operating process.



Mandatory sign
Use face protection!



Mandatory sign
Use protective gloves!
In accordance with DIN EN 374, protective gloves against chemicals and microorganisms.



Mandatory sign
Use protective apron!



Mandatory sign
Use protective boots!

1.4 Warranty

All WDT devices and systems are manufactured using modern production methods and are subject to comprehensive quality control. However, should there be a reason for complaint, any compensation claims shall be directed to the company WDT in accordance with the general terms and conditions of warranty.

General terms and conditions of warranty

The company WDT assumes a 2-year warranty, starting with the commissioning, up to 27 months after delivery; subject to correct installation and commissioning.
Exempt from this are wear parts such as seals, hoses, diaphragms, dosing screws, electrodes, roller carriers and other parts that are subject to mechanical or chemical wear and tear. For these we assume a warranty of 1/2 year.
Our enterprise resource planning system requires an invoice for each delivery (including warranty services). When returning a defective component, upon review you will receive a corresponding credit, if applicable. We request a return within 14 days.
The costs for subsequent damage and for the processing of warranty claims are excluded.
There are no warranty claims for damage caused by frost, water and electrical overvoltage or by improper handling.



CAUTION!
In the event of any unauthorised modifications to the device, the warranty and product liability will be voided!

1.5 Additional information

Further information about special topics is available from your specialist dealer or directly from:

WDT Werner Dosiertechnik GmbH & Co KG
Hettlinger Straße 17, 86637 Wertingen-Geratshofen
Phone +49 8272 98697-0; Fax +49 8272 98697-19
http: //www.werner-dosiertechnik.de

1.6 Information regarding support queries

For spare part orders, we require the following data. You can find these on the identification plate.

- device designation
- device serial number
- year of manufacture

2 Safety

2.1 Intended use

The PAKDOS Mini must only be used for the purposes described in Chapter *3.2, Product description*! Also pay attention to the locally applicable regulations concerning accident prevention, occupational safety and drinking water protection!

2.2 Safety notices

Carefully read and pay attention to the operating instructions prior to installation and use of the device! Work on the device and changes in the settings may only be carried out by properly instructed persons!

2.2.1 Handling of chemicals, risks to humans and the environment

In case of emergencies when handling chemicals, contact the emergency poison centre!

Emergency number:

Munich Emergency Poison Centre (or any other Poison Centre)

Phone: +49 89 19240

Excerpt from the Accident Prevention Regulations, GUV-V D 5

Installation rooms for chlorination systems and storage rooms
Section 3a. (1) Chlorination systems must be installed in lockable rooms and the chemicals intended for the chlorination must be stored in lockable rooms.
Re Section 3a Para. 1:
This requirement ensures that chlorination systems and chemicals shall be protected against weather effects and unauthorised access.
(2) Rooms in accordance with Para. 1 must not be intended for the permanent presence of persons.
Re Section 3a Para. 2:
…… A “permanent” presence is given when persons are present in the room for more than 2 hours per day. Repair and maintenance work on the chlorination system are exempt from this.

2.2.2 Protective measures and rules of conduct









DANGER! CORROSIVE! PROTECTIVE EQUIPMENT!
Powdered activated carbon dosed with the PAKDOS Mini.
Ensure that the correct container / chemical is used! The greatest possible care must be taken when working with chemicals! Face protection, protective gloves, protective apron, boots.
Store chemicals in such a way that they are not accessible to unauthorised persons.
Detailed information regarding handling and storage can be found in the chemical manufacturers’ safety data sheets!



ATTENTION! ESD SENSITIVE!

The electronic components in the device control units are sensitive to electrostatic discharge. For this reason, the generally accepted safety precautions for ESD-sensitive devices must be observed when handling the devices, including:

- **Discharge of personal static charge**
- **Dissipative clothing**
- **Disconnect the device from the voltage supply**

3 Product description – Functional description – (scope of delivery)

3.1 Scope of delivery / accessories

The scope of delivery includes the following assembly groups:

Dosing line for PAKDOS Mini-CB36; performance: 4.8 l/h or 10 l/h

- Control unit CB36 with LC display, built into the housing, pre-installed on the mounting plate (with 2 pump replacement hoses), safety plug
- Pulse length control and empty indication
- Peristaltic pump Sa-4.8x2.4, dosing performance max.: 4.8 l/h or peristaltic pump 6.4x2.4, dosing performance 10 l/h, counter-pressure max.: 0.5 barg
- Leakage indication
- Flushing unit for the dosing line approx. 10 - 20 l/h with adjustment valve and flow indication
- 25 m PE hose 6 x 1
- Pressure switch for empty indication / optionally with capacitive sensor
- Dosing valve PM 6x1 Flushing water removal

Suspension unit

- PE-container, 100 , 200, 300 or 500 litres
- Stirrer 60 W and control housing for stirrer (safety plug)
- Suction line PE 4x1
- Filling unit with ball valve d25
- Overflow line
- Ball valve for emptying
- Connection for empty indication, syringe for cleaning
- Remote fault indication with potential-free changeover contact

ON-SITE SERVICES

- Voltage supply
- Piping of the water supply and the
- suspension discharge
- Piping of the overflow to the gully

3.2 Product description - Function

The PAKDOS Mini dosing system is used to prepare and dose the powdered activated carbon suspension. It works with a maximum of 3% solids and a maximum grain size of 100 µm. It is used to eliminate unwanted chemicals (combined chlorine, THM, organic substances) in swimming pool water with both sand and precoat filters. A well-functioning filter system with flocculation (filter velocity < 30 m/h, fluidising backwashing) is a requirement for the successful use of powdered activated carbon. In the PAKDOS Mini, dust-free and acidified powdered activated carbon is preferably used. Fresh water or clean water from the filter circuit is used to prepare the powdered activated carbon.
The PAKDOS Mini is suitable for use in small pools with a maximum circulation rate of 100 m^3/h, which corresponds to a maximum consumption of around 100 grams of powdered activated carbon per hour. For higher consumption rates, it is more advantageous to use the PAKDOS 60 dosing device for dry powdered activated carbon, with a dosing performance of up to approx. 2500 g/h.
The PAKDOS MINI system consists of a suspension preparation unit with a 100 l, 200 l, 300 l or 500 l container with a stirrer and one or more dosing lines. The dosing performance is max. 140 or max. 300 g/h, depending on the dosing line, with a 3% suspension. The dosing is done on the circulation pump's suction side.

Overview PAKDOS Mini dosing line 4.8

With a dosing performance of up to 4.8 litres per hour

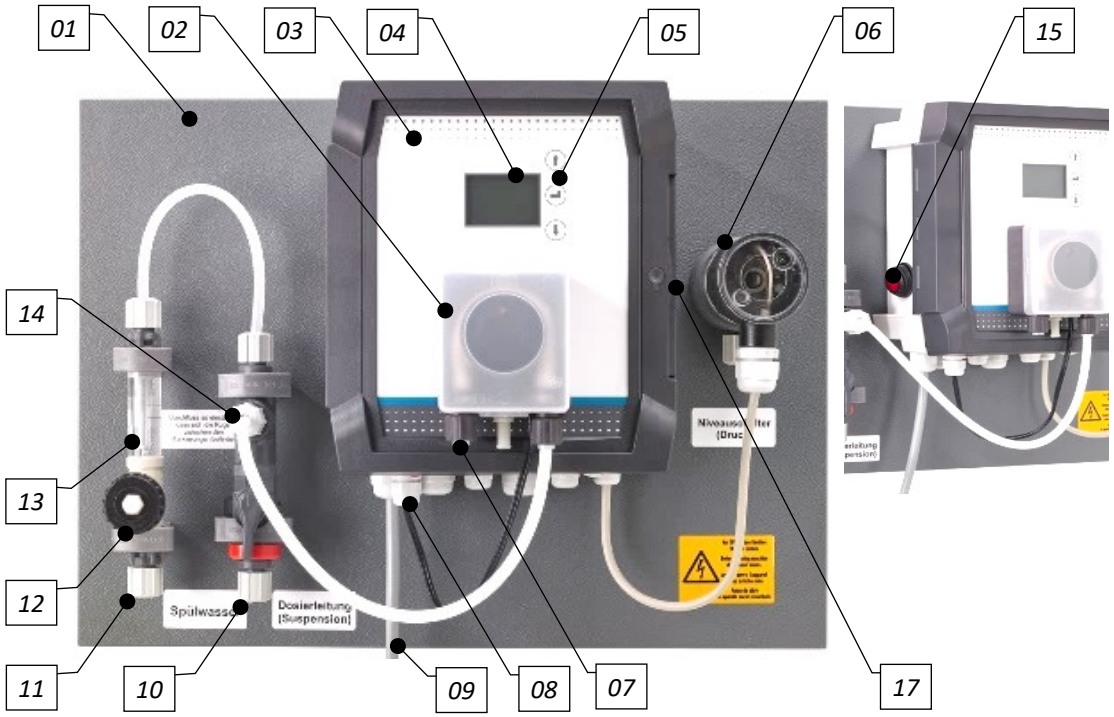


Figure 1, PAKDOS Mini dosing line 4.8

Key:

01. Mounting plate
02. Peristaltic pump
03. Control housing
04. Display
05. 3 buttons for operating the display
06. Pressure switch for level detection
07. Suction connection of peristaltic pump to the suspension tank
08. Connection for hose rupture monitoring
09. Mains cable with safety plug
10. Outflow of the dosing line to the filter circuit
11. Flushing water inlet
12. Flushing water adjustment valve
13. Flushing water flow indication
14. Dosing position for PAK suspension
15. Main switch
16. —
17. Opening mechanism for control housing
18. —

Overview PAKDOS Mini dosing line 10

With a dosing performance of up to 10 litres per hour

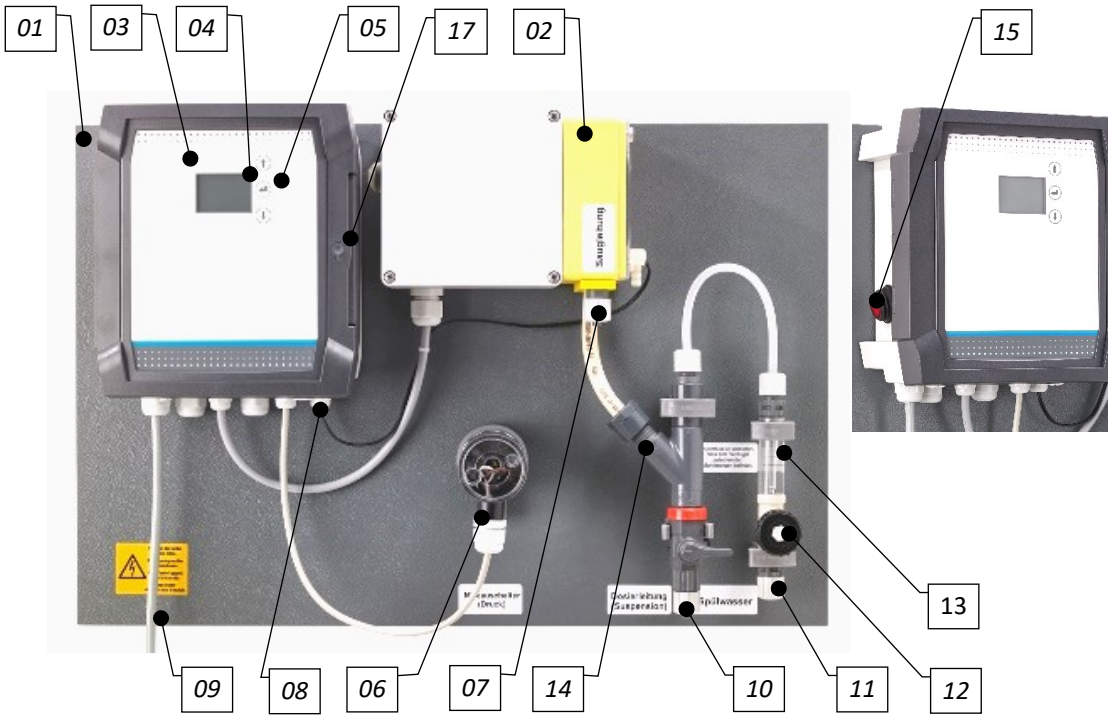


Figure 2, PAKDOS Mini dosing line 10

Key:

01. Mounting plate
02. Peristaltic pump with terminal casing
03. Control housing
04. Display
05. 3 buttons for operating the display
06. Pressure switch for level detection
07. Suction connection of peristaltic pump to the suspension tank
08. Connection for hose rupture monitoring
09. Mains cable with safety plug
10. Outflow of the dosing line to the filter circuit
11. Flushing water inlet
12. Flushing water adjustment valve
13. Flushing water flow indication
14. Dosing position for PAK suspension
15. Main switch
16. —
17. Opening mechanism for control housing
18. —

Overview suspension preparation unit

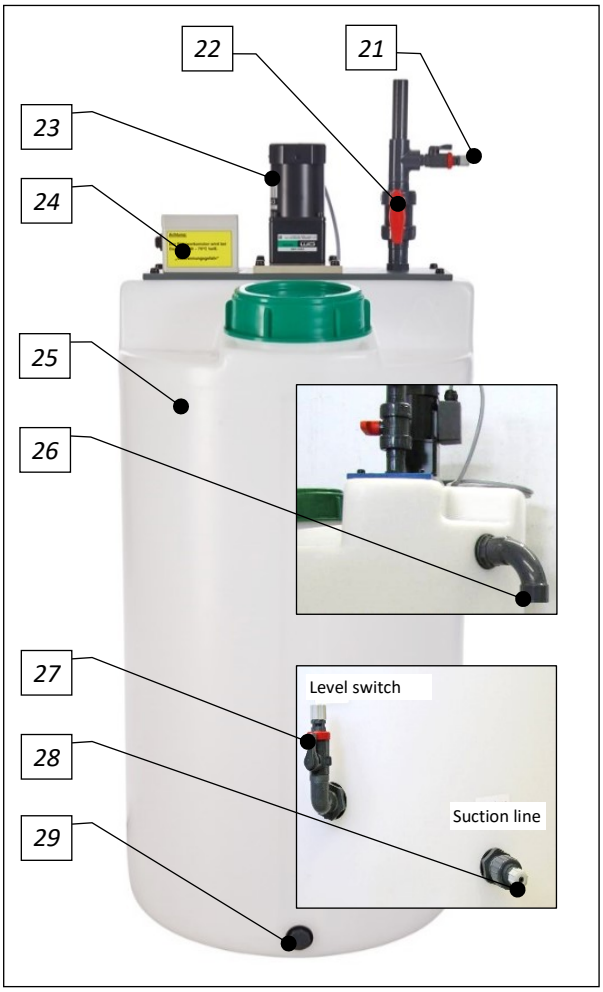


Figure 3, Suspension unit 100-500 l

Key:

21. Connection of flushing water to the dosing line
22. Filling unit with ball valve
23. Stirrer
24. Control housing for stirrer
25. Suspension tank 100 l to 500 l
26. Overflow pipe
27. Connection of pressure level switch
28. Connection of suction line for dosing line
29. Connection for emptying
30. —

3.2.1 Control unit

The control unit consists of a housing containing the built-in electronic components. An LCD display is integrated in the control unit. The operating parameters are set via a 3-button operating panel.

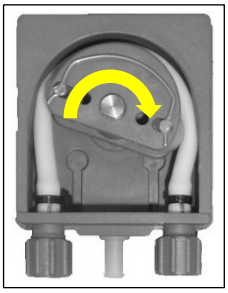


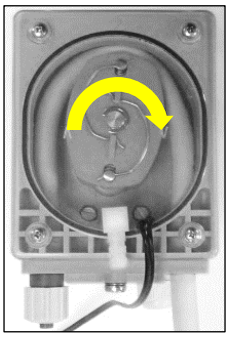
Figure 4, Control unit

3.2.2 Peristaltic pumps

Rotating spring-loaded rollers press the dosing hose against the wall of the pump casing. This pushes the liquid out of the hose in front of the roller and simultaneously sucks it in behind the roller. Since no valves are needed, they are not susceptible to contamination and air pockets in the liquid and are therefore particularly well-suited for the dosing of suspensions. An additional advantage is the virtually noiseless operation of the dosing pumps.

The maximum dosing performance is approx. 4.8 or 10 l/h, respectively.





3.2.3 Level detection / Pressure switch of the suspension unit

The container's empty indication is detected with a pressure switch. The pressure switch measures the static pressure and thus the water level in the container. If the water level is too low, the dosing is switched off and a fault indication is displayed.

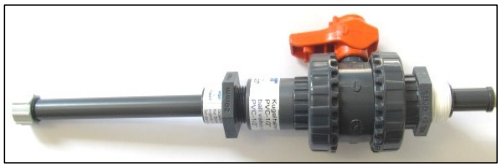


3.2.4 Flow indication and dosing position

At the dosing position, the PAK suspension is dosed from the suspension tank into the dosing line.
The PAK very easily settles in a suspension. The dosing line is constantly flushed to prevent blockage. The flow indication is used to set the flow volume. The flushing water is taken from the clean water of the respective filter circuit.



3.2.5 Dosing valve 1SK



The dosing valve type 1SK is used to dose the PAK suspension into the swimming pool circulation.
Due to the effective mixing of the powdered activated carbon into the swimming pool water, the low pressure and for reasons of operational safety, the **injection point** must always be installed **upstream of the circulation pump**. You will need a ½" socket or a tapping sleeve with a ½" threaded connection.

3.2.6 Suspension tank

The suspension tank is used to store the PAK suspension. The connections for the filling line with ball valve, overflow nozzle, emptying connection, suction line, level switch and empty indication are pre-assembled and loosely enclosed.
The stirrer unit is also installed, see *Chapter 3.2.7*.



3.2.7 Stirrer unit

The stirrer motor is installed on the suspension tank together with the control housing. The stirrer must run constantly to prevent the carbon particles from settling. The stirrer may only be switched off for maintenance work. The rotational direction of the stirrer is counter-clockwise when viewed from above.

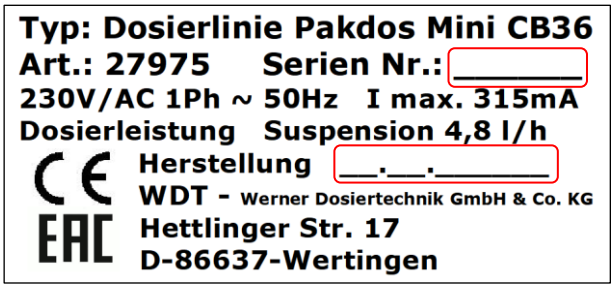




CAUTION!
The gear motor reaches temperatures of 60-70°C during continuous operation! Caution: Risk of burns!
The stirrer must run constantly to prevent the powdered activated carbon from settling!

3.3 Identification of the device / Identification plate

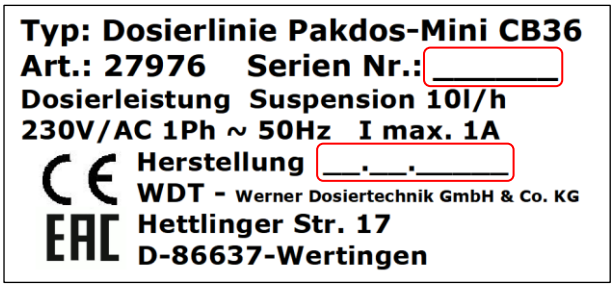
Identification plate for dosing line 4,8 l/h



Enter the data from the identification plate here.

Field 1: Enter serial number
Field 2: Enter date of manufacturing

Identification plate for dosing line 10 l/h



Field 1: Enter serial number
Field 2: Enter date of manufacturing

Identification plate for suspension unit PAKDOS Mini



Field 1: Enter the container content
Field 2: Enter code number
Field 3: Enter serial number
Field 4: Enter date of manufacturing

3.4 Technical data

	PAKDOS Mini-CB 36
Dimensions and weights:	
Dimensions of dosing line 4.8 Dimensions of dosing line 10	WxHxD 410x300x160 mm WxHxD 540x360x160 mm
Dimensions of suspension tank	100l; d 450 mm x H 1120 mm 200l; d 560 mm x H 1230 mm 300l; d 650 mm x H 1320 mm 500l; d 790 mm x H 1460 mm
Space requirement, including operation and maintenance	WxHxD 2000x2000x1000 mm
Empty weight/operating weight of dosing line 4.8 Dosing line 10	2.5 kg 4.0 kg
Empty weight/operating weight of suspension unit	100 l; 32/132 kg 200 l; 40/240 kg 300 l; 45/345 kg 500 l; 50/550 kg
Connection data	
Electrical connection data, dosing line Suspension unit	5-16 W 230 V/AC, 50 Hz, safety plug 60 W 230 V/AC, 50 Hz, safety plug
Fuse for dosing line Fuse for suspension unit	Round fuse 1 A slow, 4 A slow Round fuse 3.15 A slow
Hydraulic connection data	Water inlet d 25 mm Dosing position ½" IG
Required duct connection	At least d 40 mm
Protection class	IP44
Operating data:	
Medium temperature Ambient temperature Humidity technical room	5°C to 35°C 5°C to 35°C max.: 80% (non-condensing)
possible counter-pressure	0.5 barg
Room ventilation (in and out)	According to DIN 19643
Material	Mounting plate: PP Housing: PS Suspension tank: PE Seals: EPDM, Viton

3.5 Transport/storage

Please check the device immediately upon receipt for potential transport damage.



ATTENTION!

The device may be damaged by frost or high temperatures.
Do not store the device near objects with significant heat radiation or in direct sunlight. The device may only be transported and stored in its original packaging. Please ensure careful handling.

Storage of chemicals



DANGER!

Pay attention to the chemical suppliers' safety data sheets!
In addition, please pay attention to the provision TRGS 510 regarding the storage of hazardous substances in non-stationary containers!

4 Installation

The tasks described here must only be performed by appropriately qualified personnel from a specialist company.

4.1 Selecting the installation site

Pay attention to the following in regard to the installation site:

a) A freely accessible place of installation should be selected to facilitate operations and subsequent maintenance tasks.
b) A floor drain must be available. Observe the temperature specifications for the surrounding air and medium in accordance with *Chapter 3.4 Technical data*. No flammable vapours, dust or gases may be present in the immediate vicinity of the device.
c) The device must not be exposed to the elements. It may not be installed outdoors. The system must be protected from frost and direct sunlight.
d) 2 isolated ground sockets are required.
e) The installation site must comply with the locally applicable accident prevention regulations (Germany BGR-GUV-R 108) and should not be accessible to unauthorised persons. A separate storage room must be available for stocking the chemicals.
f) It must be possible to vent and aerate technical areas so that hazardous substances do not occur in health-hazardous concentrations (from accident prevention regulations BGR-GUV-R 108).

4.2 Installation instructions / installation

The “PAKDOS Mini” consists of a dosing line and the suspension unit. These are installed next to each other and in the immediate vicinity of the filter system in the technical room. Please pay attention to the required space for operation and maintenance of the device.

Installation diagram / space requirement

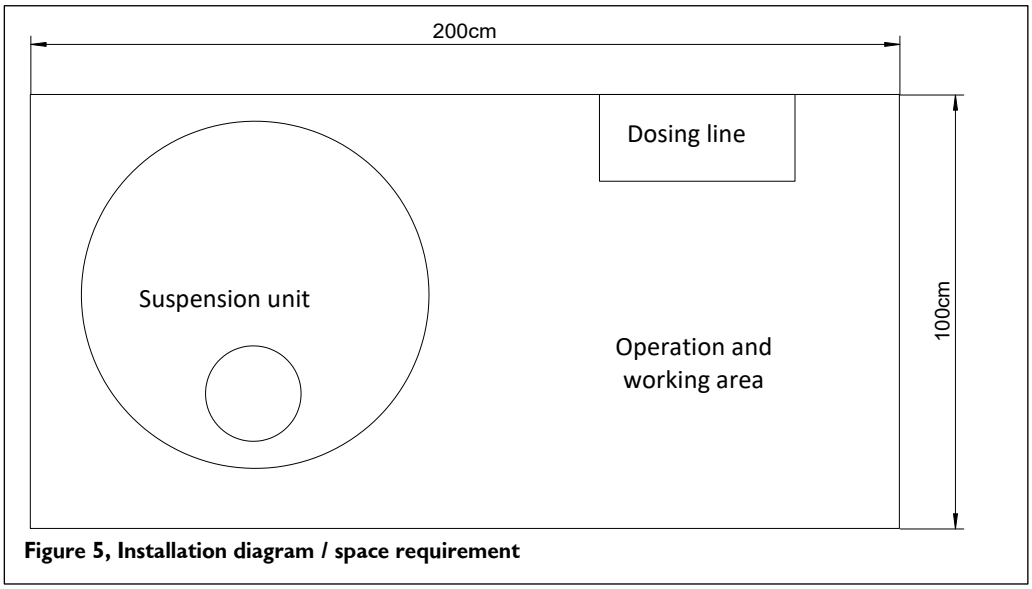


Figure 5, Installation diagram / space requirement

a) When selecting the installation site, make sure it is easily accessible.
b) Attach warning and notice signs in accordance with the locally applicable accident prevention regulations (Germany: BGR-GUV-R 108) at the designated positions. **In particular for the labelling of the chemicals used!**

Achtung!

ATTENTION!
The system is not suited for outdoor installation!

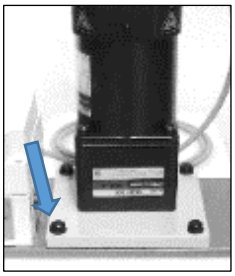
4.3 Mechanical installation

4.3.1 Setup / installation of the suspension unit

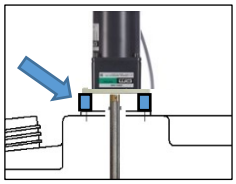
Set up the suspension tank on a flat surface in the technical room.

Fill the container with a little water to ensure it stands securely.

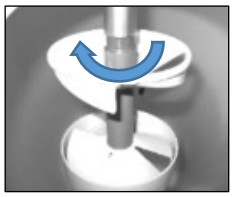
Install the stirrer



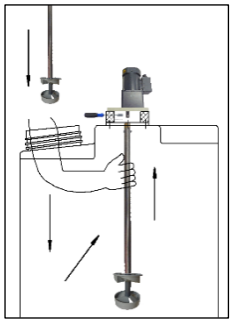
a) Remove the 4 black protective caps from the nuts of the mounting screws and loosen the four nuts for the stirrer.



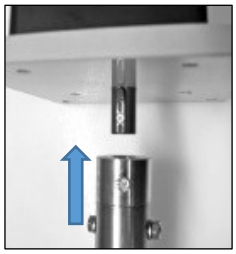
b) Lift the mounting plate with the gear motor and place 2 spacers under it.



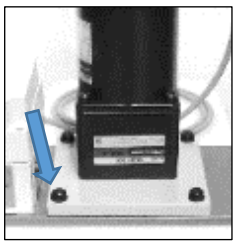
c) Screw the stirrer blade hand-tight onto the stirrer shaft.
Attention: left-hand thread!



d) Insert the stirrer shaft with the stirrer blade through the opening in the cover into the suspension tank.



e) Push the upper adapter of the stirrer shaft onto the shaft of the gear motor and tighten the clamping screw.



f) Screw the mounting plate with the gear motor back onto the grey mounting plate. Torque approx. 4 Nm.

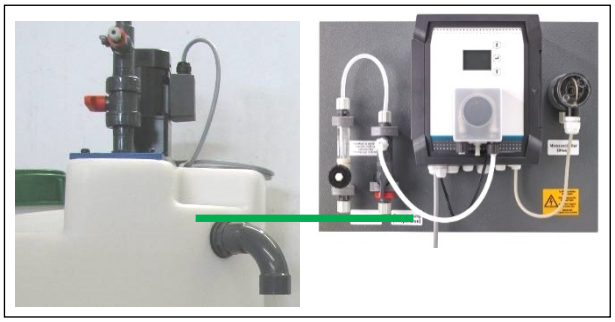


CAUTION!

The gear motor reaches temperatures of 60-70°C during continuous operation! Caution: Risk of burns!

4.3.2 Installing the dosing line

Install the dosing line as close as possible to the suspension tank.
Select the installation height so that the flushing water inlet (*pos. 11*) is above the overflow nozzle (*pos. 26*) of the suspension tank (green line). This prevents the suspension from running out of the line when the peristaltic pump's hose is changed.
Attach the dosing line plate to the wall using 4 screws.



Achtung!

ATTENTION!

The dosing line (pay attention to the level) must be installed above the overflow nozzle of the suspension tank (green line). This prevents water from running out of the line when the peristaltic pump's hose is changed.

Several dosing lines can be combined with a suspension unit. For larger dosing quantities, we recommend our PAKDOS 60 with a dosing performance of up to 2500 g/h PAK.

4.3.3 Installing the dosing valve

The 1SK dosing valve should be installed just before the circulation pump, ideally **horizontally**, in **a vertical pipe**. **Under no circumstances** must it be mounted **on the underside** of the pipe. The dosing position should be easily accessible.

Achtung!

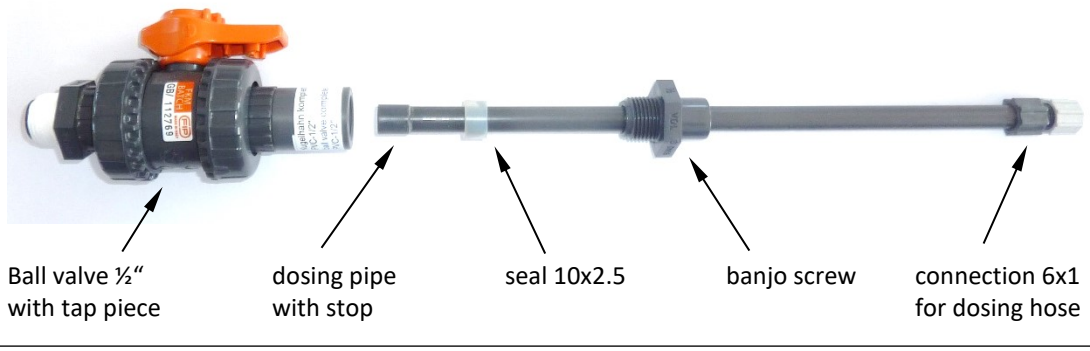
ATTENTION!

The system pressure at the dosing position must not exceed 0.5 barg. We recommend dosing upstream of the circulation pump. The pump hoses must be replaced at regular intervals, see maintenance protocol.

The dosing valve must not extend into freely accessible areas in order to prevent damage and accidents. If an injection point does not meet these requirements, a new injection point must be set, e.g., with a tapping sleeve.

A ½" IG female threaded sleeve or a ½" IG tapping sleeve is required to be able to mount the dosing valve. The dosing lance should be pushed into the ball valve until the dosing position is approximately in the centre of the pipe. (See illustration on the right)





a) Screw the ball valve with tap piece (1/2") into the injection point. If there is water in the pipe, the ball valve is closed at this point. Clamp the dosing line (PE 6x1) to the dosing pipe using the union nut.

b) Now push the seal 10x2.5 to the front stop collar of the dosing pipe, push the dosing pipe into the tap piece and tighten it lightly with the banjo screw.
c) If the ball valve was closed, open it now and push the dosing pipe through until the orifice of the dosing pipe is in the centre of the pipe.
d) Tightening the banjo screw compresses the seal, thereby clamping the dosing pipe.



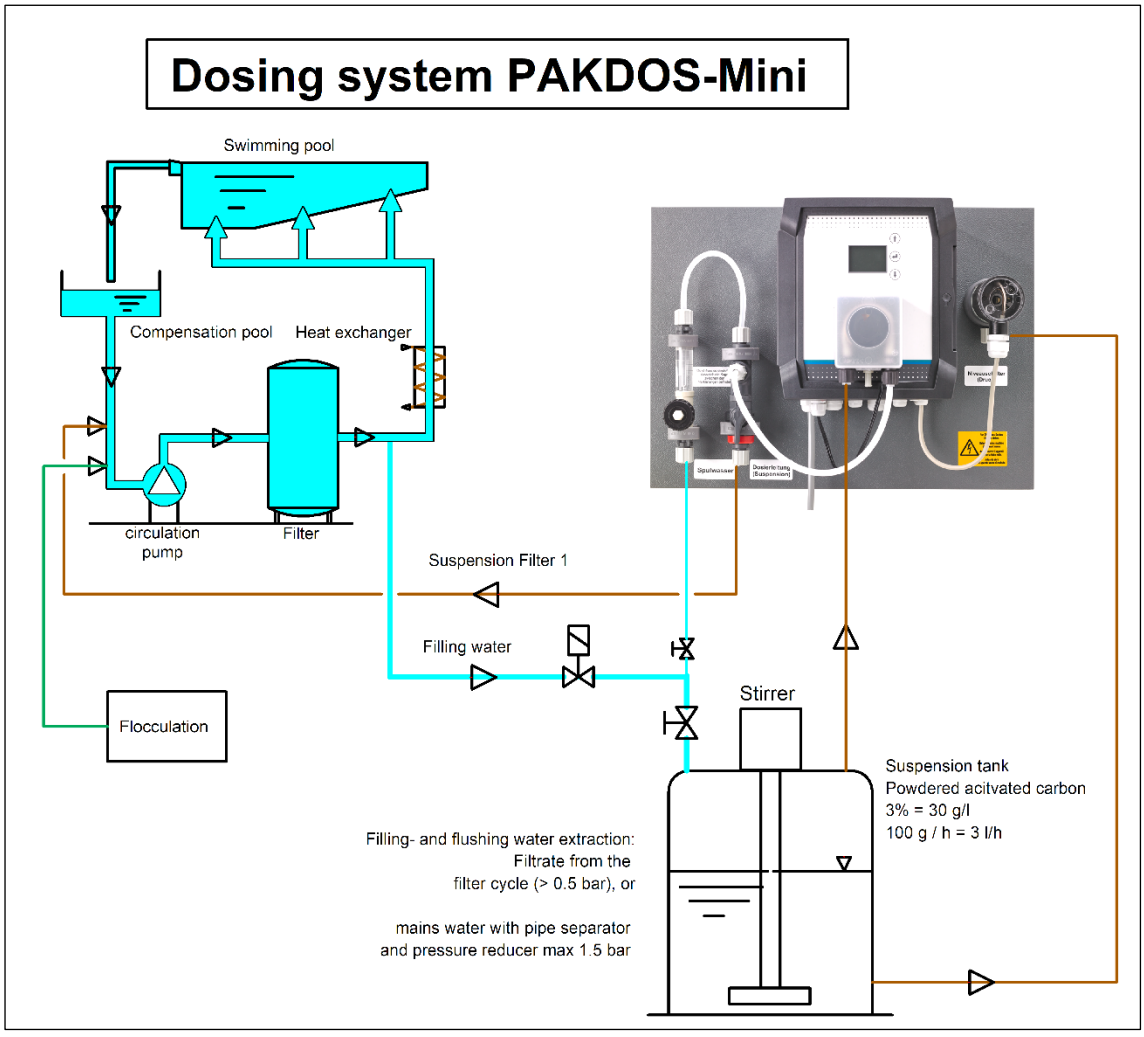
ATTENTION!

According to DIN 19643, 10 seconds should be allowed for the flocculation/adsorption reaction. At a flow rate of 1.5 m/second (which should not be exceeded), a pipe length of 15 metres would therefore be required for optimal flocculation/adsorption.

The dosing valve's ball valve must not be closed until the dosing pipe has been pulled out all the way to the stop. Otherwise the dosing pipe or ball valve will be damaged!

4.4 Hydraulic installation

Connection diagram:



a) Filling and flushing water line
The water supply for the suspension preparation is removed from the pure water line, upstream of the heat exchanger.
Install the line from the extraction point to the suspension tank and to the flushing water connection of the dosing line. PVC pipe d20/d25 line
Remove the flushing water for the first cycle (1) (filling cycle) directly from the filling line. Use the flushing water for the other dosing lines (option) from the clean water of the respective circuits. A ¼" ball valve is supplied for this purpose



CAUTION!
If the filling water is taken from the drinking water network, a safety device according to DIN EN 1717 (system separation) must be installed!

b) Suction line for suspension;
Install the line from the suspension tank to the peristaltic pump of the dosing line
c) Line for suspension to dosing position;
Install the line from the dosing line to the dosing position/injection point.
- The dosing line PE 6 x 1 to the injection point should be installed in a protective pipe with as little height difference as possible.
- Select the shortest possible line path.
- Do not bend the dosing line; lines with damaged areas must be replaced.

d) Line for level detection;
Install the line from the suspension tank to the pressure switch at the dosing line
e) Install the overflow line;
To prevent overfilling of the container, an overflow nozzle (*pos 26*) is mounted on the container.

 Install the enclosed PVC elbow d40 on the overflow nozzle.

 Connect the container overflow to the room drainage.

f) Install the drain ball valve
Mount the supplied ball valve on the emptying connection (*pos. 29*) of the suspension tank and close the ball valve.

4.5 Electrical installation

The PAKDOS Mini dosing device is delivered ready to plug in with a safety plug. For the connection, you need an isolated ground socket for the stirrer and one isolated ground socket for each dosing line.
If there are several dosing units, the electrical inputs for the empty indication (pressure switch) are looped through.



ATTENTION!
With external control, the power socket must not be switched! In the case of external control, each individual dosing line can be switched on and off using a potential-free contact. See the wiring diagram.

For connecting the potential-free switch, see the wiring diagram.



NOTICE!
Warning and information signs must be installed in compliance with locally applicable accident prevention regulations at the locations provided!

5 Commissioning

5.1 Commissioning - Remarks

The tasks described here must only be performed by appropriately qualified personnel from a specialist company. Alternatively, the work can be carried out by persons who have read and understood the entire Operating Instructions. Prior to commissioning, the installed system must be checked for proper installation and leaks.
Please use the commissioning protocol from *Chapter 9.3* for commissioning.

The device comes loaded with factory settings. During the commissioning, adjust the control parameters to the desired operation mode and enter them in the operation data sheet in *Chapter 9.4*.



ATTENTION!
To prevent the suspension from becoming contaminated with germs, the pH value in the container must be kept at pH 2.

5.2 Inserting/replacing the peristaltic pump's roller carrier - dosing line 4,8

When the dosing line 4.8 is delivered, the roller carrier is removed from the peristaltic pump to avoid deforming the hose.

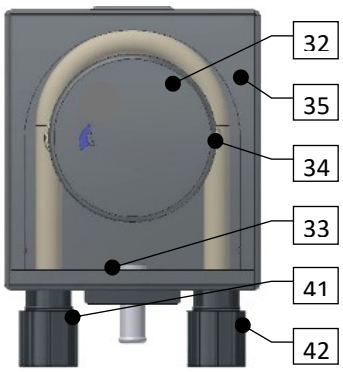


Figure 6, Peristaltic pump

Key
31. Transparent pump cover (not shown)
32. Safety disc
33. Hose bracket with dosing hose (hose kit)
34. Roller carrier (not visible)
35. Pump casing
41. Suction connection
42. Pressure connection

The peristaltic pump is fitted with a white dosing hose.

1. Remove the snapped-in, transparent pump cover *(pos 31)* and the safety disc *(pos 32)*. Pull the hose bracket *(pos 33)* out of the guide in the casing.

2. Push the roller carrier *(pos 34)* onto the shaft.

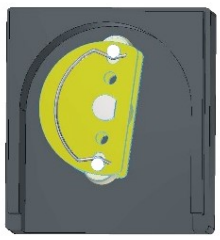


Figure 7, Insert roller carrier

3. Insert the hose bracket into the casing's guides until it firmly snaps into place.

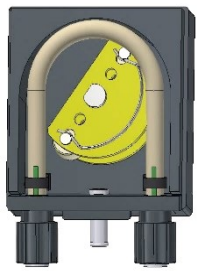


Figure 8, Insert hose bracket

4. Turn the roller carrier clockwise and carefully press the hose into the casing until the entire hose is contained in the casing.

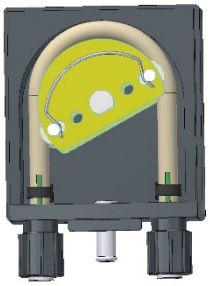


Figure 9, Turn roller carrier

Now replace the safety disc and the transparent pump cover. This completes the installation of the roller carrier.

The dismantling of the roller carrier and the hose bracket occurs in the reverse sequence.

5.3 Inserting/replacing the peristaltic pump's roller carrier - dosing line 10

With the dosing line 10 l, the roller carrier is already inserted. The peristaltic pump is ready for operation.

5.4 Establishing the power supply

1. Ensure that all installation tasks have been completed and components are switched off. Observe the sequence of the commissioning works.
2. Insert the mains plugs of the dosing line and the stirrer into the power sockets.

5.5 Preparing the suspension







ATTENTION/CORROSIVE!

To prevent germ contamination, the suspension must be adjusted to a pH of 2 or less. If the PAK is not acidified, add approximately 1 litre of 37% sulphuric acid to 100 litres of water. Wear personal protective equipment!



Tip!

If possible, only prepare enough suspension so that the container is mostly empty by the end of the season. This avoids the unnecessary discarding of suspension.

Procedure:

Step	Operation	Stirrer/ dosing line function
1.	Activate the switch for the stirrer at *Control housing* for stirrer *Pos. 24, page 11*. 	The stirrer is running continually
2.	Open ball valve, *Pos 22,* in the water inlet	The stirrer is running Water is running in No dosing
3.	When the container is half full, slowly pour the flaky powdered activated carbon into the container. Quantity: One bag (6 kg) per 100 litres of filling volume **If necessary**, add the acid slowly (only if the powdered activated carbon used has not been acidified!) Quantity: approx. 1 litre of 37% sulphuric acid per 100 litres of water	The stirrer is running Water is running in No dosing
4.	If the container is full, close the filing ball valve, *pos 22*	The stirrer is running Water inlet stops No dosing
5.	Turn on the dosing line at the control unit's main switch, *pos 15*	The stirrer is running Dosing starts
6.	Open the ball valve at the dosing position, *pos 14*, for flushing and use the adjustment valve, *pos 12*, to centre the ball in the flow tube	The stirrer is running The dosing cycles at set intervals



CAUTION!

The gear motor reaches temperatures of 60-70°C during continuous operation! Caution: Risk of burns!

The stirrer must run constantly to prevent the powdered activated carbon from settling!

6 Operation / Use

6.1 General

The tasks described here may only be carried out by appropriately trained and instructed personnel. Alternatively, the work may be done by operating personnel who have read and understood the entire operating instructions.
Once all preparations for the commissioning have been completed, the operation can be started.

6.2 Preparing the suspension

See Commissioning, *Chapter 5.5, page 23.*

The suspension tank's stirrer is in operation.

6.3 Control unit - Software

The control is operated via the device's control unit (display with 3 buttons).

Operation of the control unit



Use the **arrow keys** to navigate **up or down** or to set numerical values.
Use the **Enter key** to navigate to the Menu overview and the selected submenu.
Also use the **Enter key** to navigate back.

Dimming the display

If no input occurs for 60 seconds the display is dimmed. The first pressing of a key will illuminate the display again.

6.4 Switching on the PAKDOS Mini / Start query



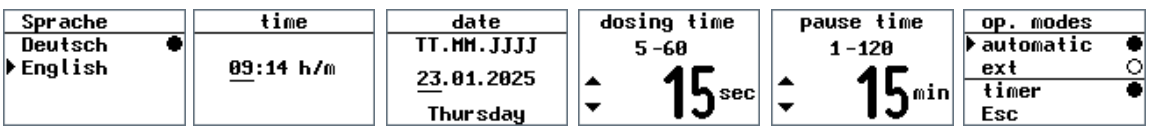
CAUTION!

The peristaltic pump's protective cover *(31)* must be installed. Risk of injury due to rotating peristaltic pump.

Switch on the dosing line at the main switch.

Start query

After **switching on** the device **for the very first time**, or after resetting it to the **factory settings**, the language, time and date, the parameters for dosing time and pause time, and the operation mode must first be entered. The corresponding displays are shown in sequence. If the values for dosing time and pause time are not yet known, continue with the displayed factory settings. The values can be changed at any time. The operation mode setting must be exited with ESC.



After a successful entry and **each time it is switched on again**, the **display automatically switches to the operating menu**. The device is now ready for operation.

6.5 Calculating the dosing performance / Dosing performance tables

Determining the dosing performance

The effective requirement for dosing powdered activated carbon depends to a large extent on the level of organic contamination (whether chlorinated or not, from the fresh water and/or from pollution by bathers), the desired water quality and the filter type.
For determining the **dosing**, we recommend the following settings:

- with a **sand filter**, a dosing performance of **0.5 grams of PAK per m³/h** of circulation,
- with a **precoat filter**, a dosing performance of **1 grams of PAK per m³/h** of circulation.

With dust-free PAK qualities, up to 50% water with acid is usually added. A standard 6 kg bag therefore contains only about 3 kg of PAK. This must be taken into account when determining the PAK concentration in the suspension.
One PAK bag (6 kg) therefore results in a 3% suspension for 100 litres of water, which equates 30 g/l.



NOTICE!

The dosing performance of the powdered activated carbon is calculated based on the PAK concentration, the suspension and the pump's dosing performance.

Calculation example:

For a sand filter with a **circulation rate of 100 m³/h** and a required **dosing performance of 0.5 grams of PAK per m³/h** and a suspension concentration **of 3% (30 g/l)**, the PAK quantity is calculated as follows:

Circulation rate	**x**	**dosing quantity in g/m³/h**	**=**	**required dosing performance in g/h**
100 m³/h	**x**	**0.5 g/m³/h**	**=**	**50 g/h PAK.**

Now look for the setting values for the calculated PAK dosing performance in the table for the corresponding operation mode. Here 50 g/h.

The value of 52 g/h (see marking) is closest to the calculated dosing performance of 50 g/h.
In this example: Pause time 3 minutes, dosing time 40 seconds
Make a note of these pause and dosing times and enter them on the display.

The effect of the activated carbon is very slow; a spontaneous impact on water quality is therefore not to be expected.
After 2 days, the effect of the PAK dosing is determined and the pump's dosing performance is adjusted accordingly, either higher or lower.

Table for setting the dosing and pause times for **automatic operation mode for dosing line 4.8**

The dosing performance is influenced by several parameters. Therefore, the accuracy of the information on dosing performance is +-20%.

PAK dosing performance in g/h	required pause time in minutes	required dosing time in seconds	Dosing performance for 3% suspension in l/h
144	1	60	4.8
130	1	50	4.3
11l5	1	40	3.8
96	1	30	3.2
72	1	20	2.4
41	1	10	1.3
96	2	60	3.2
84	2	50	2.8
72	2	40	2.4
57	2	30	1.9
41	2	20	1.37
22	2	10	0.73
72	3	60	2.40
62	3	50	2.08
52	3	40	1.74
41	3	30	1.37
28	3	20	0.96
15	3	10	0.50
57	4	60	1.92
49	4	50	1.65
41	4	40	1.37
32	4	30	1.06
22	4	20	0.73
11	4	10	0.38
48	5	60	1.60
41	5	50	1.37
33	5	40	1.12
26	5	30	0.87
18	5	20	0.60
9	5	10	0.31

PAK dosing performance in g/h	required pause time in minutes	required dosing time in seconds	Dosing performance for 3% suspension in l/h
41	6	60	1.37
35	6	50	1.17
28	6	40	0.96
22	6	30	0.73
15	6	20	0.50
7	6	10	0.25
36	7	60	1.20
30	7	50	1.02
25	7	40	0.83
19	7	30	0.64
13	7	20	0.43
6	7	10	0.22
32	8	60	1.06
27	8	50	0.90
22	8	40	0.73
16	8	30	0.56
11	8	20	0.38
5	8	10	0.19
28	9	60	0.96
24	9	50	0.81
19	9	40	0.66
15	9	30	0.50
10	9	20	0.34
5	9	10	0.17
26	10	60	0.87
22	10	50	0.73
18	10	40	0.60
13	10	30	0.45
9	10	20	0.31
4	10	10	0.15



NOTICE!

The performance of the peristaltic pump decreases with the age of the hose! The maximum permissible counter-pressure is 0.5 barg.

Table for setting the dosing and pause times for **automatic operation mode for dosing line 10**

The dosing performance is influenced by several parameters. Therefore, the accuracy of the information on dosing performance is +-20%.

PAK dosing performance in g/h	required dosing time in seconds	required pause time in minutes	Dosing performance for 3% suspension in l/h
300	60	1	10.0
273	50	1	9.1
240	40	1	8.0
200	30	1	6.6
150	20	1	5.0
86	10	1	2.8
200	60	2	6.6
176	50	2	5.8
150	40	2	5.0
120	30	2	4.0
86	20	2	2.8
46	10	2	1.5
150	60	3	5.0
130	50	3	4.3
109	40	3	3.6
86	30	3	2.8
60	20	3	2.0
32	10	3	1.0
120	60	4	4.0
103	50	4	3.4
86	40	4	2.8
67	30	4	2.2
46	20	4	1.5
24	10	4	0.8
100	60	5	3.3
86	50	5	2.8
71	40	5	2.3
55	30	5	1.8
38	20	5	1.2
19	10	5	0.6

PAK dosing performance in g/h	required dosing time in seconds	required pause time in minutes	Dosing performance for 3% suspension in l/h
86	60	6	2.8
73	50	6	2.4
60	40	6	2.0
46	30	6	1.5
32	20	6	1.0
16	10	6	0.5
75	60	7	2.5
64	50	7	2.1
52	40	7	1.7
40	30	7	1.3
27	20	7	0.9
14	10	7	0.4
67	60	8	2.2
57	50	8	1.8
46	40	8	1.5
35	30	8	1.1
24	20	8	0.8
12	10	8	0.4
60	60	9	2.0
51	50	9	1.6
41	40	9	1.3
32	30	9	1.0
21	20	9	0.7
11	10	9	0.3
55	60	10	1.8
46	50	10	1.5
38	40	10	1.2
29	30	10	0.9
19	20	10	0.6
10	10	10	0.3



NOTICE!

The performance of the peristaltic pump decreases with the age of the hose! The maximum permissible counter-pressure is 0.5 barg.

Conversion table for **external operation mode** in **mA** for **dosing line 4,8**

PAK dosing performance in g/h	Current rating in mA	Dosing performance for 3% suspension in l/h
73	4	2.4
77	5	2.5
82	6	2.7
86	7	2.8
91	8	3.0
95	9	3.1
99	10	3.3
104	11	3.4
108	12	3.6
113	13	3.7
117	14	3.9
121	15	4.0
126	16	4.2
130	17	4.3
135	18	4.5
139	19	4.6
144	20	4.8



NOTICE!

The performance of the peristaltic pump decreases with the age of the hose! The maximum permissible counter-pressure is 0.5 barg.

Conversion table for **external operation mode** in **volt** for **dosing line 4,8**

PAK dosing performance in g/h	Control voltage in volt	Dosing performance for 3% suspension in l/h
72	1	2.4
78	2	2.6
84	3	2.8
90	4	3.0
96	5	3.2
105	6	3.5
114	7	3.8
123	8	4.1
134	9	4.4
144	10	4.8



NOTICE!

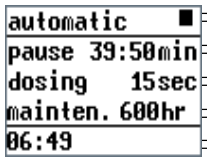
The performance of the peristaltic pump decreases with the age of the hose! The maximum permissible counter-pressure is 0.5 barg.

6.6 The control unit

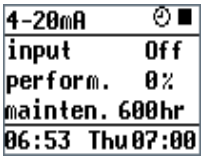
Operating menu

After activating the Pakdos, the display switches to the **operating menu**.

The display shows information on the operation mode, time switch (if activated), operating contact, pause time, dosing time, maintenance (if activated) and time of day.



⇨ Operation mode, time switch and operating contact signalling
⇨ Set pause time or remaining pause time, respectively
⇨ Set dosing time or remaining dosing time, respectively
⇨ Set or remaining time until the next maintenance
⇨ Current time and time of the next dosing (if the switch time function is activated and the current time is outside the set switch times)



Symbols:

→ Switch time inactive. The device does not dose because the time is outside the switch times.

→ Switch time active. The device doses according to the set pause/dosing time cycle.

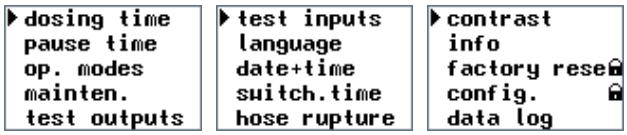
→ Operating contact open (standby mode)

→ Operating contact closed (ready for operation)

The **operating contact** is used to switch the device to standby mode via an external signal. In standby mode, only the parameters and test functions can be operated.
The operating contact function is available in all operation modes and is always displayed.

Menu overview

Use the **Enter key** to navigate to the **Menu overview**. The menu of the control unit is simply structured and easy to operate. It consists of an operating level with the following menu items:

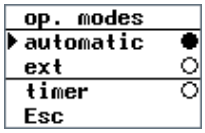


Use the 3 operating buttons to navigate in the menu. The menu functions are explained in the following chapter.

→ Some functions are always **password-protected** against unauthorised modification. Protected functions are marked with a **padlock** symbol.

After 60 seconds without input, the control unit automatically returns to the operating menu. **Any unsaved changes will be lost in this process.**

6.6.1 Operation mode menu

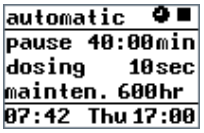


You can set 2 different operation modes.
Automatic: The dosing is done according to the set parameters for dosing time, pause time and switch times.
External: The dosing is controlled via an external signal (4-20 mA or 0-10 V) from an external measuring and control unit.

The External operation mode is only possible for the dosing line 4.8!

Select the desired operation mode.
Time switch: The time switch is activated here. **The clock symbol is displayed in the operating menu .**
The dosing is then done according to the times set in the **"Switch times"** menu. The times apply to **both operation modes**. Make the desired settings.

Automatic operation mode



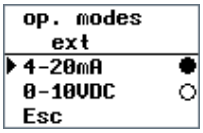
The dosing is done automatically according to the dosing time and pause time parameters (see the following chapters about dosing time and pause time).

External control operation mode

Hinweis

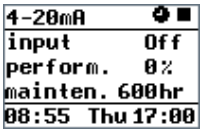
NOTICE!

The External operation mode is only possible for the dosing line 4.8.



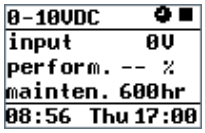
The dosing line can be operated via external control. The dosing pump is controlled by a current signal (4-20mA) or a DC voltage signal (0-10VDC). There is **continuous dosing** without pause times. Select the desired control mode.

External 4-20mA → rotation speed control



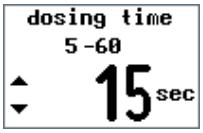
The value for the required current rating is taken from the table in *Chapter 6.5, Calculating the dosing performance / Dosing performance tables.*

External 0-10V DC → rotation speed control



The value for the required voltage is taken from the table in *Chapter 6.5, Calculating the dosing performance / Dosing performance tables.*

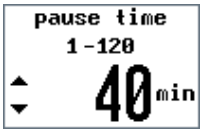
6.6.2 Dosing time menu



Set the duration of the PAK dosing (runtime of the dosing pump).

The value for the dosing time is taken from the **table in *Chapter 6.5*,** *Calculating the dosing performance / Dosing performance tables.*

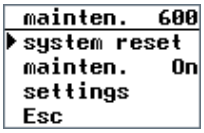
6.6.3 Pause time menu



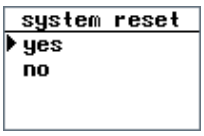
Set the pause time (pause of the dosing pump) between dosings.

The value for the pause time is taken from the **table in *Chapter 6.5*,** *Calculating the dosing performance / Dosing performance tables.*

6.6.4 Maintenance menu



If desired, a maintenance reminder can be activated. The operating hours are counted down from the set number of hours and a maintenance message is shown on the display.



Reset is used to reset the maintenance message.
The maintenance function is activated or deactivated with Maintenance on/off. When the maintenance function is activated, the time interval is shown in the operating menu.



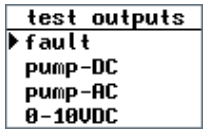
Set the desired maintenance interval.

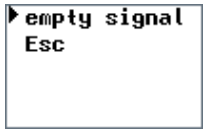
6.6.5 Test outputs menu

Hinweis

NOTICE!

The "Test functions" are used for function control to narrow down possible faults. For test functions, the time is set to 20 seconds and cannot be changed. The test function can be prematurely cancelled with the Enter key.

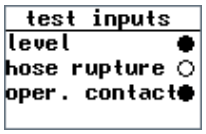




In the Test outputs menu, the electrical outputs can be activated and thereby tested.

- Activating the selected output test with the Enter key.
- The selected electric output is activated for 20 seconds.
- The control can be cancelled by pressing Enter key again.

6.6.6 Test inputs menu

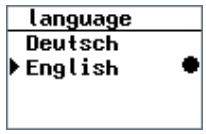


The Test inputs menu shows which electrical input has an active signal.
If a black **dot** is displayed, the electrical signal is active (contact closed).
If a black **circle** is displayed, **no** electrical signal is active (contact open).

Explanation:

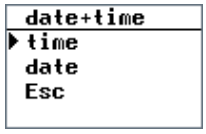
Level: Level in the suspension tank
Hose rupture: If the black **dot** is displayed, the hose in the dosing pump is defective
Operating contact: The operating contact is an external control unit

6.6.7 Language menu



Select the operating language in the display.
E.g., German, English, …

6.6.8 Set date+time menu



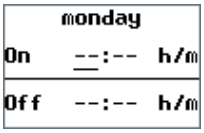
Set time of day
Set date

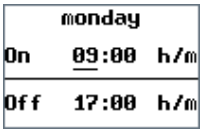
6.6.9 Time switch / Switch times menu





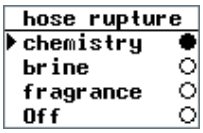
Select the days for the dosing.
Use the ESC key to save the settings and to navigate back to the main menu.



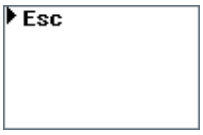


Then set the time for the respective day.

6.6.10 Hose rupture menu



The hose rupture is set ex works to the chemistry value. This value must not be changed.

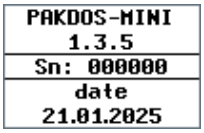


6.6.11 Contrast menu



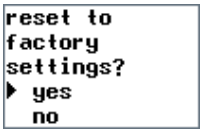
Set the desired contrast at the display.

6.6.12 Info menu



Displays the software version and serial number

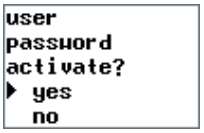
6.6.13 Reset to factory settings menu (password-protected)



The parameters can be reset to the factory settings here. Afterwards, the device behaves as it did when it was switched on for the first time; the **start query** occurs as described in *Chapter 6.4*.
The factory reset is protected with a password. **The password is: 0123**

yes: → A password is requested, after which the device is reset to the factory settings
no: → The menu is exited without any changes to the settings.

6.6.14 Config user password menu (password-protected)





The menus for the user can be protected with a password.
All menus that can be protected with a password are protected together. The menus cannot be protected individually. If the user password is activated, the following menus are password-protected:

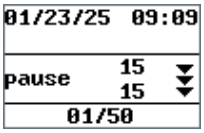
- Dosing time
- Pause time
- Operation mode
- Language
- Date + time
- Switching times
- Contrast
- Reset to factory settings **(always protected)**
- Config **(always protected)**

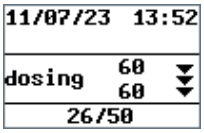
The Config menu is protected with a password. **The password is: 0123**
yes: → **A** password is requested if the above values are changed.
no: → **No** password is requested if the above values are changed.



If an incorrect password was entered, the display is highlighted in red.
After pressing the Enter key, the password can be entered again.

6.6.15 Data log menu





The past 50 actions are stored in the Data log menu.

The other log files are stored on the memory card in the PAKDOS Mini if a memory card is inserted. These log files can be read out on a PC.

6.7 Setting the dosing line's flushing volume

The dosing line is constantly flushed to prevent blockages. To do this, the flow at the flushing water adjustment valve (*pos 12*) is set so that the floating ball in the sight glass floats in the centre (between the markings). This corresponds to a water flow rate of 10-20 l/h.
The flushing water is taken from the clean water line of the respective filter circuit.

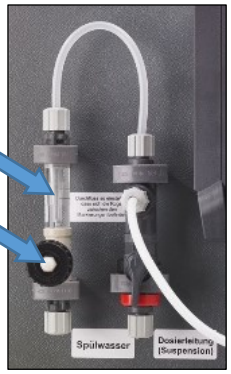


Figure 10, Flushing water adjustment valve

7 Maintenance, care, fault

7.1 Device maintenance

We recommend that you assign a specialist firm to carry out regular maintenance.

In order to ensure the proper function of the device, pay attention to the following points:

1) Regular cleaning of the device.
2) Stocking of the consumables
3) Testing and maintenance in accordance with the maintenance protocol *in Chapter 9.5*.

7.1.1 Opening and closing the control housing



DANGER DUE TO ELECTRICAL VOLTAGE!

This work may only be carried out by qualified electrical technicians! Before any electrical work is carried out, the power supply must be switched off and secured against being reactivated!



ESD SENSITIVE!

The electronic components in the devices are sensitive to electrostatic discharges. The generally accepted safety precautions for ESD-sensitive devices must be observed when handling the devices.

In particular, the following applies for work on electronic components:

- Never plug in or remove connectors unless the power has been deactivated.
- As the person handling the device, please discharge yourself electrostatically for at least 5 seconds prior to directly touching the devices, e.g., by touching a grounded part of the system or by wearing an ESD antistatic wrist strap connected to ground.

Open the housing

1) Unlock the locking knob (A) with a screwdriver.
2) Press down on both recessed grips (B) until the housing snaps open.
3) Rotate cover open.

Close the housing

1) Close cover. The recessed grips (B) must snap shut.
2) Lock the locking knob (A) with a screwdriver.

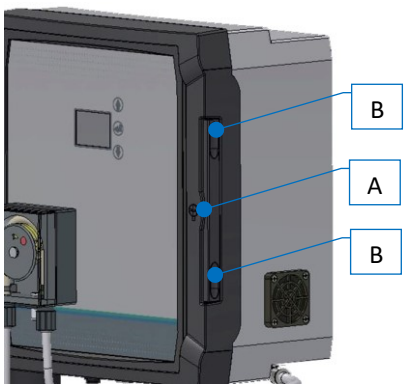


Figure 11, Open the control housing

7.1.2 Checking/replacing the hose kit for dosing line 4.8

The hose in the peristaltic pump is subject to mechanical and chemical stresses. Therefore, the hose must be checked at regular intervals to detect any damage in a timely fashion. Depending on the dosing performance, the dosing hoses of the peristaltic pumps must be replaced every 1-3 months.

Individual components of the peristaltic pump 4.8

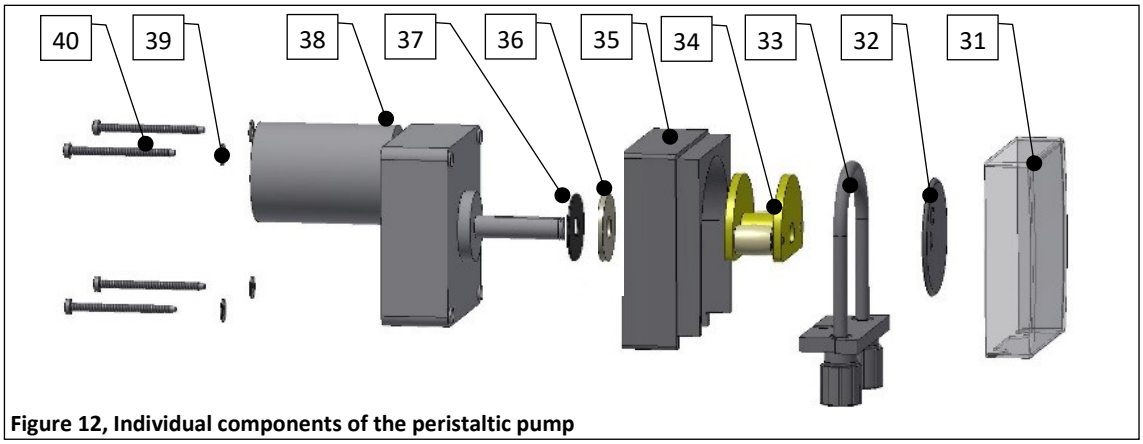


Figure 12, Individual components of the peristaltic pump

Key:

31. Transparent protective cover
32. Safety disc
33. Hose bracket with dosing hose
34. Roller carrier
35. Pump casing
36. Sealing washer felt
37. Sealing washer EPDM
38. Gear motor
39. Flat washer
40. Screw

Replace hose kit and roller carrier

See description in *Chapter 5.2 Commissioning works, "Insert roller carrier at the peristaltic pump"*

Renew hose on hose bracket

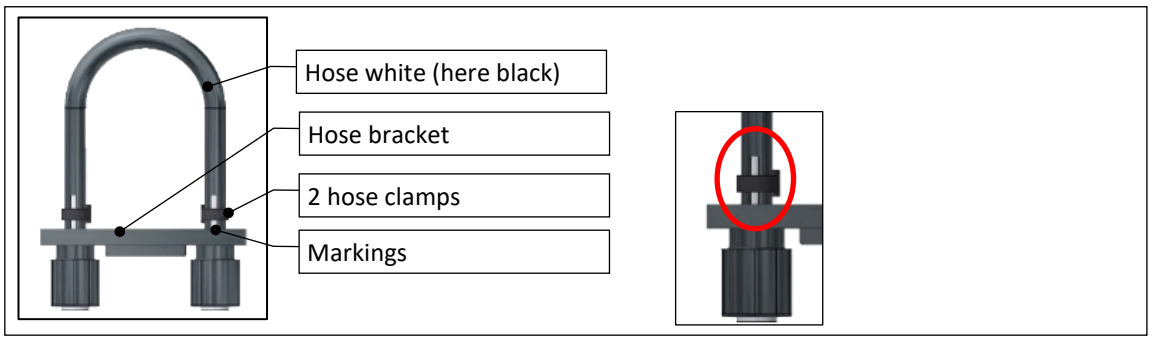


ATTENTION!

The new hose must be of the same colour and size as the disassembled hose. The hose must not be twisted when inserted! The markings must be centred at the front (see picture).

1) Remove hose kit, *see Chapter 5.2*.
2) To replace the dosing hose, **carefully** cut the hose clamps with a sharp knife or pliers! **Never damage the hose nipples!**
3) Push the new dosing hose onto the hose nipples so that the markings on the hose ends are located in the front! This ensures that the hose is not twisted.
4) Attach the hose ends using the hose clamps and cut off the protruding ends of the hose clamps.
5) Install hose kit, *see Chapter 5.2*.

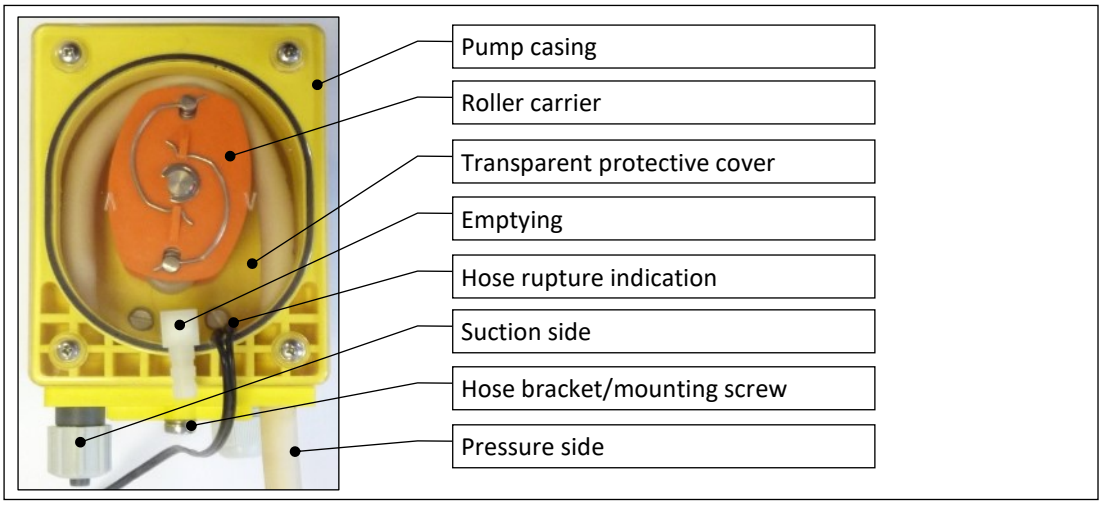
Individual components of the hose kit



7.1.3 Checking/replacing the hose kit for dosing line 10

The hose in the peristaltic pump is subject to mechanical and chemical stresses. Therefore, the hose must be checked at regular intervals to detect any damage in a timely fashion. Depending on the dosing performance, the dosing hoses of the peristaltic pumps must be replaced every 1-3 months.

Individual components of the peristaltic pump 10 l





ATTENTION!

To replace the hose, disconnect the dosing pump from the power supply and secure it against being reactivated; risk of crushing! Close the ball valve in the dosing line.

Replace hose kit and roller carrier

1) Switch off the dosing line and secure it against being reactivated; **risk of crushing!**
2) Close the ball valves
3) Remove the transparent protective cover / 4 screws
4) Turn the roller carrier to the right and pull out the pump hose over the roller carrier towards the front.
5) To replace the dosing hose, pull out the hose bracket downwards by loosening the fastening screw. – Never damage the hose nipples!
6) Push the new dosing hose onto the hose nipples so that the markings on the hose ends are located in the front.
7) Now push the hose bracket into the guide from below and fix it with the screw.
8) Thread the right end of the dosing hose through the orifice for the pressure side.



ATTENTION!

The new hose must be of the same colour and size as the disassembled hose. The hose must not be twisted when inserted! The markings must be centred at the front.

9) Turn the roller carrier to the right and carefully press the dosing hose into the pump casing.
10) Now push the retaining ring onto the shaft and screw on the transparent cover.
11) Open the ball valve and reactivate the dosing pump
12) Switch the dosing line back on.

7.1.4 Opening and closing the housing of the peristaltic pump 10 l

DANGER DUE TO ELECTRICAL VOLTAGE!

This work may only be carried out by qualified electrical technicians! Before any electrical work is carried out, the power supply must be switched off and secured against being reactivated!

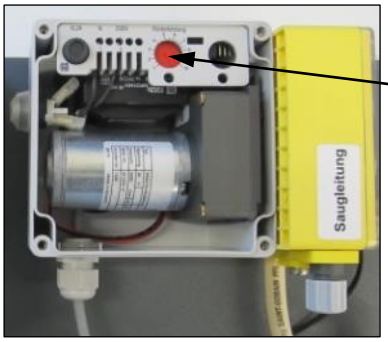
ESD SENSITIVE!

The electronic components in the devices are sensitive to electrostatic discharges. The generally accepted safety precautions for ESD-sensitive devices must be observed when handling the devices.

In particular, the following applies for work on electronic components:

- Never plug in or remove connectors unless the power has been deactivated.
- As the person handling the device, please discharge yourself electrostatically for at least 5 seconds prior to directly touching the devices, e.g., by touching a grounded part of the system or by wearing an ESD antistatic wrist strap connected to ground.

Loosen the 4 screws of the control housing and remove the cover
The control housing contains a rotary potentiometer. The potentiometer can be set from level 1 to 10. The potentiometer is set ex works to level 10. This setting must not be changed; otherwise, the dosing performance will decrease.
Close the control housing again.



Potentiometer for the peristaltic pump's performance from level 1 (10%) to 10 (100%)
The **dosing table on page 27 was calculated using the setting 10** (100%).

Figure 13, Control housing for peristaltic pump 10

Maximum dosing performance of peristaltic pump 10 l

PAK dosing performance in g/h	Level	Dosing performance for 3% suspension in l/h
18	1	0.3
84	2	1.4
150	3	2.5
216	4	3.6
282	5	4.7
348	6	5.8
414	7	6.9,
480	8	8
540	9	9
600	10	10

7.2 Cleaning of the level detection

- The container must be empty
- Close the ball valve, *pos 27*, on the container
- Loosen the connecting hose to the pressure switch at the pressure switch, *pos 06*
- Attach the supplied syringe, reopen the ball valve and blow through the pressure line with the syringe.
- Close the ball valve, connect the pressure hose and open the ball valve again.



ATTENTION!

Neither suspension nor water must be visible in the hose.

7.3 Cleaning the suspension tank

Thoroughly clean the inside of the suspension tank to remove any deposits.

1) Switch off the dosing line
2) Neutralise suspension to pH 7
3) Switch off the stirrer and disconnect it from the power supply / pull the plug
4) Close the inlet valves
5) Open the drain valve, empty the suspension tank
6) Flush and clean the suspension tank
7) Close the drain valves
8) Open the inlet valves
9) Prepare new suspension, *see Chapter 5.5*, *Preparing the* suspension.

7.4 Fault removal



Tip!

It is also possible that switches or sensors are faulty and thus do not transmit any electrical signals.

Fault indications

The following fault indications may be displayed. For the removal of fault indications, see the following fault table.

Fault indications are displayed as an option. Fault indications are highlighted in red.

Fault table

Fault display / Fault / Maintenance	**Possible cause**	**Actions**
Fault: Container empty All dosing pumps are switched off Alarm is activated	a) The suspension tank is empty b) The level sensor at the suspension tank is defective	a) Prepare the suspension b) Renew the level sensor
Fault: Hose rupture (not conducted by the factory) Leakage contact dosing pump is switched off Alarm is activated	a) The dosing pump's hose is defective	a) Check pump / renew hose
Maintenance message: Operating hours	a) The set operating hours have elapsed	a) Carry out maintenance and restart the maintenance cycle
The stirrer stopped moving	a) No power supply b) Main fuse at the stirrer defective (no optical signalling)	a) Check power supply b) Renew fuse

8 Decommissioning – Storage – Disposal

8.1 General

In the event of decommissioning, the device must be emptied completely and protected against frost!

8.2 Disposal of used parts and operating materials



Thoroughly clean any removed, contaminated parts and dispose of or recycle them in accordance with the regulations applicable at the operating location. Pay attention to the relevant instructions on the packaging for the operating materials. In case of doubt, information may be obtained from the authorities responsible for disposal at your location.
If this is not possible, dispose of the parts/substances as hazardous waste.

8.3 Decommissioning the PAKDOS Mini

Decommissioning the suspension unit

1) Switch off the dosing line
2) Neutralise suspension to pH 7
3) Switch off the stirrer and disconnect it from the power supply / pull the plug
4) Open the drain valve and empty the suspension tank
5) Flush and clean the container

Decommissioning the dosing lines 4.8 and 10

1) Flush the pump hoses and the dosing lines with water. Hold the suction line under water and flush it for 10 minutes with the maximum dosing quantity in the circuit.
2) Remove and store the pump hoses.
3) Disconnect the dosing line from the power supply / pull the plug.



ATTENTION!
When recommissioning, observe the instructions in the “Commissioning” chapter.

9 Documents

9.1 Declaration of conformity

WDT Werner Dosiertechnik GmbH & Co. KG
Hettlinger Straße 17 | D-86637 Wertingen
Tel. 0049 8272 98697-0 | Fax 0049 8272 98697-19
info@werner-dosiertechnik.de | www.werner-dosiertechnik.de

Werner Dosiertechnik

EG-Konformitätserklärung
EC declaration of conformity
Déclaration de conformité UE

im Sinne der EG-Maschinenrichtlinie 2006/42/EG, Anhang II 1.A
as defined in the ECMachinery Directive 2006/42 / EC, Annex II, Part 1A
selon la directive européenne machines 2006/42 / CE, annexe II 1.A

Hersteller WDT - Werner Dosiertechnik GmbH & Co. KG
Manufacturer Hettlinger Str. 17
Fabricant 86637 Wertingen-Geratshofen

Beschreibung und Identifikation des Produktes:
Description and identification of the product:
Description et identification du produit :

Typenbezeichnung:	Art:
• PAKDOS Mini-CB36, Dosierlinien und Suspensionsbehälter	Maschine

Funktion: Dosiersystem zur Dosierung staubfreier und angesäuerter Pulveraktivkohle mit Suspensionsbereitung
Function: Dosing system for the dosing of dust free and acidulated powdered activated carbon with suspension preparing
Fonction: Système de dosage pour le dosage de charbon actif en poudre sans poussière et acidifié avec préparation de suspension

Es wird ausdrücklich erklärt, dass das Produkt allen einschlägigen Bestimmungen der folgenden EG-Richtlinien entspricht:
It is expressly stated that the product complies with all relevant provisions of the following EC directives
Il est explicitement dit que le produit est conforme à toutes les dispositions pertinentes des directives CE suivantes :

2006/42/EG RICHTLINIE 2006/42/EG DES EUROPÄISCHEN PARLAMENTS UND DES RATES vom 17. Mai 2006 über Maschinen und zur Änderung der Richtlinie 95/16/EG (Neufassung)

Die folgenden harmonisierten Normen nach Artikel 7 (2) wurden angewandt:
The following harmonized standards as defined in Article 7 (2) were applied:
Les normes harmonisées suivantes selon l'article 7 (2) ont été appliquées :

EN ISO 12100:2010 Sicherheit von Maschinen - Allgemeine Gestaltungsleitsätze - Risikobeurteilung und Risikominderung
EN ISO 13849-1:2015 Sicherheit von Maschinen – Sicherheitsbezogene Teile von Steuerungen – Teil 1: Allgemeine Gestaltungsleitsätze
EN ISO 13849-2:2012 Sicherheit von Maschinen – Sicherheitsbezogene Teile von Steuerungen – Teil 2: Validierung
EN 60204-1:2018 Sicherheit von Maschinen – Elektrische Ausrüstung von Maschinen – Teil 1: Allgemeine Anforderungen

Die in der Gemeinschaft ansässige Person, die für die Zusammenstellung der technischen Unterlagen bevollmächtigt ist:
The designated person who is authorized to draw up the technical documentation:
La personne établie dans la communauté qui est autorisée à constituer le dossier technique:

Name: Werner Dosiertechnik GmbH & Co KG
Straße/Nr.: Hettlinger Straße 17
PLZ Stadt: 86637 Wertingen

WERNER Dosiertechnik GmbH & Co.KG 86637 Wertingen-Geratshofen Tel. 0 82 72 98 86 97-0 · Fax 9 86 97-19

Wertingen, 08.11.2021
Ort/Citiy/Place, Datum/Date

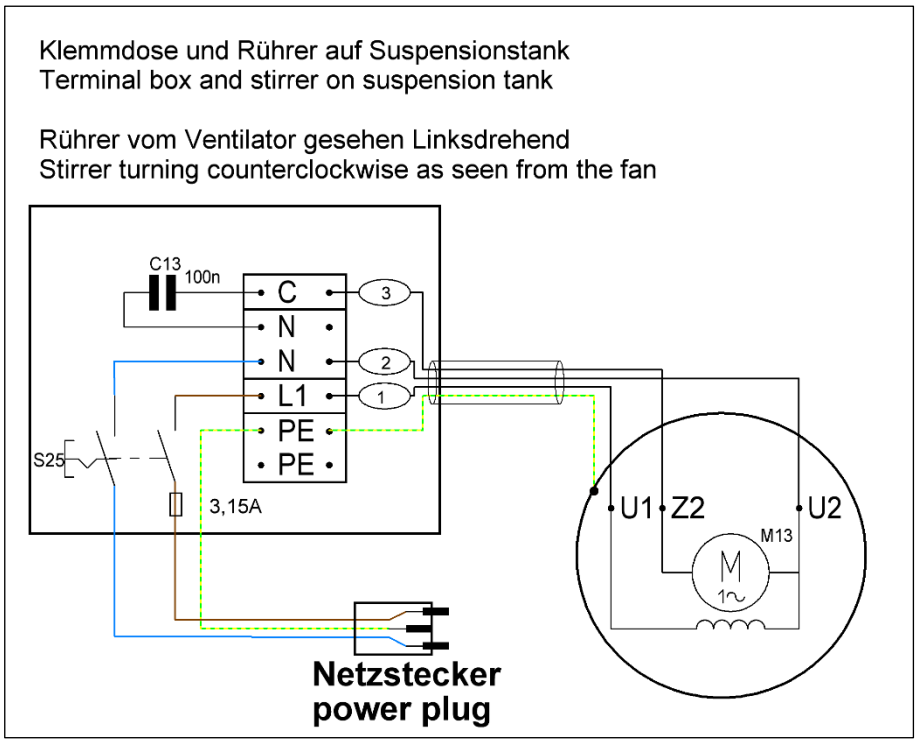
Unterschrift/signature Jochen Rieger, Director

9.2 Wiring diagrams

DANGER!

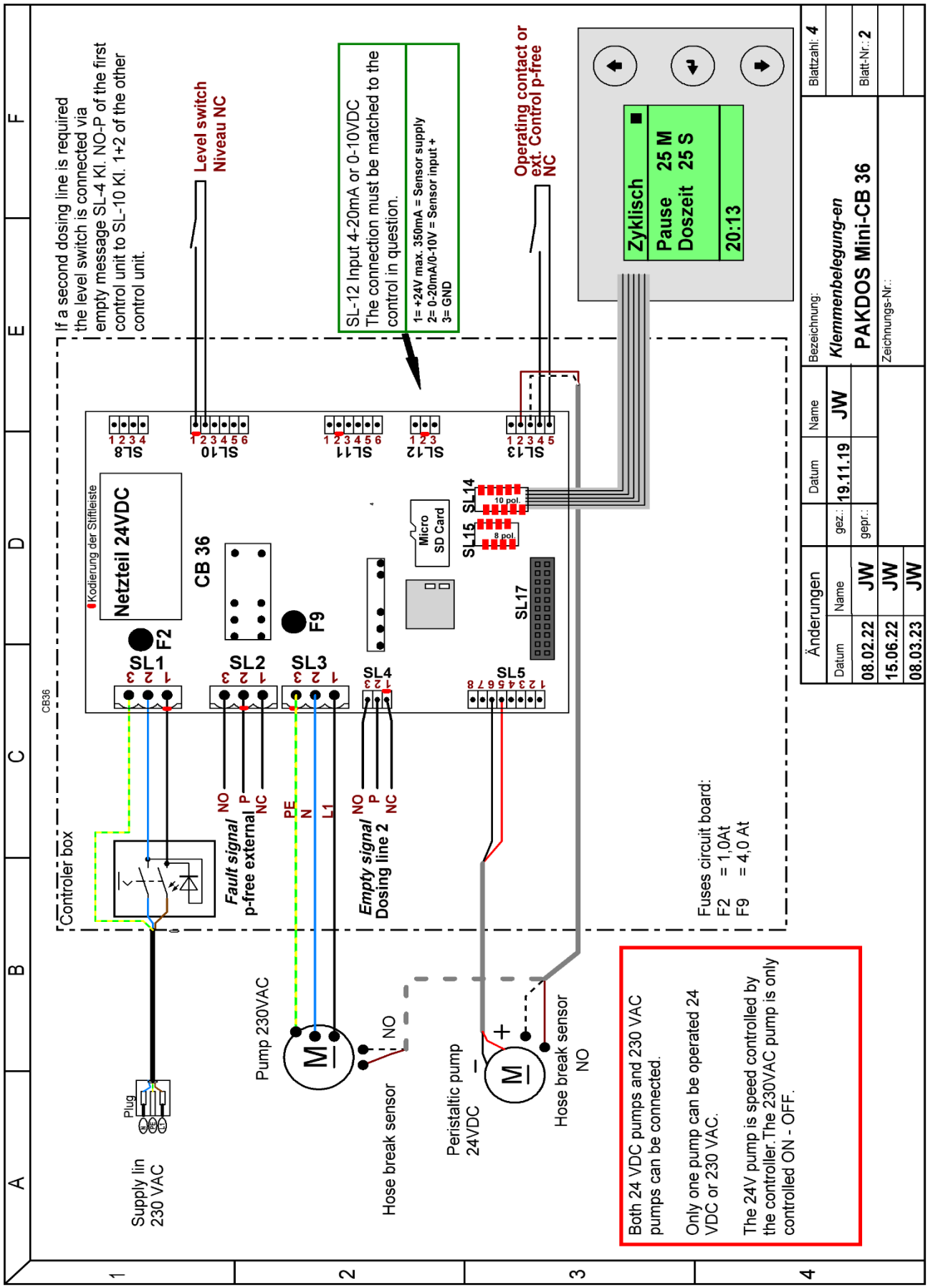
Risk of death due to high voltage. All electrical work on the device must only be carried out by trained specialists in accordance with the applicable safety regulations! Fuses on the control boards must only be renewed once the power has been disconnected and secured against being reactivated!

9.2.1 Wiring diagram for the motor

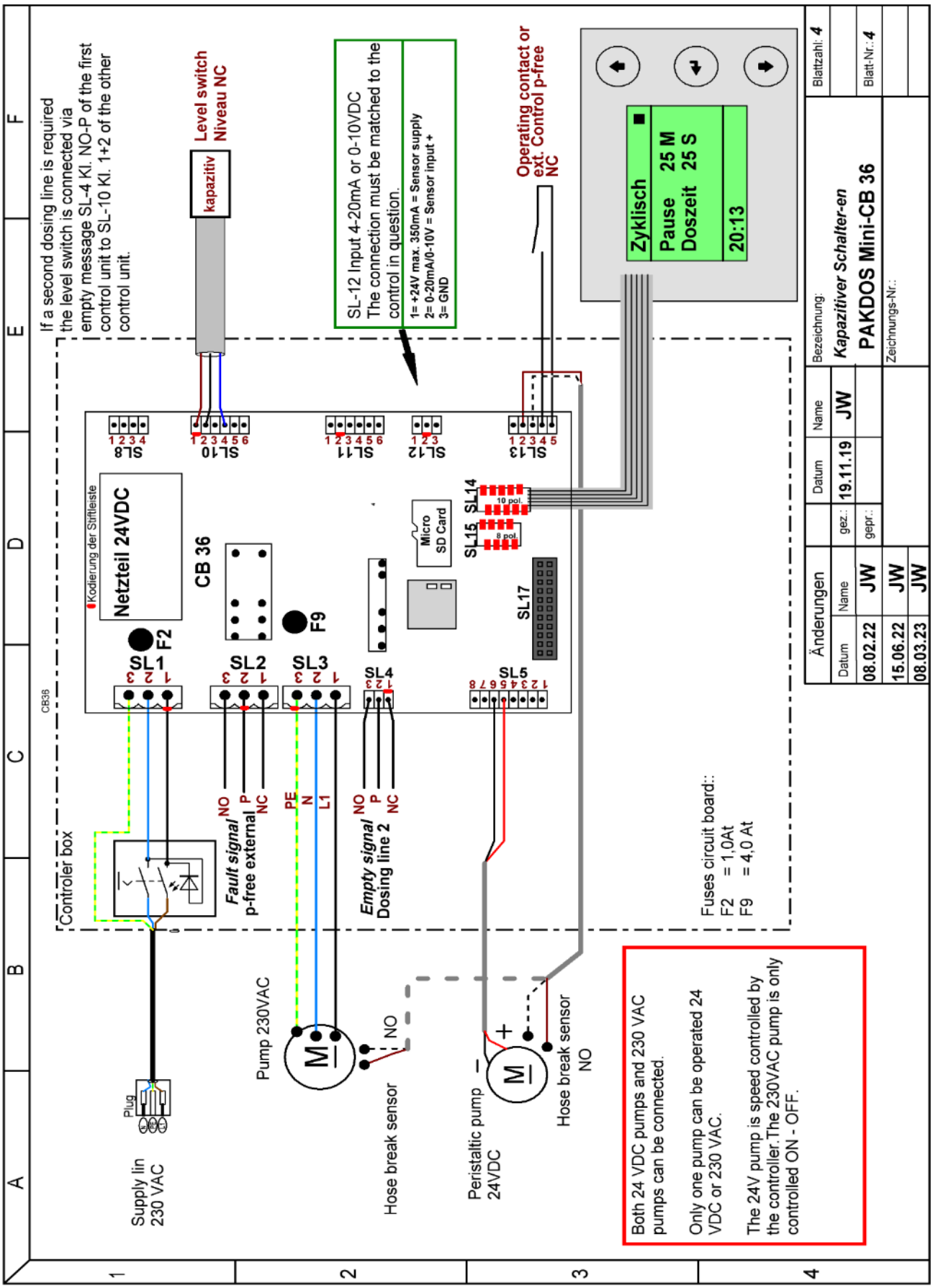


The motor is running counter-clockwise when the stirrer is viewed from above.

9.2.2 Wiring diagram 1



9.2.3 Wiring diagram 2



9.3 Commissioning protocol / Instruction

This protocol is to be completed by the commissioning technician! Without a completed and signed commissioning protocol, all warranty claims become void!

The commissioning protocol is located in the accompanying documentation.

9.4 Operation data sheet



Tip!
During commissioning, enter the operating parameters in the operation data sheet!

Operation data sheet

Parameter	*	Factory set-tings	Setting range	During commission-ing Date:	Optimised during operation Date:
Language	-1-	---	DE, EN, FR		
Time	-2-	---			
Date	-3-	---			
Dosing time	-4-	15	5-60 seconds		
Pause time	-5-	15	1-99 minutes		
Operation mode		Automatic	Automatic External 4-20 mA External 0-10 VDC		
Time switch		Off	On / Off		
Maintenance Maintenance interval		On 88 h	On / Off 0-999 h		
Switching times Monday Tuesday Wednesday Thursday Friday Saturday Sunday		Off -- -- -- -- -- -- --	On / Off 0.00-23.59 0.00-23.59 0.00-23.59 0.00-23.59 0.00-23.59 0.00-23.59 0.00-23.59		
Contrast		8	0-15		
Activate user pass-word		Yes	Yes / No		

* : Sequence when switching on directly according to factory settings

Operation data sheet, --master copy--

Parameter	*	Factory set-tings	Setting range	During commission-ing Date:	Optimised during operation Date:
Language	-1-	---	DE, EN, FR		
Time	-2-	---			
Date	-3-	---			
Dosing time	-4-	15	5-60 seconds		
Pause time	-5-	15	1-99 minutes		
Operation mode		Automatic	Automatic External 4-20 mA External 0-10 VDC		
Time switch		Off	On / Off		
Maintenance Maintenance interval		On 88 h	On / Off 0-999 h		
Switching times Monday Tuesday Wednesday Thursday Friday Saturday Sunday		Off -- -- -- -- -- -- --	On / Off 0.00-23.59 0.00-23.59 0.00-23.59 0.00-23.59 0.00-23.59 0.00-23.59 0.00-23.59		
Contrast		8	0-15		
Activate user pass-word		Yes	Yes / No		

* : Sequence when switching on directly according to factory settings

9.5 Maintenance protocol

Carry out the specified maintenance tasks in order to protect any warranty claims.
The maintenance protocol is located in the accompanying documentation.

9.6 Spare parts list

Spare parts list

Device	Position	Designation	Code no. WDT
Control unit general			
		Fuse bag 2x4 A Tr, miniature fuse 8.3x8	23012
		Fuse bag 2x1 A Tr miniature fuse 8.3x8	24949
		Control board CB36 with plug	29606
		Control board, HMI 1.7“ NT35 104x64	27553
		Battery CB36 with ready-made connection cable	28559
		Ribbon cable 10-pole, L=300 mm connection cable	25320
		Rocker switch 2-pole red illuminated round, IP64	21468
		Cable 60 cm with plug for hose rupture detector	27691
		Pressure switch complete for PAK-MINI	29579
Control unit 10 l/h		Fuse bag 2x200 mA Tr, 5x20 mm, only for 10 l/h	25487
		Control unit complete for PAK-MINI-CB36, only for 10 l/h	28423
Control unit 4.8 l/h		Control unit complete for PAK-MINI-CB36, only for 4.8 l/h	28422
Dosing technology general			
		Dosing valve PM 6x1, with PVC- ball valve 1/2” and removable dosing pipe	12168
		Dosing lance 6x1	12169
		Seal for dosing lance Si 12x3x10	12650
		Dosing line PE 6x1	10435
		Flushing water line PE 4x1	12064
		Ball valve ¼”- 4x1	20132
		Ball valve PVC-1/2” complete for 1SK/2SK	13327
		Suspension removal 4x1 for dosing line 4.8	20525
		Suspension removal 6x1 for dosing line 10	24494
		Filter insert for flushing water unit P-mini	29580
		Flushing water setting complete	13289
		Suspension distributor with ball valve for dosing line 100	24496
		Suspension distributor with ball valve for dosing line 4.8	12895
Peristaltic pump for dosing line 4.8			
		Gear motor Sa with reinforced gearbox	13306-1
		Peristaltic pump Sa PAK-Mini 4.8 l/h grey/anthracite with - Leakage detector, roller carrier, reinforced gearbox	13306
		Pump casing SA	14140
	X	Roller carrier SA	13705
		Hose bracket 4.8x2.4 with hose	16347
		Safety disc Sa	13633
		Gasket kit (felt seal, diaphragm, silicone grease)	20033
	X	Replacement hose kit for pump 4.8x2.4 (2 pc)	20311
Peristaltic pump for dosing line 10			
		Peristaltic pump 10 l/h 230 V/AC for dosing line PAK-Min	27926
	X	Hose kit 6.4x2.4x325 mm	18167
		Hose bracket for hose 6.4x2.4	24497
	X	Roller carrier, for peristaltic pump 10 l/h	14923
		Pump complete SA 20 without control unit	12652
		Pump cover SA 20	14924
		Pump casing SA 20	14922

Replacement parts PAKDOS Mini 100 round container			
		Stirrer with shaft	14454
	X	Stirrer PAK-MINI 100-500 PVC part	23128
		Motor	10973
		Gearbox	10972
		Water inlet	20528
Replacement parts PAKDOS Mini 200 round container			
		Stirrer with shaft	12073
	X	Stirrer PAK-MINI 100-500 PVC part	23128
		Motor	10973
		Gearbox 56U9KB	10972
		Water inlet	20528
Replacement parts PAKDOS Mini 300 round container			
		Stirrer with shaft	16407
	X	Stirrer PAK-MINI 100-500 PVC part	23128
		Motor	10973
		Gearbox	14695
		Water inlet	20528
Replacement parts PAKDOS Mini 500 round container			
		Stirrer with shaft	20135
	X	Stirrer PAK-MINI 100-500 PVC part	23128
		Motor	10973
		Gearbox 5GU5kB	11684
		Water inlet	20528

Wear parts list

All items marked with “X” in the spare parts list are wear parts!

10 Appendices

- Operating instructions for dosing valve 1SK-S
- Commissioning protocol
- Maintenance protocol

Personal notes

Commissioning Protocol IP-076-EN
PAKDOS Mini-CB36

Werner Dosiertechnik

This protocol is to be completed by the commissioning technician! Without a completed and signed commissioning protocol, all warranty claims become void!

Object: _____ Date: __/__/____

City, street, house number: _____

Device type: _____ Year of manufacture: _____ Serial number: _____

	Activity	Completed	Comment
1	**Commissioning**		
1.1	Peristaltic pump roller carrier inserted	☐	
1.2	Device checked for correct installation	☐	
1.3	Power supply for dosing line and stirrer established	☐	
1.4	Suspension prepared and flow volume set	☐	
1.5	Stirrer switched on	☐	
1.6	Dosing line switched on and start query parameters set, if necessary	☐	
1.7	Operation mode and operating parameters set	☐	
1.8	All test programmes checked	☐	
1.9	Device checked for correct operation	☐	
1.10	Device thoroughly cleaned	☐	
2	**Other**		
2.1	Operating instructions reviewed and handed over	☐	
2.2	Service and operating personnel instructed	☐	

Additional remarks:

_____

_____

_____

_____

_____

_____

Commissioning and instruction carried out by: _____

Instructed persons: _____

Signature of commissioner: _____

Countersigned by operator: _____

Maintenance Protocol WP-076-EN
PAKDOS Mini-CB36

Werner Dosiertechnik

This protocol is to be completed by the maintenance technician! We reserve the right to determine the warranty conditions when no completed and signed maintenance protocol is available.

Object: _____ Maintenance year: 20___

City, street, house number: _____

Device type: _____ Year of manufacture: _____ Serial number: _____

	Activity	Maintenance interval in months	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8	Month 9	Month 10	Month 11	Month 12	Comment / additional tasks
1	**PAKDOS Mini-CB36**														
1.1	Check peristaltic pump(s) for function and leaks	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
1.2	Check/change the dosing line's hose kit (only use WDT original replacement part)	1	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	
1.3	Check/clean level detection on the suspension tank	3			☐			☐			☐			☐	
1.4	Check device for leaks	3			☐			☐			☐			☐	
1.5	Run test programmes	3			☐			☐			☐			☐	
1.6	Activate valves, check for function and leaks	3			☐			☐			☐			☐	
1.7	Clean device	6						☐						☐	
1.8	Check and clean dosing position	6						☐						☐	
1.9	Check the stirrer for tight fit	6						☐						☐	
1.10	Clean the suspension tank	12												☐	
1.11	Check electric cabling	12												☐	

Additional remarks:

_____

_____

_____

_____

_____

Maintenance carried out and device checked for function: _____ Date: _____
Signature

Countersigned by operator: _____
Signature