

Operating and Installation Instructions



Dosing system for Powdered Activated Carbon Type PAKDOS 60-Touch



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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

This instruction describes the function, installation, commissioning and operation of the **PAKDOS 60-Touch** dosing device along with the corresponding accessories.

The Operating Instructions must be read carefully before use and kept on the device for direct use!



NOTICE!

These instructions do not contain a description of the following optional components of the dosing system:

- Fresh water design with solenoid valve
- Acid dosing
- Buffer tank

The corresponding instructions are available separately. If you have any questions, please contact your sales partner.

1.2 Target group

Only our authorised partners and people who have been trained in the device functions are permitted to work on the system.

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 **injuries**, **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 dust protection!



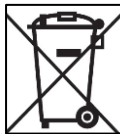
Mandatory sign
Use protective gloves!
In accordance with DIN EN 374, protective gloves against chemicals and microorganisms.



Mandatory sign
Use protective apron!



Mandatory sign
Use protective boots!



Disposal of waste electrical equipment

This symbol indicates that this product must not be disposed of with other household waste in accordance with the Electrical and Electronic Equipment Act - ElektroG (v. 20/10/2015) and national laws. This product must be returned to a designated collection point. This can be done, for example, by dropping it off at an authorised collection point for the recycling of waste electrical and electronic equipment, or, for devices in Germany, also by returning it to the manufacturer, WDT GmbH & Co KG.

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 with a completed and signed commissioning protocol.

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.



Tip!

In order to protect the warranty claims, please mail the completed commissioning protocol, along with the defective component, to the company WDT. Without the commissioning protocol, we reserve the right to an exclusion of warranty.



CAUTION!

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

1.5 Additional information

Additional information concerning specific topics, such as designing of the dosing performance or description of the operating parameters, may be obtained 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

The PAKDOS 60 TOUCH series' control unit is subject to continued further development of both its firmware and hardware. We always strive to preserve the compatibility of the components used.

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

- **Device designation, device serial number and year of manufacture**

In addition, we require the following data for technical support queries. These are located in the menu item **Menu → Service → Info**.

- **current DSP version, current I/O version and current http version**

2 Safety

2.1 Intended use

The **PAKDOS 60-Touch dosing device** may only be used for the purpose listed in the product description 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 trained and instructed persons!

Pay attention to the warning notices on the device



Caution!

It is not permitted to make any modifications to the device!



IT safety

The PAKDOS-Touch control unit enables remote display by means of network-enabled devices. The operator is responsible for ensuring that only authorised persons can access the device. The operator, or his authorised representative, is further responsible for the safety of all Internet and/or WLAN connections.

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

2.2.2 Protective measures and rules of conduct



SAFETY EQUIPMENT!

The PAKDOS dosing system is used for the dosing of powdered activated carbon (colloquially: PAC) from a drum.



It is essential to exercise due diligence during all work with the powdered activated carbon and to wear the personal protective equipment (dusk mask and protective gloves)!

It is recommended to wear a protective apron and protective boots.

Store chemicals in such a way that they are not accessible to unauthorised persons. When storing chemicals, pay attention to the chemical manufacturer's safety data sheets.

For more information, see the chemical manufacturer's safety data sheets!



CAUTION!

If water from the drinking water network is used to supply the PAKDOS dosing device, for the protection of the water network a system separation must be installed according to the locally applicable legal provisions (for Germany and the EU: DIN EN 1717: 2011-08). This prevents a backflow of the water contaminated with chemicals in the event of a sudden pressure drop in the network!



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 “PAKDOS 60-Touch” dosing system comprises the following components:

- Standing column with a rotatable drum holder
- Powdered activated carbon dosing
- Suspension unit with injector and booster pump or solenoid valve, respectively **(option)**
- Control unit with 7” touch colour display
- USB data interface for data export
- Water connection valves
- Spare parts bag
- Remote display and remote access via browser-enabled terminal device, e.g., smartphone, tablet **(option)**
- Pneumatic valves **(option)**

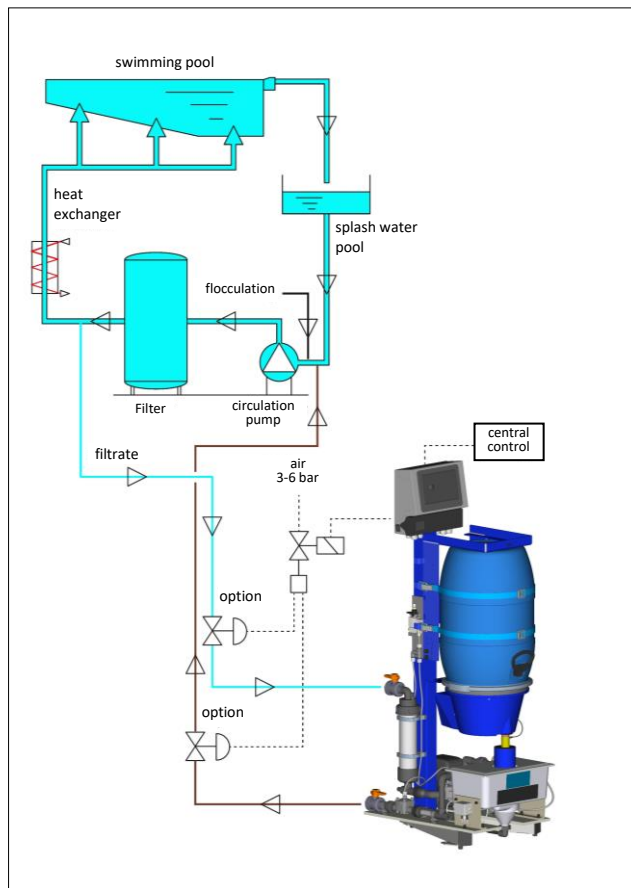
On-site services

- Voltage supply
- Piping of the water supply and the suspension discharge
- Piping of the overflow to the gully
- Compressed air connection, if necessary

3.2 Product description

The PAKDOS dosing system is used for the reduction of unwanted chlorine compounds (chloramines, chlorinated hydrocarbons) and organics in swimming pool water by means of powdered activated carbon.

3.2.1 Functioning of the PAKDOS system



The PAKDOS 60-Touch dosing system is used to dose powdered activated carbon from the drum and suspend it. The suspension is added to the water flow upstream of the filter to achieve the prescribed water quality. This is particularly recommended for precoat filters and ultrafiltration.

The dosing screw conveys the powdered activated carbon into a suspension unit, where the powdered activated carbon is suspended with **swimming pool or fresh water** and suctioned off by means of an injector. A knocker aids the continued flow of the powdered activated carbon from the dosing hopper into the dosing screw.

In exceptional cases, the device is operated with **fresh water**. **Fresh water denotes water from the drinking water network**. Exceptional cases are given when brine water, thermal water or well water is used for the swimming pool water, for example.



NOTICE!

The descriptions and instructions for operating the system with fresh water can be found in the corresponding instructions. If you have any questions, please contact your sales partner.

The concentration of the suspension and thus the dosing performance for the powdered activated carbon is also determined by the dosing motor control. The level switches in the flushing tub control the suspension water or, in the event of a fault, the carbon dosing is stopped.

All functions are monitored by sensors. In case of a malfunction, the fault is displayed at the control unit. The powdered activated carbon dosing technology is switched off and the collective fault is reported to the CCT (option).

A requirement for the successful use of powdered activated carbon to improve water quality is a well-functioning filter system.

The advantages of the PAKDOS dosing system

- Dosing of the powdered activated carbon directly from the delivery container - no decanting, no dust
- Conveying of the activated carbon suspension with an injector - no contaminated valves
- no wear and tear, safe dosing and conveying
- control and monitoring of the dosing by means of a microprocessor
- potential faults are displayed on the touch graphic display
- ease of use

There are 4 designs for the PAKDOS system

1. **Standard design** (with booster pump)
2. **Standard design with switch-off** (with booster pump and 2 diaphragm valves)
3. **Fresh water design** (with solenoid valve and pressure reducer)
4. **Fresh water design with switch-off** (with solenoid valve, pressure reducer and 1 diaphragm valve in the drain)



NOTICE!

The descriptions of the **fresh water design** are not part of these instructions. If you have any questions, please contact your sales partner.

3.2.2 PAKDOS with drum holder (standard)

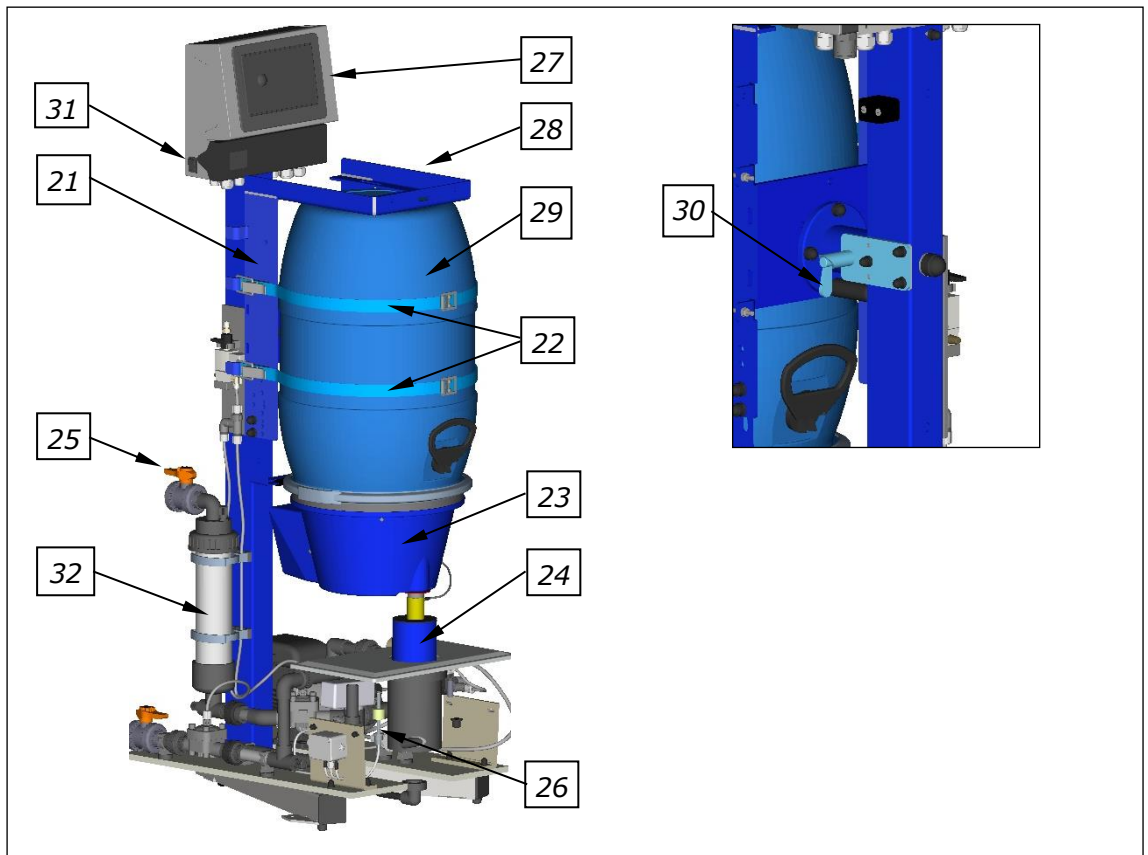


Figure 2, Overview PAKDOS

The PAKDOS consists of:

- | | |
|---|---|
| 21. Drum holder | 27. Control unit |
| 22. Tension bands | 28. Identification plate (covered, on the upright pipe) |
| 23. Dosing head | 29. Carbon drum |
| 24. Dust protection pipe in the lid of the flushing tub | 30. Spring bolt for the turning device |
| 25. Shut-off valve inlet | 31. Main switch (lateral) |
| 26. Suspension unit | 32. Dirt filter inlet d75 mm |

Operating principle of the PAKDOS dosing system with booster pump

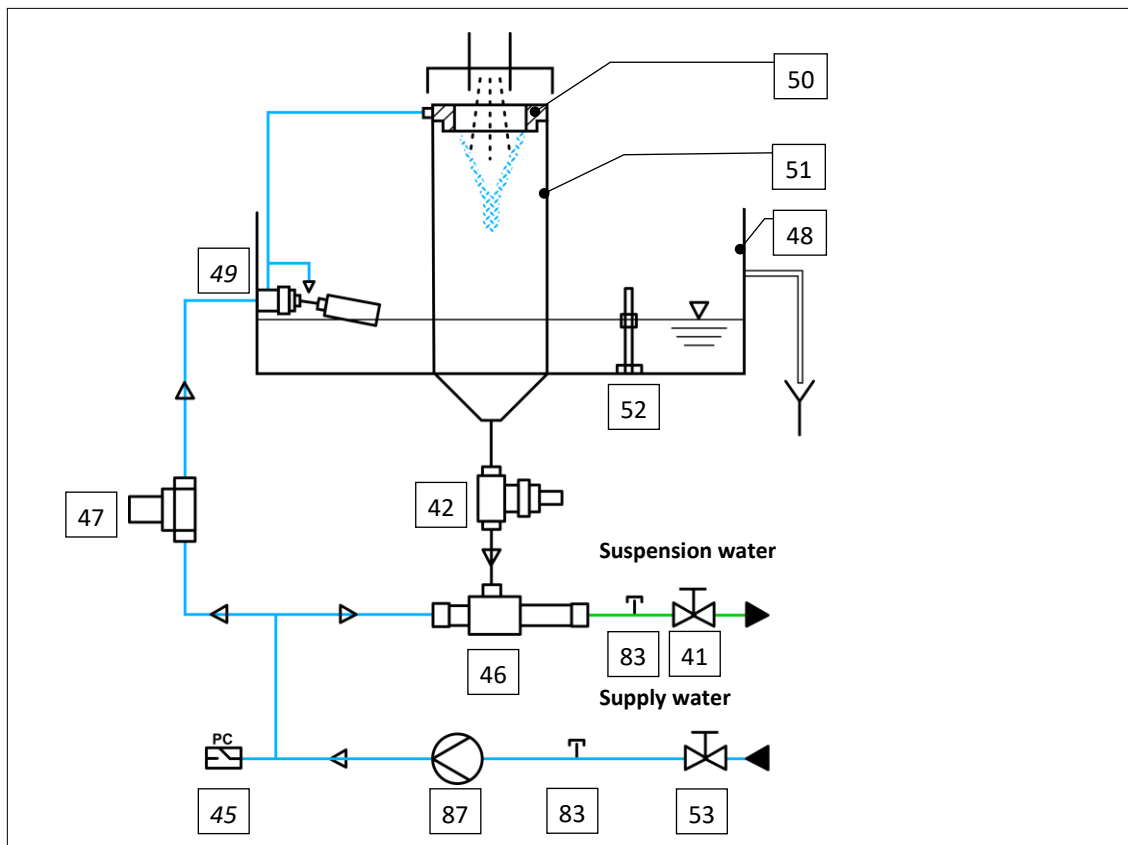


Figure 4, operating principle PAKDOS

The dosing system consists of:

- | | |
|---|-------------------------------------|
| 41. Shut-off valve for suspension water | 50. Flushing ring |
| 42. Flow switch with suction pipe | 51. Suspensor |
| 45. Pressure switch | 52. Level switch for flushing tub |
| 46. Injector | 53. Shut-off valve for supply water |
| 47. Fine filter | 83. Manometer connection 6x1 |
| 48. Flushing tub (lid not shown) | 87. Booster pump |
| 49. Float control valve | |

There are 4 designs for the PAKDOS system

1. **Standard design** (with booster pump)
2. **Standard design with switch-off** (with booster pump and 2 diaphragm valves)
3. **Fresh water design** (with solenoid valve)
4. **Fresh water design with switch-off** (with solenoid valve and 1 diaphragm valve)



NOTICE!

The descriptions of the fresh water version are not part of these instructions. If you have any questions, please contact your sales partner.

3.2.3 Dosing appliance for powdered activated carbon

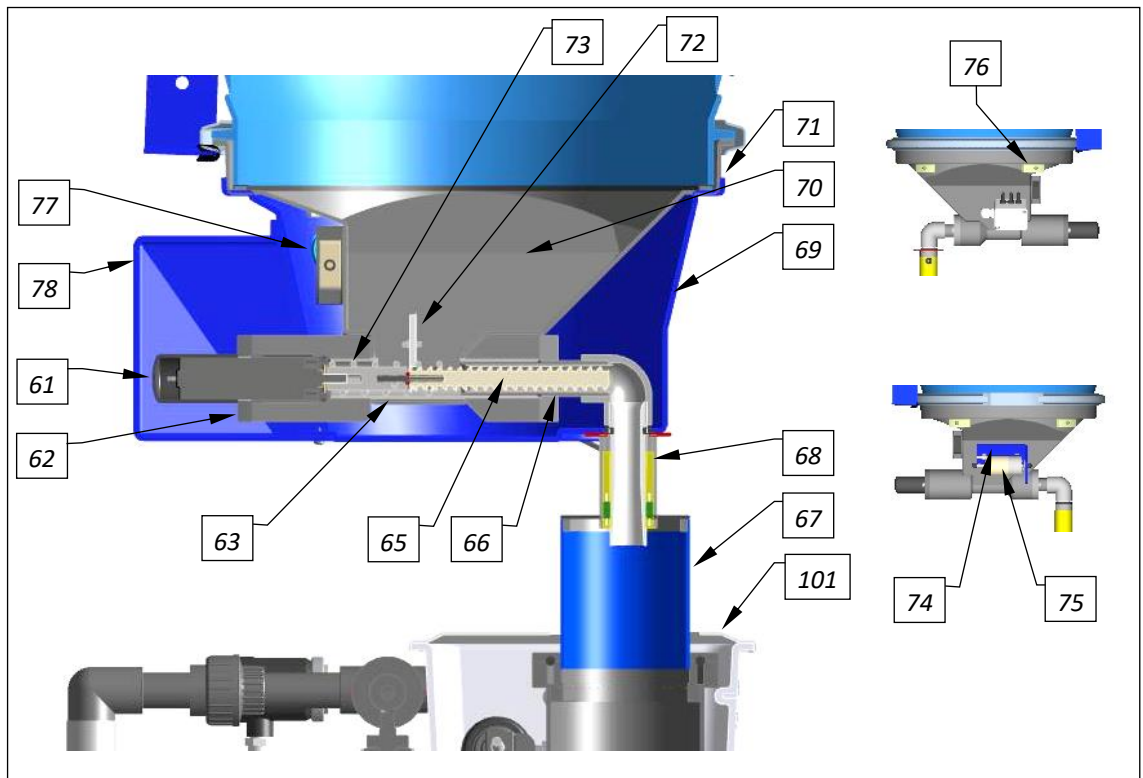


Figure 5, Dosing appliance

The dosing appliance consists of:

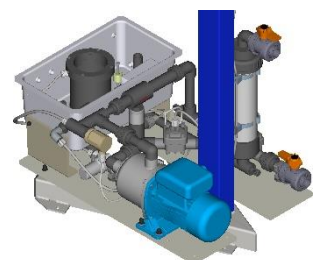
- | | |
|---|---------------------------------------|
| 61. Dosing motor with flange | 70. Dosing hopper |
| 62. Motor bracket | 71. Seal |
| 63. Motion screw | 72. Wear plate for PAC |
| 64. Plug for dosing pipe heating
(not shown) | 73. Motion spring for wear plate |
| 65. Dosing screw | 74. Mounting plate for VA knocker PAC |
| 66. Screw guide pipe | 75. PAKDOS solenoid knocker |
| 67. Sealing pipe for suspensor | 76. Empty indicator |
| 68. Dosing pipe, heated | 77. Connection socket low voltage |
| 69. Dosing hopper cover | 78. Motor cover for PAC motor |
| | 101. Lid (blue) for flushing tub |

The dosing appliance is mounted on the drum with the drum lid's clamping ring. A capacitive switch (76) acts as an empty indicator.

The powdered activated carbon is activated by a solenoid knocker (75) mounted on the outside of the dosing hopper and the wear plate (72) in such a way that even poorly flowing PAC qualities are dosed. The dosing pipe (68) is heated to prevent condensation moisture. The sealing pipe (67) seals the dosing appliance against the suspension unit. The entire dosing is thus largely dust-free.

The dosing performance is adjusted to the demand via the dosing motor's control:

Within a cycle time, the dosing screw (65) conveys at its full capacity (1200 g/h, optionally 5000 g/h) in the set dosing time. The dosing performance strongly depends on the type and quality of the powdered activated carbon. The setting of the dosing performance depends only on the cleaning result of the PAC dosing.



3.2.4 Suspension unit with booster pump (standard design)

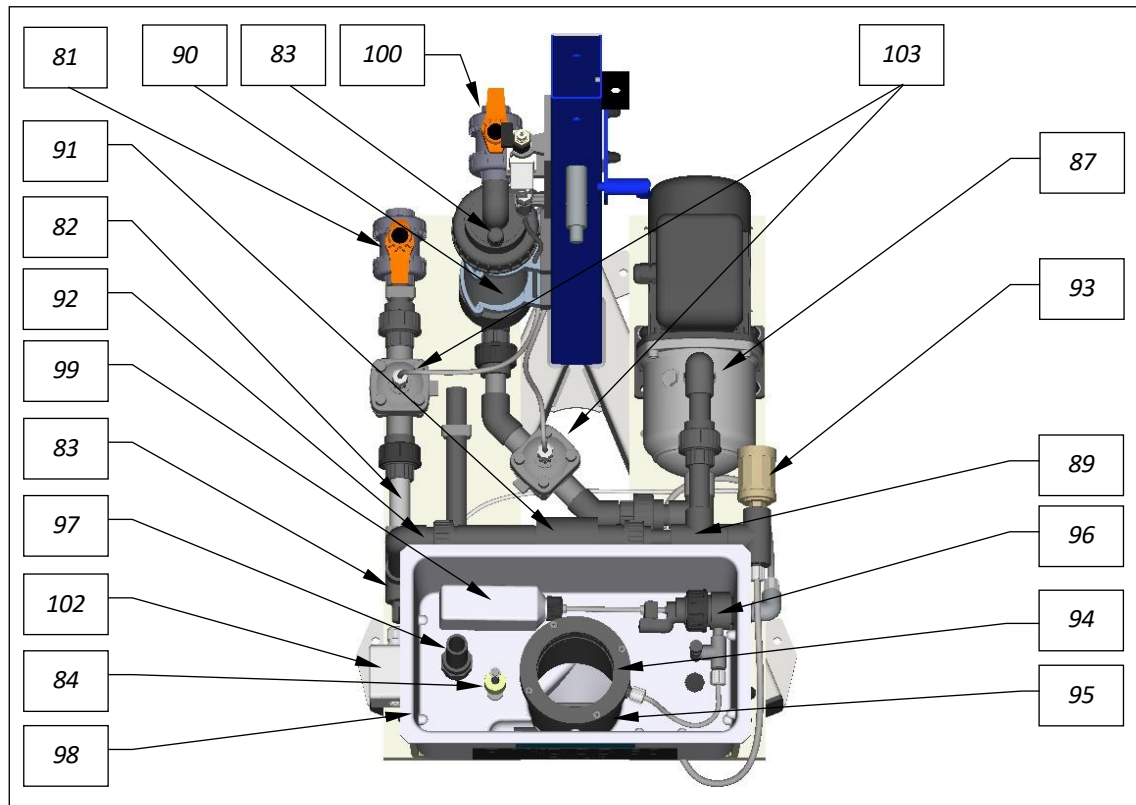


Figure 6, Suspension unit-standard

The suspension unit consists of:

- | | |
|---|--|
| 81. Shut-off valve outflow suspension | 93. Pressure switch |
| 82. Sighting pipe with opto-sensor (option) | 94. Flushing ring (top, one unit with suspensor) |
| 83. Manometer connection 6x1 | 95. Suspensor (bottom, one unit with flushing ring) |
| 84. Level switch min. / max. Flushing tub | 96. Float control valve in the flushing tub inlet |
| 85. — | 97. Overflow |
| 86. Flow switch with suction pipe (not shown) | 98. Flushing tub |
| 87. Booster pump | 99. Float control valve float |
| 88. — | 100. Water inlet via shut-off valve and dirt filter |
| 89. Pressurised water distribution | 101. Lid (blue) for flushing tub with dust protection pipe (not shown, see Figure 5) |
| 90. Fine filter 300µm for flushing water | 102. Connection socket (shown in closed state) |
| 91. Injector | 103. Valves for automatic shut-off (option) |
| 92. Hole washer (in pipe union) | |

For the function of the PAKDOS 60-Touch it is essential to observe the pressure conditions. The limits are described in *Chapter 4.4.1, Pressure conditions*.

In the standard design, the water coming from the circulation circuit (inlet pressure min. 0.2 bar) is divided downstream of the booster pump (87) in the pressurised water distribution (89) into flushing water for the powdered activated carbon and booster water for the injector. The flushing water is fed via a fine filter 300µm (90) to the float control valve (96). The flushing water flow is introduced tangentially into the suspensor via a pipe, which generates a rotation of the flushing water in the suspensor. In the lower part of the suspensor, coarser particles are sifted out of the powdered activated carbon that could otherwise lead to a fault in the injector.

The “thin” suspension produced in this way is suctioned out of the suspensor by the injector (91). The powdered activated carbon becomes visible in the sighting pipe (82) a short time after dosing and can be detected by the opto-sensor (option). The injector’s suction performance is adjusted to the pressure conditions during

commissioning with the use of a hole washer (92) downstream of the injector. Changes in the operating conditions are detected by the pressure switch (93) and level switch (84) sensors in the flushing tub and the flow switch (86) in the transparent suction pipe under the injector. Both the dosing and/or the booster pump are switched off if proper operation is not guaranteed.

Faults are displayed on the control unit. The switch body of the flow switch, which is designed as a non-return valve, and the floating valve prevent a strong backflow of water into the suspension unit. This is achieved by a corresponding overflow nozzle (97) in the flushing tub in case of malfunctions or by switching off. The overflow line conducts the overflow water to the gully.

3.2.5 Control unit

Control unit (PAKDOS Touch)

The control unit is contained in a dust- and splash-proof housing. The device is operated via a 7" colour touch graphic display. This allows simple and clear operator guidance by means of a graphic display of the operating states. Fault messages and alarms are displayed in plain text or with self-explanatory icons. If a fault occurs, the dosing is automatically switched off. A consumption counter and an event memory (data logging) are integrated.

The operating states and faults are displayed directly via the function display as an active flow diagram. For a detailed description, see Chapter 6. Operation.

The start display:

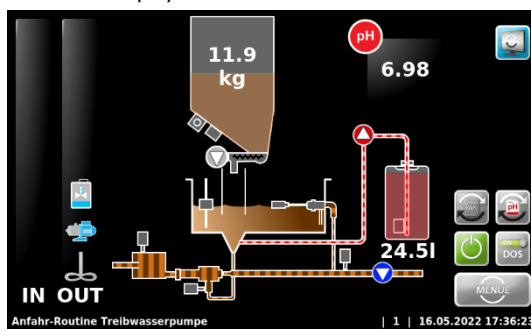


Figure 7, Start display

3.2.6 Automatic shut-off of the flushing tub (option)

When switching off the PAKDOS (e.g., due to automatic backwashing of the swimming pool filter or when switching off overnight), the flushing tub may overflow. To prevent this, there is an optional automatic shut-off device that safely shuts off the inlet and outlet into the flushing tub. The pneumatic shut-off valves can be used at all pressures possible in the swimming pool. A control valve for the shut-off valves is mounted on the rear of the PAKDOS. The control valve can become hot during operation, which is why it is connected with PTFE hoses.

When the PAKDOS is switched off, the pump continues to run for the set time to flush out the dosing lines. The shut-off valves then close automatically.

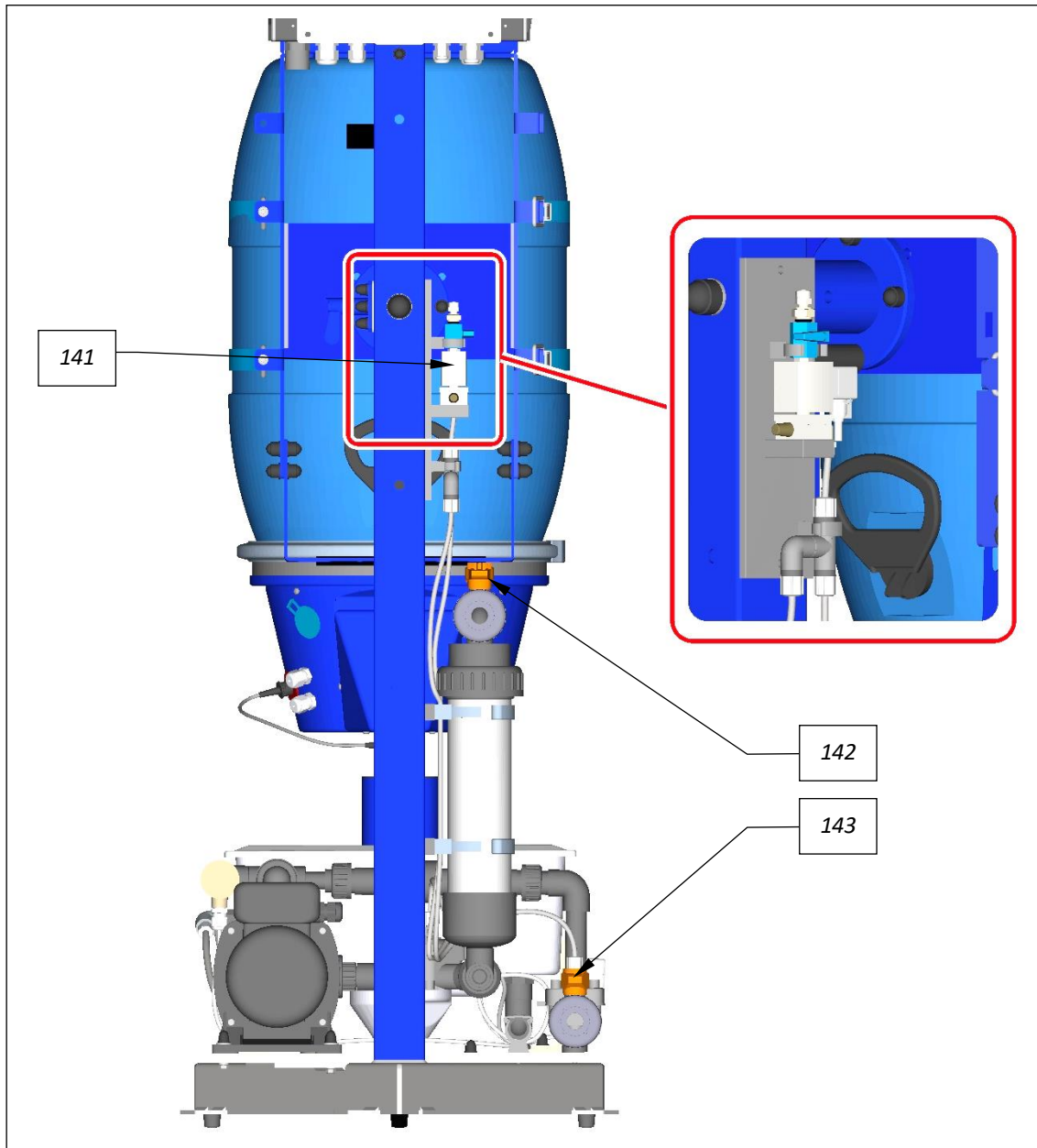


Figure 8, Suspension unit-standard + switch-off

The automatic shut-off consists of:

141. Control valve for automatic shut-off with PTFE hoses

142. Shut-off valve for inlet

143. Shut-off valve for outlet

Automatic shut-off for standard design (booster pump):

The control valve (Pos 141) that controls the shut-off valves is mounted on the rear of the PAKDOS. This takes place in parallel with the control of the booster pump. When the output signal is switched off, the de-energised open control valve opens and the shut-off valves (Pos 142 + 143) in the inlet and outlet close.

3.2.7 Identification of the device/ Identification plate

Copy the data from your device's identification plate here!

1. Enter the device version
2. Enter code number
3. Enter serial number
4. Enter date of manufacturing

Typ: PAKDOS-60/ [] -Touch-TWP
Art.: [] Serien Nr.: []
230V - 1~ 50Hz - P1: 0,48 kW
Dosierleistung PAK [] kg/h

CE **Herstellung: []**
EAC **WDT - Werner Dosiertechnik GmbH & Co KG**
Hettlinger Str. 17
D-86637-Wertingen

Figure 9, Identification plate

3.3 Technical data

	PAKDOS 60-Touch
Dimensions and weights:	
Dimensions	W 60 cm x D 70 cm x H 150 cm
Device space requirement (base)	W 130 cm, D 90 cm
Space requirement, including operation and maintenance	W 130 cm, D 170 cm
Empty weight / operating weight	approx. 50 kg / 100 kg
Connection data	
Electrical connection data	230 V/AC 50 Hz (with locked filter system) 400 / 600 W, I max. 3.15A, safety plug
Fuse front panel	Fine wire fuse 6.3A slow
Hydraulic connection data	Inlet DN20, adhesive sleeve Outflow DN20, adhesive sleeve
Required duct connection	At least DN25
Protection class	IP54
Nominal pressure / operating pressure	PN 4 / 0.2-0.6 barg
Inlet pressure intake	2.5 - 4 barg (without booster pump) 0.2 - 0.6 barg
Permissible counter-pressure outflow	approx. 2 bar (depending on inlet pressure)
Suspension water supply	From the swimming pool water cycle with booster pump (b-pump): 0.3 kW, 230 VAC at least 0.2 barg
Operating data:	
Dosing performance	adjustable 20-1200 g/h (depending on the PAC quality)
Water flow	approx. 1000 l/h
Medium temperature	5°C to 35°C
Ambient temperature	5°C to 50°C
Humidity technical room	max. 70%
Room ventilation (in and out)	required
Dosing motor	Rotation speed 80 rpm
Material	Standing column: Steel, galvanised and painted Other functioning parts: PVC, PE Seals: EPDM, Viton
Filling volume drum	15- 25 kg (depending on the PAC quality)
Sound emissions	less than 70 dB

3.3.1 Requirement for the powdered activated carbon

Requirements for the powdered activated carbon quality

Powdered activated carbon qualities offered on the market vary greatly, both in terms of selectivity, i.e., their effectiveness in water purification, and in the quality of the granulation (this means the fineness and uniformity of the granulation). The dosing performance can therefore vary with the same dosing setting. It may therefore be necessary to readjust the dosing performance slightly when changing the PAC quality. An excessive amount of fine dust and excessive humidity can lead to caking (bridging) in the carbon, and coarse grains and foreign objects can lead to blockage of the dosing screw or clogging of the suspension unit.

The following specifications should be met by the PAC qualities used to ensure effective and fault-free operation:

- BET surface: 800 - 1000 m²/g
- Water content: less than 4%
- Grain size: 100% smaller than 100 µm; max. 10% smaller than 10 µm
- no oversized grain, no foreign objects in the powdered activated carbon (sifted quality!)



ATTENTION!

Different PAC qualities require different dosing screws. If necessary, please consult the company regarding the PAC quality used.

3.4 Transport/storage

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



ATTENTION!

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 manufacturer's safety data sheets, along with the locally applicable accident prevention regulations.

4 Installation

4.1 Select the installation site

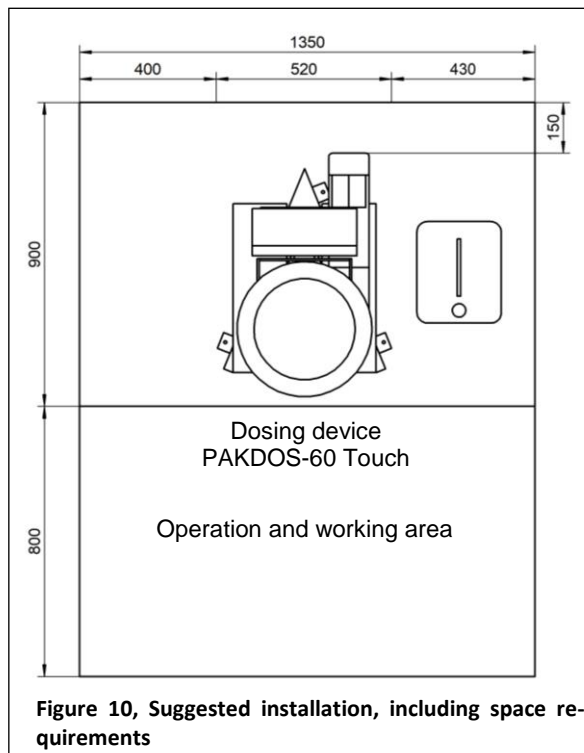
The installation site must have the following properties:

- A freely accessible place of installation should be selected to facilitate operations and subsequent maintenance tasks.
- Comply with the dimensions for the floor drain and the temperature specifications for the ambient air and medium in accordance with *Chapter 3.3 Technical data*. No flammable vapours, dust or gases may be present in the immediate vicinity of the device.
- 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.
- An electricity power connection, a water connection and a duct connection must be available.
- The operating room must not be used as a recreational space. (max. 2 hours per day), also consult the locally applicable accident prevention regulations.
- It must be possible to vent and aerate technical areas so that hazardous substances will not occur in health-hazardous concentrations.
- It must comply with the accident prevention regulations and should not be accessible to unauthorised persons.

4.2 Installation instructions / installation suggestion

- a) Remove transport safety devices
- b) Attach warning and notice signs in accordance with the locally applicable accident prevention regulations (Germany: BGR-GUV-R 108) at the designated positions.

Suggested installation for PAKDOS:



4.3 Mechanical installation

The dosing device is delivered completely pre-assembled, including the control unit and the dirt filter.

4.3.1 Installation of the PAKDOS 60-Touch dosing device

Place and align the PAKDOS 60 dosing device on a suitable, level foundation in the technical room.

Ensure that there is sufficient clearance for operating and servicing the device.



ATTENTION!

Once the installation has been completed, attach the PAKDOS 60 to the floor, using the enclosed screws!

Installation materials

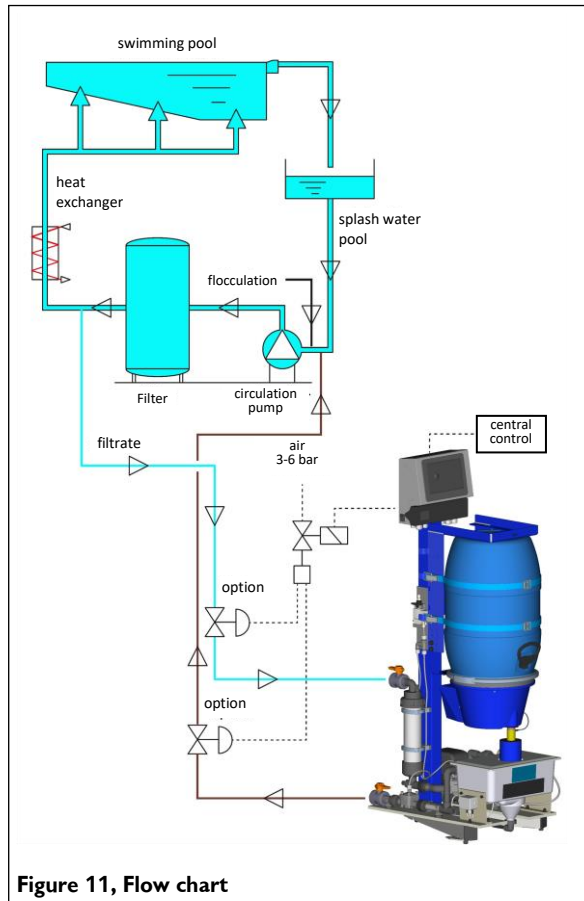
Accessories kit

- Manometer and 2 washers

4.4 Hydraulic installation

4.4.1 Connecting the PAKDOS dosing device

Integration into the water circulation with swimming pool water (standard design):



As a rule, the PAKDOS is supplied with **swimming pool water** downstream of the swimming pool filter (also called pure water or filtrate).

Pressure conditions

When installing the PAKDOS, particular attention must be paid to the pressure conditions. Certain pressure conditions are required for the PAKDOS to function properly. Accordingly, 2 booster pumps are used.

For lower pressures, e.g., when dosing upstream of the filter pump (recommended), the following pressure ratios are covered with the booster pump type 1:

With an inlet pressure of:	1.2 bar	possible counter-pressure:	1.4 bar
	0.6 bar		1.1 bar
	0.3 bar		0.9 bar

For higher counter-pressures, the following pressure ratios are covered with the booster pump type 2:

With an inlet pressure of:	1.2 bar	possible counter-pressure:	2.0 bar
	0.6 bar		1.8 bar
	0.3 bar		1.5 bar

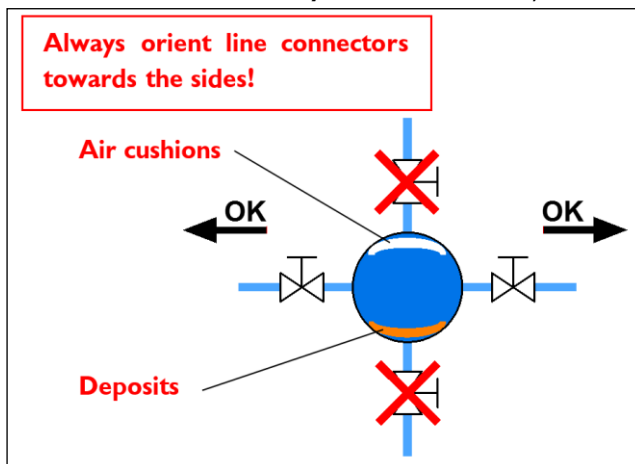
To measure the effective pressures, 6x1 mm hose connections are fitted upstream and downstream of the booster pump, to which the enclosed pressure gauge can be connected. More powerful pumps are available for higher counter-pressures.

Water removal point, general information regarding the water supply

- Ensure that the connection sleeves for the water removal and the dosing point are completely permeable (metal sleeves may potentially be rusted shut).
- The pipes should be kept as short as possible.
- The piping of the supply line in PVC must be executed in the dimension d25-3/4".
- Increase the nominal width for lines longer than 20 m or in case of poor pressure conditions.
- Connect the intake nozzle of the PAKDOS to the water removal point. Avoid a rising and falling of the intake line in the piping. This can lead to the formation of air cushions that may subsequently enter the pump during operation and cause faults.

Line connection design

Line connections should **always** be installed laterally.



4.4.1.1 Standard design (water supply with swimming pool water)

Removal of the suspension water from the clean water line downstream of the swimming pool filter system, if the flow pressure at the PAKDOS inlet is **at least 0.2 barg**.

Water removal downstream of the filter:

In outdoor swimming pools, water removal from the filtrate / clean water can be advantageous if there is a risk of heavy contamination of the raw water, e.g., by leaves and inflorescences.

The following must be observed in this case:

- The pressure ratio inlet pressure/counter-pressure may become so unfavourable that a stronger booster pump must be used. Pay attention to the pressure ratios - see above
 - The dosing in this case always takes place upstream of the circulation pump and upstream of the flocculant injection point
- Flushing water removal downstream of the swimming pool filter
 - Dosing downstream of the shut-off valve - upstream of the flocculant injection point.
 - Check for minor pressure loss:
 - short connections; installation of the device close to the filter
 - Hose 1" or piping d25, with bends, if applicable
 - Only use the enclosed connection fittings (with ball valve).
 - For the water removal and dosing point, 1" sleeves without constriction are required on site
 - A safety socket is required for the electrical supply, which is interlocked with the water circulation system.

Water removal upstream of the filter, downstream of the circulation pump

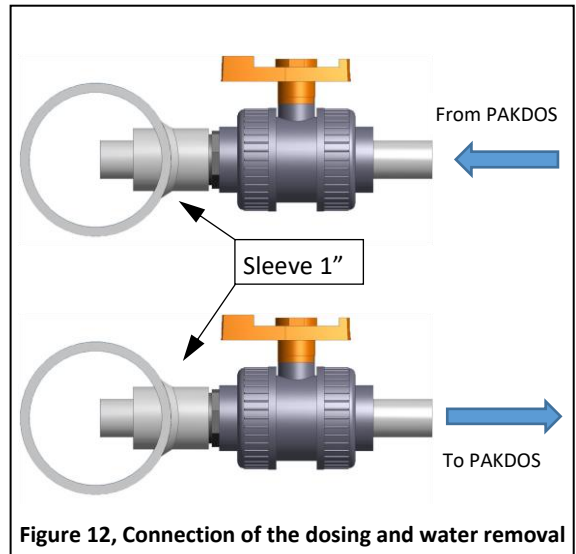
- Flushing water removal directly downstream of the pump, upstream of the non-return valve, if possible.
- Dosing downstream of the shut-off valve - upstream of the flocculant injection point.
- Check for minor pressure loss:
 - short connections; installation of the device close to the filter

- Hose 1" or piping d25, with bends, if applicable
 - Only use the enclosed connection fittings (with ball valve).
- d) For the water removal and dosing point, 1" sleeves without constriction are required on site
- e) A safety socket is required for the electrical supply, which is interlocked with the water circulation system.

4.4.1.2 Installation of the dosing and water removal point for PAC dosing

Important! The dosing pipes (on-site procurement) must have a diameter of 25 mm. The 1" connecting sleeves must therefore be freely permeable.

- Determine the length of the water removal pipe or the dosing pipe, respectively
- Measure the distance from the centre of the water line to the sleeve and add 15 mm.
- Use a fitting nipple.
- Saw off the pipes, deburr them and glue them into the ball valves 1" screw nipples.
- Once the glue has hardened (approx. 1 hour), screw in according to the drawing. Only grip the screw nipple to tighten.
- Screw the overflow nozzle into the flushing tub and connect it to the floor drain.



4.4.1.3 Installation of the pipes to the PAKDOS

If there are any existing connections, ensure that they are not blocked. The pipes should be kept as short as possible.

- Connect the intake nozzle of the PAKDOS to the water supply.
- Connect the suspension line from the PAKDOS to the dosing point.
- Install a **overflow line from the overflow nozzle of the PAKDOS to the gully.**



ATTENTION!

If the overflow connection is not connected, this can lead to the suspension overflowing in the event of a malfunction.

4.5 Electrical installation



DANGER DUE TO ELECTRICAL VOLTAGE!

The electrical installation must 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:

- Do not pull or plug in socket connections under voltage.
- 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.

4.5.1 Open and close the housing

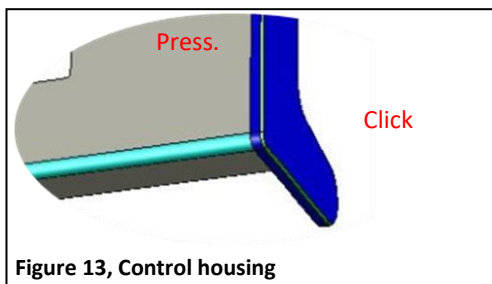
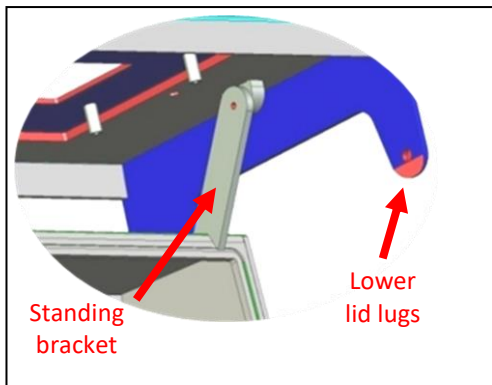


Figure 13, Control housing

The housing is equipped with an “easy lock-in closure”. In order to open the display lid or the small connection space cover, the lateral lid lugs must be gently lifted outwards from the main casing. The display lid can then be pulled forward. The upper lid lugs run in guide grooves up to the front lock-in position.

Afterwards, the display lid is folded upwards. The display lid can be supported on the main housing using a standing bracket so that it remains raised for work on the terminals.

In order to close the housing, the standing bracket must be unlocked with a backward motion and the lid closed by moving it downward. The upper lid lugs must now be unlocked and the lid pushed backward onto the main housing. In order to ensure that it has been completely resealed, press gently on the four corners of the housing. The housing lid will close with a soft, audible click. Ensure that all of the lid lugs have been securely bolted using the safety bolts each time.

4.5.2 Electrical connection

For electrical installation, see wiring diagrams in the PAKDOS terminal casing or in *Chapter 9.2*.

The power supply for the dosing device must always be ensured.

The external control inputs and outputs (shut-down in the event of fault, etc.) must be clamped to the clamping connectors of the baseplate in the control housing. Do not use any fixed wire conductors. See *wiring diagram in Chapter 9.2*.



ATTENTION!

Please pay attention to the spatial separation between energy and signal lines when inserting additional cables. The crossing of energy and signal lines must be avoided!

Upon completion of the work, the housing must be properly closed again!

Electric connection / external connection to the control centre:

As a rule, only use flexible control cables max. 0.5 mm²! See wiring diagram in *Chapter 9.2*.



ATTENTION!

To ensure that the PAKDOS does not produce when the filter pumps are switched off or when the water supply is not guaranteed, the PAKDOS must be interlocked with the filter system by the CCS (Central Control System).

The buffer tank's stirrer (option) must not be locked!

Connect the steel frame to the local earth wire.

Signals to external – potential-free outputs:

The PAKDOS system provides the following signals for external processing:

- Collective fault message
- Reserve indication chemistry
- Empty indication chemistry

Signals from external – potential-free inputs:

The PAKDOS system can be activated via a CCT:

- Shut-off of the suspension production
- PAKDOS off
- Dosing off

When the CCT switches off the PAKDOS, the feed pump continues to run according to the set run-on time in order to flush the dosing lines (rinsing programme).

5 Commissioning

5.1 Commissioning – remarks



ATTENTION!

Also pay attention to this chapter for each recommissioning following an operating pause. Do not switch on the PAKDOS until the flushing tub has been filled.

The work described here may only be carried out by trained specialist personnel. Prior to commissioning, the installed systems must be checked for proper installation and leaks.

Please use the commissioning protocol from *Chapter 9.3.* for commissioning. The device is delivered with defined factory settings. You can find the setting values in the operation data sheet in *Chapter 9.4.*



ATTENTION!

During the installation of the piping and the electrical system, foreign objects may have fallen into the suspension unit, which could lead to potential faults in the floating valve or the flow switch's suction pipe. Remove foreign objects!

Remarks

At the startup, **all faults are suppressed for 12 seconds** to ensure a constant flow in the flushing tub.

Afterwards, operation / filling starts unless a fault is present.

During operation / filling, a fault must be pending for **longer than 6 seconds** before the PAKDOS is switched off.

The opto-sensor on the sighting pipe (82) must detect powdered activated carbon within 8 seconds after the start of the 2nd dosing interval. The LED on the opto-sensor does not light up when a sufficient amount of powdered activated carbon is present in the sighting pipe.

After switching off the dosing by the PAKDOS control unit, the suspension unit is still rinsed for the set time. This serves to keep the suspension unit of the PAKDOS clean. During the first half of the time, this occurs with acid dosing (option).

Start query

If the software is reinstalled, the start query appears. The following data must be entered:

1. Language
2. Date and time
3. Rinsing time (factory setting 20 sec.)

5.2 Commissioning, setting of the operating parameters

Prior to commissioning, ensure that the intake ball valve is open.

5.2.1 Fitting the delivery drum onto the PAKDOS 60

The powdered activated carbon is delivered in 60 l drums.

To fit the delivery drum, proceed as follows:

1. Loosen the two stop pieces (37).
2. Attach the drum with the dosing head.
3. Press the two stop pieces onto the drum and tighten the tension bands.
4. Loosen the 4 locking screws (35) and adjust the retaining bracket (36) so that it rests firmly on the clamping ring (38).
5. Retighten the locking screws (35) and stop pieces (37).

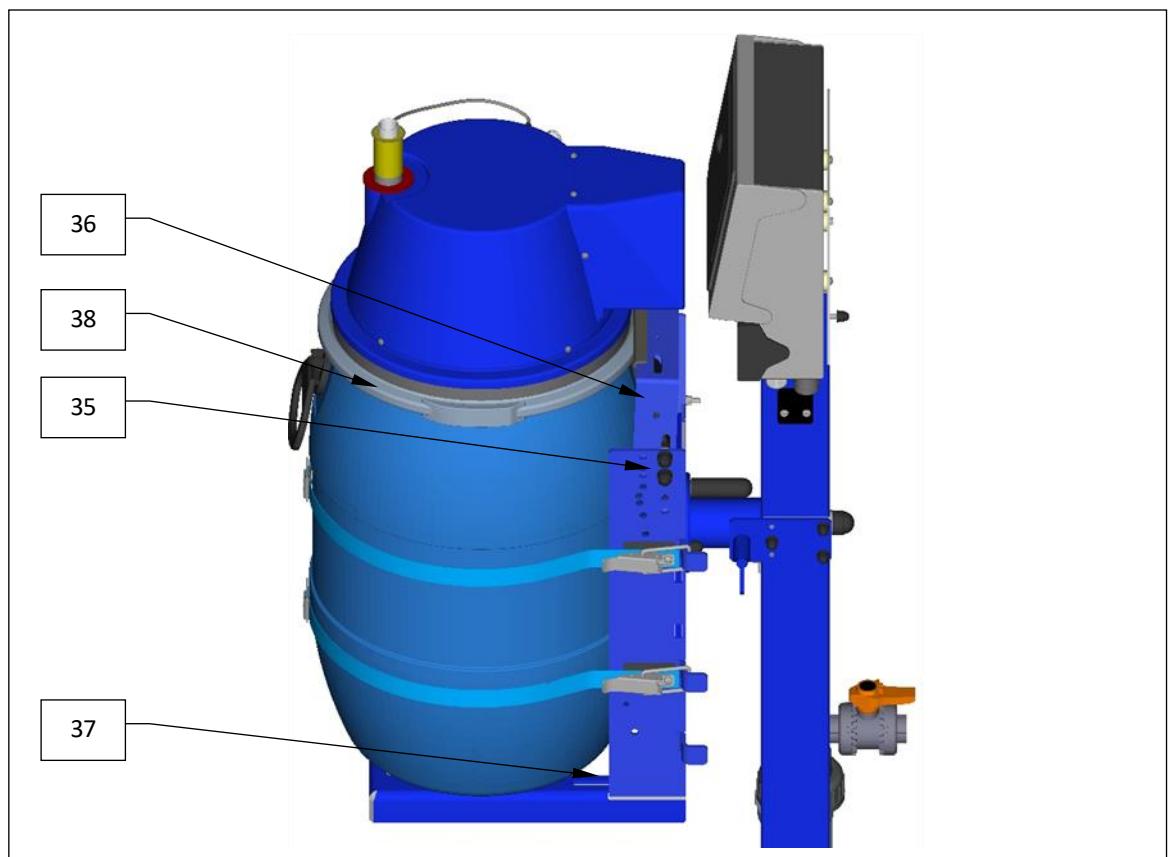



Figure 14, Drum holder

Key for fitting the drum:

- | | |
|-----------------------|-------------------|
| 35. Locking screws | 37. Stop pieces |
| 36. Retaining bracket | 38. Clamping ring |

5.2.2 Attach / change the drum

Stop dosing via the  button when changing the drum.



ATTENTION!

When changing the drum, ensure that the suspension unit is covered, so that no dust or foreign objects can fall into the suspension unit.

PAKDOS overview:

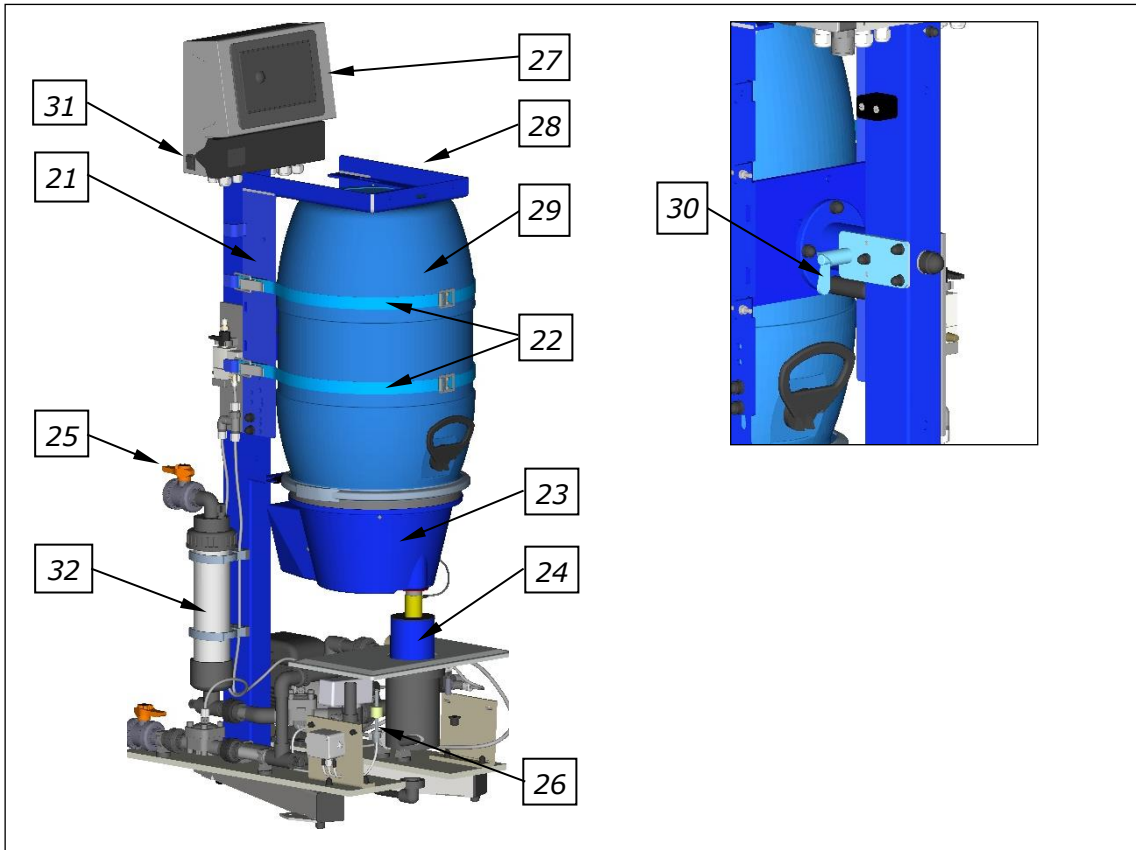


Figure 15, Overview PAKDOS

The PAKDOS consists of:

- | | |
|---|--|
| <ul style="list-style-type: none"> 21. Drum holder (turning device) 22. Tension bands 23. Dosing head 24. Dust protection pipe 25. Shut-off valve inlet 26. Suspension unit | <ul style="list-style-type: none"> 27. Control unit 28. Identification plate (on the right side of the upright pipe) 29. Carbon drum 30. Spring bolt for the turning device 31. Main switch (lateral) 32. Dirt filter inlet d75 mm |
|---|--|

Procedure for drum change:



Notice!

It is recommended to roll the new drum several times on the floor prior to attaching it to the drum holder to loosen up the powdered activated carbon, which may have been compacted during transport.

- a) Push the dust protection pipe (24) with the rubber diaphragm downward.
- b) Loosen the spring bolt (30) of the turning device (21) and rotate the turning device with the empty drum clockwise from the dosing position upward; while doing so, keep the dosing pipe at the dosing head (23) covered with a finger to prevent any powdered activated carbon from escaping. Relock the turning device. (This point does not apply during the initial commissioning.)
- c) Loosen the tension bands (22). Remove the empty drum together with the dosing head from the turning device. (This point does not apply during the initial commissioning.)
- d) Place the new, full drum next to the empty drum and align it so that the handles point to the front and back.
- e) Open the clamping ring of the new drum, remove the lid and take out the measuring cup, if present. Leave the clamping ring on the drum.

Wait a short time before removing the dosing hopper from the empty drum; this reduces the amount of dust when opening it.

- f) Remove the dosing hopper from the empty drum and place it on the full drum so that the motor cover comes to rest above one of the handles. Attach the dosing hopper with the clamping ring.
- g) Secure the clamping ring with a safety pin / locking plate.
- h) Place the new drum on the turning device so that the drum rests against the back rails in the rear. The motor cover points towards the body

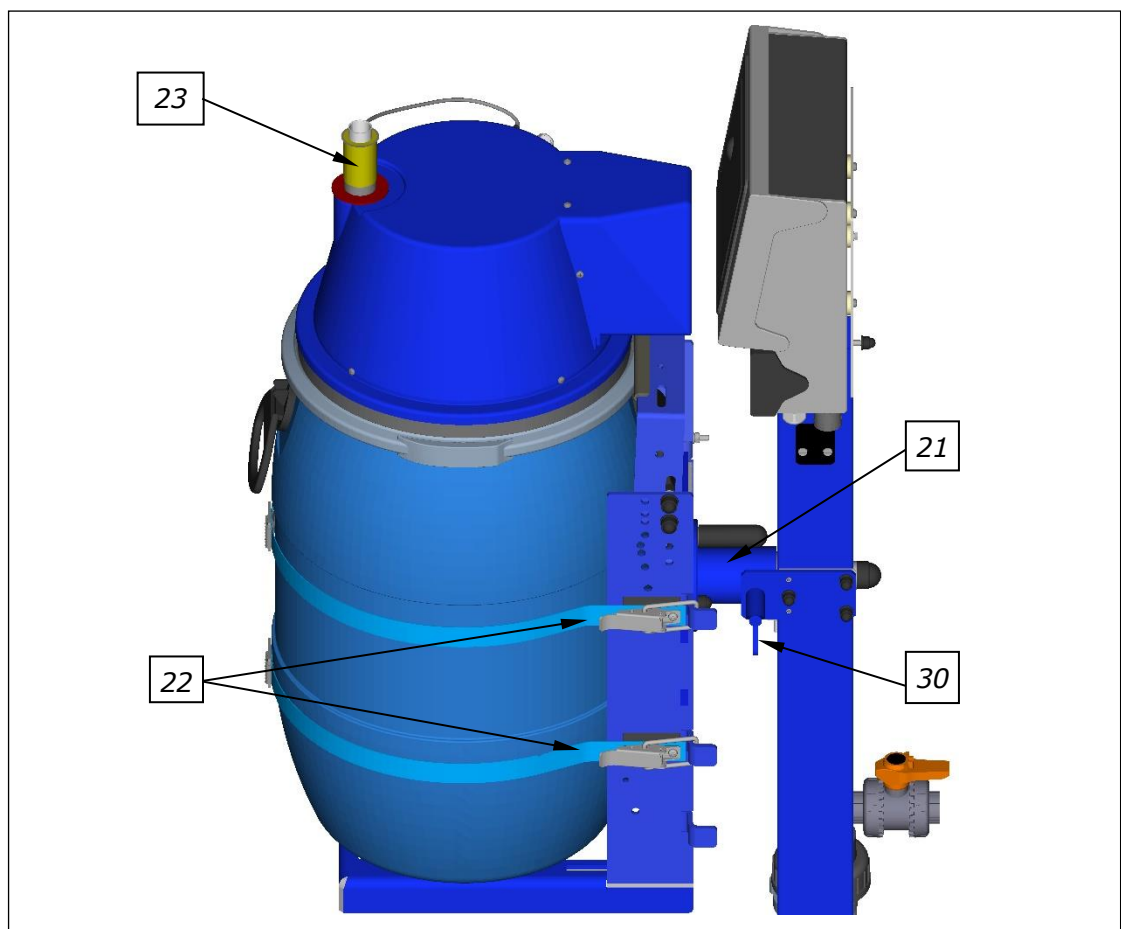


Figure 16, Drum holder

- i) Next, pull the tension bands around the drum and close the tension lever. The tension lever must be tightly closed; however, do not use excessive force when turning the tension lever. The length of the tension band must be adjusted correspondingly at the screw ends.
- j) Insert the safety pins at the tension lever



ATTENTION!

Ensure that all safety pins at the tension lever have been inserted!

- k) Unlock the drum holder by turning the turning device's spring bolt (21) upward. Cover the dosing pipe with a finger and slowly turn the drum counter-clockwise in the dosing position. Lock the drum holder by turning the tension bolt downward. Ensure that the control cable does not get entangled.
- l) Slide the dust protection pipe with the rubber diaphragm facing upward over the heating nozzle, so that any potential air current does not blow away the fine PAC dust. If necessary, pull the dust protection pipe down again so that the pipe fits tightly to the suspensor. Minimise air draft - close doors!

5.2.3 Venting the booster pump

The pump and the piping must be carefully vented prior to each commissioning of the PAKDOS to prevent the booster pump from running dry. Pay attention to the following in this regard:

- a) Check manually if the pump shaft can be turned with ease. To do so, use a screwdriver to turn the fan propeller in the back. If the shaft does not turn smoothly, the mechanical seal is clogged. Loosen the shaft by abruptly turning it back and forth. If this does not solve the problem, the pump must be deinstalled and disassembled to loosen the mechanical seal.



ATTENTION!

If the pump is switched on with a blocked mechanical seal, the pump's failure is inevitable.

- b) During commissioning, open the ball valve at the water removal point and the intake valve at the dirt filter and wait until the flushing tub is half full. This ensures that water has flowed through the pump and the pump has been vented. Now open the outflow ball valve downstream of the sighting pipe. **Switch on the PAKDOS at the main switch (31).**
- c) Now observe the dirt filter d75.
If the filter's water level shows a significant drop when the pump is switched on, turn off the PAKDOS at the main switch, open the venting screw on top of the filter and allow water to flow back into the filter before switching the device back on.
If necessary, repeat the process several times until the filter remains full; a few air bubbles in the upper filter area are inconsequential.



ATTENTION!

If the pump draws air while in operation or during unmonitored activation, the pump's mechanical seal will run dry, overheat and start to leak. This can be the case with an installation above the swimming pool level, when draining the supply line or when turning off the filter system.

5.2.4 Setting the water flow in the suspension unit (standard design)

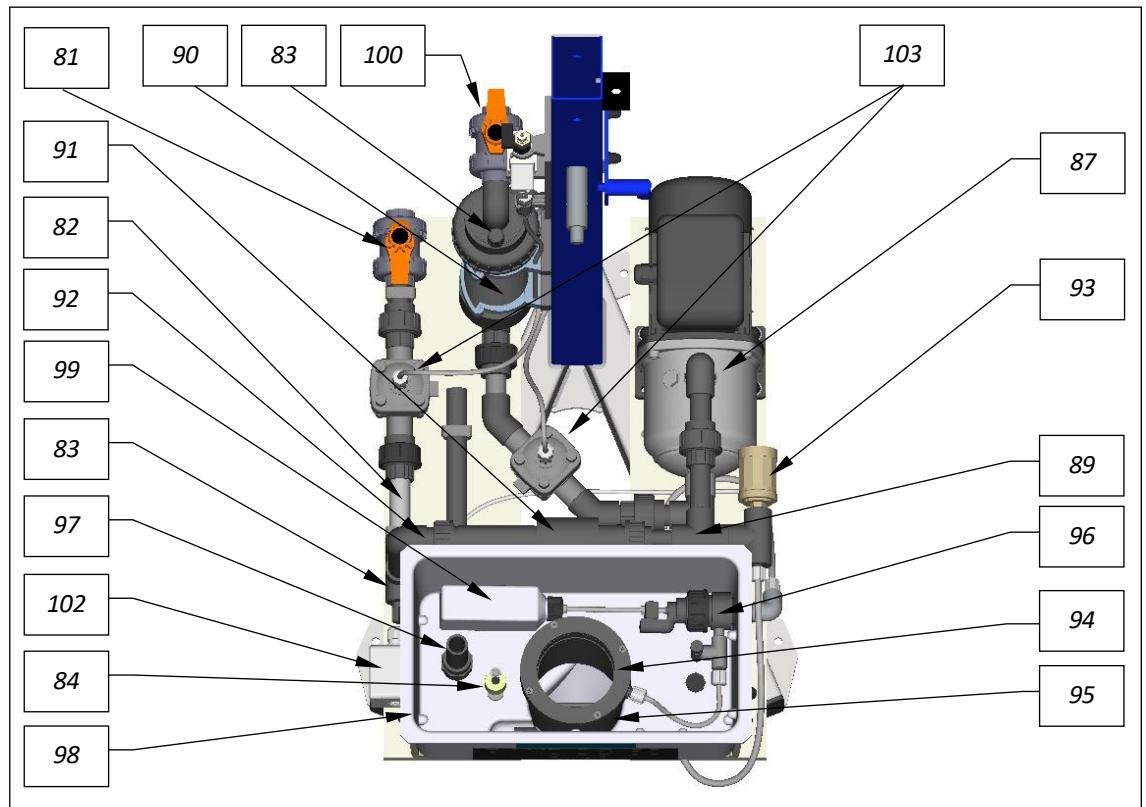


Figure 17, Suspension unit-standard

The suspension unit consists of:

- | | |
|---|--|
| 81. Shut-off valve outflow suspension | 94. Flushing ring (top, one unit with suspensor) |
| 82. Sighting pipe with opto-sensor (option) | 95. Suspensor (bottom, one unit with flushing ring) |
| 83. Manometer connection 6x1 | 96. Float control valve in the flushing tub inlet |
| 84. Level switch min./max. Flushing tub | 97. Overflow |
| 85. — | 98. Flushing tub |
| 86. Flow switch with suction pipe (not shown) | 99. Float control valve float |
| 87. Booster pump | 100. Water inlet via shut-off valve and dirt filter |
| 88. — | 101. Lid (blue) for flushing tub with dust protection pipe (not shown, see Figure 5) |
| 89. Pressurised distribution | 102. Connection socket (shown in closed state) |
| 90. Fine filter 300µm for flushing water | 103. Valves for automatic shut-off (option) |
| 91. Injector | |
| 92. Hole washer (in pipe union) | |
| 93. Pressure switch | |

The hole washer (92) in the pipe union behind the injector (91) adjusts the injector's suction performance to the pressure conditions:

If the water level in the flushing tub (98) drops during commissioning, the injector's suction performance is too high and it is necessary to insert a washer with a smaller drill hole in the pipe union.

If the water level rises, or if the flow switch's switch body (86) is not clearly pushed upward, the injector's suction performance is too low and a washer with a larger drill hole is required, or the washer must be removed entirely.

A washer with 6 mm is installed ex works; washers with 5.5 mm and 7 mm are available in the enclosed spare parts bag.



ATTENTION!

During installation, foreign objects may have fallen into the suspension unit, e.g., cut-off cable insulation or PVC chips that could block the switch body. Check the mobility of the switch body by repeatedly pinching the suction hose or closing the drain tap.

A washer with 6 mm is installed ex works; washers with 5.5 mm and 7 mm are available in the spare parts bag. If sufficient suction performance cannot be achieved, measure the inlet and counter pressure and compare with the specified pressure ratios from *Chapter 4.4.1*. A manometer is included for this purpose.

5.2.5 Setting the water level in the suspension unit


The water level in the flushing tub can be changed by screwing the float at the *float control valve*(96) in or out. A higher level is achieved by unscrewing the float, a lower level by screwing the float in. One revolution corresponds to approx. 1 cm water height. Adjust the float in the flushing tub so that the water level corresponds approximately to the centre of the flushing tub.

5.2.6 Setting the pressure switch

The pressure switch (93) records the inlet line's effective pressure. This pressure monitoring ensures that the PAKDOS switches off if the switching pressure falls below the set value, e.g., when air is drawn in or in the event of a pressure drop in the water supply. This ensures that:

- The dosing is turned off if there is an insufficient amount of water in the inlet.
- The booster pump is not exposed to the risk of cavitation.

To set the switching point, the dosing device must be in operation.

- a) Remove the cover from the pressure switch (93).
- b) Turn the adjustment knob 0.25 bar to the right and wait for 6 seconds.
- c) If the dosing device continues to run, repeat the process until the dosing device stops and the fault indication  "Minimum pressure alarm" appears. The PAKDOS dosing device stops.
- d) Turn the adjustment knob 0.25 bar to the left and confirm the alarm message.
- e) The dosing device will start up again.
- f) Now, the dosing device will throw a fault at a pressure drop of 0.25 bar.

If additional pumps are switched on and off during operation (e.g., pump for splash water), set the pressure switch with the additional pump switched off. When the circulation is switched off, the PAKDOS must be shut down.

A switching point of approx. 1.5 bar is preset ex works. If necessary, the switching point can be readjusted after unscrewing the protective cap.

5.2.7 Determining the dosing performance for the PAC dosing

The effective dosing performance for the powdered activated carbon must be determined in order to calculate chemical consumption and thereby also the reserve indication for the powdered activated carbon.

Provide a shallow collecting vessel for approx. 500 ml (e.g., a shallow dish) and scales for determining the dosing performance.



NOTICE!

Place a shallow collecting vessel under the dosing pipe and follow the menu prompts. Weigh the dosing samples.

Determining the dosing performance:

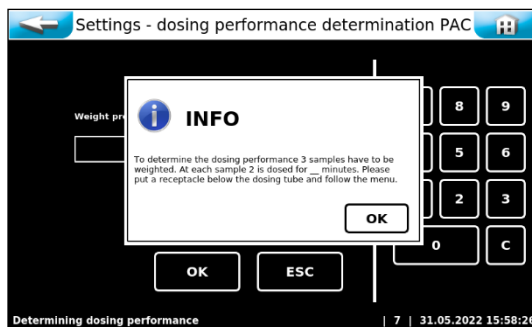
Turn on the device at the main switch; the start display will appear

Press **Menu** → **Settings** → **Determining dosing performance** on the start display. Then follow the menu prompts.



ATTENTION!

Before the dosing performance determination is started, it must be ensured that the PAKDOS can run without interruption for the next 20 minutes. This is because the dosing performance determination lasts approx. 20 minutes and the stop must not be reached prior to this.



Place a collecting vessel, e.g., a shallow dish, under the dosing pipe.

Figure 18, Determining dosing performance PAC 1

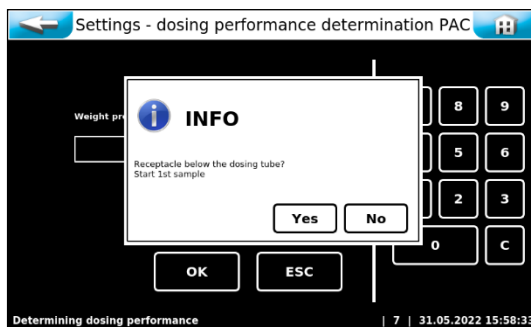
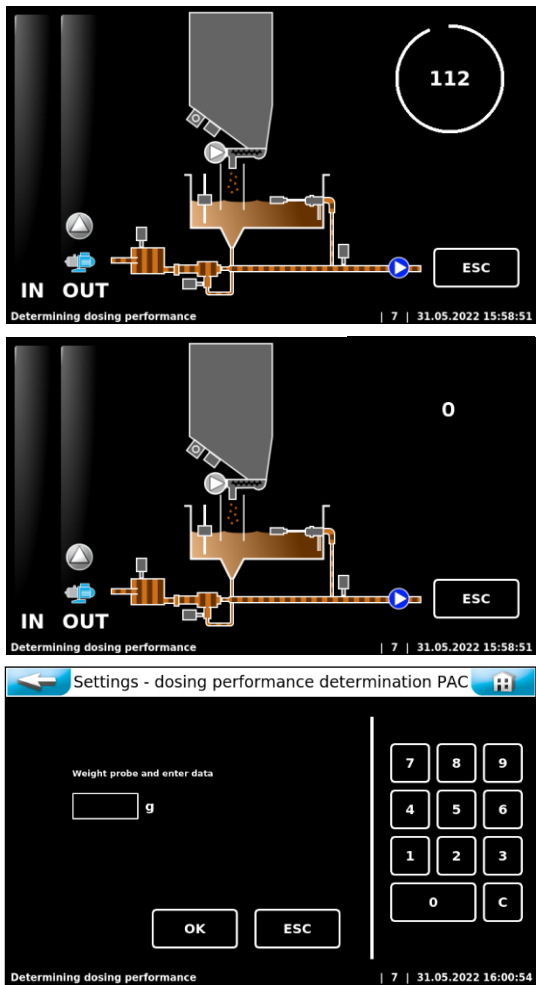


Figure 19, Determining dosing performance PAC 2



Powdered activated carbon is transported into the collecting vessel for 2 minutes.

This is followed by rinsing according to the set time.

Weigh the dosing volume in the collecting vessel with a letter scale.

Enter the determined weight in grammes and confirm with **OK**.

This process is repeated 3 times in total. The programme then calculates the mean value of the 3 samples, thereby determining the dosing device's PAC consumption. Enter the 3 determined values in the operating data sheet, *chapter 9.4*.

Following the final weight entry, the device shows the actual dosing performance in continuous operation.

Confirm this value with **OK**.

Switch to the start display via the Back button (white arrow).

Figure 20, Determining dosing performance PAC 3



Tip!

If the PAC quality changes, e.g., if a different supplier is used, the dosing performance determination must be performed again to ensure that the reserve indication is accurate.

6 Operation / Use

Pay attention to the nationally applicable accident prevention regulations (Germany: BGR/GUV-R 108 Operation of swimming pools).



NOTICE!

These instructions do not contain a description of the following optional components of the dosing system:

- Fresh water design with solenoid valve
- Acid dosing
- Buffer tank

Although the corresponding buttons are visible in the user interface, the functions are only available if the respective component is installed!

6.1 Normal filling process during operation

Once all the preparations for commissioning have been completed, the PAKDOS dosing system can be started. The device is already switched on (main switch).

Operating programme:

Press the Start button  to start the programme.

After the start, there will be 12 seconds of flushing with water only, followed by a **continuous dosing** or a **time-controlled dosing** of powdered activated carbon and acid (option), according to the setting.

With buffer tank (option)

The PAKDOS dosing device is only switched on and off via the level switches “**Start filling**” and level “**Stop filling**” in the buffer tank.

After switching off the dosing via the level “**Stop filling**” = **Container full**, the suspension unit will still be flushed for the set time interval to ensure that the suspension unit of the PAKDOS remains clean. During the first half of the time, this occurs with acid dosing (option).

6.2 The control unit PAKDOS Touch

The control unit PAKDOS Touch is equipped with a touch-sensitive display. Settings can be made by tapping on a symbol. The justage menus come with additional text-based instructions.

6.2.1 Operation display – Operating status – Operation messages

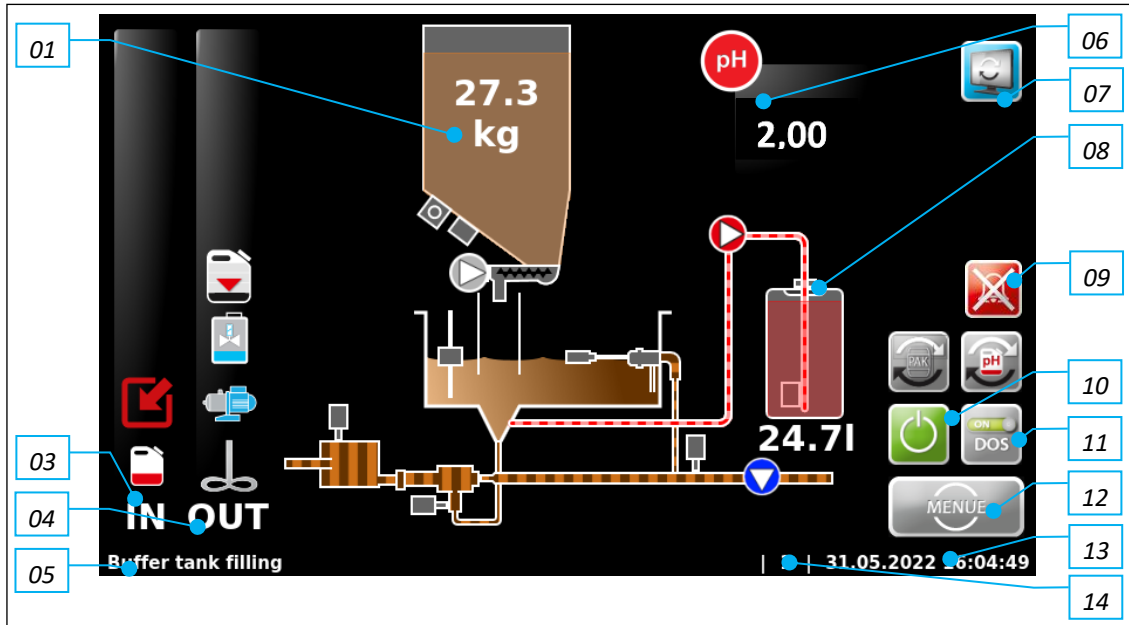
The operating states and faults are displayed directly on the start display: see *Figure 21*, In automatic operation, the current operating status, the fill levels and active inputs and outputs are displayed (IN – OUT). The inputs and outputs can be operation messages or fault indications.

Operating notes:

The operating status is displayed in the status line at the bottom left. The following operating states are available:

Dosing delay	Menu	Output test
Automatic	Calibration	Input test
Manual dosing	Rinsing programme	Buffer tank filling

The device is operated by means of a resistive touch screen. Desired parameter changes, calibrations and tests can be done simply by lightly touching the corresponding symbol or the numeric value.



Display key:






- | | |
|--|--|
| 01. Powdered activated carbon fill level | 08. Acid fill level |
| 02. ---- | 09. Cancel alarm |
| 03. IN list | 10. Start / Stop dosing device |
| 04. OUT list | 11. Manually activate / deactivate dosing |
| 05. Status line | 12. Menu button |
| 06. Measuring value pH (option) | 13. Date / time bar |
| 07. Toggle between start display and buffer tank display | 14. User level (0=guest, 1=end user, 2=technician 1) |

The IN list shows the input signals to the control unit.
The OUT list shows the active output signals of the control unit.

Symbols used:

The symbols depend on the firmware installed, i.e., the device version. For further information on how to proceed, see *Chapter 6.3.3.6, Main Menu → Service → Info*

The function buttons on the start display

-  Switch to buffer tank view
(Function only available with installed component)
-  Reset PAC counter
-  Reset acid counter
(Function only available with installed component)
-  Dosing device on/off
-  Switch off dosing, e.g., for service tasks



Deactivate alarm relay



View main menu

IN list



Powdered activated carbon level (container for powdered activated carbon empty)



red = acid level (acid container empty)
(Function only available with installed component)



The controller is deactivated using the central control cabinet.
No dosing occurs, no alarm message given.



The dosing is blocked by an optional flow switch in the clean water line.
No dosing occurs



A dynamic dosing time (PAC) has been exceeded. The respective output is blocked.



Dosing deactivated manually



Dosing performance in ECO operation (see Chapter 6.3.2.9)



red= input signal; external pH control active (function only available with installed component)
grey = input signal; external PAC control active



The pressure at the booster pump is too low. The booster pump is stopped



The level in the flushing tub is too low. The booster pump is stopped



The level in flushing tub is too high. The dosing of powdered activated carbon and acid is stopped



The flow in the suction line is too low. The dosing of powdered activated carbon is stopped.



The fuse of the powdered activated carbon dosing motor has tripped.

OUT list



red= acid dosing output active (function only available with installed component)
grey = PAC dosing output active



The alarm relay is active.



Chemical reserve
Advance notice for container exchange, check chemicals levels and prepare new powdered activated carbon



The booster pump is active



The knocker is active. This symbol is only displayed very briefly

The following symbols only apply for the OPTION with buffer tank filling



NOTICE!

The descriptions and instructions for operating the system with buffer tank and the meaning of the respective symbols can be found in the corresponding instructions. If you have any questions, please contact your sales partner.



IN list (optional, design with buffer tank)

The buffer filling is started, message is pending for 4 seconds



The buffer filling with powdered activated carbon suspension is stopped. Now, flushing takes place.



The buffer tank level has dropped too low. The dosing of the powdered activated carbon suspension is stopped



The buffer tank level is too high.
The dosing with powdered activated carbon and acid and the booster pump are stopped.



Collecting tub alarm (leakage)
The dosing with powdered activated carbon and acid and the booster pump are stopped.



The optical sensor on the transparent pipe did not detect any powdered activated carbon while the buffer tank was being filled. The filling was stopped.



The buffer tank filling has been deactivated by the system. The filling occurred too slowly, or the optical sensor on the transparent pipe was triggered.

OUT list (optional, design with buffer tank)

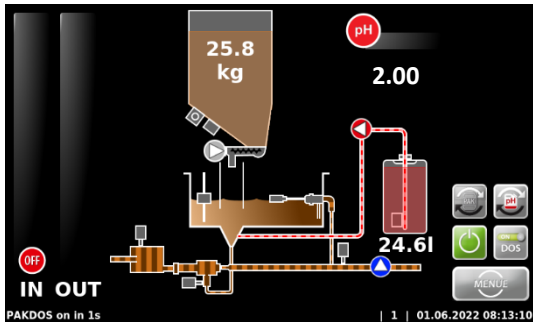


Buffer tank filling is active.

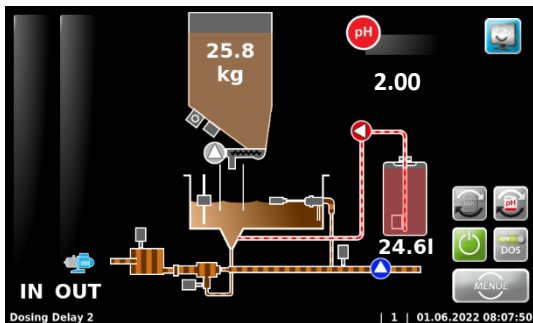


Buffer tank agitator

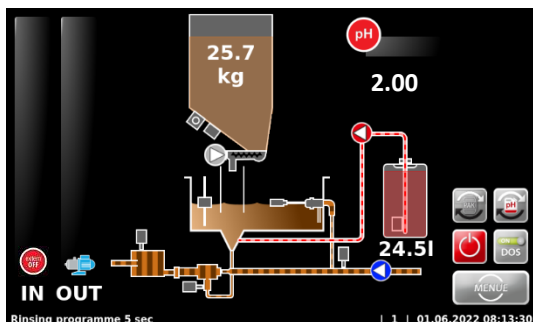
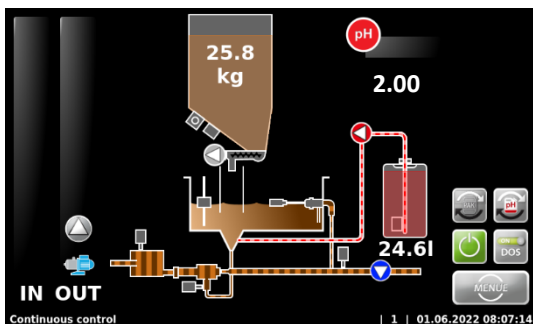
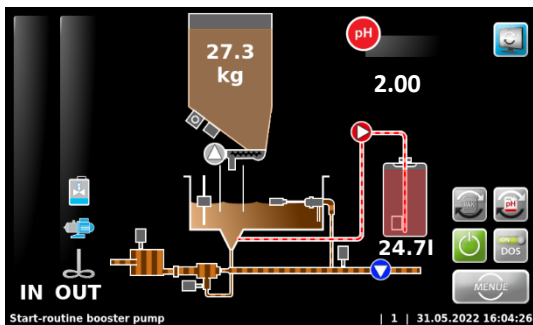
6.2.2 Start –Delay booster pump and dosing delay



If the device is restarted, the booster pump startup routine is running. Dosing is suppressed during this time. Software alarms are suppressed during this time. The device then switches to automatic operation.

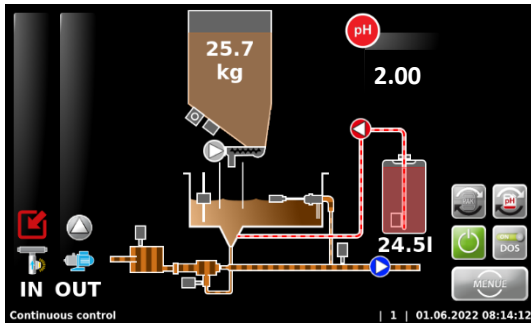


If “Delay booster pump” is activated, the delay time shown in the footer elapses before the booster pump starts. (This is used to vent the supply line.)



If the dosing device is deactivated externally, dosing stops and the booster pump runs on, as shown in the footer, so that no powdered activated carbon remains in the suction pipe. The time for the rinsing programme can be set.

6.2.3 Continuous control



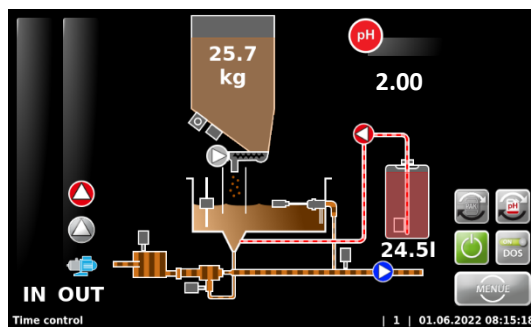
The device is in the “Continuous control” operating status. The device doses continuously according to the set parameters.

The **Out list** shows the currently active outputs Booster pump and Powdered activated carbon dosing as an example.

The **In list** shows external acid demand and insufficient flow in the suction line as an example.

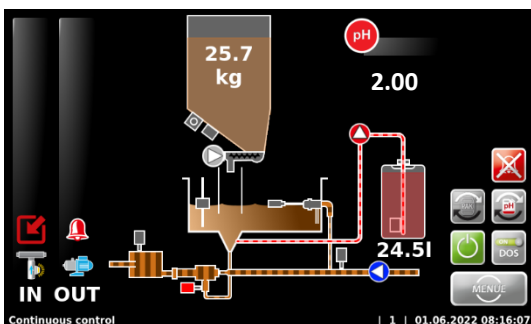
(Acid demand function only available with installed component)


6.2.4 Time control



In the “Time control” operating status, the device doses at the set times. Times can be set in the “Dosing performance PAC” submenu. If this operating mode is selected (see *Chapter 6.3.2.1*), the display in the status line changes from Continuous control to Time control.

6.2.5 Alarm




If an alarm occurs, this will be indicated by the symbol  in the OUT list. The alarm relay is activated.

A distinction is made between alarms (software alarms, e.g., dosing time monitoring) and faults (switch inputs).

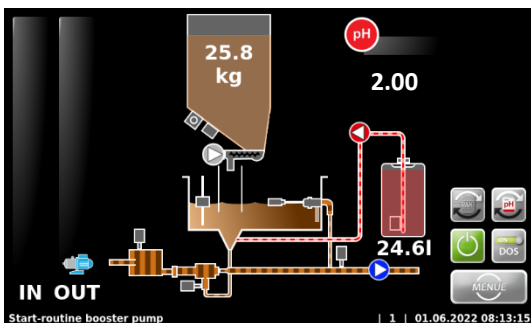
In the event of measuring value alarms, the respective measuring value is additionally illustrated in red.

In the event of faults, the corresponding symbol appears in the **In list**. Alarms or faults must be pending for 5 seconds before an alarm is triggered.

With the  button, the alarm relay can be temporarily deactivated without fixing the fault.

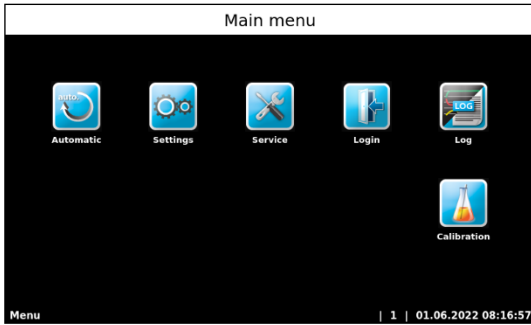
The PAKDOS now starts with the startup routine.

If the fault subsequently recurs, or if the fault is not fixed, the alarm relay will be reactivated.



Tip!
The Switch-off time monitoring alarm must be acknowledged manually, as described above!

6.3 The Main menu



Automatic

Navigates to the start display and into the operating mode. Switches automatically to user level 0 or 1.



Settings

For adapting parameters and system settings



Service

Input and output test, info



Login

For password assignment; no password is assigned in the delivery state.



Log

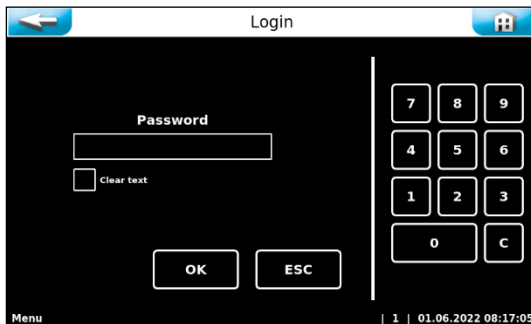
For query of events and data logging



Calibration

Calibration of the pH electrode

6.3.1 Main menu Login



Passwords are assigned under Settings → System → Password in the main menu. A personal password protects the control unit against unauthorised access. Settings, justage, output tests, etc., can then no longer be performed without a password. You can still browse the menu and view the data logging.

If no password has been assigned in user level 1, the system always switches to user level 1! See *operation data sheet, Chapter 9.4*.

For future changes and adjustments, you must sign in with your personal password under Login. If you switch to the start display, the password must be re-entered.

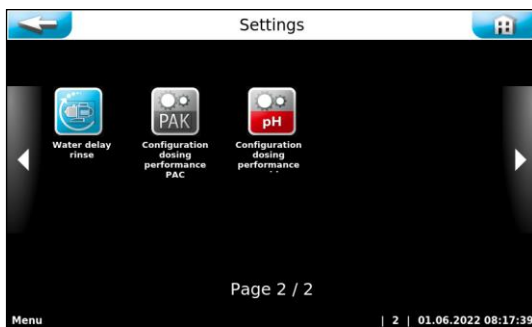
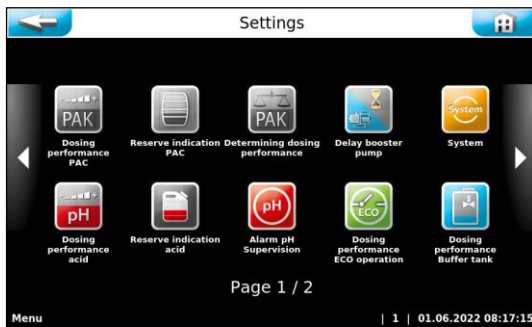


NOTICE!

Once a password has been assigned, unauthorised persons will be denied access to the control unit. The setting buttons will appear in grey. Desired changes can only be made after the password has been entered. Once a password has been assigned, make a note of the password and keep it in a secure location.

6.3.2 Main menu → Settings (overview)

The settings menu is used to implement the desired settings for the dosing device. Use the white arrow keys on the side to scroll to the next screen menu. The 2nd page is only displayed in user level 2 (technician 1).



Dosing performance powdered activated carbon (6.3.2.1)

Adjust the dosing performance to the pool size



Reserve indication powdered activated carbon (6.3.2.2)

Set reserve indication for powdered activated carbon



Determining dosing performance for powdered activated carbon (6.3.2.3)

Dosing performance (dosing quantity) is determined



Delay booster pump (6.3.2.4)

Set delay time for the start of the booster pump



System (6.3.2.5)

Set date, time, password, display, network and language



Dosing performance ECO operation (6.3.2.9)

Set parameter for ECO operation



Water delay rinse (6.3.2.11)

Set parameters for water delay rinse



Configuration of powdered activated carbon dosing performance (only by factory customer service) (6.3.2.12)

Set device-specific dosing parameters



NOTICE!

The following buttons only work when using the options for acid dosing and buffer tank operation. Information on the meaning and operation of each function can be found in the corresponding instructions. If you have any questions, please contact your sales partner.



Dosing performance acid (by customer service only) (6.3.2.6)

Set device-specific dosing parameters



Reserve indication acid (6.3.2.7)

Set reserve indication for pH reducer



pH supervision (for operation with buffer tank) (0)

Set parameters for pH monitoring



Buffer (operation with buffer tank) (6.3.2.10)

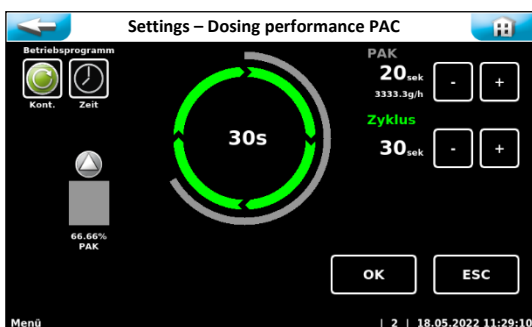
Set dosing performance for Buffer tank filling function



Configuration dosing performance acid (only by factory customer service) (6.3.2.13)

Set device-specific dosing parameters

6.3.2.1 Main menu → Settings → Dosing performance PAC (Powdered activated carbon) (button)



The “Dosing performance PAC” menu is used to adjust the dosing performance to the expected consumption of chemicals in the pool.

Especially in case of lower water content, it is very important to adjust the dosing performance to avoid incorrect dosing.

The required dosing performance depends on several factors, e.g., the pool volume, location, type of use and, of course, the pool’s frequency of use.

Explanation of the setting parameters

- **Powdered activated carbon:** → Dosing time for the powdered activated carbon, can be set from 1-30 seconds
- **Cycle:** → Time for the entire dosing cycle, can be set from 30-360 seconds
- **Operating programme:** → Switch between Continuous control and Time control possible. This setting can only be made in user level 2.

Explanation regarding the dosing process

The powdered activated carbon is dosed at intervals with pauses between the dosing cycles.

The dosing performance is determined by the dosing cycle (time between the dosing intervals) and the dosing times (running time of the dosing motors for powdered activated carbon).

A dosing cycle proceeds as follows:

- Powdered activated carbon dosing – 1-30 sec.
- Pause until end of cycle

This cycle runs continually with **“Continuous control”** over 24 hours.

With **“Time control”**, this cycle also runs; however, dosing is only activated during the set times.

Example for setting the dosing performance

Indoor pool with a circulation capacity of **300 m³/h**.

In accordance with DIN 19643, it is recommended to add **0.5 - 2 g of powdered activated carbon per 1 m³/h circulation capacity**. For commissioning, WDT recommends to set **1 g of powdered activated carbon per 1 m³/h circulation capacity** here.

Calculation:

300 m³/h x 1 g powdered activated carbon = 300 g/h powdered activated carbon dosing

Maximum dosing performance of the PAKDOS 60/1200: 1200 g/h = 100%

A **dosing performance of 25%** must therefore be set for a PAC dosing rate of 300 g/h.

As the dosing performance varies depending on the carbon used, we recommend checking and adjusting the dosing performance according to the combined chlorine value that actually occurs during operation.

Experience has shown that approx. 24 hours should elapse between adjustment and the next check.

PAC dosing recommendations according to DIN 19643-2:2012-12

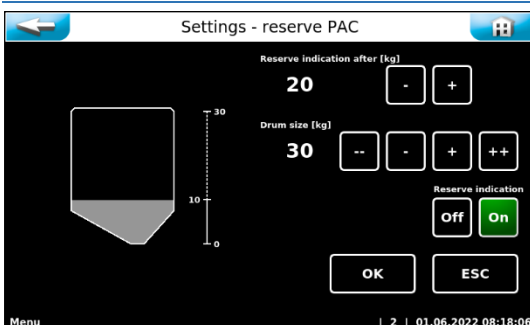
Standard filtration	0.3 – 2 g/m ³ /h
UF filtration	0.5 – 3 g/m ³ /h



NOTICE!

With some activated carbons, the maximum dosing performance is only 700 g/h! It is therefore important to determine the exact dosing performance. Set the dosing performance according to the measured combined chlorine value and recheck the setting after one day of operation!

6.3.2.2 Main menu → Settings → Reserve indication powdered activated carbon



The quantities for which a reserve indication will be displayed after dosing are indicated here, as well as the size of the full container. The message indicates that the chemical container will soon be empty.

The reserve indication function can also be deactivated.

6.3.2.3 Main menu → Settings → Determining dosing performance

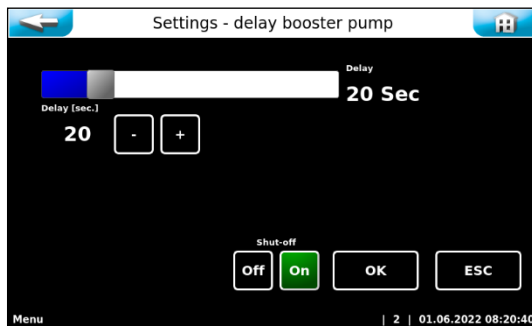
The effective dosing performance must be determined in order to calculate chemical consumption and thereby the reserve indication. Without this determination of the dosing performance, the calculations are carried out using the ex works settings, which can lead to deviations.
See Chapter 5.2.7, *Determining the dosing performance* for the PAC dosing.



Tip!

If the PAC quality changes, e.g., if a different supplier is used, the dosing performance must be determined again to ensure that the reserve indication is accurate.

6.3.2.4 Main menu → Settings → Delay booster pump + automatic shut-off



The **Delay booster pump** function is activated during external control of the PAKDOS.

This allows the booster pump to be started again with a set delay time, e.g., after the swimming pool filter has been flushed. This ensures that no air remains in the pipes, which could lead to faults in the PAKDOS.

The **Automatic shut-off** function can be activated/deactivated here. This command can only be performed in user level 2 (with password).



ATTENTION!

Changing this setting always requires a conversion of the dosing device because additional fittings are necessary!

See also *Chapter 3.2.6 Automatic shut-off of the flushing tub (option)*

Flushing the swimming pool filters - shutting off the PAKDOS

When flushing the swimming pool filters, the inlet and outlet lines of the PAKDOS 60 must be shut off to prevent powdered activated carbon from being flushed into the filter.

If the PAKDOS 60 is equipped with automatic shut-off, this is done automatically by the filter control / switching off the PAKDOS. Depending on the given pressure conditions, this is done in the inlet with a solenoid valve or pneumatic valve, and in the outlet line to the filter(s) with a pneumatic valve.









Without the automatic shut-off function, the PAKDOS 60 must be switched off manually and the ball valves (Figure 17, pos 81 and 100) must be closed manually before the flushing is started.

Installation of a shut-off valve (see also *Chapter 3.2.6 and 6.3.2.4*)

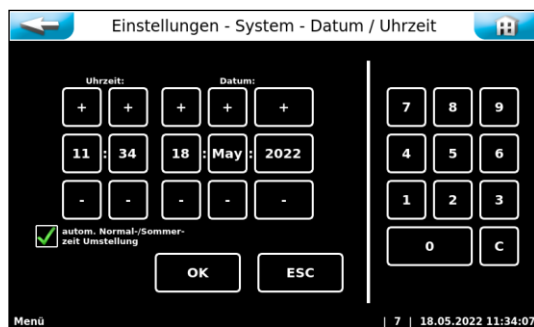
When the PAKDOS 60 is switched off, especially if the filter system malfunctions or during automatic flushing, the flushing system remains connected to the water circulation and, depending on the pressure conditions, a small overflow of flushing water, which is also mixed with powdered carbon, occurs at the PAKDOS 60.

6.3.2.5 Main menu → Settings → System



-  **Date/Time**
Set date and time
-  **Password**
Assign a password
-  **Display**
Adjust the display brightness to the ambient conditions
-  **Network**
Set network parameters
-  **Reset**
Reset all parameters to the factory settings
-  **Language**
Select the user language
-  **System ID**
For factory customer service only
-  **Internal**
For factory customer service only

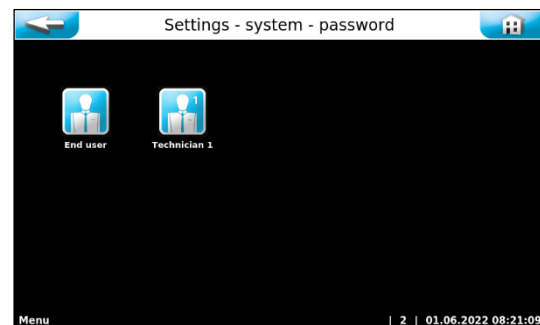
a) Main menu → Settings → System → Date/ Time



Set date and time.

Automatic switching from winter to summer time can be activated.

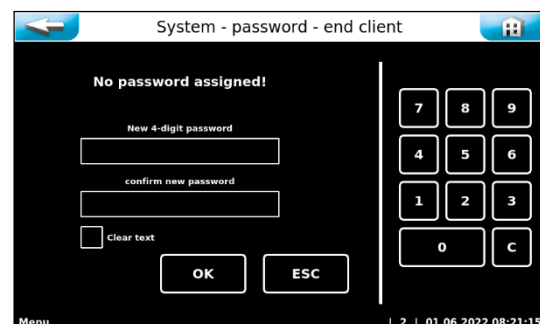
b) Main menu → Settings → System → Password



Passwords can be changed in this menu.

Guest (user level 0)
No password, read-only rights

End user (user level 1)
No end user password is assigned ex works. We recommend the assignment of an end user password to protect the system against unauthorised access. Enter the password in the operation data sheet. The individual end user password must contain four digits between 0000 and 9999. In the second line, the password must be re-entered.



Technician 1 (user level 2)
The Technician 1 password consists of five digits and has a factory default setting of 01234. This password is intended for the service partner. We recommend that you change this password as well and enter it in the operation data sheet.
If you place a green check mark next to Clear text, the entered numbers are shown instead of white dots.
To change an active end user password, it must be entered in the uppermost line. The new password must be entered in the two following lines.

If you want to delete the end user password, you only have to enter the active password in the uppermost line. The other two lines remain empty.

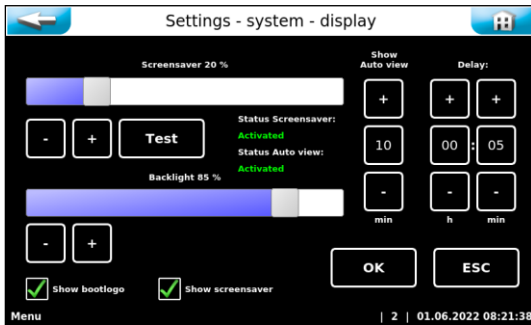
If an incorrect password is entered, a fault indication appears.



NOTICE!

The individually chosen passwords must be stored securely in the operation data sheet. Lost passwords can only be reset by the factory customer service!

c) Main menu → Settings → System → Display



After the set delay time, the screensaver dims the background lighting to the selected brightness.

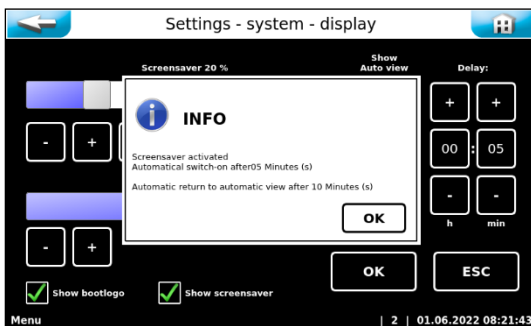
The **Test** button can be used to test the settings.

The Backlight setting permanently reduces the background lighting in the operation mode.

The boot logo (currently WDT logo) can be activated or deactivated when the control unit is started up

The screensaver can be activated or deactivated.

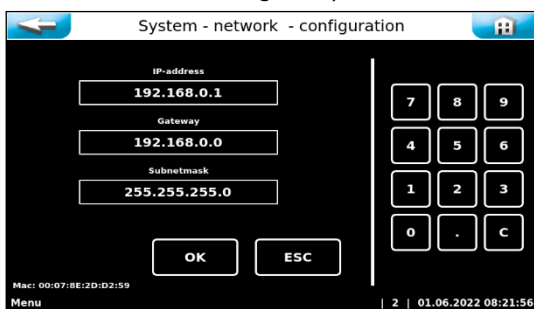
Save settings using **OK** and confirm the instruction text with **OK**.



NOTICE!

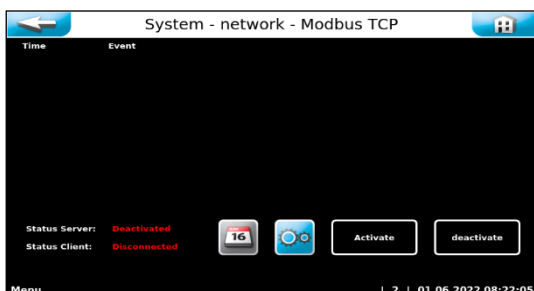
Please reduce the background lighting to the minimal brightness required by you. This significantly increases the display's service life.

d) Main menu → Settings → System → Network → Configuration / Remote access

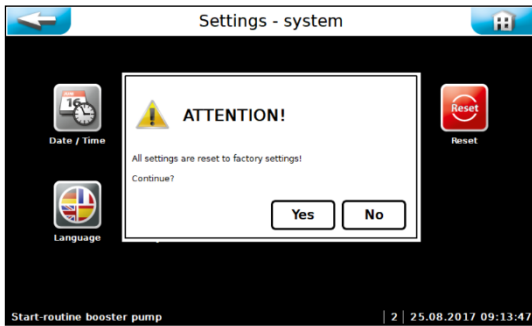


The touch panel contains a LAN interface with an RJ45 socket. The current status messages can be transferred to an external display via this interface. The terminal device can be a PC monitor, a tablet PC or a smartphone, for example.

Further information about this topic is available upon request. The operator must establish the necessary IT requirements for remote access! (e.g., VNP connection, data security, etc.)



e) Main menu → Settings → System → Reset



This command can only be performed in user level 2 (with password). All of the set parameters are reset here to the factory settings. The ex works settings are listed in the operation data sheet in *Chapter 9.4, Operation data sheet*.

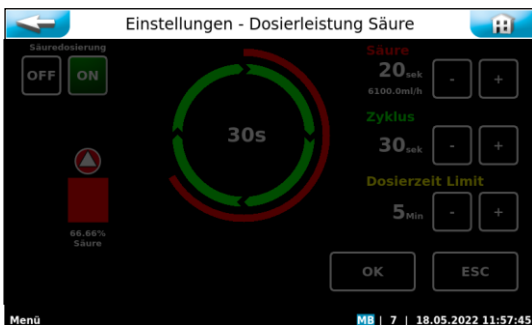
Subsequently, all parameters must be entered again!

f) Main menu → Settings → System → Language



Select the desired language for the operating menu. If the language is changed, the programme is restarted.

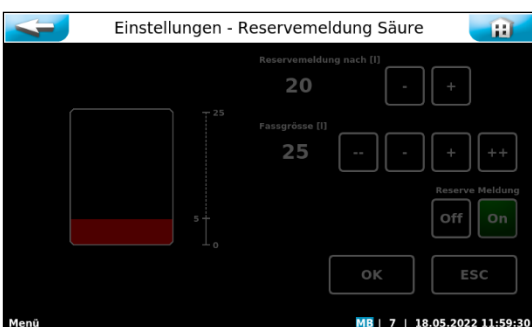
6.3.2.6 Main menu → Settings → Dosing performance acid (option)



This screen only works when operating the system with the acid dosing option

The descriptions of the respective symbols and the operation can be found in the corresponding instructions.

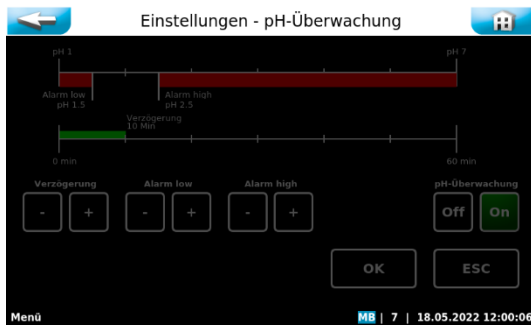
6.3.2.7 Main menu → Settings → Reserve indication acid (option)



This screen only works when operating the system with the acid dosing option

The descriptions of the respective symbols and the operation can be found in the corresponding instructions.

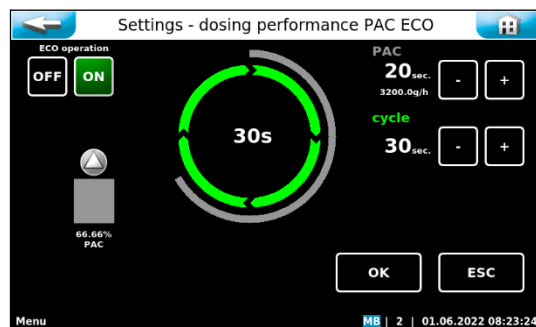
6.3.2.8 Main menu → Settings → Alarm pH supervision buffer tank (option)



This screen only works when operating the system with the acid dosing option

The descriptions of the respective symbols and the operation can be found in the corresponding instructions.

6.3.2.9 Main menu → Settings → Dosing performance PAC ECO operation



The ECO operation function for powdered activated carbon enables an operation with optimised energy cost and consumption.

Explanation of the setting parameters

- PAC: → Dosing time for the powdered activated carbon during ECO operation; can be set from 1-30 seconds
- Cycle: → Cycle time for the entire dosing cycle during ECO operation, can be set from 30-360 seconds

The ECO operation function can be activated manually using the OFF/ON buttons on the touch screen, or switched on and off via an external signal. Contacts 1 and 2 of connector strip SL9 must be closed for the external signal.

The ECO operation function:

Continuous operating programme:

ECO operation OFF: Continuous dosing takes place according to the dosing performance settings for normal operation in the “Dosing performance PAC” submenu; contacts 1 and 2 of the SL9 connector strip are non-functional.

ECO operation ON: ECO operation is activated when contact 1+2 of the SL9 connector strip are closed. As long as ECO operation is ON, dosing takes place continuously with the ECO settings (“PAC ECO dosing performance” menu).

Time operating programme:

ECO operation OFF: Dosing only takes place during the set times. Dosing is carried out according to the dosing performance settings for normal operation in the “Dosing performance PAC” submenu. Dosing does not take place at all outside the set times.

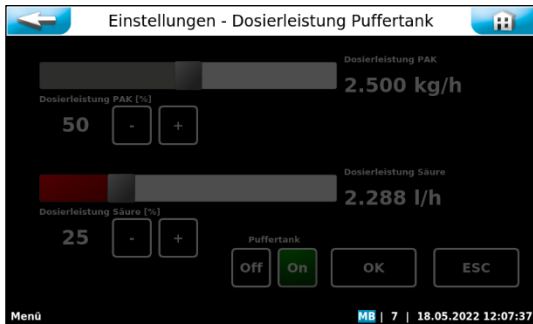
ECO operation ON: Dosing takes place during the set times. Dosing is carried out according to the dosing performance settings for normal operation in the “Dosing performance PAC” submenu. Outside the set times, the reduced ECO quantity (as set in the PAC-ECO dosing performance menu) is dosed.



NOTICE!

Contact 1+2 of SL9 is inactive in the “Time operating programme” setting! For the operating programme, see *Chapter 6.3.2.1*.

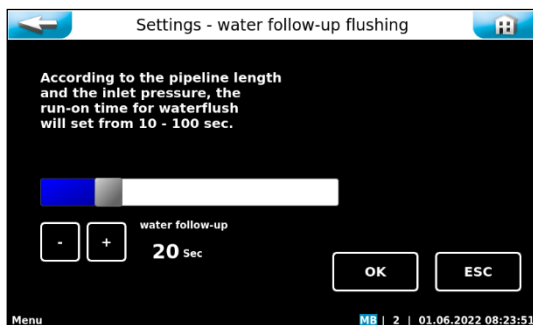
6.3.2.10 Main menu → Settings → Dosing performance Buffer tank (option)



This screen only works when operating the system with the buffer tank option.

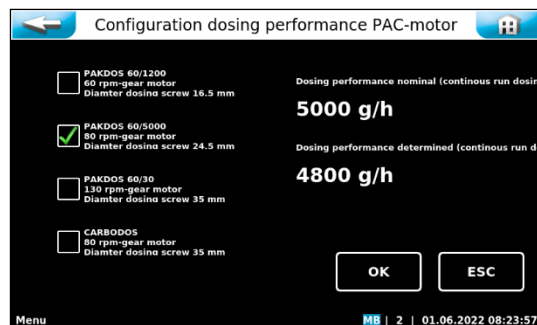
The descriptions of the respective symbols and the operation can be found in the corresponding instructions.

6.3.2.11 Main menu → Settings → Water follow-up flushing / Rinsing programme



With the "Water follow-up flushing" function, the pipe is still flushed for the set time after the dosing has been switched off. This prevents powdered activated carbon from settling in the pipe. Set the desired run-on time.

6.3.2.12 Main menu → Settings → Dosing performance PAC - installed dosing components



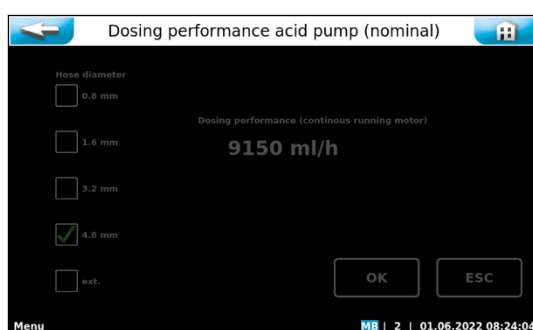
These settings can only be made in user level 7. The values set here depend on the dosing device design. The values are preset ex works and are used as the basis for determining the dosing quantities and reserve indication.



Attention!

These values may only be changed if the appropriate components have been installed in the dosing device. Otherwise, the dosing quantities will be determined incorrectly!

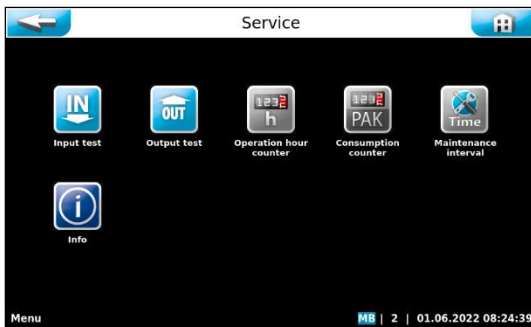
6.3.2.13 Main menu → Settings → Dosing performance acid - installed dosing components (option)



This screen only works when operating the system with the acid dosing option

The descriptions of the respective symbols and the operation can be found in the corresponding instructions.

6.3.3 Main menu → Service



Input test

A test programme for switch inputs (electrical signals).



Output test

A test programme for pumps and relay outputs.



Operation hour counter

Counts the operating hours for booster pump, acid dosing motor and carbon dosing motor.



Consumption counter

Counts the chemical consumption.



Maintenance interval

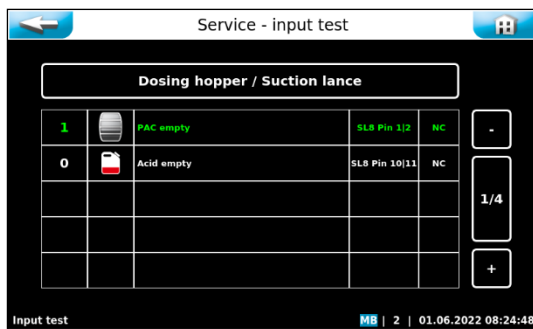
Setting the time interval for the maintenance message



Info

For querying the firmware versions.

6.3.3.1 Main menu → Service → Input test



The input test is used to check the connected inputs (switches). The changing activation of the switch inputs is indicated by 0 (open) or 1 (closed).

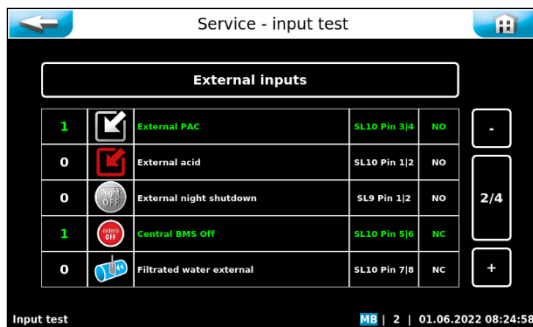
The fourth column displays the pin header (SLx) and the connectors (Pinx/x) to which the switch is connected.

The fifth column shows the function of the switches NO or NC, respectively.

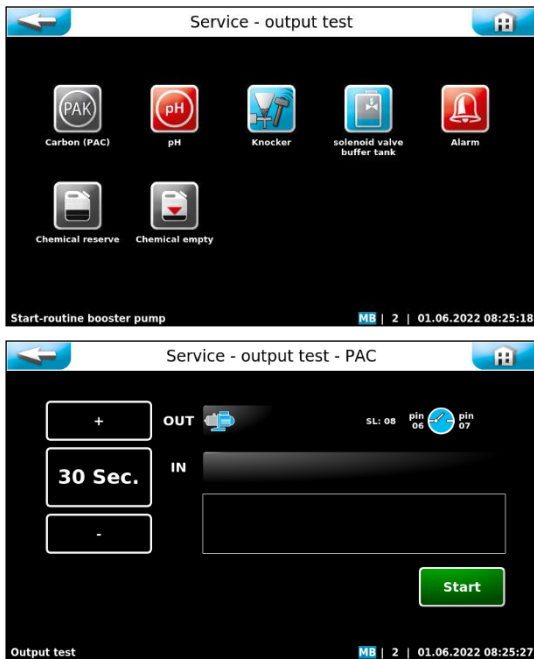
NO (normally open) indicates open in the operating state and closed in the event of a fault.

NC (normally closed) indicates closed in the operating state and open in the event of a fault.

You can scroll through the 4 pages for the input test using the + and – buttons.



6.3.3.2 Main menu → Service → Output test



The output test is used to check the connected outputs (pumps, motors and relays). The selected output is activated for 30 seconds. The control can be deactivated at any time using **Stop**.

For safety reasons, the output test for the chemical-dosing outputs is only released if no fault exists that could prevent the dosing.

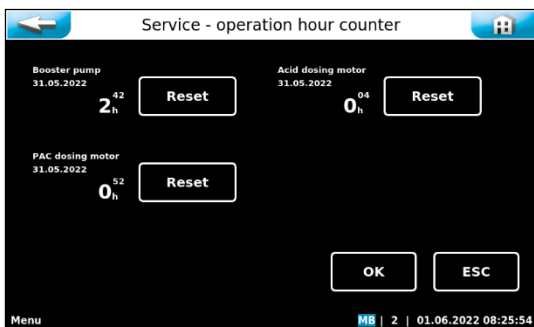
An output test can be performed for the following actuators:

- Powdered activated carbon dosing
- Knocker
- Alarm
- Chemical empty

The following output tests are only available with the use of the corresponding option:

- Acid dosing (option)
- Solenoid valve buffer tank filling (option)
- Chemical reserve – for both together

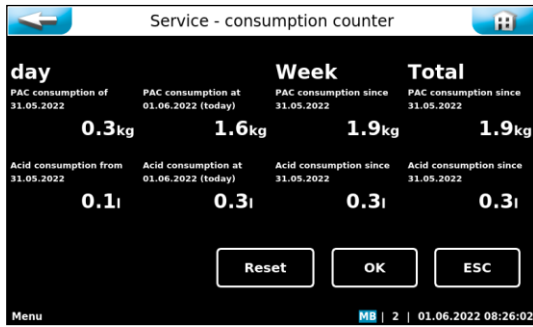
6.3.3.3 Main menu → Service → Operation hour counter



Use “Reset” to reset the operating hours for the respective actuators.

The reset can only be done in user level 2.

6.3.3.4 Main menu → Service → Consumption counter

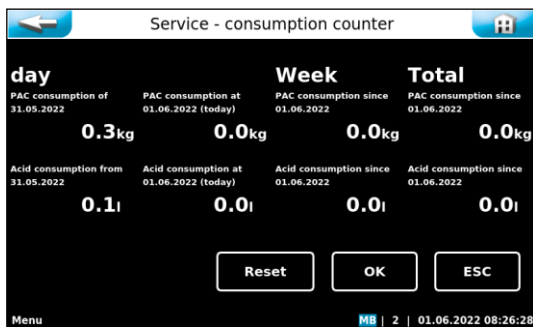


The consumption counter summarises the consumption of each chemical.

The Reset button can be used to reset each individual consumption reading to 0.

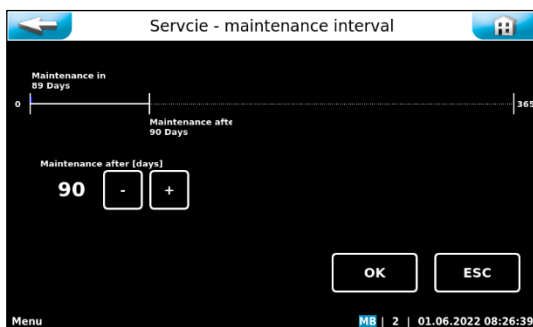
The reset can only be done in user level 2.

Each value is queried and must be confirmed individually.




The previous operating day's consumption (left column) **cannot** be reset!

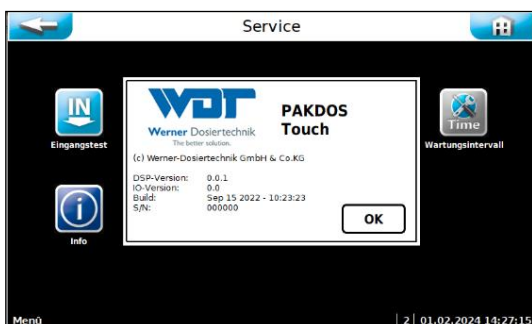
6.3.3.5 Main menu → Service → Maintenance interval



The time interval for the maintenance message in days is set here. Af-

ter the set time interval the  symbol is used on the start display as a reminder of any pending maintenance works.

6.3.3.6 Main Menu → Service → Info



The software and device data used can be viewed using the Info button.

The following are distinguished:

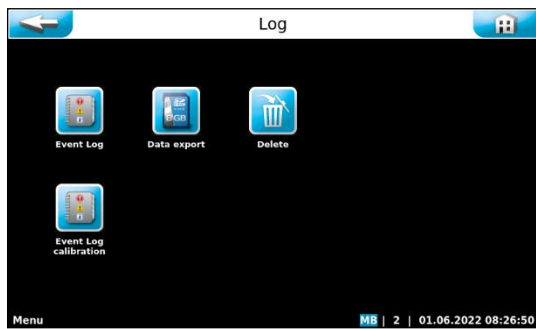
DSP version: → Firmware version

I/O version: → Coprocessor version on the I/O board

Build: → Date of manufacturing

S/N: → Serial number

6.3.4 Main menu → Log (event and data logging)



Event Log

Displays a chronological list of the events that have occurred



Data export

Is used to export the collected data to a USB stick



Delete

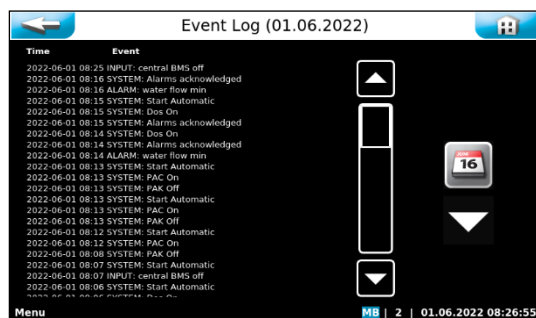
Is used to delete the stored data



Event Log calibration (option)

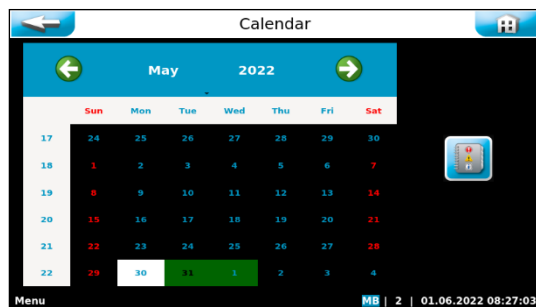
Displays a chronological list of the events that have occurred for the pH adjustment

a) Main menu → Log → Event Log



When calling up the menu, a list of events that occurred on this day will be displayed.

You can use the Calendar BUTTON to view events from previous days.

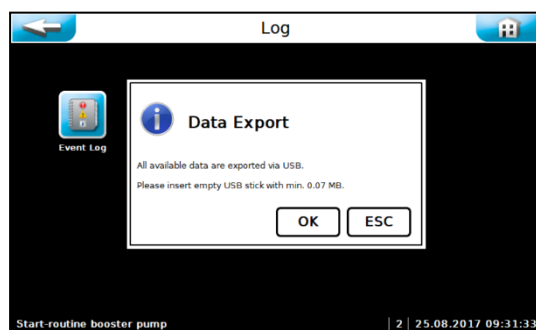


The current day is shown on a white background. Days on which the control unit was activated are shown on a green background.

If you select another day by tapping on it, that day will be shown on a white background.

You can use the Event Log BUTTON to view the events of the selected day.

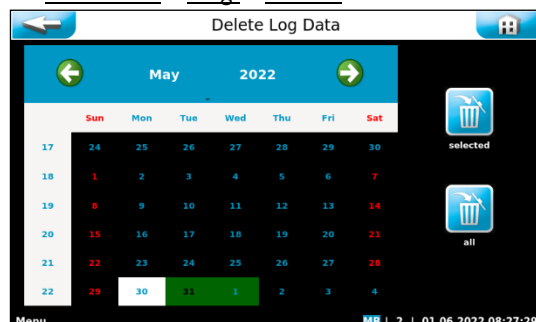
b) Main menu → Log → Export



You can use the Export menu item to load the stored log data onto an **empty** USB stick. If the USB stick is not empty, formatting is suggested and will be carried out after you confirm with OK.

The daily event files and CSV files can then be found on the USB stick.

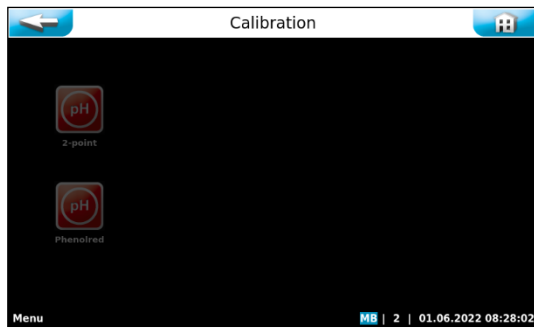
c) Main menu → Log → Delete



The current day is shown on a white background. Days on which the log files were stored are shown on a green background. If you select the desired day by lightly touching it, that day will be shown on a white background. You can use the **selected** button to delete the event log events and the data log events for the selected day.

You can use the **all** button to delete all event log events and data log events at once.

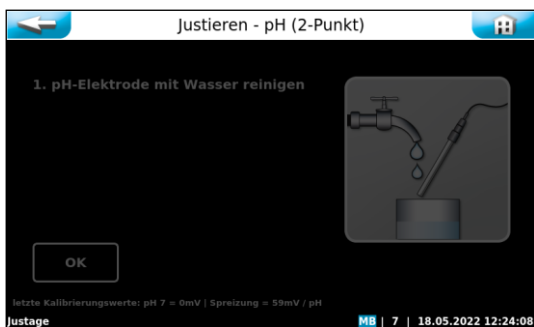
6.3.5 Main menu → Calibration (Option for design with buffer tank)



This screen only works when operating the system with the acid dosing and buffer tank options.

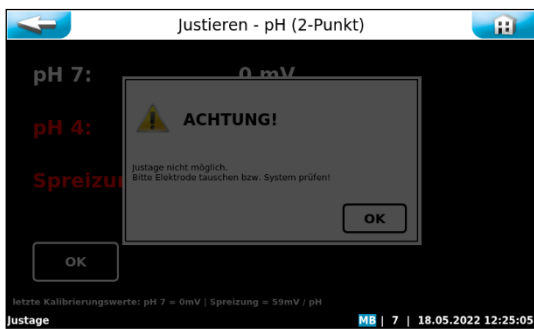
The descriptions of the respective symbols and the operation can be found in the corresponding instructions.

6.3.5.1 Main menu → Calibration → pH 2-point (option)

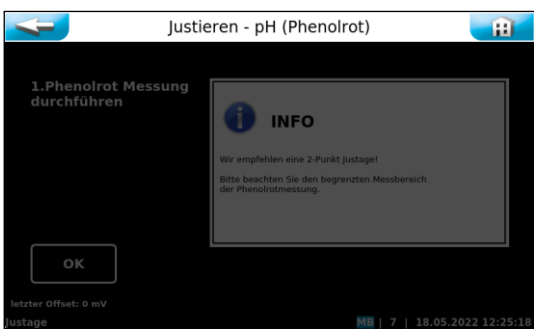


This screen only works when operating the system with the acid dosing option.

The descriptions of the respective symbols and the operation can be found in the corresponding instructions.

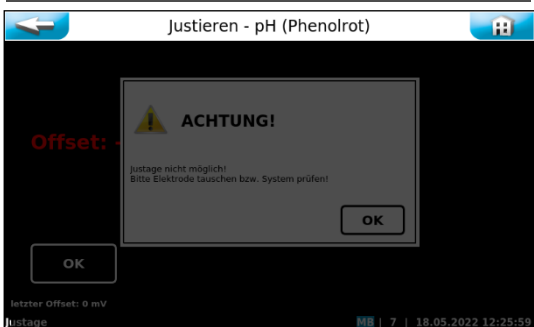


6.3.5.2 Main Menu → Calibration → pH Phenolred (option)



This screen only works when operating the system with the acid dosing option.

The descriptions of the respective symbols and the operation can be found in the corresponding instructions.



6.4 Replenish consumables



PROTECTIVE CLOTHING!

Personal safety equipment must be used when handling chemicals: Tight-sealing goggles, protective gloves, apron, face protection/dust protection, boots. Pay attention to the safety data sheets for each chemical.

Replenish powdered activated carbon

Replacing the PAC drum, see *Chapter 5.2.2, Attach / change the drum.*

7 Maintenance, care, fault

7.1 Device maintenance

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



Tip!

The maintenance work required for trouble-free operation is listed in the maintenance protocol in *Chapter 9.5*.



DANGER FROM ELECTRICAL VOLTAGE!

Before any electrical work is carried out, the device must be disconnected from the power supply and secured against being reactivated!

The following points must be observed for fault-free operation:

- ✓ Only use suitable powdered activated carbon - for requirements see *Chapter 3.3.1*.
- ✓ Keep the dirt filter clean
- ✓ Check function of the flushing ring, even, gentle flow, clean if necessary
- ✓ Frequently check the function of the flow and level control switches
- ✓ With every drum change or every month, clean the inside of the suspensor – including the suspensor bottom – and the flushing tub with a brush
- ✓ With every drum change, clean the heated dosing pipe with the small round brush up to the connection angle to the dosing screw
- ✓ Remove the dosing motor with the dosing screw every month and thoroughly clean the dosing screw. The dosing screw must be absolutely smooth and free of adhering particles. If the dosing screw is damaged, install a new one.
- ✓ Annually renew the diaphragm of the float and the sealing ring of the flow switch's switch body
- ✓ Keep the plexiglass tube of the optical dosing monitor (option) clean

For extended decommissioning, remove the dosing motor and clean all adhering carbon particles from the dosing screw. Only install the dosing screw during recommissioning. Clean the suspension unit. The maintenance tasks are listed in the maintenance protocol.

7.1.1 Cleaning the dirt filter

When working on lines that carry water, always close the inlet and outlet valves!



ATTENTION!

A clean dirt filter is important for proper functioning. A dirty filter can lead to cavitation in the pump, causing a reduced performance and damage to the bearings.

Cleaning the dirt filter in the intake line

- Unscrew the upper d75 and lower d25 pipe unions at the filter and completely remove the filter from its bracket.
- Pull out the filter insert.
- Clean the filter insert and the filter hood under running water.
- Reinstall the filter in the reverse sequence.

7.1.2 Replacing the dosing screw and the dust gasket

Removal / installation of the protective cover

- Push the dust protection pipe (24) downward.
- Loosen the spring bolt (30) of the turning device and rotate the turning device with the drum clockwise from the dosing position upward; while doing so, keep the dosing pipe **covered with a finger** to prevent any powdered activated carbon from escaping. Relock the turning device.
- Loosen the attachment screws of the protective cover, remove the cover – pull the cables slightly inward to ensure improved cover mobility
- To install the protective cover, follow the procedure in reverse sequence



PROTECTIVE CLOTHING!

Personal safety equipment must be put on prior to starting the work

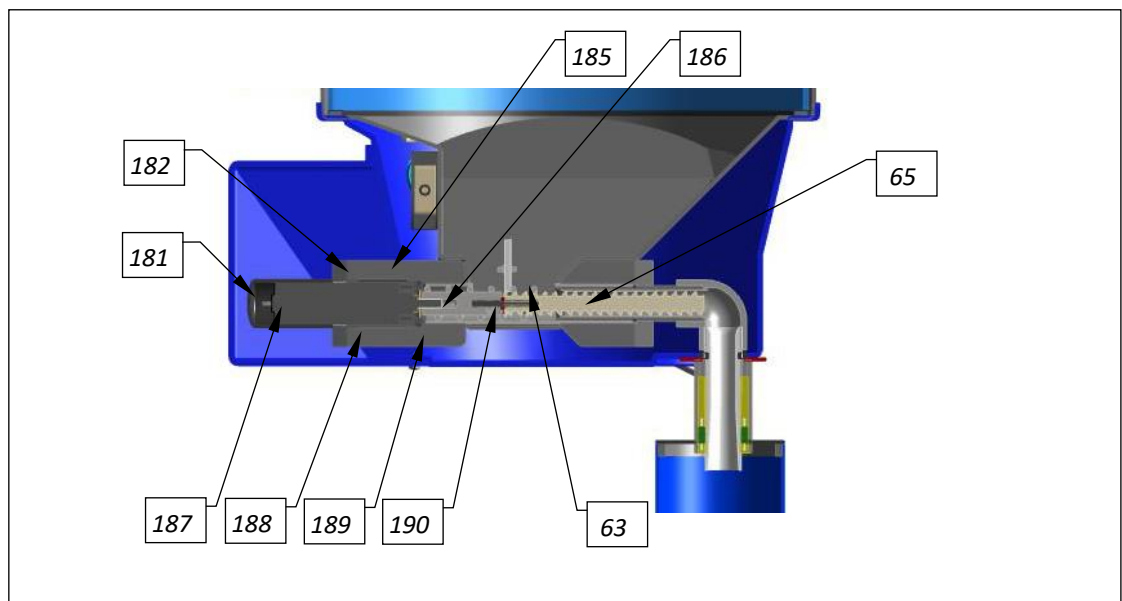


Figure 22, Dosing motor with dosing screw

The dosing motor/dosing screw consist of:

181. Protective cap	182. Screw M5x20
183. Diaphragm (covered)	184. Felt washer (covered)
185. Dust cover	186. Threaded pin 1
187. Dosing motor	188. Motor bracket
189. O-ring	190. Threaded pin 2
63. Motion screw	65. Dosing screw

Required tools for replacing the dosing screw or the dosing motor

- ✓ Phillips screwdriver PZ2 to loosen the screws on the cover and control unit
- ✓ Flat-head screwdriver 2mm to loosen the cable clamps,
- ✓ Wrench 8mm to loosen the dosing motor
- ✓ Measuring device (multimeter) for measuring the voltage
- ✓ Small knife or screwdriver to clean the threaded pin
- ✓ Allen wrench 2.5 mm for the threaded pin on the dosing screw

7.1.2.1 Removal of the dosing motor and the dosing screw

- a) Rotate the drum upward and lock it.
- b) Loosen the attachment screws of the protective cover, remove the cover – pull the cables slightly inward to ensure improved cover mobility.
- c) If the motor is to be removed, open the connection socket on the dosing hopper and disconnect the cables.
- d) Remove the protective caps (181) from the attachment screws M5x20 (182) and unscrew the screws using a wrench SW 8.
- e) Pull the dosing motor (187) out of the motor bracket (188) – to do this, hold a shallow collecting container under the motor bracket to prevent any powdered activated carbon from being scattered. Clean the inside of the motor bracket and remove any scattered powdered activated carbon.
- f) Clean the dosing screw – The powdered activated carbon in the screw may be heavily solidified or may fall out of the screw quite loosely when the screw is pulled out!
- g) If the granulate is solidified, it may be too moist or have an excessive dust content. It is also possible that the dosing screw is already too worn and the powdered activated carbon can no longer be properly transported.

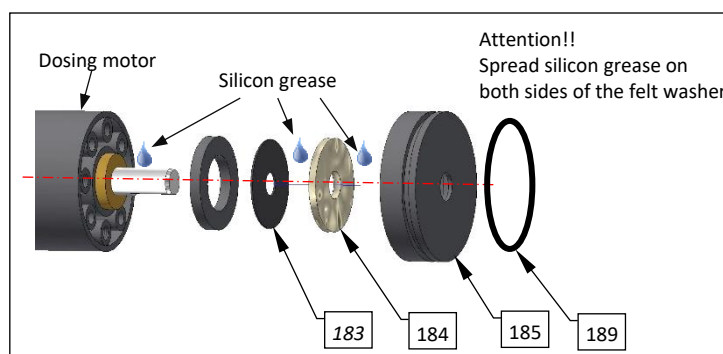
7.1.2.2 Maintenance of the dosing motor

- a) Disconnect the motor cable at the hopper and pull the cable from the grommet.
- b) Use a small screwdriver or a small knife to scrape the putty from the thread hole of the threaded pin 1 (186) on the dosing screw's brass collar.
- c) Loosen the threaded pin 1 with an Allen wrench SW 2.5 and pull the dosing screw (65) with the motion screw (63) from the shaft.
- d) Pull the dust cover from the dosing motor and remove the old sealing washers.
- e) Spread silicon grease on both sides of the new felt washer.
- f) Fill the bearing indentations at the dosing motor with silicon grease.
- g) First push the EPDM (rubber) sealing washer on the shaft, followed by the greased felt washer, and firmly reattach the dust cover (185) on the motor.
- h) Remove the old O-ring (189) from the dust cover's groove, insert a new O-ring, and apply approx. 2 layers of Teflon tape.
- i) Spread silicon grease on the front surfaces of the dosing motor/PVC dust cover and the dosing screw.
- j) Push the dosing screw on the shaft so that the threaded pin 1 (186) is located on the flat part of the motor shaft.
- k) Press the dosing screw against the motor and lightly tighten the threaded pin.



ATTENTION!

Do not fasten too tightly, as this may strip the PVC thread.



Sealing key:

- 183. Diaphragm
- 184. Felt washer
- 185. Dust cover
- 189. O-ring

Figure 23, Dosing motor

- l) Thoroughly close the thread bore with putty.
- m) Insert cable in the connection socket – apply a small amount of silicon grease, if needed, and connect the cables: white on white, brown on brown
- n) Test the dosing motor's functioning with the output test
- o) Push the dosing motor into the - cleaned - motor bracket and evenly screw tight with the new screws M5x20. Attach protective caps.



ATTENTION!

Without putty, the threaded pin will heavily corrode within a short time and can no longer be unscrewed. If the dosing screw or the motor must be replaced again at a later time, both parts would then have to be replaced together!

7.1.2.3 Only replacing the dosing motor

Carry out the tasks in Chapter 7.1.2.1 prior to removing the motor.

- a) Entirely unscrew the threaded pin 1 (186) from the dosing screw with the motion screw and insert a new threaded pin.
- b) Clean the front surface of the dosing screw's adapter and apply a layer of silicon grease.
- c) Open the connection socket at the dosing hopper.
- d) Loosen the connectors of the dosing motor cable (brown - white).
- e) Pull in a new motor cable and clamp tight: brown on brown, white on white.
- f) Push the dosing screw on the shaft so that the threaded pin is located on the flat part of the motor shaft, press firmly against motor and tighten the threaded pin.
- g) Push the motor with dosing screw back into the cleaned bracket.
- h) Screw on the flange – not too tightly.
- i) Press the protective caps on the screw heads.
- j) Place a new O-ring (189) on the dosing screw's guide pipe, wrap with Teflon tape (approx. 3 layers), and apply grease.
- k) Push the dosing unit into the bracket.

7.1.2.4 Replacing only the dosing screw

When only replacing the dosing screw, the seal in the dust protection cover should also be renewed. Sealing washers made of EPDM and felt are included in the scope of delivery.

Carry out the tasks in Chapter 7.1.2.1 prior to removing the motor.

- a) On threaded pin 2 (190), use a small screwdriver or a small knife to scrape the putty from the thread hole of the threaded pin 2
- b) Loosen threaded pin 2
- c) Pull the dosing screw (65) from the motion screw (63)
- d) Push the new dosing screw on the shaft so that the threaded pin 2 is located on the flat part of the motor shaft.
- e) Press the dosing screw onto the motion screw and firmly tighten the threaded pin 2.
- f) Thoroughly close the thread bore with putty.
- g) Insert cable in the connection socket – apply a small amount of silicon grease, if needed, and connect the cables: white on white, brown on brown
- h) Test the dosing motor's functioning with the output test
- i) Push the dosing motor into the cleaned motor bracket (188) and evenly screw tight with the new screws M5x20. Attach protective caps.

7.1.3 Maintenance and setting of the float control valve for the flushing tub inlet

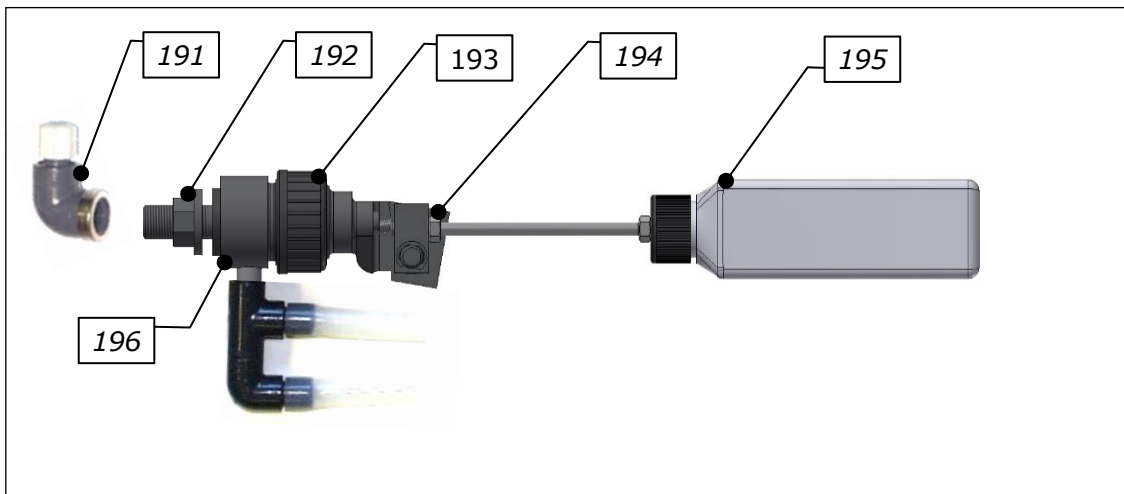


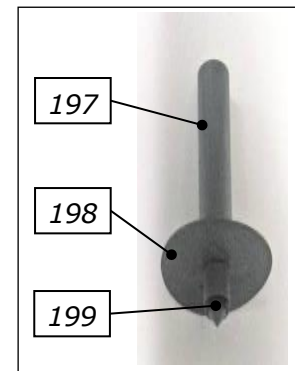
Figure 24, Complete float control valve and floating valve tappet

The complete floating valve consists of:

- 191 Connecting angle 3/8" for flushing water hose 6x1 mm
- 192 3/8" nut
- 193 Union nut for float assembly group
- 194 Adjustment screw for water level
- 195 Float 250 ml
- 196 Floating valve body with seal

The floating valve tappet consists of:

- 197 Tappet
- 198 Diaphragm
- 199 Valve cone with O-ring



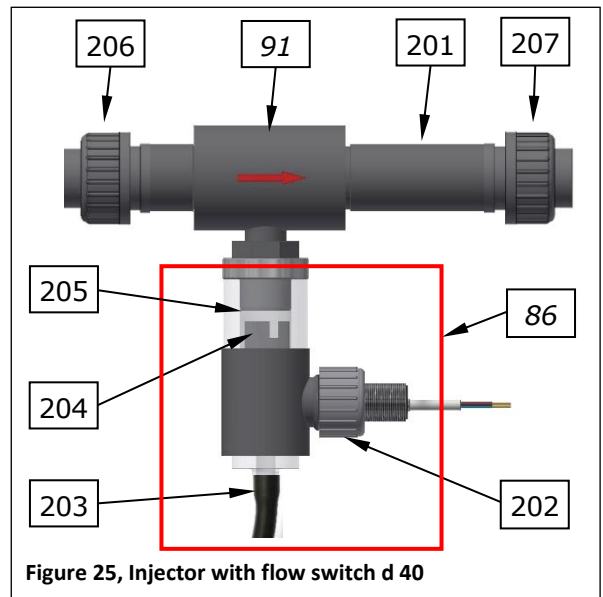
Replace the diaphragm

- a) Loosen the union nut (193) and remove the upper part of the floating valve.
- b) Remove the tappet assembly group (197 to 199).
- c) Pull the valve cone (189) out of the tappet (197).
- d) Push a new diaphragm (198) onto the valve cone.
- e) Replace the O-ring on the valve cone (199) as well.
- f) Reinstall in the reverse sequence.
- g) Reset the water level in the flushing tub. *See Chapter 5.2.5.*

7.1.4 Injector with suction pipe and flow switch

Key:

- 201. Diffuser nozzle with installed hole washer
- 202. Union nut for flow switch
- 203. Viton hose to the flushing tub
- 204. Switch body (in the suction pipe)
- 205. Suction pipe
- 206. Pipe union of injector inlet
- 207. Pipe union of injector outlet
- 86. Flow switch with suction pipe (with LED)
- 91. Injector



Replace the hole washer:

Loosen the union nuts (206 + 207) and swivel the injector out. The hole washer is sealed into the O-ring at the diffuser nozzle's (201) inner thread. Pry out this hole washer with a small screwdriver. Insert another hole washer or leave the washer out, as needed.

7.1.5 Calibration of the opto-sensor "PAC missing" on the sighting pipe

When the water is clear (LED on the sensor lights up), turn the setting potentiometer to the left until it stops (LED off), then turn it to the right again until the LED lights up, plus ¼ turn to the right.

7.1.6 Replace and set the PAC empty switch at the dosing hopper

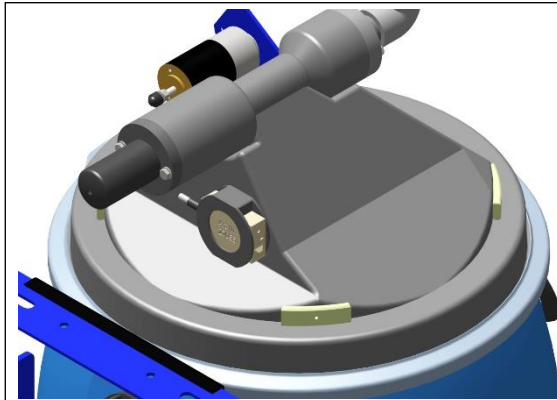


Figure 26, Empty switch for GR 45/100

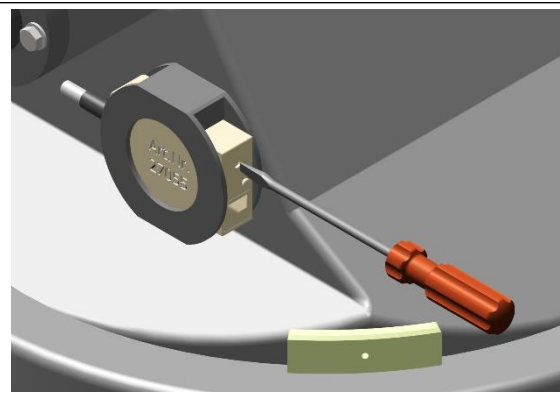


Figure 27, Empty switch installed on GR 45/100

At the PAKDOS, the empty switch can be accessed after removing the protective cover. The small adjustment screw with the switch LED can be seen on top of the narrow side. When the drum is empty or the dosing hopper has been turned upward with the drum, this LED must **not** be illuminated; the display must show **PAC empty**.

If the switch LED is illuminated, turn the adjustment screw slowly to the left until the LED goes out. The **PAC empty** fault display at the control unit reacts with a **6-second delay**.

If the switch does not react to the adjustment potentiometer or if the adjustment screw has been destroyed, a new switch must be installed.

Adjust the empty switch (drum rotated upward)

- Turn the adjustment screw to the right until the switch LED lights up
- Then carefully turn it back until the switch LED goes out, followed by an additional 10° turn
- The **PAC empty** fault is displayed at the control unit. After rotating the drum that is **not empty** into the dosing position, the fault indication at the control unit goes out – provided there is powdered activated carbon in the drum.

Replace empty switch

- Open the connection socket and disconnect the 3 switch wires, pull out the cable.
- Push the old switch out of the bracket.
- Push the new switch into the bracket until it snaps into place.
- Insert the cable in the connection socket and clamp on according to the wiring diagram.
- Close the terminal casing and fill the screw heads with grease to prevent any corrosion.
- Adjust the switch, as described above.

7.2 Fault removal



Tip!



All faults and notifications are displayed on the touch screen in the IN list. In addition, they may be queried in the Event Log.

An error will only be displayed once it has occurred uninterrupted for at least 6 seconds.









Attention! In the event of a fault indication, it is also possible that switches or sensors are faulty and thus do not transmit any electric signals.













Tip!

Encrustations of powdered activated carbon in the dosing hopper can lead to malfunctions. Clean the dosing hopper according to the maintenance protocol.

For fault table, see following page.

Fault display	Cause / effect	Actions
<p> 1. Powdered activated carbon empty ALARM: PAC container empty</p>	<p>This notification is for information purposes only, no action ensues. The PAC dosing and booster pump keep running.</p>	<p>1. Refill PAC or change container 2. If the powdered activated carbon is not empty, recalibrate the empty switch or 3. Renew the empty switch.</p>
<p> 2. Acid empty ALARM: (option) Acid container empty</p>	<p>The acid dosing stops and the booster pump and PAC dosing keep running.</p>	<p>1. Replace the empty acid container with a full one 2. If the acid container is not empty, the empty switch is faulty. 3. If the suction lance is new, check the float's functional direction - float at the bottom = empty display; otherwise, turn the float</p>
<p> 3. Chemicals container filling level reserve NOTIFICATION</p>	<p>This notification is for information purposes only, no action ensues.</p>	<p>Ensure sufficient resupplies.</p>
<p> 4. Minimum pressure ALARM: The pressure at the booster pump is too low</p>	<p>Dosing is stopped. The booster pump has been deactivated. 1. Supply pressure too low 2. Booster pump faulty 3. Pressure switch faulty</p>	<p>Check pump Set a lower response pressure at the pressure switch</p>
<p> 5. Flushing tub level minimum ALARM: Water minimum switch active. The water level in the flushing tub is low; more water is suctioned off than runs into the flushing tub through the floating valve.</p>	<p>Cause: Inlet pressure too high, Counter-pressure too low Dosing is stopped. The booster pump has been deactivated. Floating valve defective? Switch defective?</p>	<p>1. Floating valve function: The water inlet should gently follow the float's movement. If OK, calibrate the water level. See OI Dosing unit, Chapter Commissioning; if this is not the case, insert a new diaphragm in the floating valve. 2. Insert a hole washer with a smaller drill hole 3. Prefilter (Pos. 9) dirty → clean 4. If water level is not at minimum, insert a new switch</p>
<p> 6. Flushing tub level maximum ALARM: Water maximum switch active. The water level in the flushing tub is too high, less water is siphoned off than is flowing into the flushing tub through the floating valve.</p>	<p>Cause: Counter-pressure too high Floating valve defective Dosing is stopped. The booster pump keeps running. Switch defective?</p>	<p>1. If the injector's suction performance is OK: a) Floating valve function: The water inlet should gently follow the float's movement. If OK, calibrate the water level. See OI Dosing unit, Chapter Commissioning b) If this is not the case, insert a new diaphragm in the floating valve. 2. If the suction performance is not sufficient, see under fault display 7 "Water flow suction tube min. ALARM" 3. If water level is not at max.: insert a new switch</p>
<p> 7. Suction pipe flow minimum ALARM: The water flow in the suction pipe is too low. The switch body of the flow switch does not rise, the switch LED lights up.</p>	<p>Dosing is stopped. The booster pump keeps running.</p>	<p>1. Check booster pump functioning. 2. Prefilter dirty → clean 3. Blocked suction opening in the flushing tub 4. There may be particles in the injector, both at the nozzle or in the suction pipe, due to particles entering during installation or from the PAC drum 5. Insert a hole washer with a larger drill hole or remove it entirely 6. Blocked non-return valve at the buffer tank 7. Injector's diffuser nozzle worn out; if D > 6.5 mm, replace diffuser nozzle</p>
<p> 8. PAC dosing monitoring in sighting pipe ALARM: (with buffer tank) The optical sensor on the sighting pipe is activated.</p>	<p>The sensor on the sighting pipe indicates that after the 2nd dosing interval, insufficient PAC was dosed/is present in the sighting pipe.</p>	<p>1. Fault during dosing: Clumping of the PAC Dosing screw blocked due to poor PAC quality (too fine, moist) 2. The dosing motor is defective. 3. Calibrate the optical sensor.</p>

<p>9.  ALARM: Fuse for the PAC dosing motor or acid dosing motor or supply of the 24V sensors See log file regarding the differentiation between the individual safeguards</p>	<p>The PAC dosing or acid dosing stops despite control. The booster pump keeps running.</p> <p>With fuse F1 of the 24V sensors: The dosing and booster pumps are stopping</p>	<p>Check PAC motor for blockages; remove blockage, if necessary, and renew the fuse.</p> <p>Check the acid dosing motor and renew the fuse.</p> <p>Check the PAC empty, PAC missing and Flow minimum sensors, renew the defective sensor and the fuse.</p>
<p>10.  Buffer tank filling start NOTIFICATION:</p>	<p>The filling starts. Switchover valve active</p>	<p>The dosing device starts to produce the PAC suspension at the set dosing performance.</p>
<p>11.  Buffer tank filling stop NOTIFICATION:</p>	<p>The filling with PAC suspension stops.</p>	<p>The rinsing cycle starts, the PAKDOS then stops and remains in standby operation.</p>
<p>12.  Buffer tank level minimum ALARM:</p>	<p>The lower control switch for starting the filling did not trigger.</p>	<p>Check switch function: If the tank is empty, the switch contact must be closed (measure at the terminal). If open: Switch or terminal contact faulty</p>
<p>13.  Buffer tank level maximum ALARM:</p>	<p>When filling, the upper Maximum level control switch to stop the filling was not triggered.</p>	<p>1. Check the "Stop buffer tank filling level" switch: If the tank is full, the switch contact of the "Stop buffer tank filling level" switch must be closed (measure at the terminal). If it is open when the buffer tank is full, the switch or terminal contact is faulty.</p> <p>2. "Stop buffer tank filling level" switch working: → Check switchover valves for functioning</p>
<p>14.  Alarm collecting tub</p>	<p>The level switch in the collecting tub reports liquid in collecting tub.</p> <p>Control valve to the buffer tank not closing</p>	<p>1. Buffer tank is overflowing or leaking</p> <p>a) "Stop buffer tank filling level" and Level maximum alarm level switches at buffer tank defective. → Renew level switches</p> <p>b) Leaking non-return valve in a dosing line → renew non-return valve</p> <p>c) Buffer tank leakage → renew buffer tank</p> <p>d) Check control valve to the buffer tank</p>
<p>15.  Buffer tank filling time-out ALARM:</p>	<p>Filling occurred too slowly. The buffer tank filling has been deactivated by the system.</p>	<p>1. Check valves</p> <p>2. Check "Start buffer tank" sensor: The contact must be open again 3 minutes after filling has started!</p>
<p>16.  Filtrated water external ALARM: Ext. control switch of the flow in the clean water line active</p>	<p>External flow sensor reports flow too low. The dosing and booster pump are stopped.</p>	<p>Check swimming pool circulation; if this is OK, then check the flow sensor.</p>
<p>17.  External Off NOTIFICATION:</p>	<p>The PAKDOS has been deactivated.</p>	<p>No action, since it has been deactivated externally.</p>
<p>18.  Dosing timeout ALARM: PAC (brown) or acid (red)</p>	<p>The dynamic dosing time for PAC or acid has been exceeded. The respective output is blocked. Dosing performance may be too low.</p>	<p>Check dosing screw and dosing pumps for defects and blockages. Eliminate fault or blockage. (see also Chapter 7 for the respective dosing unit). Check external control Increase dosing performance, if necessary.</p>

Malfunctions without display in the device:

1. The display is dark and the device is turned off:

- a) No supply voltage: → Restore the supply voltage
- b) The main fuse at the lower left of the housing has blown: → Renew fuse – determine the cause
- c) The F1 fuse at the power pack has blown: → Renew fuse – determine the cause
- d) The power pack is defective: → Renew power pack

2. The flushing tub overflows when shutting down the PAKDOS: → In this case, check the following parts:

- a) Leaking floating valve: → Renew diaphragm
- b) Switch body in the suction pipe is blocked: → Foreign object in the suction pipe → Clean suction pipe

Switch contact to the corresponding fault indication:


Designation	Situation	Switch contact	Display in the "IN" list
Dosing device			
1. D-min alarm, b-pump flushing tub	no pressure at pump	open	Yes
2. W-min alarm, flushing tub	Float at the bottom	closed	Yes
3. W-max alarm, flushing tub	Float at the top	closed	Yes
4. Df-min alarm, flushing tub	Switch body at the bottom	closed	Yes
5. No PAC alarm	No PAC in sighting pipe	open	Yes
6. PAC empty alarm	PAC drum empty	open	Yes
7. Acid empty, alarm acid container	Float at the bottom	open	Yes
Buffer tank (option)			
8. "Start filling" level. Buffer tank notification	Float at the bottom	closed	Yes
9. "Stop filling" level buffer tank notification	Float at the top	closed	Yes
10. 11 Level min. alarm, buffer tank	Float at the bottom	closed	Yes
11. Level max. alarm, buffer tank	Float at the top	open	Yes
12. Level protection tub alarm	Float at the top	closed	Yes
13. pH Supervision alarm	pH value not within the tolerance range	closed	Yes
14. Feed pump motor protection alarm	Motor protection switch is triggered	closed	Yes
Other			
15. CCS (Central Control System) off, notification	Input CCS,	open	Yes

8 Decommissioning – Storage – Disposal

8.1 General

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

8.2 Decommissioning of the PAKDOS 60 dosing device

- a) Thoroughly remove any remnants of powdered activated carbon in the device and allow the system to run for an additional 10 minutes for flushing and cleaning.
- b) Stop the dosing via the  button.
- c) Remove the PAC drum and close it securely.
- d) Empty and thoroughly clean the dosing hopper.
- e) Disassemble the dosing motor with the dosing screw from the dosing hopper, thoroughly clean the dosing motor with dosing screw and store it in a dry place.
- f) Thoroughly clean all parts of the PAKDOS.
- g) If there is a risk of frost, drain all of the water-conveying parts; in particular, remember the suction pipe and the pump.
- h) Deactivate the dosing device at the main switch. – Or, in very cold and moist rooms, keep the dosing device activated to prevent potential condensation in the control housing.

Also pay attention to *Chapter 8.3*

8.3 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.

9 Documents

9.1 Declaration of conformity

<p>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</p>					
<p>EG-Konformitätserklärung EC declaration of conformity Déclaration de conformité UE</p> <p>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</p>					
<p>Hersteller WDT - Werner Dosiertechnik GmbH & Co. KG Manufacturer Hettlinger Str. 17 Fabricant 86637 Wertingen-Geratshofen</p>					
<p>Beschreibung und Identifikation des Produktes: Description and identification of the product: Description et identification du produit :</p>					
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%; padding: 5px;">Typenbezeichnung:</td> <td style="width: 20%; padding: 5px;">Art:</td> </tr> <tr> <td style="padding: 5px;">• PAKDOS 60-Touch</td> <td style="padding: 5px;">Maschine</td> </tr> </table>	Typenbezeichnung:	Art:	• PAKDOS 60-Touch	Maschine	
Typenbezeichnung:	Art:				
• PAKDOS 60-Touch	Maschine				
<p>Funktion: Das Dosiersystem dient zur Dosierung trockener Pulveraktivkohle in Schwimmbadwasser. Function: The dosing system is intended for dosing of dry powdered activated carbon into swimming pool water. Fonction: Le système de dosage est utilisé pour doser du charbon actif en poudre sec dans l'eau de piscine</p>					
<p>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 :</p>					
<p>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)</p>					
<p>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 :</p>					
<p>EN ISO 12100:2010 Sicherheit von Maschinen - Allgemeine Gestaltungsleitsätze - Risikobeurteilung und Risikominderung EN 60204-1:2018 Sicherheit von Maschinen – Elektrische Ausrüstung von Maschinen – Teil 1: Allgemeine Anforderungen EN ISO 14120:2015 Anforderungen an Gestaltung und Bau von feststehenden und beweglich trennenden Schutzeinrichtungen</p>					
<p>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:</p>					
<p>Name: Werner Dosiertechnik GmbH & Co KG Straße/Nr.: Hettlinger Straße 17 PLZ Stadt: 86637 Wertingen</p>					
<p>Wertingen, 27.05.2022</p>					
<p>Ort/City/Place, Datum/Date</p>	<p>Unterschrift/signature Jochen Rieger, Director</p>				
					
<p>CE SW 009-00 Konformitätserklärung PAKDOS 60.docx</p>					

9.2 Wiring diagrams



DANGER!

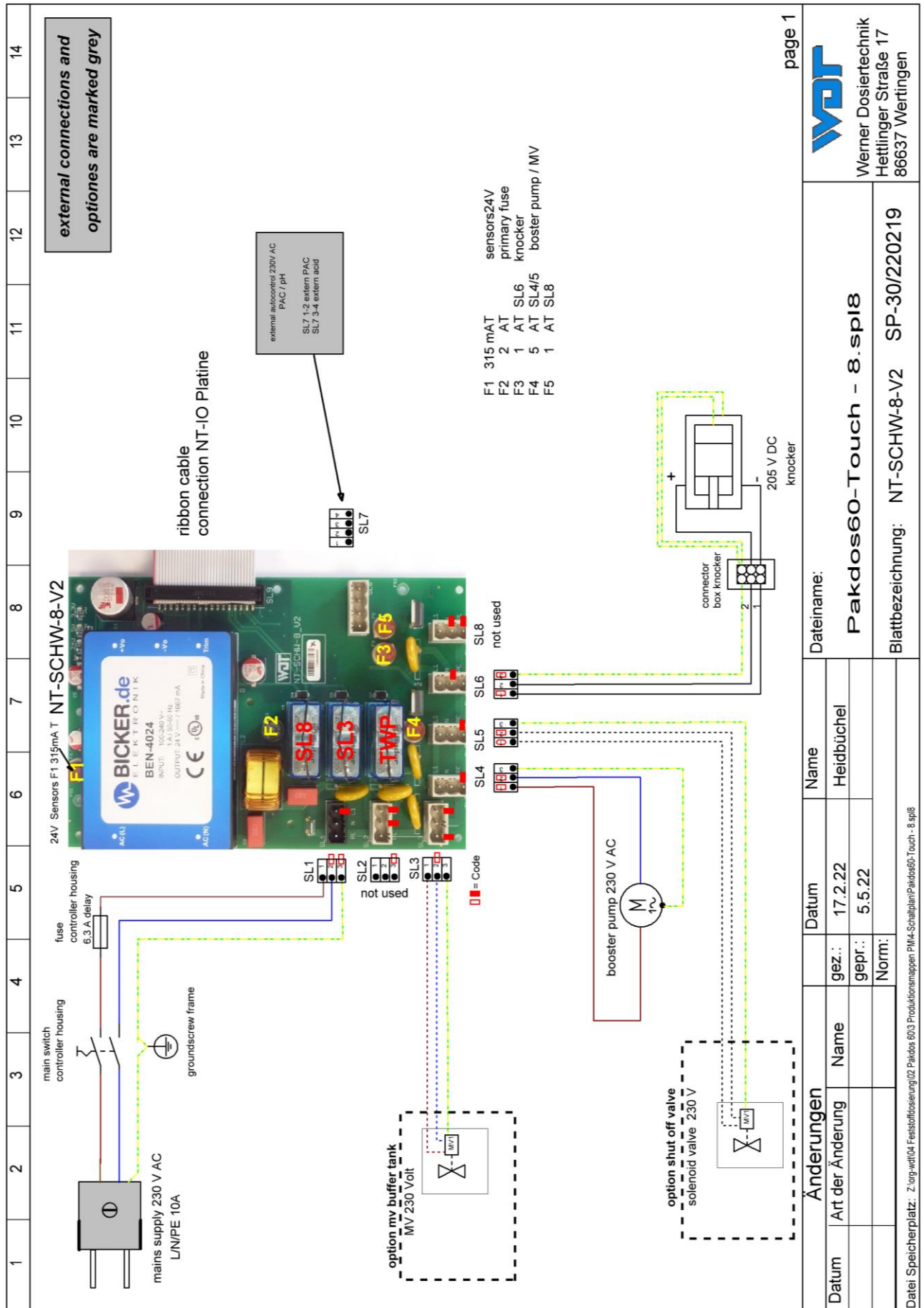
Risk of death due to high voltage. All electrical work on the device must only be carried out by trained specialists in accordance with the applicable safety regulations! Fuses on the control boards must only be renewed once the power has been disconnected and secured against being reactivated!



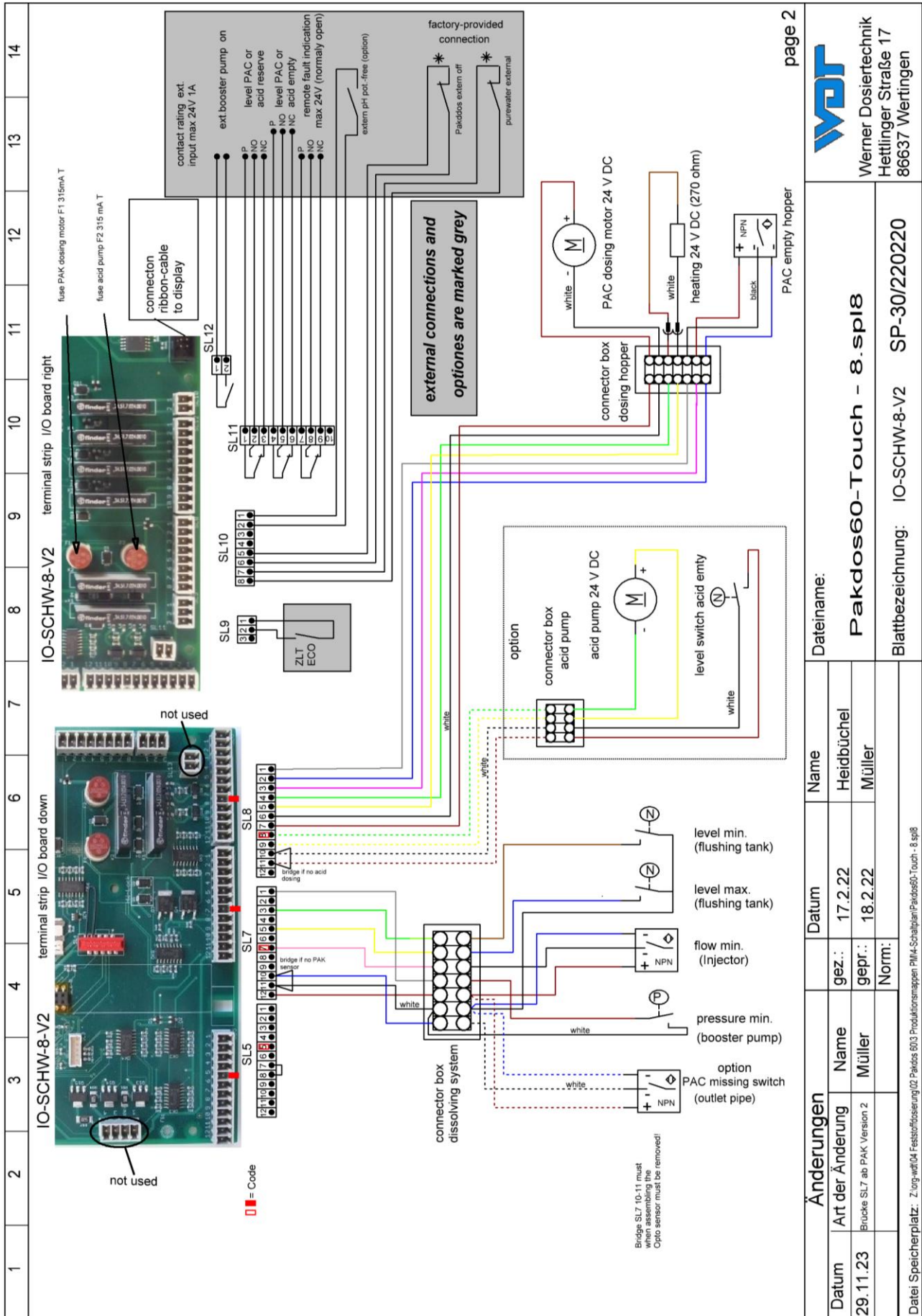
Tip!

These operating instruction contain the wiring diagrams for the devices' standard design. The special wiring diagrams attuned to the optional furnishing of the dosing device and buffer tank are located in the devices' terminal boxes.

9.2.1 Wiring diagram power pack with connection to the I/O circuit board



9.2.2 Wiring diagram I/O circuit board PAKDOS 60-Touch



page 2

Änderungen		Dateiname:	
Datum	Art der Änderung	Name	Name
29.11.23	Brücke SL7 ab PAK Version 2	Heidbüchel	Pakdos60-Touch - 8.sp18
		Müller	Blattbezeichnung: IO-SCHW-8-V2 SP-30/220220
Datei Speicherplatz: Z:\prog-welt\CA Festschreibung\02 Pakdos 603 Produktionsmappen PMM-Schalplan\PAKdos60-Touch - 8.sp18			

WDT
 Werner Dosiertechnik
 Hettlinger Straße 17
 86637 Wertingen

9.3 Commissioning protocol

The commissioning protocol is included with the attached documents.

9.4 Operation data sheet



During a *programme exchange*, all parameters are reset to the factory settings. After a programme exchange, all parameters must therefore be checked and readjusted. We therefore recommend that you enter the optimised, pool-specific parameters in this list.

Settings menu	Factory setting	Setting ranges		during commissioning	Optimised during operation
				Date:	Date:
1 Dosing performance PAC					
Operating programme		Cont. or time			
PAC	20 seconds	1-30 seconds			
Cycle time	30 seconds	30-360		—	—
Time programme - ECO times		Mon through Sun			
2 Reserve indication PAC					
Reserve indication		0-30 kg			
Drum size		10-30 kg			
Reserve indication	On	Off - On			
3 Dosing performance determination					
1. Dosing sample		Weight: ___ gr			
2. Dosing sample		Weight: ___ gr			
3. Dosing sample		Weight: ___ gr			
automatically calculated average value		dosing performance: _____ kg/h			
4 Delay booster pump					
Delay time	20	0 - 120 seconds	5		
Shut-off (option)	according to order	On - Off			
5 System					
Date/ time	CET / CEST	CET -12 +11			
6 System → Password					
End user	—	0000 – 9999			
Technician 1	01234	00000 – 99999			
7 System → Display					
Screensaver	20%	12-100%			
Screensaver delay	00: 05	00: 00 – 23: 59h			
Backlight	75%	24 - 100%			
8 System network (if available)					
IP address	—	xxx.xxx.xxx.xxx			
Subnetmask	—	xxx.xxx.xxx.xxx			
Gateway	—	xxx.xxx.xxx.xxx			
9 Water follow-up flushing					
Run-on time	20 seconds	10-100 seconds			
Line flushing					

Dosing system Type PAKDOS 60-Touch



Werner Dosiertechnik

Operation data sheet (master copy)

Settings menu	Factory setting	Setting ranges		during commissioning	Optimised during operation
				Date:	Date:
1 Dosing performance PAC					
Operating programme PAC		Cont. or time			
PAC	20 seconds	1-30 seconds			
Cycle time	30 seconds	30-360		—	—
Time programme - ECO times		Mon through Sun			
2 Reserve indication PAC					
Reserve indication		0-30 kg			
Drum size		10-30 kg			
Reserve indication	On	Off - On			
3 Dosing performance determination					
1. Dosing sample		Weight: ___ gr			
2. Dosing sample		Weight: ___ gr			
3. Dosing sample		Weight: ___ gr			
automatically calculated average value		dosing performance: _____ kg/h			
4 Delay booster pump					
Delay time	20	0 - 120 seconds	5		
Shut-off (option)	according to order	On - Off			
5 System					
Date/ time	CET / CEST	CET -12 +11			
6 System → Password					
End user	—	0000 – 9999			
Technician 1	01234	00000 – 99999			
7 System → Display					
Screensaver	20%	12-100%			
Screensaver delay	00: 05	00: 00 – 23: 59h			
Backlight	75%	24 - 100%			
8 System network (if available)					
IP address	—	xxx.xxx.xxx.xxx			
Subnetmask	—	xxx.xxx.xxx.xxx			
Gateway	—	xxx.xxx.xxx.xxx			
9 Water follow-up flushing					
Run-on time	20 seconds	10-100 seconds			
Line flushing					

9.5 Maintenance protocol

The maintenance protocol is included with the attached documents.

9.6 Spare parts list

Spare part list upon request

Commissioning Protocol IP-074-EN

PAKDOS 60-Touch



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	<u>Preparatory Tasks</u>		
1.1	Install the roller carrier for the peristaltic pump, see OI Chapter 5.2 (optional)	<input type="checkbox"/>	
1.2	Connect the acid canister (optional), see OI	<input type="checkbox"/>	
1.3	Attach the PAC drum, see OI		
1.4	Vent the booster pump	<input type="checkbox"/>	
2	<u>Suspension unit (pay attention to a 6 second delay with the switches!)</u>		
2.1	Adjust the water flow in the suspension unit Adjust the water level – adjust the washer to the pressure conditions	<input type="checkbox"/>	
2.2	Adjust the water lever in the suspension unit	<input type="checkbox"/>	
2.3	Adjust and check the pressure switch: Ball valve inlet closed, PAKDOS stops, indication on the display	<input type="checkbox"/>	
2.4	Check the flow switch: Ball valve drain closed, dosing stops, fault display	<input type="checkbox"/>	
2.5	Determining the dosing performance for the PAC dosing and enter it in the operating data sheet	<input type="checkbox"/>	
2.6	Check the floating valve function – flow reacts gently	<input type="checkbox"/>	
2.7	Check the level switch of the flushing tub min/max: Switch body up – dosing off, indication on the display Switch body down – indication on the display, PAKDOS stops	<input type="checkbox"/>	
3	<u>Dosing appliance PAC</u>		
3.1	Check the heating function: Dosing pipe warm	<input type="checkbox"/>	
3.2	PAC empty switch function: Turn drum – fault display	<input type="checkbox"/>	
3.3	Dosing motor function: Programme output test PAC	<input type="checkbox"/>	
3.4	Check the tension bands	<input type="checkbox"/>	
4	<u>Dosing Technology Acid (optional)</u>		
4.1	Check the empty switch: Pull the suction lance from the canister – display	<input type="checkbox"/>	
4.2	Check the dosing pump: Programme output test acid	<input type="checkbox"/>	
5	<u>Control unit – after opening the control unit</u>		
5.1	All connector plugs are securely engaged	<input type="checkbox"/>	
6	<u>Buffer tank (optional)</u>		
6.1	Check the function of the control and alarm switch in the tank: Indication on the display	<input type="checkbox"/>	
6.2	Check the backflow prevention of the on-site dosing pumps	<input type="checkbox"/>	
6.3	Check the backflow prevention of the filling	<input type="checkbox"/>	
7	<u>Other Tasks</u>		
7.1	Clean the PAKDOS device	<input type="checkbox"/>	
7.2	Operating personnel instructed	<input type="checkbox"/>	
7.3	Operating instructions reviewed and handed over	<input type="checkbox"/>	

Maintenance Protocol WP-074-EN

PAKDOS 60-Touch



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____

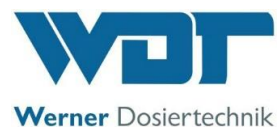
City, street, house number: _____

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

	Activity	Maintenance interval in	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	<u>Suspension unit</u>														
1.1	Check the level switch min + max	6						<input type="checkbox"/>						<input type="checkbox"/>	
1.2	Check the pressure switch, adjust, if necessary	6						<input type="checkbox"/>						<input type="checkbox"/>	
1.3	Check the flow switch	6						<input type="checkbox"/>						<input type="checkbox"/>	
1.4	Renew the floating valve diaphragm and the conical seal	12												<input type="checkbox"/>	
1.5	Clean the switching body in the flushing tub, replace the flat gasket	6						<input type="checkbox"/>						<input type="checkbox"/>	
1.6	Check and adjust the floating valve function	6						<input type="checkbox"/>						<input type="checkbox"/>	
1.7	Renew the hose to the suction pipe	12												<input type="checkbox"/>	
1.8	Check the pump impeller and lid	12												<input type="checkbox"/>	
1.9	Mechanical seal on booster pump – check for leaks (standard design only)	6						<input type="checkbox"/>						<input type="checkbox"/>	
1.10	Check the pump ball bearings – noise	6						<input type="checkbox"/>						<input type="checkbox"/>	
1.11	Clean the dirt filter	3		<input type="checkbox"/>				<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>	
1.12	Renew all O-rings	12												<input type="checkbox"/>	
1.13	Diffuser nozzle diameter < 6 mm - check; (check passage with a 6 mm drill)	12												<input type="checkbox"/>	
2	<u>Dosing appliance for powdered activated carbon</u>														
2.1	Check the motion spring	3		<input type="checkbox"/>				<input type="checkbox"/>			<input type="checkbox"/>			<input type="checkbox"/>	
2.2	Heating function: Dosing pipe warm?	6						<input type="checkbox"/>						<input type="checkbox"/>	
2.3	Check the PAK empty switch	6						<input type="checkbox"/>						<input type="checkbox"/>	
2.4	Clean and check the dosing screw	6						<input type="checkbox"/>						<input type="checkbox"/>	
2.5	Check the knocker	6						<input type="checkbox"/>						<input type="checkbox"/>	
2.6	Dosing motor: Renew the gaskets	12												<input type="checkbox"/>	
2.7	Dosing motor: Measure the power consumption	12												<input type="checkbox"/>	
2.8	Check/renew the suspensor sealing	12												<input type="checkbox"/>	
3	<u>Dosing appliance for acid (optional)</u>														
3.1	Check the peristaltic pump for function and for humidity and corrosion	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3.2	Check the function of the empty switch for the suction lance	6						<input type="checkbox"/>						<input type="checkbox"/>	
3.3	Renew the dosing hose	12												<input type="checkbox"/>	
3.4	Renew the gaskets of the acid dosing valve	12												<input type="checkbox"/>	

Maintenance Protocol WP-074-EN

PAKDOS 60-Touch



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
4	<u>Buffer tank (optional)</u>													
4.1	Check the function of the level switches, 4x buffer tank + 1x collecting tub	6					<input type="checkbox"/>						<input type="checkbox"/>	
4.2	Check the agitator for tight fit	6					<input type="checkbox"/>						<input type="checkbox"/>	
4.3	Replace the activated carbon in the filter	12											<input type="checkbox"/>	
5	<u>Control unit</u>	12											<input type="checkbox"/>	
5.1	Check all inputs	12											<input type="checkbox"/>	
5.2	Check all outputs	12											<input type="checkbox"/>	
5.3	Check and correct parameter settings	12											<input type="checkbox"/>	
6	<u>Other tasks</u>													
6.1	Thoroughly clean the dosing device	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7	<u>Maintenance tasks with each drum change</u>													
7.1	Clean the flushing ring and suspensor in case of contamination	F	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7.2	Remove encrustations from the dosing pipe	F	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7.3	Test PAK and acid (optional) dosing	F	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7.4	Check for pump noise	F	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7.5	Check the system for leaks	F	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7.6	Check the tension bands	F	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Additional remarks:

Maintenance performed and system checked for proper function: _____ Date: _____
Signature

Countersigned by operator: _____
Signature