User Manual

MagixX-P

Code No. 99-97-0024

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Overview of changes / updates in the manual

Name of chapter	Type of change / update	No. of BD product in-formation	Issue date	Page
Entire manual	completely revised		07/2014	
3.7.1 ”Sulphuric acid store”	Values adapted in table "Predicted sulphuric acid requirement per animal place".		01/2012	23
6.7.3 ”Calibrating the pH electrode (every four weeks)”	Chapter updated (new regulation of pH value)		01/2012	57
6.6 ”Filling the biological cleaning stage with root timber”	Chapter added		01/2012	53
chapter 8 ”Process screen”	Process screen updated		10/2011	63

1 Basic instructions

	**Important:** Please take care of these documents and keep them close to the system **at all times for quick reference**. All persons operating, maintaining and cleaning this system have to be familiar with the contents of these instructions. Observe these security instructions whenever any work is carried out on this system! Manuals can be reordered from **Big Dutchman** when necessary.

One of the following information is required to reorder a manual:

- the 8-digit code number of your language version [99-97-xxx] as stated on your manual's cover;
- the complete title of the manual including information on the type of instruction;
- if stated, the 8-digit universal code number [99-94-xxxx] including information on the required language version.

1.1 Purpose of the BD manuals

Depending on the intended use, **Big Dutchman** provides the following documentation:

1. Assembly manual
2. User manual
3. Operation manual (assembly and use of the system)
4. Spare parts lists
5. "Local add-on manuals": for products which differ from those of the original manual in specific countries.

The type of instruction of this manual can be found on the cover above the title.

1.2 Basics

The **Big Dutchman** system has been built with state-of-the-art technology and meets the recognized technical safety requirements. The system is reliable. Upon operation, however, dangers to life and limb of the user or third persons or impairments of the system or other material property are still possible.

The system may only be operated, maintained and repaired

- in accordance with its designated use;
- in an excellent state from the safety and technical point of view;
- by persons who are familiar with the safety regulations.

Should specific problems occur which are not described in detail in these documents, we recommend you contact us for your own safety.

1.3 Explanation of the symbols and structure of these instructions

1.3.1 Structure of the safety instructions in this manual

Basic structure:

Pictograph	**Type of danger**
	Possible consequence(s) of non-compliance
Signal word	• Measure(s) against the danger

Meaning of the signal words:

Pictograph	**Signal word**	**Meaning**	**Consequences of non-compliance**
Possible personal injuries:			
possible safety symbols: see chapter 1.3.2	**DANGER**	**directly** dangerous situation	**Will** lead to death or severe injuries.
	WARNING	**possibly** dangerous situation	**May** lead to death or severe injuries.
	CAUTION	**possibly** dangerous situation	**May** lead to minor injuries.
Possible damage to property:			
	**CAUTION**		**May** lead to damage to property

1.3.1.1 Special safety symbols in the manual and on the system

CAUTION	**Safety symbols and instructions on the system must always be easily visible and undamaged.** • If they are soiled by dust, manure, feed remains, oil or grease, clean them with a water-detergent mixture. • Damaged, lost, or unreadable safety symbols have to be replaced immediately. • If a safety symbol or instruction is fixed to a part to be replaced, ensure that it will be fixed to the new part as well.

These safety symbols (pictographs) illustrate remaining dangers when handling the system. They are used in the safety instructions of this manual (also refer to chapter 1.3.1) and on the system.

	Warning: general danger
	Warning: dangerous electric tension
	Warning: caustic substances
	Warning: automatically starting fan

The following pictographs provide instructions on how to operate the system. They are used in the safety instructions of this manual (also refer to chapter 1.3.1) and on the system.

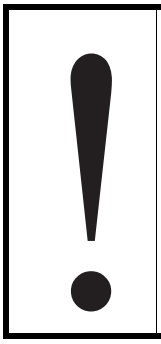
	Order: Wear eye protection!
	Order: Wear suitable, acid-resistant gloves!
	Order: Wear suitable, acid-resistant protective clothing!
	Order: Wear suitable, acid-resistant protective footwear!
	Order: Wear respiratory protection mask!

1.3.2 Structure of the general instructions in the manual

	**IMPORTANT!** This symbol indicates important information. There is no risk of personal injuries or damage to property.

1.4 Necessary qualifications of the persons working with the system

1.4.1 Employing external personnel



IMPORTANT:

The supervisor is responsible for the safety of external personnel.

Maintenance and repair works are frequently carried out by external personnel not familiar with the circumstances specific for the system and the inherent dangers.

You as operator are to survey the personnel and to define responsibilities and powers. Inform these people in detail on the dangers of their area of work. Check their method of working and intervene as soon as possible.

1.4.2 Operation of the system

The system may only be operated by persons who are competent and can guarantee proper handling due to special training or knowledge and practical experience with the system. The system operator or owner has the sole power of decision.

1.4.3 Maintenance and repairs

Maintenance and repair works may only be carried out by persons who are competent and can guarantee proper handling due to special training or knowledge and practical experience with the system. The system operator or owner has the sole power of decision.

1.4.4 Electrical installation

Work on the electric components may only be carried out by technically skilled personnel and according to German Industry Standards, VDE regulations, safety instructions and electro-technical regulations of the power supply industry (EVU) and the applicable national regulations.

1.5 Ordering of spare parts

The exact description of the spare parts to be ordered can be found by means of the position no. in the spare parts list.

 **WARNING**	**Risk of injury and danger to life** **Operational safety is of paramount importance!** Spare parts not released or recommended by **Big Dutchman** can cause severe injuries as their suitability for **Big Dutchman** systems cannot be assessed beforehand. • Only use spare parts released or recommended by **Big Dutchman** for your own safety.

Indicate the following when ordering spare parts:

- Code no. and description of the spare part or

  Position no. including description and manual number in case of parts that are not encoded;
- Invoice number of the original delivery;
- Current supply, e.g. 230/400 V – 3 Ph – 50/60 Hz.

1.6 Obligations

Closely adhere to the instructions in this manual.

A basic condition for safe operation and trouble-free handling of this system is the knowledge of the basic safety instructions and regulations.

This manual, particularly the safety instructions, must be observed by all persons working on this system. Moreover, the regulations and instructions for the prevention of accidents valid at the respective place of use have to be observed.

The manufacturer is not responsible for any damage to the system resulting from changes not authorized by **Big Dutchman**.

1.7 Warranty and liability

Warranty and liability claims regarding personal injury or property damage are excluded if they result from one or several of the following causes:

- non-designated use of the system;
- improper operation of the system;
- operating the system with defective safety equipment or not duly fixed or not functioning safety and protective devices;
- non-compliance with the instructions in this manual regarding maintenance and upgrading of the system;
- unauthorized modifications to the system;
- improper repairs;
- disasters caused by foreign matter or force majeure.

1.8 Faults and power failures

We recommend the installation of alarm systems for a better control of your production units or the use of an automatic emergency battery system for supplying the system with power in case of a power failure. This will protect your animals and thus your own economic health.

To ensure that the control unit completes all started process steps correctly and shuts down properly in case of a power failure, we recommend the use of a UPS (uninterruptible power supply).

1.9 First aid

In the case of an accident, a first-aid kit must always be available at the place of work, unless specified otherwise. Material taken out and used is to be replaced immediately.

If you need help, describe the accident as follows:

- where it happened
- what happened
- the number of persons injured
- what type of injury
- who is reporting the accident!

Important:

In addition to the first aid kit, an eye wash solution must also be available in those areas where work with acid takes place. **The eye-rinsing solution is included in the scope of delivery.**

First aid measures in case of an accident involving acids:

Please also refer to chapter 15 "Copy templates (operating directive and operations diary)" and 12 "EU safety data sheet - sulphuric acid 96 %" of this manual!

Type of accident:	Measures to be taken:
INHALATION	Bring the accident victim outside for fresh air. Seek medical advice!
CONTACT WITH SKIN	Take off contaminated clothing and shoes. Wash wetted skin immediately with plenty of water!
CONTACT WITH EYES	Rinse eyes for several minutes (min. 15) under running water while holding the lid open. Use an eye rinsing solution if no clean water is available. Immediately consult an ophthalmologist!
SWALLOWING	Make the accident victim drink plenty of water. Do not induce vomiting. Immediately consult a physician / seek medical advice!

1.10 Pollution abatement regulations

All works on and with the installation have to be carried out in compliance with the legal requirements concerning waste prevention and proper recycling / disposal of waste.

Special care has to be taken when carrying out installation, repair and maintenance works, as water pollutants like lubricating grease and oils, as well as solvent-containing cleaning solutions are not to pollute the soil or get into the canalisation! These materials have to be kept, transported, collected and disposed of in appropriate containers!

1.11 Waste disposal

After finishing the assembly or repair of this installation, dispose of the packing material and remains which do not need to be further used according to the legal provisions for recycling. The same applies to the component parts after putting the installation out of service.

1.12 Notes for use

We reserve the right to modify the construction and technical data for reasons of further development.

Therefore, no claims can be derived from the information, pictures, drawings and descriptions. Subject to correction!

Get the information on mounting, adjusting, operating and maintaining before taking the system into operation.

Apart from the safety-relevant instructions in this manual and the safety precautions valid in the country of use, also consider the generally acknowledged technical regulations (safe and appropriate working according to UVV, VBG, VDE etc.).

1.13 Copyright

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2 Safety instructions

2.1 Instructions on accident prevention

Before operating, cleaning, maintaining or disassembling this system, the operator or person authorized by him is obliged to instruct any person carrying out any of these works on

- the remaining dangers when carrying out these tasks
- the applicable rules and regulations regarding accident prevention and to ensure they are complied with!

The basis for these are:

- the installation's technical documentation, specifically the included safety instructions,
- the applicable safety and health regulations applicable at the place of work.

2.2 General safety instructions

	**Risk of injury**
	Children in the area of the system are at risk of injury as they can often not be supervised sufficiently and are not able to recognize hazards.
WARNING	• Ensure that children do not use the system as a playground and are not left unsupervised in the vicinity of the system. Explain remaining dangers fully to the children.

The respective safety precautions and other generally accepted regulations regarding safety and operational health have to be observed.
Please check safety and function control devices to ensure safe and accurate operation

- before putting the system into operation again
- in adequate intervals (confer maintenance intervals)
- after modifications or repairs.

Check the proper functioning of the system after any kind of repair works. You may only put the device into operation when all protective system have been put into place again.

Also observe the regulations of local water distribution and power supply companies.

2.3 Personal safety instructions

These safety instructions are intended to make you familiar with important information on the handling of the system. They are important for your safety and for the safety of the system.

The farm staff has to familiarize itself with the function and arrangement of the safety devices, in particular of the emergency stop button.

The farm staff has to regularly participate in health and safety briefings (according to the provisions e.g. by trade associations).

Maintenance works may only be carried out by specially trained personnel.

 **WARNING**	**Risk of injury**
	Lack of knowledge about the structural design of the system can lead to injury. • Make yourself familiar with the design and construction of the system under sufficient lighting! • Inform yourself as responsible person for the system and your employees about the remaining dangers in connection with this system!

2.3.1 Personal protective equipment and measures

Risk of injury
The following instructions apply to all works carried out on the system. • The protective equipment must be **acid-resistant**. • Wear **close-fitting protective clothing** and **protective footwear**. • Use **protective gloves** where there is a risk of hand injuries and **safety goggles** where there is a risk of eye injuries. • Do not wear **any rings, necklaces, watches, scarves, ties or other items** which could get caught in parts of the system. • Make sure that **long hair is always tied back**. Hair can get caught in powered or rotating working units or parts of the system, resulting in severe injuries. • When working underneath the system **always** wear a **hard hat**!

This exhaust air cleaning system cleans the heavily contaminated exhaust air of the house. It contains ammonia, dust, bioaerosols, carbon dioxide and other harmful gases.

Risk of injury
Wearing a respiratory protection mask with/and eye protection is recommended while being in the filter stages. Suitable protective equipment must be used when staying in the filter stages for a longer time period.

The respiratory protection mask must be equipped with a respiratory filter for ammonia and dust. Simple, particle-filtering dust masks are not sufficient as they are not able to filter ammonia. The eyes are best protected by a full face mask. As an alternative, it is also possible to wear safety goggles in addition to a respiratory protection mask.

2.4 Use of electrical appliances

You as the person responsible for the system or his agent have to ensure that the system with its electrical appliances is operated and maintained according to the local electro-technical regulations.

  **WARNING**	**Risk of injury and danger to life** **Dangerous electric tension may be bare in the case of open control units and may cause severe injuries or lead to death!** • Be aware of the danger and keep workers of other professions away from the danger zone. • Installations and works on electric components/building units may only be carried out by qualified persons according to electro-technical regulations (e.g. EN 60204, DIN VDE 0100/0113/0160).

- Immediately switch off the system in the event of malfunctions of the power supply units. Check that the electrical equipment is not alive.
- Check the electrical wiring and cables for recognisable damage before putting the system into operation again. Replace damaged wiring and cables before taking the system into operation.
- Only use the fuses indicated in the circuit diagram.

 **WARNING**	**Danger of short circuits** Never repair or shut defective fuses. • Defective fuses should be replaced by new ones immediately.

- Never cover an electrical motor. This can cause high temperatures resulting in fires and the destruction of the equipment.
- Always keep the control cabinet and all terminal and connection boxes of the system locked.
- Damaged or broken plugs should be immediately replaced by an electrician.
- Do not pull the plug from the socket at the flexible cable.
- For the respective connections please see the enclosed connecting plan of the system parts delivered.

2.5 Safety instructions when handling sulphuric acid

Please inform yourself about the used hazardous materials such as e.g. sulphuric acid (see chapter 12) or the anti-foaming agent "Struktol" (see chapter 13). Advise the operating staff of existing risks and make the information available to anyone.

 **WARNING**	**Risk of chemical burns** When handling the dosing system and sulphuric acid, always observe the safety data sheet "Sulphuric acid 96 %" (see chapter 12 ”EU safety data sheet - sulphuric acid 96 %”)

Working with sulphuric acid requires plenty of caution and wearing the acid-resistant, personal protective equipment (goggles, gloves, footwear and protective clothing, see chapter 2.3.1 "Personal protective equipment and measures").

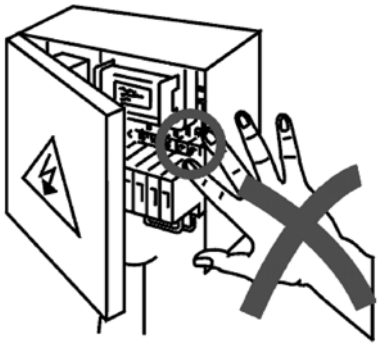
Ensure that the operating instructions "Concentrated sulphuric acid (96 %) (chapter 15) is placed in a visible spot in the room containing the acid dosing system.

2.6 System safety instructions

The following rules apply for the exhaust air cleaning system:

- Only reach into the wash water when wearing gloves!
- Danger of slipping in the entire exhaust air cleaner!
- Do not stand on the walls of the basins: danger of slipping!
- Drain the water before working in the basins!
- Wear a respiratory protection mask with ammonia filter when working in the exhaust air cleaner for a longer time period!

2.6.1 Electrical components



 **WARNING**	**Risk of electric shocks and short circuits**
	Live parts may be bare while different kinds of work are carried out. Touching live parts might lead to injuries caused by electric shock and short circuits.
	• Before performing any repair or maintenance work, turn the main switch to "OFF" and display a sign warning that repair or maintenance work is in progress!
	• Never touch bare electrical components. Equipment with bare electrical components must not be used by the farm staff.

2.6.2 Ventilation system

 **WARNING**	**Risk of automatically starting fan**
	Fans might turn on suddenly and unexpectedly as they are controlled automatically. This can cause severe injuries!
	• Never reach through the wire mesh guard or lamellar flaps into a fan, not even if it is not running.
	• Before performing any repair or maintenance work, turn the main switch to "Off" and display a sign warning that repair or maintenance work is in progress!

2.7 Safety contrivances

	Risk of injury and danger of life
  **WARNING**	**Defective or disassembled safety contrivances may cause severe injuries or lead to death!** • It is strictly forbidden to remove or put out of operation any safety contrivance. • Should the safety contrivances be damaged, the system has to be put out of operation immediately. The main switch must be locked in neutral position and any damage must be eliminated. • Before putting the system into operation again, make sure that all safety contrivances are assembled correctly and are functioning after works on the system have been carried out.

2.8 Dangers resulting from non-compliance with the safety instructions

Non-observance of these instructions can cause severe danger for life and health of people or can lead to material or environmental damages and to the forfeiture of any claim for damages. To be precise, the non-observance of these instructions can lead to:

- Failure of vital functions of the installation
- Failure of prescribed maintenance methods
- Dangers for people owing to electrical and mechanical influences.
- Hazards to personnel due to chemical effects.

3 System description

3.1 Designated use

The multi-stage **Big Dutchman** exhaust air cleaning system "MagixX-P" is intended exclusively for reducing ammonia, dust and odour emissions in the exhaust air from animal production systems.

The **Big Dutchman** system may only be used according to its designated use.

Every other use is considered non-designated use. The manufacturer does not accept liability for damages resulting from other uses, the user alone has to bear the risk. The designated use also includes the exact following of the operation, maintenance and repair conditions as prescribed by the manufacturer.

3.2 Avoidance of foreseeable misuse

The following applications of the **Big Dutchman** exhaust air cleaning system "Anlagenname" are not permitted and considered improper use:

- The use of liquids and substances inside the exhaust air cleaning system other than those described in this book.
- Operation of the system following structural / design modifications, which have not been agreed with **Big Dutchman** and the local authorities responsible for approvals.

A non-designated use will lead to a liability exclusion by **Big Dutchman**.

The operator of the system exclusively bears the risk resulting from misuse!

3.3 Functional description

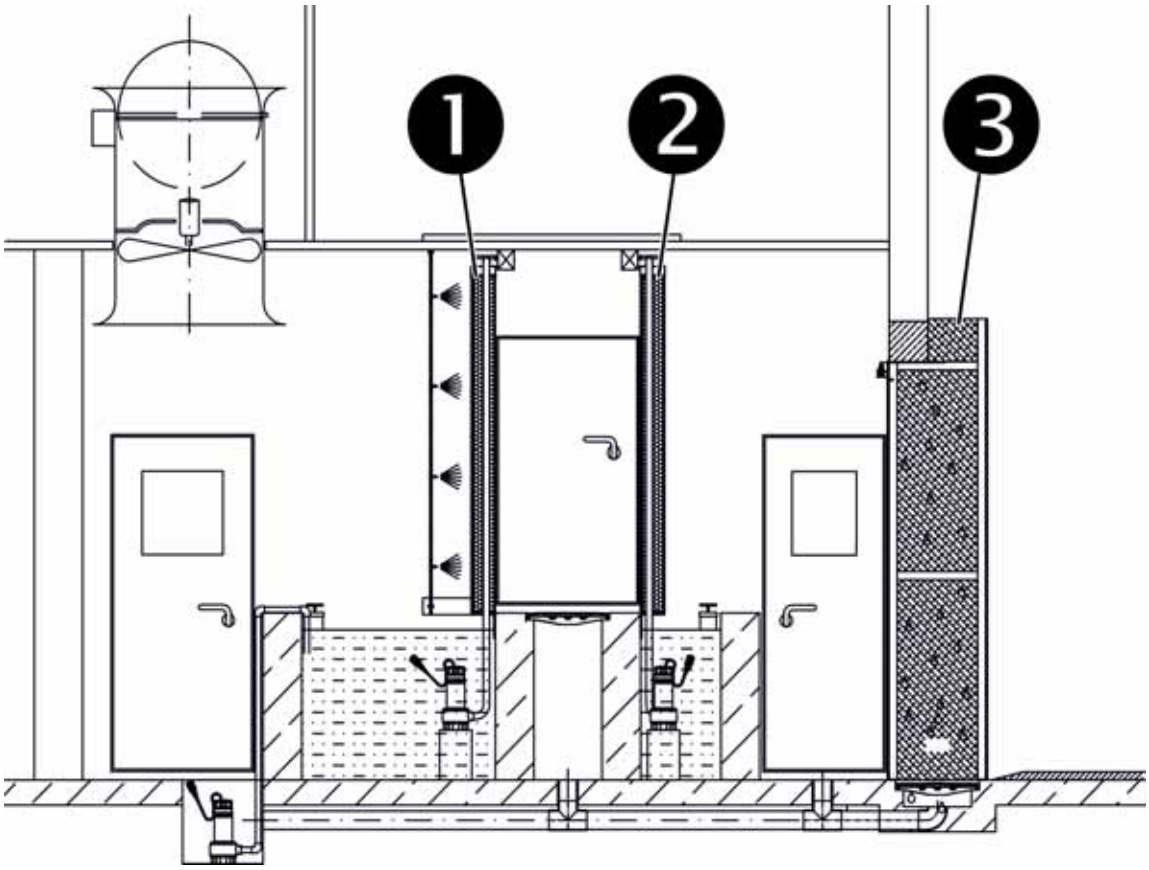


Table 1: Function of the filter walls

Stage	Type of filter	Density	Material	Function
1	Wet filter wall	15 cm	Plastic	Dust and NH_3 separation
2	Wet filter wall with pH control	15 cm	Plastic	NH_3 separation
3	Bio filter bed	60 cm	Shredded root timber	Odour degradation

The exhaust air cleaner "MagixX-P" is a multi-stage exhaust air cleaning system for the efficient reduction of ammonia, dust and odour emissions from pig houses. The length of the exhaust air cleaner's filter depends on the volumetric air flow to be cleaned. The centrally guided exhaust air is fed through three successive filter walls. The individual filter stages serve to provide the functions described in table 1. The guaranteed high separation rate of ammonia (NH_3), dust and odour is the result of a complex combination of physical, chemical and biological cleaning procedures and is only attained through the combination of all three filter stages.

The three exhaust air cleaning stages are placed in separate chambers. All are accessible. The doors to the individual chambers must be closed during operation to guarantee the faultless function of MagixX and to protect the electronic components and dosing equipment installed in the service rooms against the harmful effects of the house's exhaust air.

The separation capacities of the MagixX are presented in the following table.

Table 2: Separation capacities of the MagixX

Separation capacities		Comment
Ammonia	> 70%	
Total dust	> 90%	
Odour	< 300 OU	No raw gas odour perceivable in the clean gas

3.4 Filter stage 1

The 1st wet filter wall comprises the 15 cm deep plastic packing. This stage serves to separate dust loads, which introduce a high proportion of organic substance into the process water. With this filter stage a significant formation of foam in the acidulated 2nd wet filter stage is prevented.

The sprinkling of the wet filter wall is carried out by a submersible pump, which is positioned in the water basin located below. The pump pressure is adjusted by a ball valve in the riser pipe. The fill level of the basin is monitored by a fill level sensor. If the fill level drops below the minimum value, the pumps are switched off.

The 1st wet filter wall is sprayed by a nozzle group at factory-specified time intervals, in order to wash off the dust load. Spraying takes place using a non self-priming centrifugal pump, which is positioned on the service corridor or in the service room. The nozzle group is divided into individual nozzle lines, each with 4 nozzles one above the other, which are situated at a distance of 25 cm from the first wet filter wall.

In case of a filter length of up to 14.4 m, one submersible pump per basin is used for sprinkling. For filter lengths from 17.4 m to 28.8 m, two submersible pumps are required per basin.

3.5 Filter stage 2

The 2nd wet filter wall is essentially identical in terms of its configuration and dimensioning to filter stage 1. It only differs in a lower volume of water in the basin and the added dosing of sulphuric acid in order to reduce the pH value to pH < 5. Due to the sulphuric cleaning, a high separation rate of ammonia is attained as shown in the equation (Eq. 1).

$$2\ NH_3 + H_2S0_4 \Rightarrow\ (NH_4)_2S0_4 \qquad \text{(Eq. 1)}$$

The sprinkling of the wet filter wall is carried out with a submersible pump, which is positioned in the water basin. The fill level of the basin is monitored by a level gauge. If the fill level drops below the minimum value then the pumps are switched off. The pH control unit is installed outside of the cleaner area in a separate service room and is supplied with process water via a ring line (DN 25). The ring line is charged by the riser pipe for sprinkling. The sulphuric acid is fed to the process water in the return of the ring line by a dosing pump and added to the water basin.

3.6 Filter stage 3

The biological cleaning stage made of coarsely shredded root timber is 60 cm deep and serves to facilitate degradation of the residual emissions, in particular odorous substances that have not been cleaned by the first two wet filter walls. Thanks to the high evaporation of water via the first two wet filter walls and the associated high relative air humidity of the incoming fresh air to the root timber bed, the drying of this biological cleaning stage is prevented.

The humidity is a condition for the activity of the odour-reducing microorganisms in the 3rd filter stage.

A drying out of the root timber, especially during the summer, is prevented through separate spraying with fresh water. The humidification interval must be adjusted by the user in accordance with the seasonal conditions.

(For the setting of the humidification intervals, see chapter 5.5.8.)

3.7 Further installations

In addition to the assemblies included in the **Big Dutchman** scope of delivery, a sulphuric acid store must be provided by the operator to ensure efficient operation of the MagixX system.

3.7.1 Sulphuric acid store

 **WARNING**	**Risk of chemical burns** When handling the dosing system and sulphuric acid, always observe the safety data sheet "Sulphuric acid 96 %" (see chapter 12 "EU safety data sheet - sulphuric acid 96 %")

Working with sulphuric acid requires plenty of caution and wearing the acid-resistant, personal protective equipment (goggles, gloves, footwear and protective clothing, see chapter 2.3.1 "Personal protective equipment and measures").

The annual sulphuric acid demand depends on the number of connected animals and the management type. An approximate value regarding the expected consumption can be found in 3-1. If the cleaning interval of three months is exceeded, a rising sulphuric acid consumption can be expected. To reduce the replacement intervals, container sizes of 1000 litres should be planned.

The location of the sulphuric acid store should be selected such that deliveries and collections as well as the replacement of the containers can be performed easily and safely. So that any leaking sulphuric acid cannot cause environmental pollution, a collection drain or collection pan is to be installed in accordance with local regulations.

The supply line to the water treatment plant can take the form of a PTFE hose laid in a protective pipe running to the pH dosing device. In order to guarantee constant dosing of sulphuric acid, provide for two storage tanks when planning the storage capacity.

A second sulphuric acid tank will thus be available whenever the connected store runs low.

Table 3-1: Predicted sulphuric acid requirement per animal place (with acid consumption of 2kg/kg NH_3)

Management type	Emissions factor * [kgNH_3/animal place/year]	Sulphuric acid requirement [kg H_2S0_4/animal place/year]
Finishing pig	2.,92	5.84
Empty sows	3.36	6.72
Piglets up to 30 kg	0.49	0.98
Sows with piglets	6.48	12.96

* N-reduced feeding

3.7.2 Waste water disposal

The elutriation of the water basins is to be carried out manually by the operator. It is necessary to replace the wash water 4x annually. The annual elutriation volume depends on the length of the exhaust air cleaner.

If the waste water from the 1st wet filter wall is to be spread on the fields, this can be done directly. If intermediate storage is necessary, the waste water can simply be added to the preliminary pit of the slurry store.

The waste water of the 2nd wet filter wall has a nitrogen concentration of up to 40 g/l. Due to the addition of sulphuric acid, most of the nitrogen is available as ammonium sulphate solution, which can be spread directly on the fields. If this is the case, the pH value must be taken into account. Mixing is therefore recommended shortly before spreading the slurry.

Approximately 1 part liquid manure should be mixed with approximately 2 parts waste water from the 2nd wet filter wall. Liquid manure is poured into a tank and the waste water is then added. This procedure ensures a good mixing.

The manure tank must be cleaned thoroughly after spreading the wash water / liquid manure mix.

 **WARNING**	**Risk of injury**
	• **Mixing** the wash water of the 1st wet filter wall with the wash water of the 2nd wet filter wall is **strictly prohibited** as it can cause the formation of toxic, nitrous fumes.
	• **Storing** the wash water of the 2nd wet filter wall after mixing with the liquid manure is **strictly prohibited** as the addition of sulphuric acid can lead to the formation of harmful hydrogen sulphide (H_2S).

The waste water of the 2nd wet filter wall must be stored in a separate, corrosion-free tank, e.g. below the exhaust air cleaner.

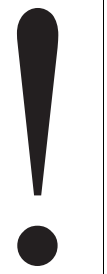
If no use for agricultural purposes is possible, appropriate recycling must take place.

4 Initial operation

To put MagixX into operation, the control cabinet must be connected to the power supply. After the master switch integrated into the door has been switched to "ON", the computer will start up automatically. Only a Big Dutchman service technician may carry out initial operation. He will first check the system by sight and take some preliminary measures such as filling the spraying pumps, checking system-specific limit values, etc. Not observing this can damage the system and thus invalidate the guarantee.

4.1 Switching on the exhaust air cleaner

When the controller starts up the user automatically arrives in the main view of the MagixX controller. This presents an overview of the current status of the operational exhaust air cleaning system.



Important:

All switches at the front of the controller must be set to automatic operation.

The exhaust air cleaning system is switched on with the master switch (see chapter 5.2.1 ”Master switch”).

First, the basins are filled automatically. The sprinkling pumps switch on automatically as soon as the water level in the basins is sufficient.

It is necessary to set the pressure in the sprinkling line for the 1st wet filter wall to 0.3 bar with the ball valve.

It is necessary to set the pressure in the sprinkling line for the 2nd wet filter wall to 0.3 bar with the ball valve.

The humidification intervals for the biological filter stage must be set as required for the location in the setup menu (see chapter 5.5.8 ”Humidifying the bio filter stage”).

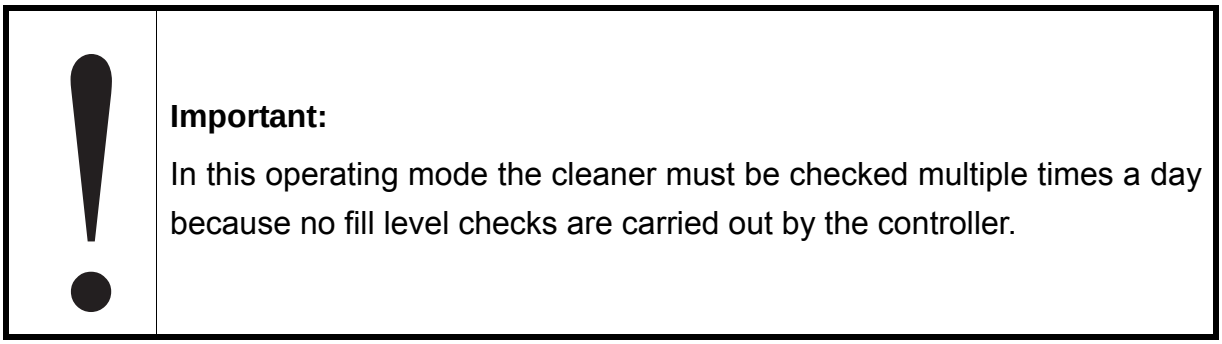
4.2 Switching off the exhaust air cleaner

The system can be switched off, e.g. between two batches, by actuating the master switch in the lower right corner of the display for approx. 2 seconds (see chapter 5.2.1 ”Master switch”). A change in colour indicates that the controller has been switched off. Pressing the master switch again turns the controller on once more.

4.3 Manual mode

In the event of controller faults, it is possible to operate the exhaust air cleaner manually by means of the manual switches. However, this is only allowed for a period as short as possible (e.g. until a service technician is available), as the required cleaning and rinsing intervals can only be implemented in the automatic mode by the controller.

For manual mode the manual switches for the sprinkling pumps and spraying are set to manual.



Important:

In this operating mode the cleaner must be checked multiple times a day because no fill level checks are carried out by the controller.

5 Controller

All process sequences of MagixX are centrally controlled by the controller. In addition, the controller records process data which document the use of the exhaust air cleaning system as required by the authorities.

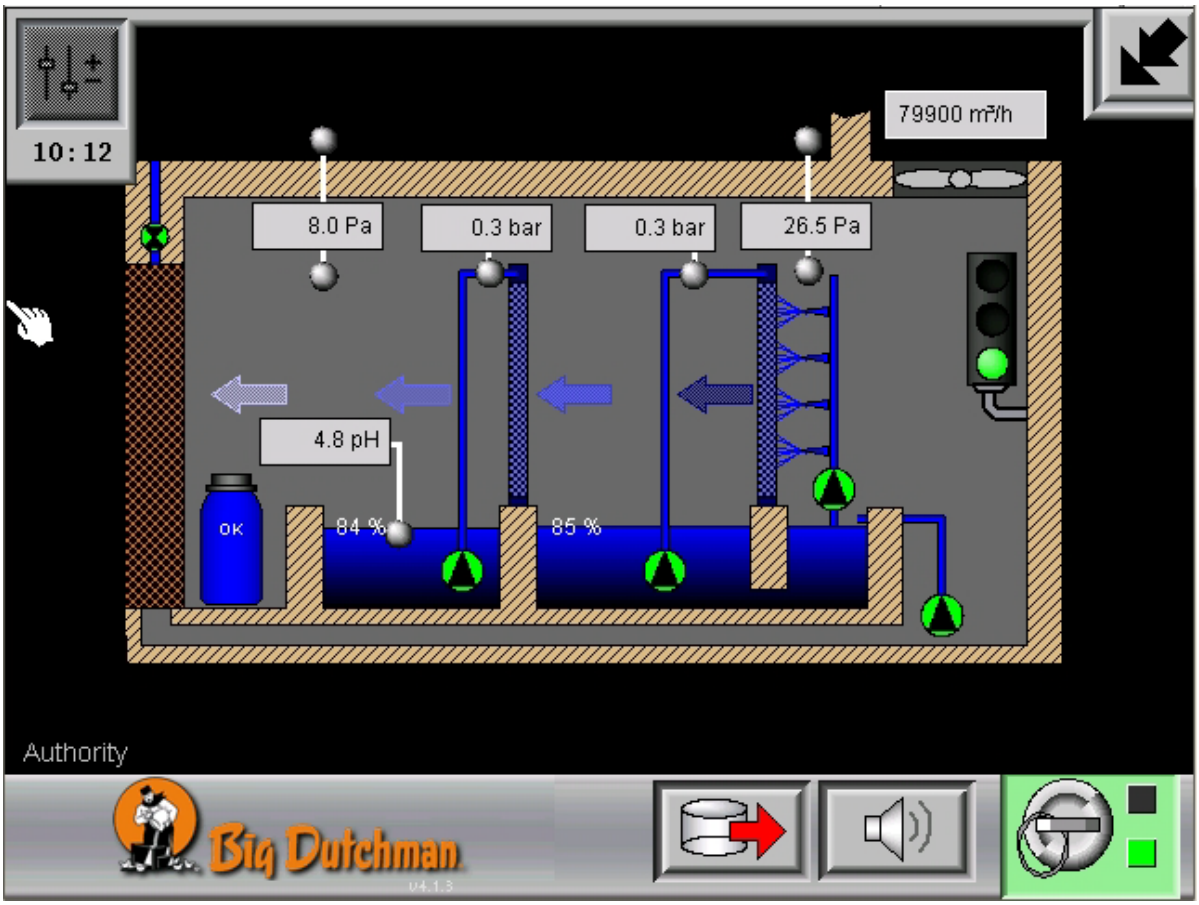
5.1 Navigation

The MagixX controller has a touch-sensitive screen (touchscreen). Using this touchscreen it is possible to actuate the display and operating keys of the MagixX program with a light touch of the finger. In order to call up a menu one presses the key with the respective symbol.

The operation and configuration of the MagixX menu is almost identical throughout the entire system.

5.2 Start screen

The process screen (start screen) allows a speedy overview of the most important parameters of the exhaust air cleaning system.



The main screen can be subdivided into three areas. The symbols on the top margin enable the user to log in and input settings for the exhaust air cleaning system. The bar along the bottom margin of the screen serves on the one hand to facilitate process documentation, whilst also enabling the exhaust air cleaner to be switched on and off via the master switch.

In the centre of the screen the configuration of the exhaust air cleaning system is shown as a cross sectional view, from the side of the house (right) to the outside of the building. All of the necessary operating data is presented as an overview here, so that daily checking can be carried out quickly.

The percentages shown for the water basins indicate their fill level. Values between 80 and 90 % are a normal level. If the values are above 95 % or below 30 %, an alarm is issued, which can affect the fresh water valve, the pumps and the acid dosing.

The number of sensors and pumps may deviate from the figure shown, depending on the configuration and layout of the exhaust air cleaning system.

5.2.1 Master switch

The master switch can be used to switch the exhaust air cleaner on and off. By pressing the switch symbol for approx. two seconds the system can be switched on or off. The state of the system is indicated by the switch position as well as the signal lamps located alongside. The green signal lamp indicates the status "System ON". The red signal lamp indicates the status "System OFF".

5.2.2 Pump status

Manual mode	Automatic mode		
			
(orange border)	Pump OFF (grey)	Pump ON (green)	Pump fault (red)

Whilst the exhaust air cleaning system is in operation, the status of the pumps for the sprinkling and spraying of the wet filter walls is graphically presented as standard. During operation of the individual pumps the colour of the pumps changes from grey to green. The outer ring of the pump indicates whether the pump is switched to manual (orange) or automatic (no border).

5.2.3 pH control

Water basin 2 is equipped with a pH control unit for efficient ammonia separation.

With the aid of a dosing pump the pH value unit controls the preset pH value (pH <5), which can be read on the display via basin 2.

The blue barrel behind basin 2 stands for the replacement container for the sulphuric acid.

The fill level of the acid barrel is detected by an empty sensor. If the fill level is below the pre-set minimum, the barrel is coloured red, a warning is issued and the acid dosing is stopped.

Correct operation can be maintained by providing a new acid barrel as soon as the contents of the current barrel are running low. This is the only way that an empty container can be replaced immediately.

5.2.4 Differential pressure sensors

Above the image of the exhaust air cleaner, pressure indicators display the difference between the pressure in the individual cleaning chambers and the pressure of the environment.

The differential pressure is displayed in Pascal (Pa). This pressure indicates the degree of contamination of the filter walls.

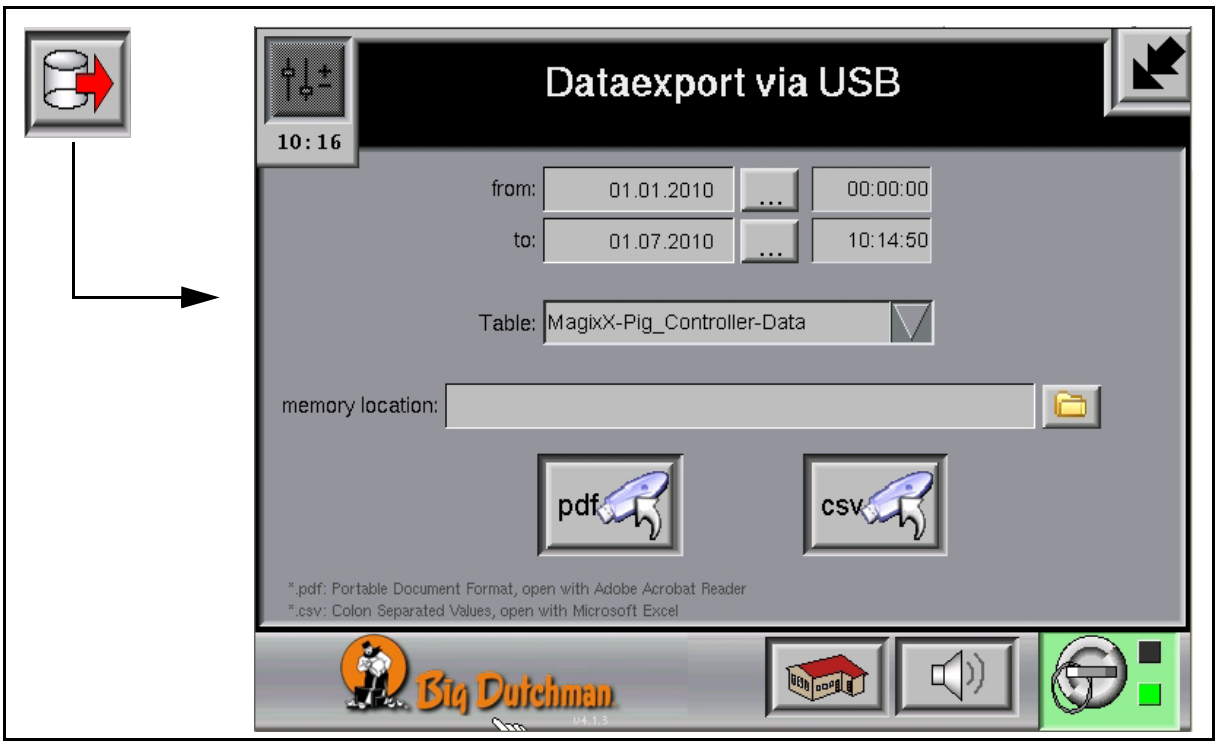
A traffic light aids compliance with the cleaning intervals by indicating the state of the filter walls (see chapter 6.5).

5.2.5 Volumetric air flow

This field shows the current volumetric air flow in m³/h.

This is calculated using the input signal of the 0-10V signal issued by the climate computer.

5.2.6 Data export



Using the controller, it is possible to generate a clear data evaluation for the operating records required by the authorities with just a few steps. For this purpose, the required data format as well as the time period for the record (using the date and time fields) are entered in the following dialogue.

Before it is possible to carry out the export it is necessary to select the inserted USB flash drive as save location by  selecting **"Search"**.

Please use a USB flash drive with relatively little storage space (less than 8 GB) for data export and the original format from the manufacturer.

The user is able to locate the actual USB flash drive in the dialogue **"Save under ..."** by selecting USB flash drive. It is then necessary to choose a subdirectory in which the exported data is subsequently saved.

An extract from a data export is presented in the following figure.

Average day values of MagixX Pig
2009-11-01 - 2010-01-13

MagixX Pig Controller-Data

Big Dutchman

2010-01-13 (1/2)

	Basin 1 Level [%]	Basin 2 Level [%]	Energy Consumption [kWh]	Freshwater Consumption [m3]	Ventilation [%][m3/h]	Pump pressure Irrigation 1 [bar]	Pump pressure Irrigation 2 [bar]	Air pressure Pad & Woodchips [Pa]	Air pressure Woodchips [Pa]	Basin pH Value [pH]
2009-11-27	76.50	68.38	62.86	0.41	29565.04	0.33	0.31	2.35	0.61	4.81
2009-11-28	75.56	68.40	110.88	1.08	29606.47	0.33	0.31	2.82	0.60	4.79
2009-11-29	76.23	68.48	110.92	1.18	29828.18	0.33	0.31	3.11	0.61	4.79
2009-11-30	76.17	68.40	110.85	1.12	29491.47	0.33	0.31	4.11	0.64	4.79
2009-12-01	76.41	68.31	110.69	1.12	29182.16	0.33	0.31	4.53	0.66	4.79
2009-12-02	76.77	68.42	107.66	1.01	28976.85	0.33	0.31	3.28	0.70	4.80
2009-12-03	76.02	68.49	106.82	1.09	29564.12	0.33	0.31	3.33	0.64	4.79
2009-12-04	76.03	68.49	105.86	1.27	29305.25	0.33	0.31	3.67	0.66	4.79
2009-12-05	75.92	68.33	106.19	1.22	29349.28	0.33	0.31	3.66	5.35	4.79
2009-12-06	76.81	68.33	106.17	1.48	30172.53	0.33	0.31	4.78	16.66	4.79
2009-12-07	76.01	68.46	106.04	1.50	29684.87	0.33	0.31	4.82	2.66	4.79
2009-12-08	75.99	68.49	105.99	1.44	29969.01	0.33	0.31	4.87	3.18	4.79
2009-12-09	75.94	68.41	105.81	1.42	29934.88	0.33	0.31	4.94	1.79	4.79
2009-12-10	76.61	68.30	105.87	1.56	30716.37	0.33	0.31	5.69	8.79	4.79
2009-12-11	75.59	68.33	105.93	1.59	30380.30	0.33	0.31	6.40	2.49	4.79
2009-12-12	75.93	68.42	106.23	1.47	29931.73	0.33	0.31	6.84	2.66	4.79

5.2.7 Alarm

By selecting the **"Alarm"** button, the user arrives in the alarm management area, where a list of all alarms is provided.

The alarm management interface is subdivided into a navigation bar and a display field, in which the logged alarms and messages are listed in chronological order. With the aid of the arrow keys or the date key the user selects the requisite date in order to view the data on the navigation bar.

By actuating the update key the alarms for the respective date are updated.

Alarm definition:	
Entries highlighted in orange:	Alarm start
Entries highlighted in light blue:	Alarm end

The alarm entries are sorted chronologically according to the time stamp of the *alarm start* messages, whereby the latest entry is shown at the top of the list.

The following alarms can be activated in the standard configuration:

Alarm type	Min.	Max.	Analogue	Alarm	Activation
Basin fill level (analogue) *Fill level too high*		X	0-100 %	Alarm Basin	closes solenoid valve, turns off dosing pump
Basin fill level (analogue) *Fill level too low*	X		0-100 %	Alarm Basin	stops pumps, turns off dosing pump
pH value *pH value too high*		X	pH 0-14	Alarm pH value	-
pH value *pH value too low*	X		pH 0-14	Alarm pH value	turns off dosing pump
Pressure differentials	X	X	0-200 Pa	Alarm Pressure differential	-
Pump pressure	X	X	0.1-0.8 bar	Alarm Pump pressure	turns off dosing pump
Pumps *Protective motor switch off*	Safety shut-off		-	Alarm Pumps	-

Please find further information on the standard settings for the alarm limits in chapter 10.

5.3 Users

The MagixX controller is divided into three user levels. In order to prevent misuse, a user that is logged in is automatically logged out again (or the "Guest" user is logged in) after a preset period of time if no further user actions take place. The user that is currently logged in is shown at the bottom left of the start screen.

- **"Authority" user**

  The "authority" user is the default user for the start of the MagixX control. It is the user with the fewest rights. In general, this user can see the state of the exhaust air cleaning system. Additionally, daily mean values of the most important process data can be saved on a USB flash drive as PDF or CSV file (see chapter 5.2.6 "Data export").

- **"Operator" user**

  The "Operator" user can access the setup menu (see chapter 5.5) to make basic settings for the exhaust air cleaner. Upon delivery, the following password is set for the operator:

  Password operator = **1234**

  The password can be changed under the menu point "System settings".

- **"Service" user**

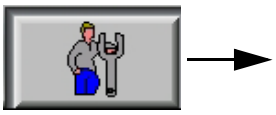
  The "Service" user level is only accessible to customer service personnel from **Big Dutchman**. In addition to the basic settings it is possible to implement all settings necessary for the configuration and start-up of the exhaust air cleaning system from this user level.

5.4 System settings

5.4.1 User login

The respective user is able to access the dialogue for the user login in the main screen by pressing the **"arrow key"** in the top right corner.

In the window that follows - **"List of pictures"** - the user can press on the icon **"User login"** and then enter the password via the onscreen keypad. A successful login is indicated by the symbol with the red triangle.

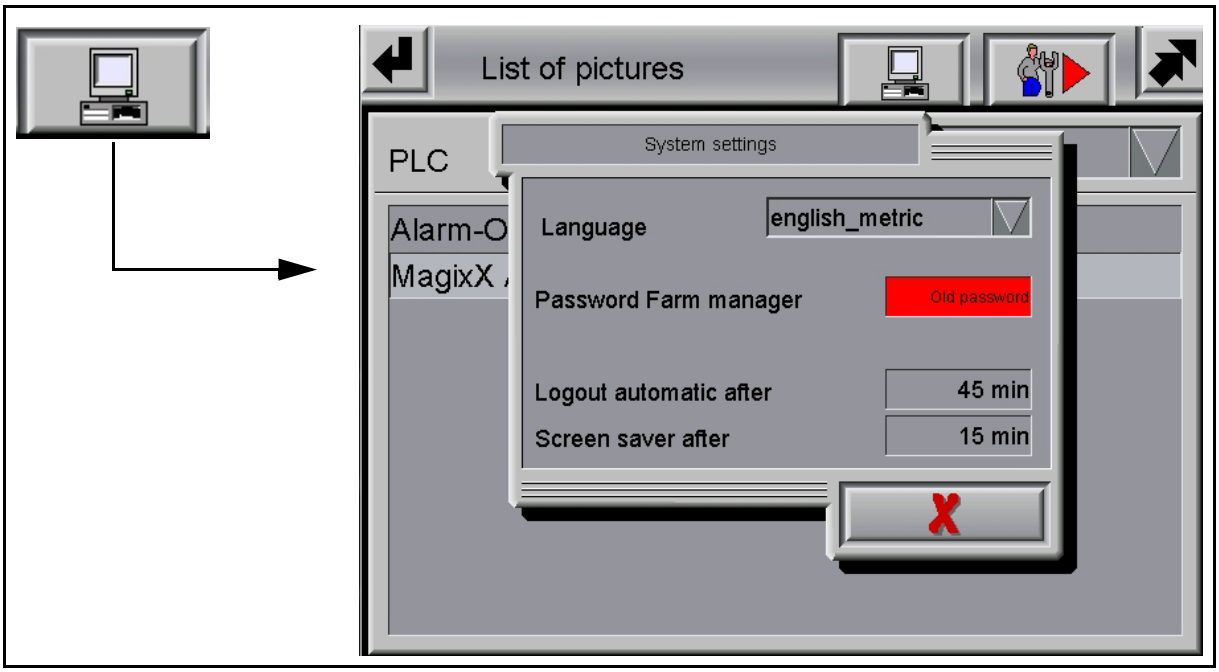
User login	**Onscreen keypad for user login**	**successful** Login
		

This can also be used for logging out. After logging in successfully the user can to adjust the system in accordance with his user rights.

If the controller is not used for a period of 30 minutes then the user is automatically logged out again and the controller reverts once more to authority mode.

5.4.2 Language and password

Changing the language or password requires that the user be logged into the system. A logged in user can to open the **"List of pictures"** window in the main screen by pressing the **"arrow key"**. This enables the user to set the language or password by pressing the **"System settings"** button.



The user can select the desired language in the system settings dialogue. If the **"Language"** option is selected then MagixX provides the user with a wide range of international languages to choose from.

The current user password can be changed by entering the current password, followed by the new password.

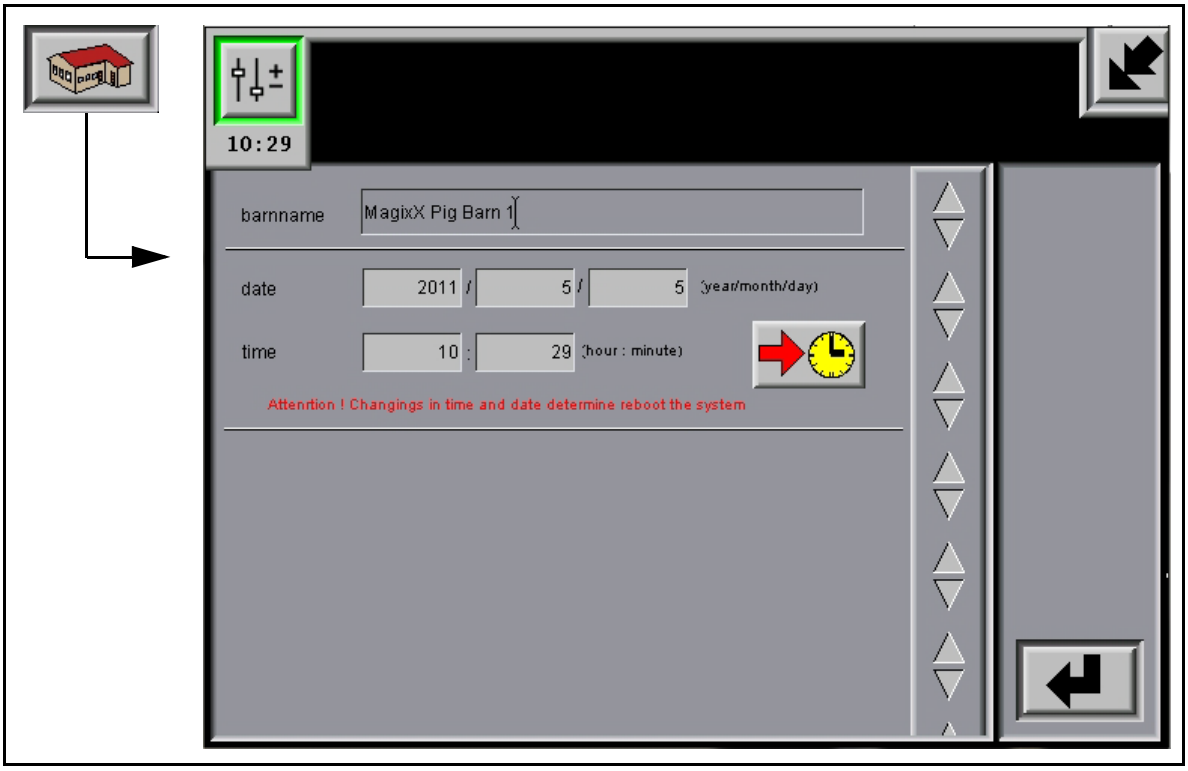
5.5 Setup menu

In order to access the setup menu, it is necessary to log in (chapter 5.4.1) as the **Operator** user (chapter 5.3). Next, the following icon must be pressed on the start screen:

After logging in as an "Operator" a range of menu options are available in the "Setup menu", which can be called up by selecting the requisite icon.

All changes to the standard settings must be recorded in writing to prevent data loss. Use the final pages of this manual for this purpose.

5.5.1 Configuration of the exhaust air cleaner

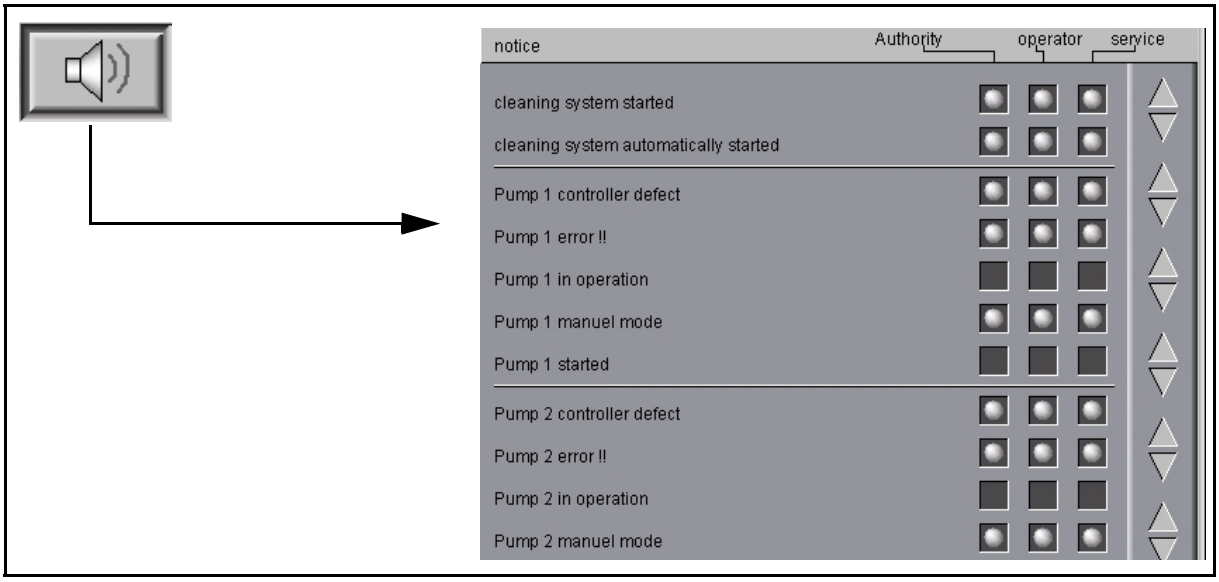


In this field the operating identification data and the basic settings are entered during initial operation (the house name is important for the data export, in order that the data can be subsequently assigned to the correct house).

If the exhaust air cleaner is connected to the **Big Dutchman** climate and production computer then the identification of the exhaust air cleaner is possible even with multiple connected houses.

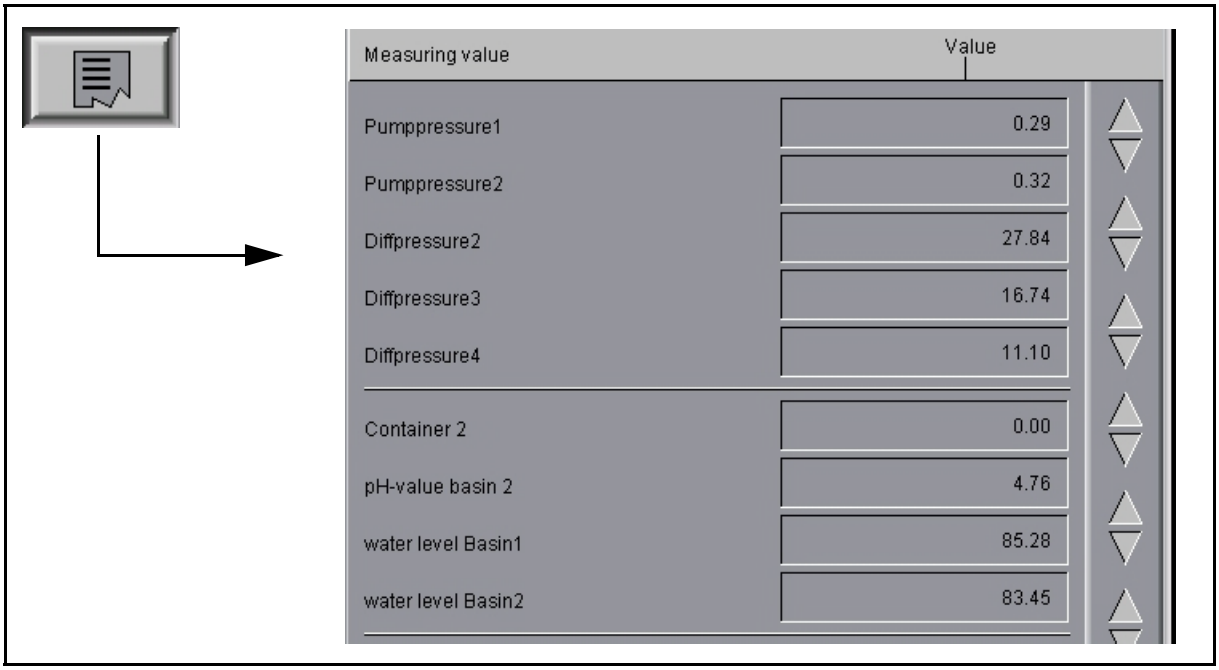
Furthermore, the date and time can be set here.

5.5.2 Alarm settings



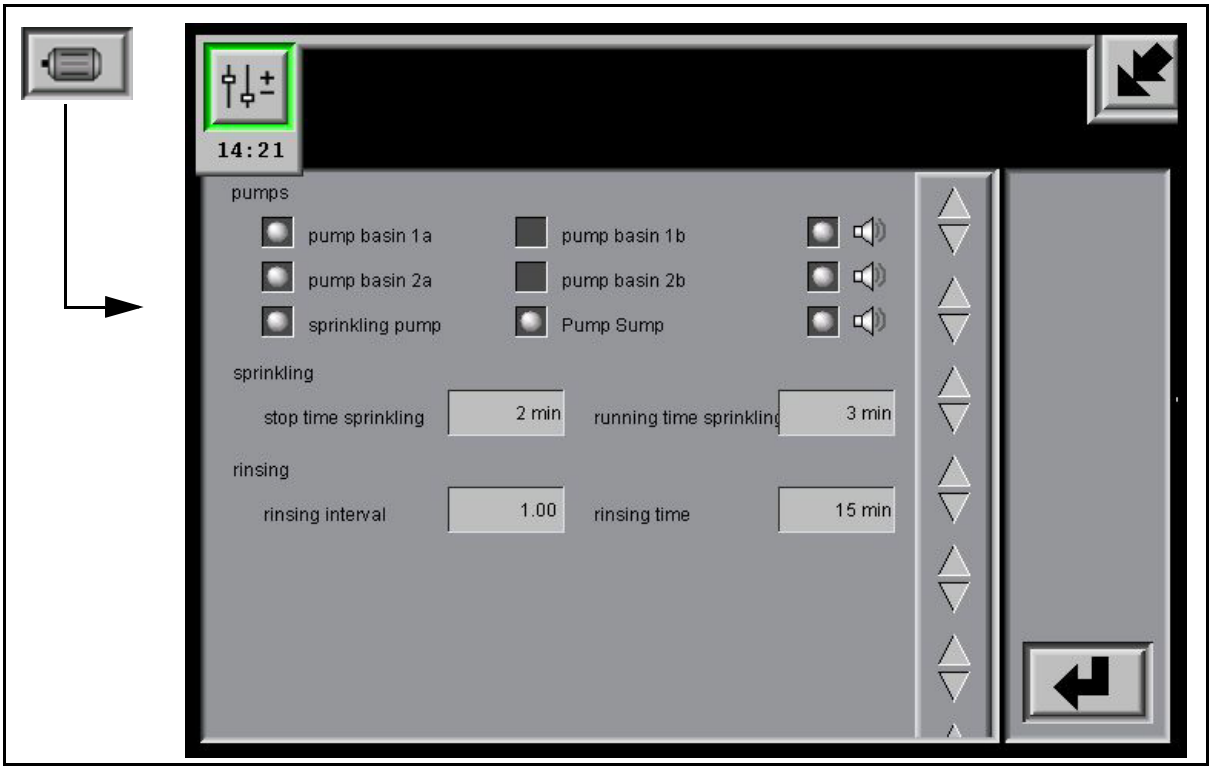
The issuance of alarm messages is configured under this menu point. By selecting the various alarms it is possible to stipulate here which users' alarms are to be visible in the start screen.

5.5.3 System log



In this menu the updated operating data is presented in tabular format. This is only used by **Big Dutchman** service personnel. The data presented provides information on the status of the controller computer.

5.5.4 Pumps



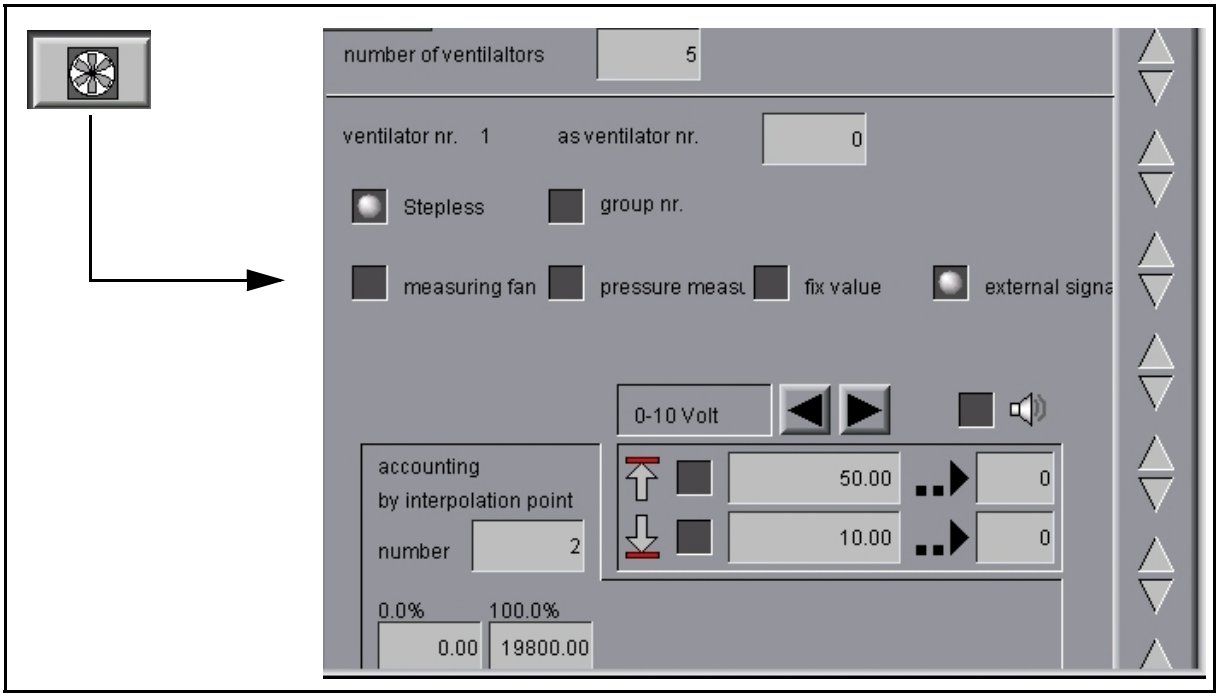
In the pump configuration menu, up to six pumps can be configured. Systems longer than 14.4 m in total require two additional basin pumps (1b and 2b).

For systems with a total length from 17.4 m or when using a second pump per basin, the sprinkling profile must be rinsed. It is possible to stipulate how often during the day and for how long rinsing should take place (e.g. rinsing interval = 1 / rinsing time = 15 min).

In order to guarantee sufficient dust separation it is necessary to configure the spraying of the first filter wall in a pulse-pause operation.

The following applies: The more dust enters the exhaust air cleaner, the more often / longer should the spraying take.

5.5.5 Volumetric air flow



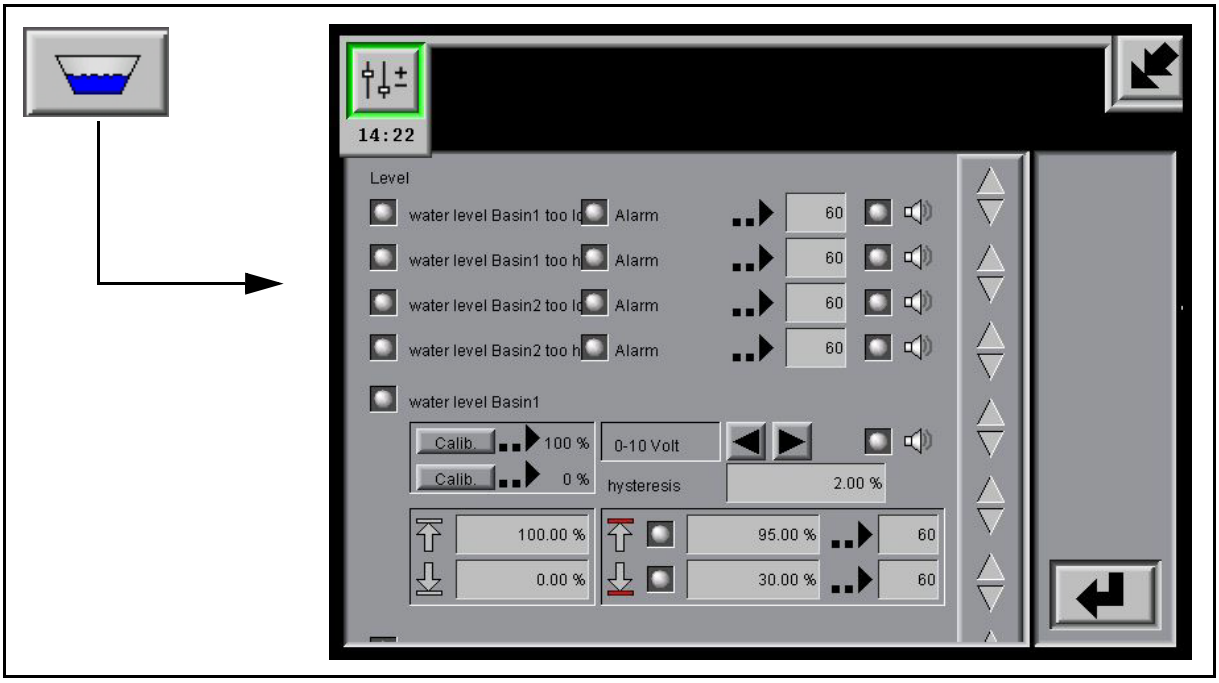
The system's volumetric air flow is transferred via an analogue 0-10 V signal from the climate computer and displayed on the controller. The current **volumetric air flow** is displayed in m³/h.

In order to **display** the volumetric air flow it is possible to enter the number of fans in the respective configuration.

For the configuration of the fans the controller distinguishes between two variants:

1. The volumetric flow of the group of infinitely variable fans can be calculated using an external signal (0-10 V standard) and a support point curve. In order to enter a support point curve it is possible to provide up to eight support points, each with their volumetric air flow.
2. It is possible to calculate multiple groups of fans with a constant volumetric air flow.

5.5.6 Water basin level signal



For the purpose of guarding against basin overflows and dry-running pumps both basins contain water level sensors. A water level alarm is shown in the display by a red flashing fill level in the respective basin (1 or 2).

In the event of excessive water supply, e.g. due to a defective float valve, the water supply is stopped by closing the solenoid valve, and the acid dosing is halted.

If the water supply to the basins fails, e.g. due to a defective main line, then the water level will fall due to the evaporation.

If the minimum fill level is not met, a minimum alarm is displayed in the form of a likewise red bar beneath the respective basin (1 or 2). The pump located in the basin for sprinkling the wet filter wall (in basin 1 also the spraying pump) is switched off, just like the acid dosing pump.

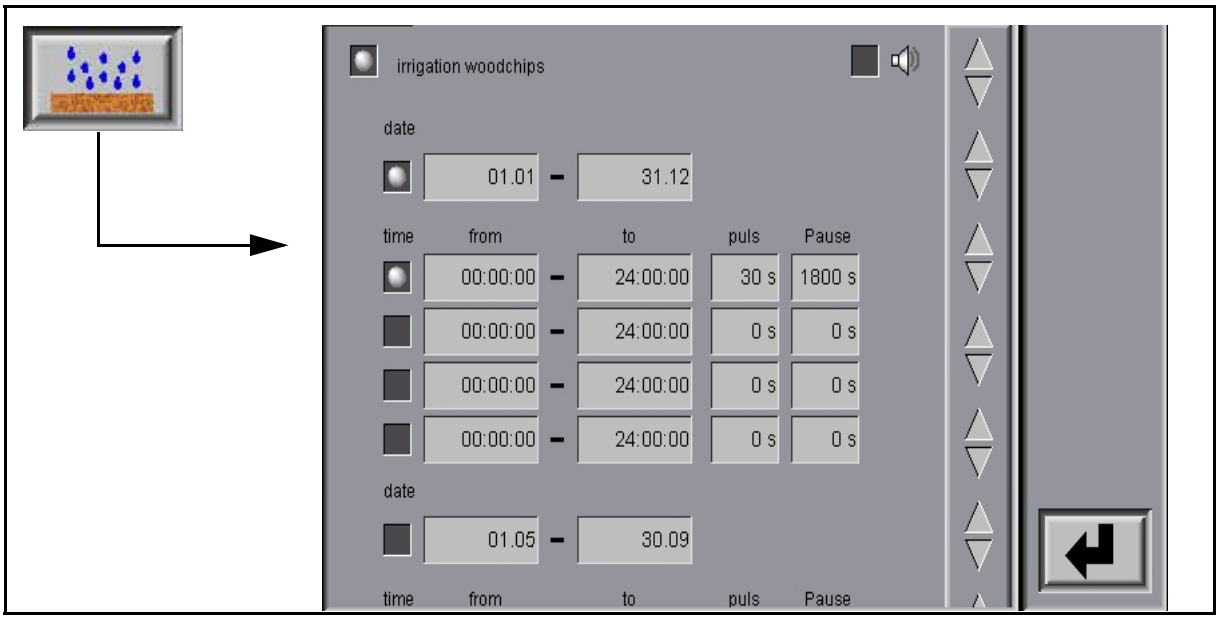
In this menu point it is also possible to set the limit values for the alarm signal.

The standard limit values are 30 % and 95 %.

5.5.7 Pressure sensors

The MagixX controller computer is equipped with two pressure sensors for the basin pumps and two differential pressure sensors for determining the pressure rise in the individual cleaning stages. However, the measuring range and the respective sensor alarm limits can only be configured in "Service mode".

5.5.8 Humidifying the bio filter stage



In this menu point it is possible to set various time intervals for humidifying the bio filter stage. This is necessary because the bio filter bed is adjacent to the outside and is therefore exposed to external climate conditions. In the event of humidification being insufficient the bio filter bed will dry out, whilst excessive humidifying will result in operating costs rising due to the increase in water consumption.

Important:

The overflow from the bio filter bed is pumped into the water basin for the first wet filter wall by a submersible pump in the pump sump.

Four time periods can be assigned for different climatic conditions by entering the corresponding start and end dates (day and month).

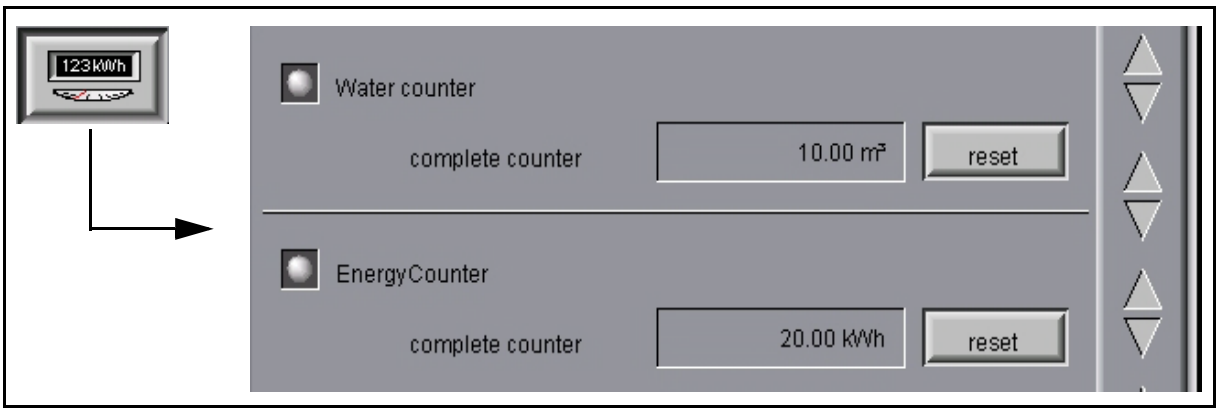
This allows the operator to configure the higher water demands in the summer, the following moderate demand in the fall, the reduced requirements during the winter as well as the humidification in spring differently as required.

Within each time period, there is again the option to enter four daily cycles to react to the temperature and sunshine curves of the day. The highest demand for water can be expected for midday/afternoon and will be lower for the evenings. During the nights, demand will be lowest, rising again towards morning.

The correct settings depend on the location of each house and must be made by the operator as they need to be checked regularly. A basis is the standard setting (30 seconds pulse, 1800 seconds pause), which can be adjusted depending on the humidification. A wet bio filter bed is not required; a permanently humid surface is sufficient.

The figures can be adjusted when the corresponding field is pressed and an entry field has opened as a result. To activate the settings, check the corresponding boxes for each line on the left-hand side.After you have identified the correct settings, please write them down to prevent data loss. Some empty pages have been added to the end of this manual for this purpose.

5.5.9 Counter statuses



Under this menu point you are able to read the counter statuses of the consumer counters and reset these to **"zero"**. The consumer counter pulses are evaluated via pulse counter cards, logged and stored in the database.

6 Cleaning and service tasks

General cleaning and service tasks must be carried out by the operator on a regular basis. In addition to the maintenance contract, the following tasks must be performed:

6.1 Daily function check

- of the submersible pump(s) of the 1st wet filter wall
- of the centrifugal pump(s) of the 1st wet filter wall
- of the submersible pump(s) of the 2nd wet filter wall
- of the nozzles of the 1st wet filter wall
- of the pH value of the wash water of the 2nd wet filter wall
- of the fill level of the sulphuric acid container
- of the fill levels of water basins 1 and 2
- of the differential pressure
- of the controller
- of the filter walls

6.2 Service tasks every 14 days

- **Acid backflushing line:**

  The acidulated water has to flow evenly through the openings of the backflushing line to ensure a uniform pH value. The ball valve at the end of the backflushing line in filter stage 2 is opened for approx. 30 seconds to prevent clogging of the opening holes.

- **Rinsing the spraying lines:**

  The spraying lines are rinsed by opening the ball valves in front of the 1st wet filter wall for approx. 30 seconds while the spraying pump(s) is/are operating. Exhaust air cleaners up to a length of 14.4 m have one large and one small ball valve, while there are two ball valves each from a length of 17.4 m.

- **Rinsing the line for humidifying the biological filter bed:**

  For this task, the "solenoid valve root timber" is set to manual operation by means of the manual switch. The ball valve in filter stage 2 at the end of the humidification line is then opened for approx. 30 seconds. After the rinsing, the "solenoid valve root timber" is set to automatic mode again.

- **Rinsing the sprinkling line:**

  For cleaners with a length of up to 14.4 m:

  Open the ball valves at the end of the service aisle between the 1st and the 2nd filter stage for approx. 30 seconds while the pumps are operating.

  For cleaners with a length from 17.4 m:

  Switch off the "sprinkling pump 1a" and the "sprinkling pump 2a" at the control cabinet (manual switch in central position). Close the ball valves of pumps 1a and 2a at the front of the service aisle and open the ball valves of the rinsing line next to them for approx. 30 seconds. Move the ball valves back into their original position and put the pumps into automatic mode.

  Switch off pumps 1b and 2b next. Close the ball valves of pumps 1b and 2b at the back of the service aisle and open the ball valves of the rinsing line next to these for approx. 30 seconds. Move the ball valves back into their original position and put the pumps into automatic mode.

6.3 Service tasks every 4 weeks

- Calibrating the pH electrode (see chapter 6.7.3 "Calibrating the pH electrode (every four weeks)")
- **Bio filter bed:**

  The root timber bed is to be checked at regular intervals for any breakthrough, i.e. areas with open orifices. If breakthroughs are detected then it is necessary to eliminate these by dispersing the root timber or adding root timber. Also check the moisture in the root timber and adjust the humidification intervals (refer to chapter 5.5.8 ”Humidifying the bio filter stage”) if necessary.

6.4 Regular cleaning tasks

- **Cleaning the wet filter walls:**

  The two wet filter walls must be cleaned thoroughly with water after every production cycle, no less than every three months. A high-pressure cleaner with a minimum output of 26 l/min and 180 bar should be used for cleaning. When doing so, a sufficient spray distance should be maintained to ensure that the packing is not damaged.

  Unscheduled cleaning should be carried out as required (see chapter 6.5).

!	**Important:** If, contrary to expectations, the pressure loss between the cleaning intervals becomes too great, unscheduled cleaning is essential. Do not use any disinfectants during operation.

- **Wash water replacement:**

  The wash water for the two wet filter walls must be completely replaced **after every production procedure** and no less than every 3 months.

6.5 Instructions for cleaning the filter walls of MagixX

The traffic light in the controller display indicates the degree of contamination in the packing compared to the air capacity. This makes it easy to see whether the ventilation demands can be met considering the current degree of contamination.

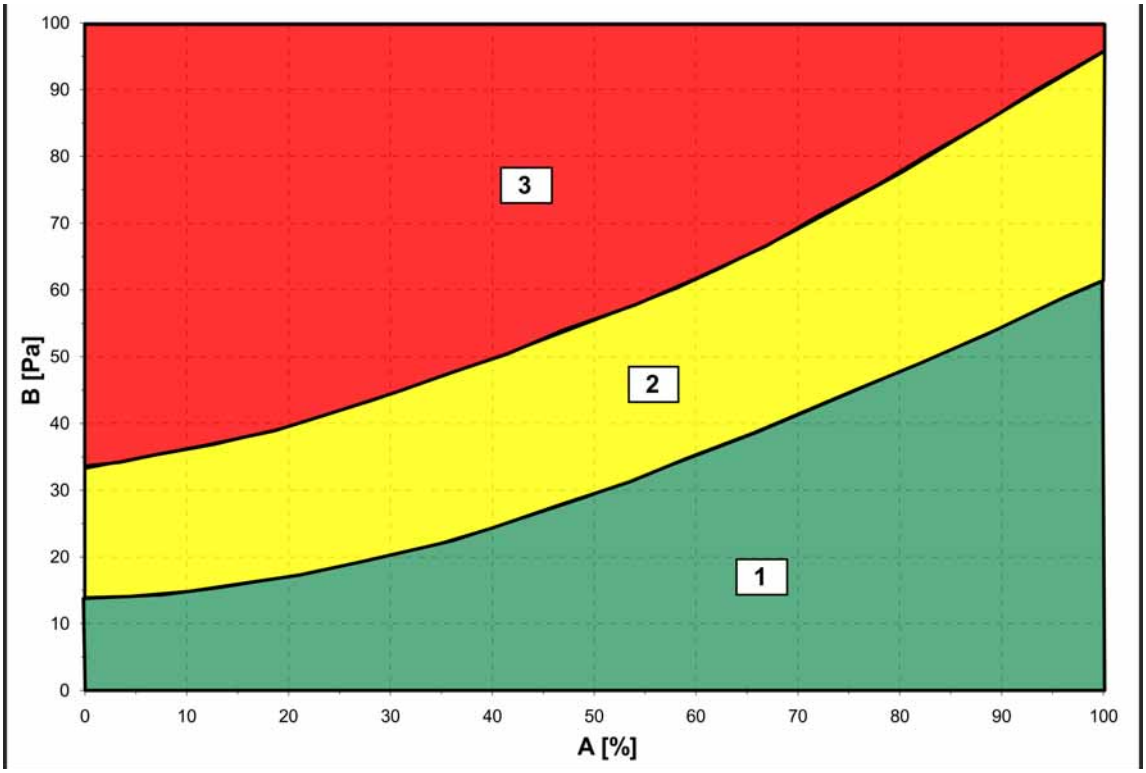
If the traffic light shows red, the instructions in chapter 6.5.1 "Regular cleaning tasks with wash water replacement" or 6.5.2 "Unscheduled cleaning without water replacement" must be followed.

If the traffic light is not operational due to an error in the signal transmission for the fan then it is possible to refer to the following diagram in order to estimate the contamination of the filter walls.

The following diagram shows the differential pressure against the percentage ventilation.

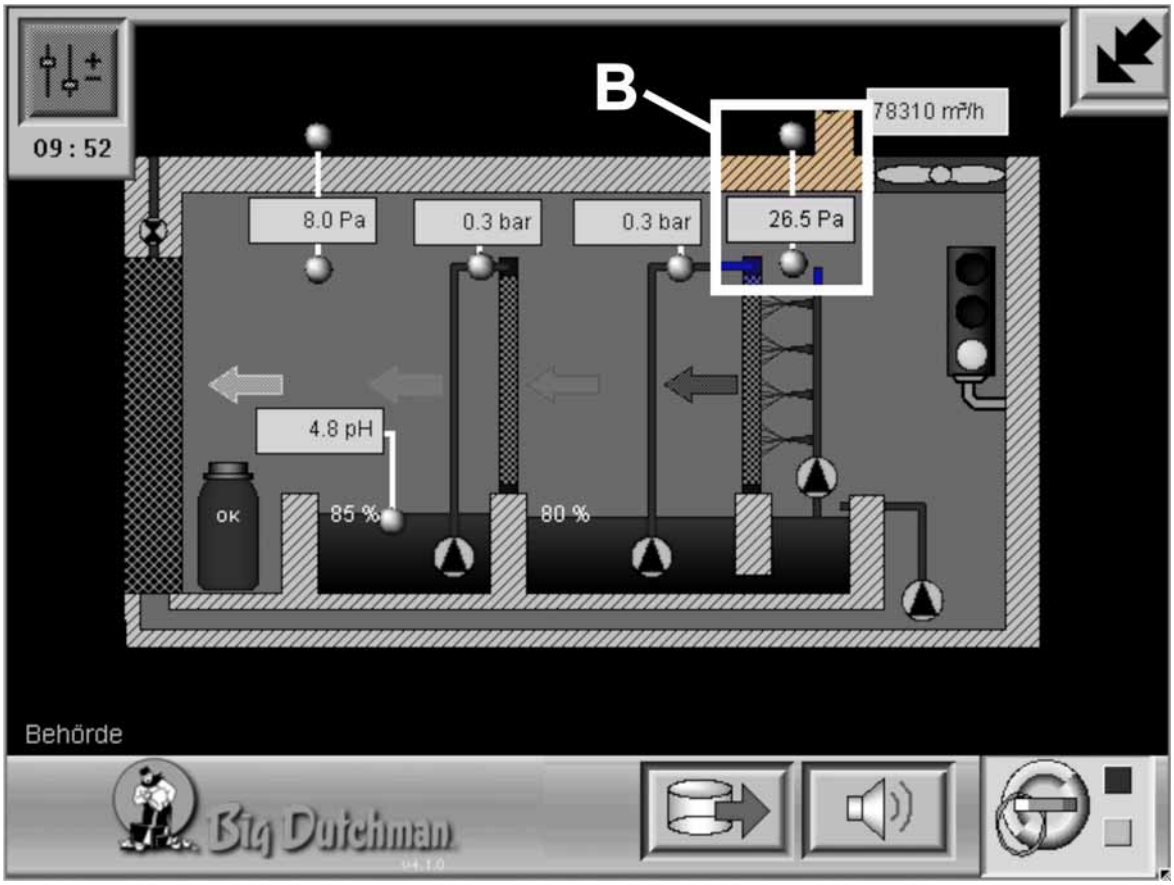
Important:

The pumps may not be switched off prior to cleaning because the contamination in the packing will then dry out and thus be very difficult to clean.



For the legend: see the following page

A	= current air capacity in the house (percentage)
B	= pressure difference between the pressure **ahead of the first filter wall** and the **air pressure outside of the house** (also refer to the following figure)
1	= filter wall OK (green)
2	= filter wall slightly contaminated (yellow)
3	= filter wall heavily contaminated (red)



6.5.1 Regular cleaning tasks with wash water replacement

The two wet filter walls must be cleaned thoroughly with water after every production procedure and no less than every 3 months. A high-pressure cleaner with a minimum output of 26 l/min and 180 bar should be used for cleaning in conjunction with a fan nozzle. When doing so a sufficient spray distance should be maintained, in order that the packing is not damaged (min. 10 cm).

Cleaning process:

a) First all switches (pumps, solenoid valves, etc) at the control cabinet are switched off. The only exception is the pump sump pump, which must remain in automatic mode.

b) Subsequently, open the ball valves in the riser pipes and spraying line to drain off the standing water in the pipes.

c) Drain the process water of the two basins **(and dispose of them or store it correctly!)**. Simultaneously turn the cleaning nozzles by 180° to the front to be able to clean the nozzle plate together with the packing.

   If necessary, the nozzles plates must be removed and rinsed individually. If the water basins are empty, the check valves of the centrifugal pumps (cleaners with length of up to 14.4 m have one check valve, two check valves from 17.4 m) must be opened to drain the waste water from the pipe. The valves are then dismounted, checked and cleaned and then mounted again.

d) Clean each individual packing separately. Start at the top left and move slowly to the right with the fan nozzle of the high-pressure cleaner. In this way the packing is cleaned from top to bottom. The nozzle must be held at an angle pointing downward during cleaning.

e) The rear side of the first filter wall is cleaned in the same way.

f) If, once the rear side of the first filter wall has been cleaned, there is dirt once again on the front then this must be rinsed off (plenty of water!).

g) Proceed in the same way with the second filter.

h) Once the packing is clean the water basins are sprayed out using the high-pressure cleaner (removal of sludge, dirt, etc). Then clean the passages in front of and behind the water basins, the ceiling and the walls.

Once the entire cleaner and the building have been cleaned, put the cleaner back into operation in the following order:

1. Turn the cleaning nozzles back again by 180°.
2. Fill the centrifugal pumps with water once again (Attention! The pumps are not self-priming!), otherwise they will run dry and become damaged.
3. Close all previously opened ball valves.
4. Now all manual switches are set back to automatic and the system commences operation once the water basins are filled with sufficient water.

Important:

After cleaning and re-starting the system, do not forget the entry into the operating records for the authorities. The operation status of the system should be checked again the next day.

6.5.2 Unscheduled cleaning without water replacement

The automated spraying of the 1st wet filter wall at cyclical intervals ensures that no blocking of the filter occurs in the event of high dust loads. However, if contrary to expectations the pressure losses between the cleaning intervals become too great, unscheduled cleaning outside of the planned cycle is essential.

Unscheduled cleaning process:

Important:

Even if the cleaner requires unscheduled cleaning, it remains necessary to stick to the three-monthly filter cleaning intervals as previously planned and above all to replace the water.

a) The cleaner is not switched off!

b) The contaminated filter walls are cleaned with a high-pressure cleaner according to items d to g in chapter 6.5.1.

c) The water level in the basin will rise as a result of this. If the basin is equipped with an overflow then the water can drain off here. If the basin has no overflow then the water level must be lowered appropriately prior to the unscheduled cleaning.

6.6 Filling the biological cleaning stage with root timber

Before filling the biological cleaning stage with root timber, the assembly of the frames and wire grilles has to be finished first.

A wire grille is dismounted at the outside of the biological cleaning stage in the middle of the exhaust air cleaner. This access is required to reprocess the root timber by hand during the filling up.

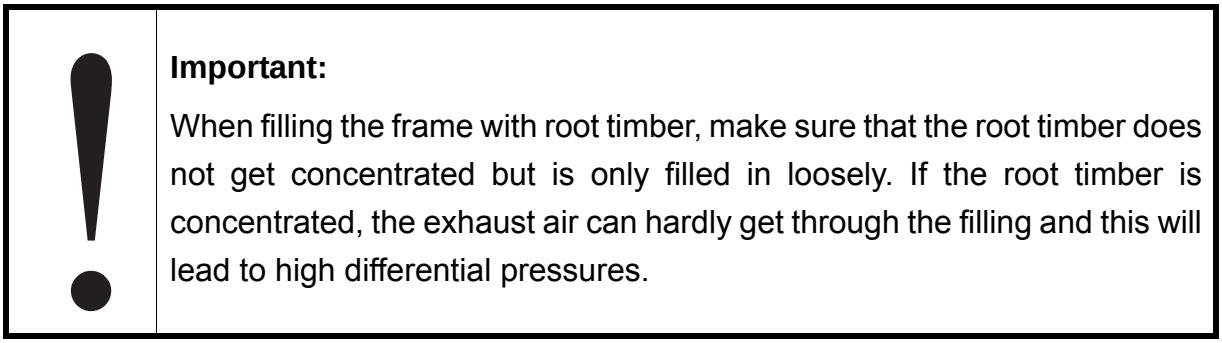
The root timber is filled up uniformly towards the centre, beginning on the left-hand and right-hand sides of the filter stage.

Big Dutchman recommends to fill in the root timber from above between the wire grilles by means of a wheel loader or similar.

Make sure that there are no holes in the filling when filling in the root timber. In this case, the holes have to be backfilled.

In order to achieve a correct distribution and consistence below the concrete lintel, the wood has to be filled in by hand.

Finally, the previously removed wire grille is reinstalled in the centre of the filter stage and all remaining areas are filled up with root timber.



Important:

When filling the frame with root timber, make sure that the root timber does not get concentrated but is only filled in loosely. If the root timber is concentrated, the exhaust air can hardly get through the filling and this will lead to high differential pressures.

6.7 pH control unit

MagixX-P is equipped with a fully functional measuring, control and dosing unit to correct the pH value in aqueous media. Its main components are an LDPH controller (pH measuring and controlling device), hereinafter referred to as "LDPH", a solenoid diaphragm dosing pump and connection piping made of PVC with an in-line electrode bracket to hold the pH electrode and the injection for the dosing.

The measured and control values are displayed by an LC display with background lighting at the LDPH. A membrane keypad with six keys is available to set and parametrize the unit.

The LDPH regulates the set pH target value by means of metering sulphuric acid proportionally to the measured value using a solenoid diaphragm dosing pump.

The two stop ball valves (inlets and outlets of the connection piping) are always open during regular operation and are only closed for calibration.

 **WARNING**	**Risk of chemical burns**
	When handling the dosing system and sulphuric acid, always observe the safety data sheet "Sulphuric acid 96 %" (see chapter 12 ”EU safety data sheet - sulphuric acid 96 %”)

6.7.1 Scope of delivery

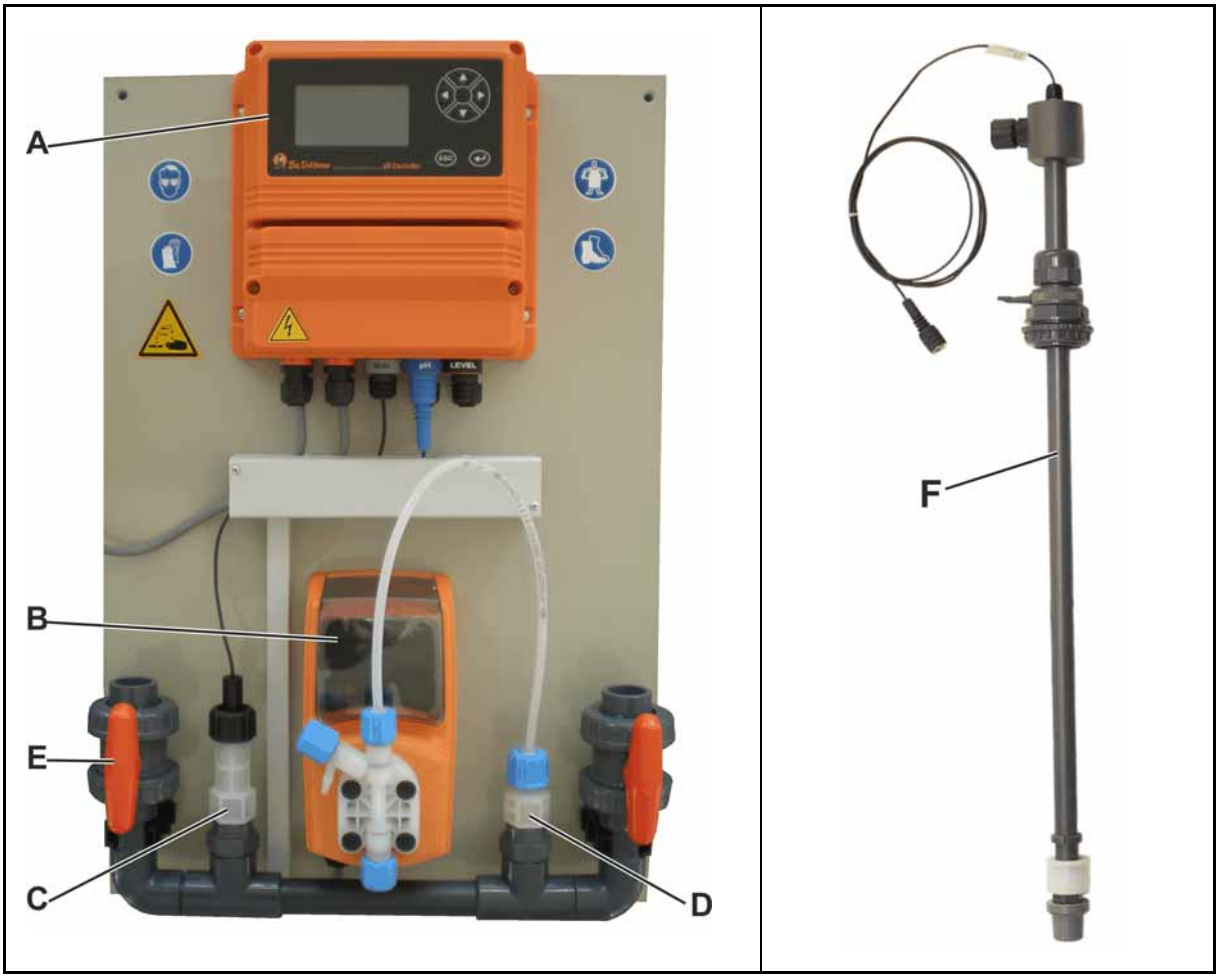
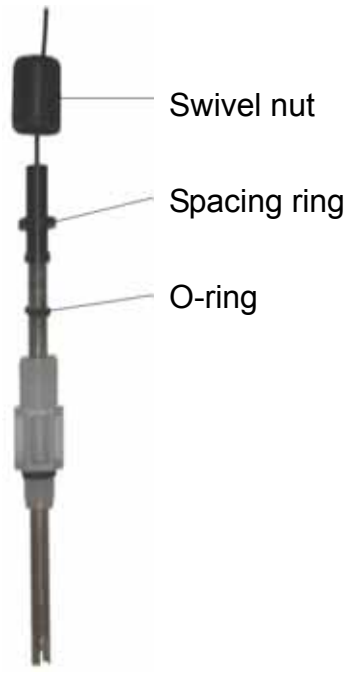


Plate for wall mounting made of PE plastic with:

- **A:** Measuring and controlling device (controller) type LDPH
- **B:** Solenoid diaphragm dosing pump type VIS 1004
- **C:** In-line electrode bracket with pH electrode type SPHS with 0.8 m fixed cable and BNC connector
- **D:** Injection valve ½" - 4x6 (PVDF+FP+PTFE+CE) with 5 bar counter pressure
- **E:** PVC piping 25 mm with 2 stop ball valves
- **F:** Suction lance type LASP/V10 4x6 PVC with level switch (empty sensor) and 3.5 m connection cable with BNC connector
- 50 ml bottles of buffer solution pH 4 and pH 7 each to calibrate the pH electrode
- One 50 ml syringe to suck in the dosing liquid from the container and to bleed the dosing pump

Structure of the pH electrode in the in-line electrode bracket



6.7.2 Connecting a new pH electrode

Remove the pH electrode from the packaging and insert the blue BNC connector of the pH electrode into the blue BNC socket of the LDPH, marked with "pH".

Remove the protective cap from the pH electrode.

Calibrate the new pH electrode before installing it in the in-line electrode bracket (see chapter 6.7.3).

6.7.3 Calibrating the pH electrode (every four weeks)

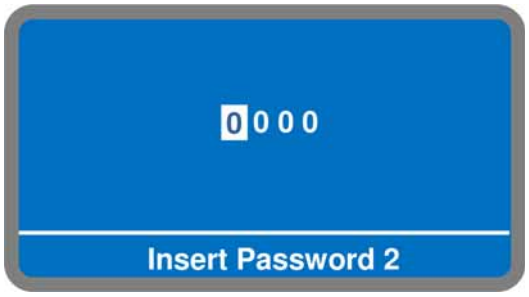
The pH electrode experiences wear and tear over time. This causes the displayed pH to sometimes deviate slightly, which means that the electrode must be re-calibrated every four weeks. Significant deviations of the measured value from the actual values can limit functioning or seriously damage the exhaust air cleaner. Document each calibration in the operating records.

 **WARNING**	**Risk of chemical burns** When handling the dosing system and sulphuric acid, always observe the safety data sheet "Sulphuric acid 96 %" (see chapter 12 ”EU safety data sheet - sulphuric acid 96 %”)

 **WARNING**	**Risk of injury** Always wear the acid-resistant, personal protective equipment when working on the pH control unit (goggles, gloves, footwear and protective clothing).

- Standard display of the LDPH

- Press the key "►" 2 times until **"PROBE"** flashes inversely and confirm with **< ENTER >**.

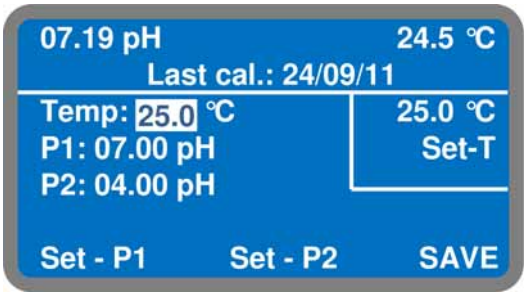


- Set the four-digit password 2 by means of the arrow keys.

  In the delivery status, the password is "0 0 0 0".
- The values can be set with the keys "▲" and "▼" .
- Confirm the entry with

  .

- Press **< ENTER >** again to open the submenu **"Calibrate"**.

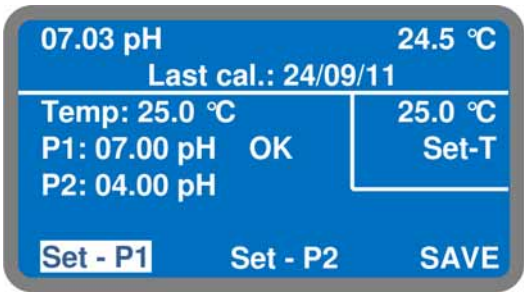


In the upper third of the display, following values are indicated:

- The current measured pH-value is displayed on the left.
- The current measured temperature appears on the right (if a temperature sensor is connected).
- In the second line, the date of the last calibration is displayed.

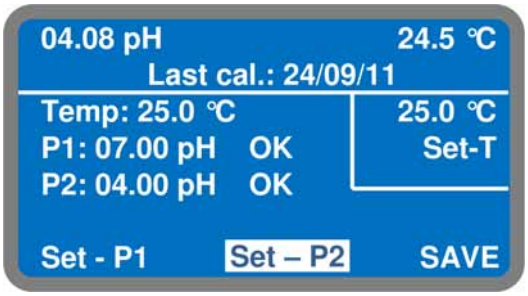
In the middle third of the display, the input value for the calibration temperature is displayed inversely.

- Press the key "►" until the field **"Set -P1"** is displayed inversely.



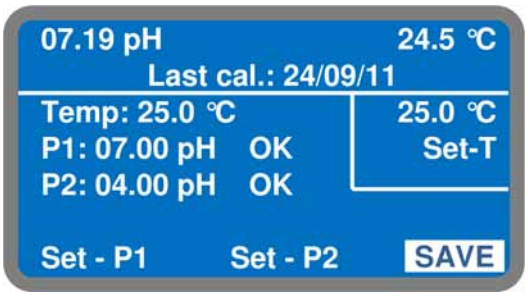
Calibrating the electrode zero point "P1":

- Close all ball valves ahead of and after the pH electrode.
- Remove the electrode from the support (not in case of a new electrode). Clean the top of the electrode with fresh water and dry it carefully with a clean cloth.
- Immerse the pH electrode in the bottle containing the **pH 7** buffer solution. The value currently measured by the pH electrode is displayed in the upper left corner.
- Slightly swirl the pH electrode in the bottle and wait until the value on the display has stabilized.
- Press **< ENTER >** to confirm the calibration. The word **"OK"** now appears next to P1.
- Press the key "►" to access the menu point **"Set - P2"**.



Calibrating the electrode slope "P2":

- Rinse the pH electrode again using fresh water and pat it dry with a clean cloth.
- Immerse the top of the pH electrode in the bottle containing the **pH 4** buffer solution.
- Slightly swirl the pH electrode in the bottle and wait until the value on the display has stabilized.
- Press **< ENTER >** to confirm the calibration. The word **"OK"** now appears next to P2.



- Press the key "►" to open the menu point **"SAVE"** and confirm with **< ENTER >** to carry out the calibration.

The question **"SAVE?"** prompts you once more to save the new calibration.

- Press **< ENTER >** to confirm the new calibration values.
- Or press **< ESC >** to keep the old values.
- Or install the pH electrode in the in-line electrode bracket (see chapter 6.7.1 "Scope of delivery").

Repeat the procedure again if it was not possible to save the calibration. If an error message appears again, the electrode had to be replaced (Big Dutchman, code no. 60-50-0096).

6.7.4 Replacing the sulphuric acid store

During normal operation, the exhaust air cleaning system MagixX uses sulphuric acid, thus minimising the total water demand (see chapter 3.7.1 ”Sulphuric acid store”). To reduce time and costs, we recommend purchasing of technical grade 96 % sulphuric acid in 1,000 kg (or larger) IBCs.

Providing a second acid store is sensible to ensure nearly continuous operation as this is the only option to replace the store immediately when necessary. It also reduces the possibility of additional efforts caused by the dosing pump needing to be bled after the replacing.

 **WARNING**	**Risk of chemical burns** When handling the dosing system and sulphuric acid, always observe the safety data sheet "Sulphuric acid 96 %" (see chapter 12 ”EU safety data sheet - sulphuric acid 96 %”)

 **WARNING**	**Risk of injury** Always wear the acid-resistant, personal protective equipment when working on the pH control unit (goggles, gloves, footwear and protective clothing).

When changing the store, the suction lance is removed upwards and in a vertical position and an acid-resistant container (e.g. a bucket) is placed below it. This is the only way to ensure that the draining sulphuric acid is collected safely at all times. Store the suction lance in this container and make sure it cannot tip over. The lance is re-installed after the store has been changed. If the new acid barrel is already situated in the second spot, the suction lance can be moved directly.

The suction pipe must be placed horizontally on the IBC to ensure that no air bubbles can form. Clean the acid-resistant container thoroughly in the wash water of the 2nd filter stage and rinse it with fresh water.

If no acid is conveyed after having replaced the sulphuric acid store, the system has to be bled (see chapter 6.7.5 "Bleeding the dosing pump").

6.7.5 Bleeding the dosing pump

After the system has not been used for some time or after a longer break due to a change of the sulphuric acid store, the suction hose can run dry, preventing the dosing pump from conveying acid. In this case, the hose and the pump must be bled. Carry out the following steps to do this.

 WARNING	**Risk of chemical burns** When handling the dosing system and sulphuric acid, always observe the safety data sheet "Sulphuric acid 96 %" (see chapter 12 ”EU safety data sheet - sulphuric acid 96 %”)

 WARNING	**Risk of injury** Always wear the acid-resistant, personal protective equipment when working on the pH control unit (goggles, gloves, footwear and protective clothing).

- Place the syringe on the hose stem of the dosing pump's vent screw using a short piece of hose.
- Open the vent screw at the dosing head of the pump.
- Suck in the dosing medium using the syringe (preferably while the pump is running). You can now see how the dosing medium rises inside the suction hose between the suction lance and the dosing head. For longer suction hoses, it may be necessary to repeat the sucking. Close the vent screw before removing the syringe.
- Close the vent screw as soon as the dosing medium has reached the dosing head and is visible in the syringe hose, while the pump is still running.
- Remove the hose including the syringe and clean all parts which came into contact with the sulphuric acid thoroughly and carefully in the wash water of the 2nd filter stage. Rinse with fresh water.

7 Replacement parts list

7.1 Sensors

All sensors for process monitoring are adjusted in the controller in the factory and are available for use immediately after installation with the exception of the pH control unit.

Important:

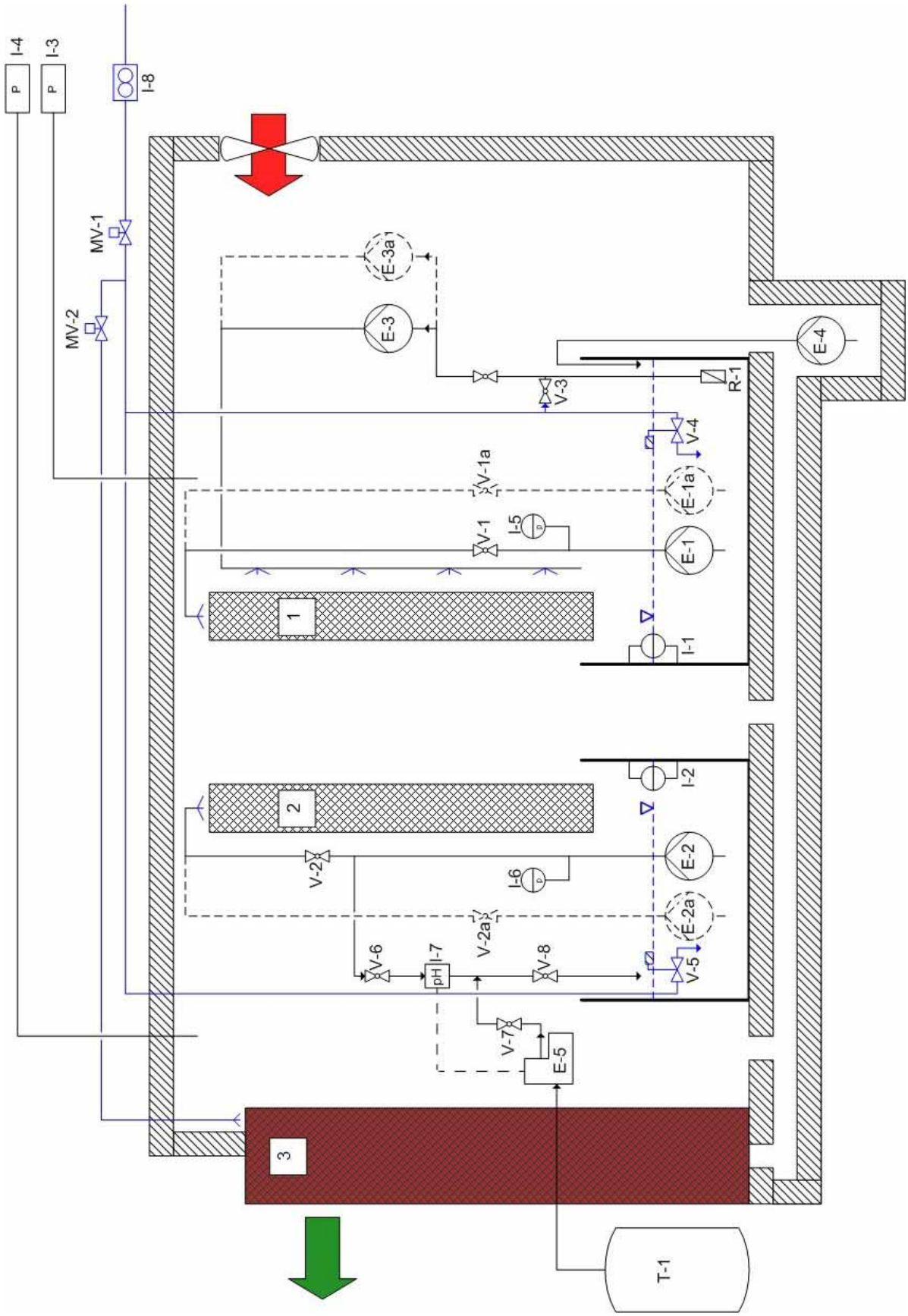
Only sensors exclusively approved by **Big Dutchman** may be used. The connection of other sensors that are not approved can result in the computer being damaged.

Sensor:	Signal	Code no.	Remarks
Water level	0-10 V	60-50-0050	
Pump pressure	0-10 V	60-50-0063	
Differential pressure	0-10 V	60-49-0121	
pH electrode MagixX	0-10 V	60-50-0096	

7.2 Other parts and consumable materials

Components	Code no. (50 Hz)	Code no. (60 Hz)	Remarks
Plastic packing	60-50-0079		
Sprinkling pump	60-50-0135	62-00-3231	
Spraying pump	60-50-0052	60-50-0051	
Overflow pump root timber bed	62-00-7321	60-43-7322	
Solenoid valve for water supply	30-00-1259		
Buffer solution pH 4	60-50-0028		
Buffer solution pH 7	60-50-0299		
Eye-rinsing solution pH neutral	00-00-3104		
Root timber shredded	60-50-0048		
Anti-foaming agent Struktol	60-50-0049		

8 Process screen



Component	Function / description
1	Filter wall 1
2	Filter wall 2
3	Root timber bed
E-1 (E1a)	Submersible pump for sprinkling filter wall 1
E-2 (E2a)	Submersible pump for sprinkling filter wall 2
E-3 (E3a)	Centrifugal pump for spraying filter wall 1
E-4	Submersible pump for return water from the bio filter stage
E-5	Acid dosing pump
I-1	Fill level sensor water basin 1
I-2	Fill level sensor water basin 2
I-3	Differential pressure sensor total pressure increase
I-4	Differential pressure sensor bio filter
I-5	Pump pressure sprinkling pump basin 1
I-6	Pump pressure sprinkling pump basin 2
I-7	pH value sensor
I-8	Water counter fresh water consumption
V-1 (V1a)	Ball valve for throttling the submersible pump filter wall 1
V-2 (V2a)	Ball valve for throttling the submersible pump filter wall 2
V-3	Filler valve centrifugal pump
V-4	Float switch fresh water supply water basin 1
V-5	Float switch fresh water supply water basin 2
V-6	Ball valve for throttling the acid dosing flow
V-7	Dosing valve sulphuric acid
V-8	Service ball valve for pH electrode maintenance
MV-1	Solenoid valve for fresh water supply to the water basins
MV-2	Solenoid valve for bio filter spraying
R-1	Check valve centrifugal pump
T-1	Sulphuric acid tank

9 Technical data

MagixX-P	Unit	Comment
Number of cleaning stages:	3 stages	
1. Wet filter wall	15 cm	
2. Wet filter wall	15 cm	
- pH value of the acid stage	<5	
3. Bio filter stage	60 cm	
Separation capacities:		
- Ammonia	>70 %	
- Total dust	>90 %	
- PM_{10}	>80 %	
- Odour	<300 OU	No raw gas odour perceivable in the clean gas
Pressure increase:	<100 Pa	
N concentration wash water:		
- Basin 1	<20 g N/l	
- Basin 2	<42 g N/l	

10 Standard settings

Parameter	Standard setting
House name	MagixX-P
System length	up to 14.4 m / from 17.4 m
Pumps:	
Pump 1a [active/inactive]	active
Pump 1a [active/inactive]	inactive/active
Pump 2a [active/inactive]	active
Pump 2a [active/inactive]	inactive/active
Pump sump [active/inactive]	active
Pump spraying [active/inactive]	active
Spraying pause [min]	2
Spraying duration [min]	3
Rinsing intervals - sprinkling [per day]	0/1
Rinsing duration [min]	15
Humidification bio bed pause [sec]	1800
Humidification bio bed duration [sec]	30
Basins:	
Target fill level [%]	80-90
Min. alarm basin 1 [%]	30
Max. alarm basin 1 [%]	95
Min. alarm basin 2 [%]	30
Max. alarm basin 2 [%]	95
Acid:	
Min. alarm acid [pH]	4
Max. alarm acid [pH]	6.5
Differential pressures:	
Min. alarm pump pressure 1 [bar]	0.1
Max. alarm pump pressure 1 [bar]	0.8
Min. alarm pump pressure 2 [bar]	0.1
Max. alarm pump pressure 2 [bar]	0.8
Min. alarm differential pressure 1 [Pa]	-
Max. alarm differential pressure 1 [Pa]	120
Min. alarm differential pressure 2 [Pa]	-
Max. alarm differential pressure 2 [Pa]	50 bio

11 What to do if ... First aid with fault analysis

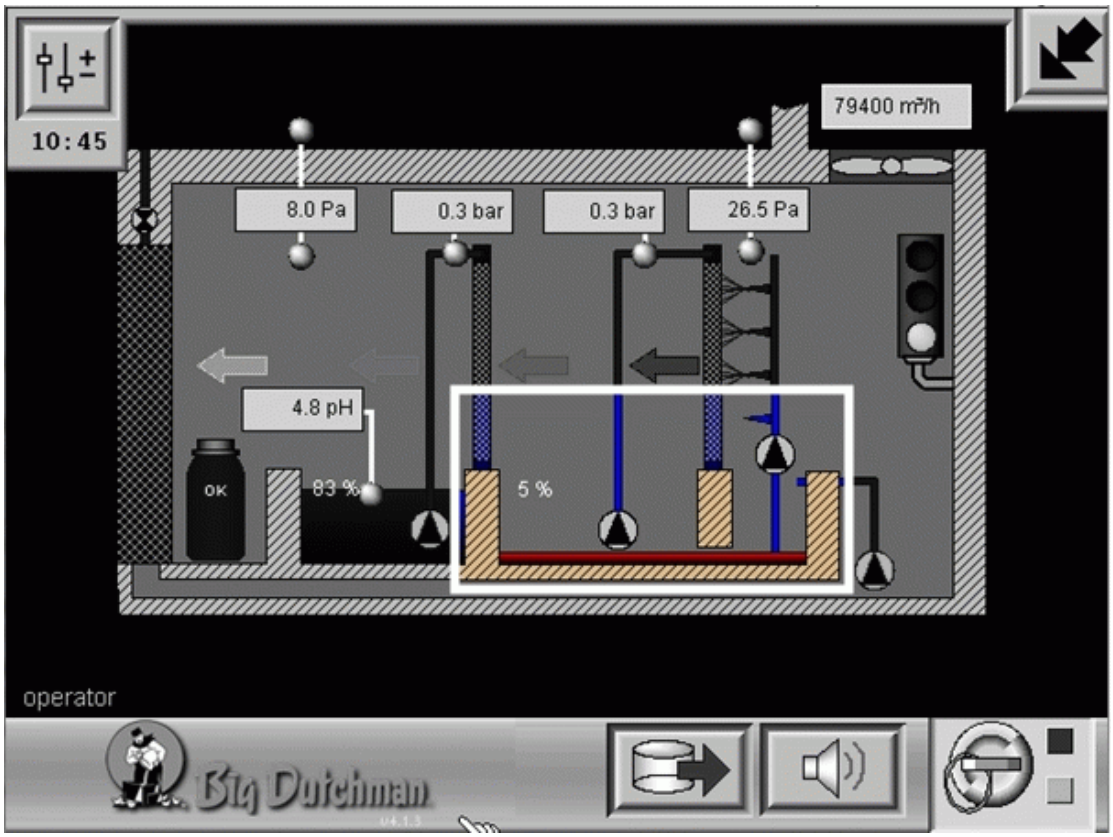
11.1 Big Dutchman contact information

If there is an error you are not able to correct, please do not hesitate to contact **Big Dutchman**.

Get in contact with Big Dutchman:	Telephone: +49 (0)4447/801-0
	Fax: +49 (0)4447-801-237
	Email: big@bigdutchman.de

11.2 Alarm water level

Alarm water level		**The water level in water basin 1 or 2 is not normal.**



Possible causes:

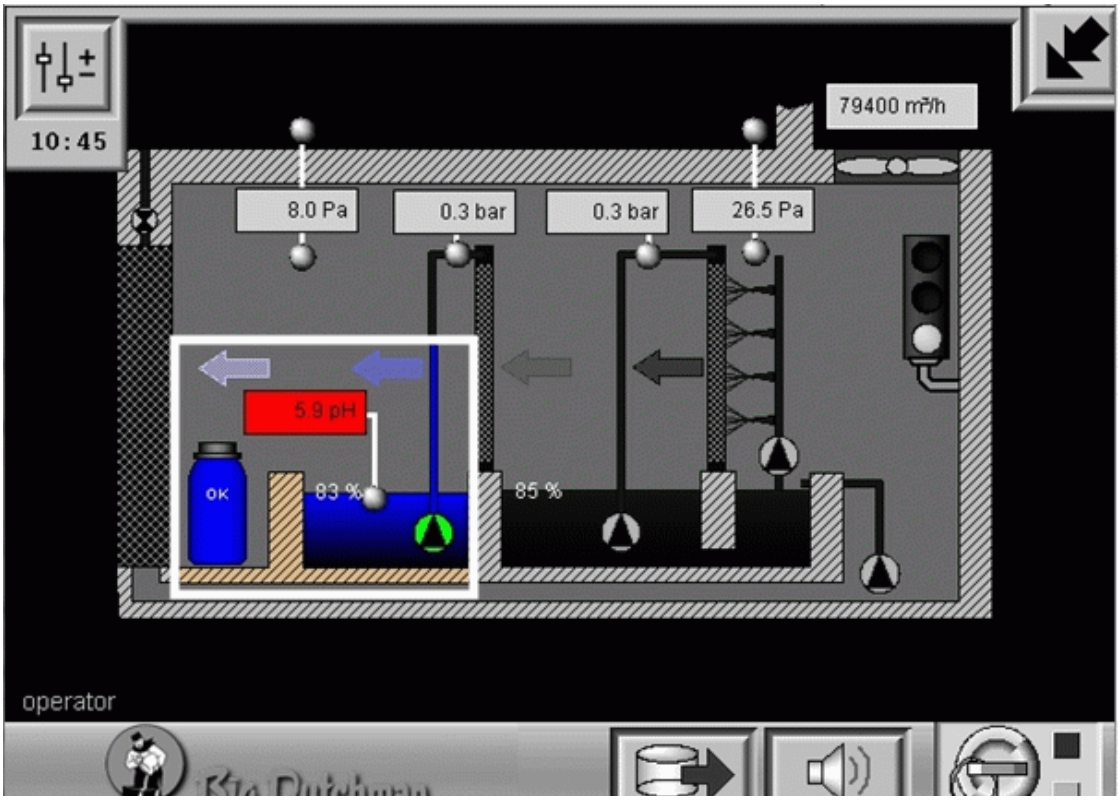
➲	The fill level in the water storage basin is less than 30 % **(min. alarm)**.	
	☑	Check your central water supply.
	☑	Check the float of the level sensor and clean it, if necessary.
	☑	Check the water outlet and the corresponding water basin for leaks.
	☑	Check the solenoid valve in the central water supply, using the manual switching function. • If the solenoid valve opens, there is a problem with the controller of the exhaust air cleaner. • If the solenoid valve does not open, it is defective.
	☑	Check the float valve and clean the sieve insert, if necessary.
	☑	Check the switching function by manually actuating the level sensor (min. 5 seconds). If the alarm message, which is signalled via a red bar at the respective basin (1 or 2), does not disappear, the alarm is incorrect.

➲	The fill level in the water basin is above 95 % **(max. alarm)**.	
	☑	Check the function of the float valve by manual actuation. If the float valve does not close correctly, try to restore its function by cleaning it.
	☑	Check the switching function by manually actuating the level sensor (min. 5 seconds). If the alarm message, which is signalled via a red bar at the respective basin (1 or 2), does not disappear, the alarm is incorrect.
	☑	If there is heavy precipitation, water can reach filter stage 3 and enter water basin 1 through the pump sump. In this case the fill level adjusts itself through evaporation.

11.3 Alarm pH value

Alarm pH value	➲	**The pH value displayed does not lie within the prescribed pH value level.**

 **WARNING**	**Risk of chemical burns** When handling the dosing system and sulphuric acid, always observe the safety data sheet "Sulphuric acid 96 %" (see chapter 12 ”EU safety data sheet - sulphuric acid 96 %”)

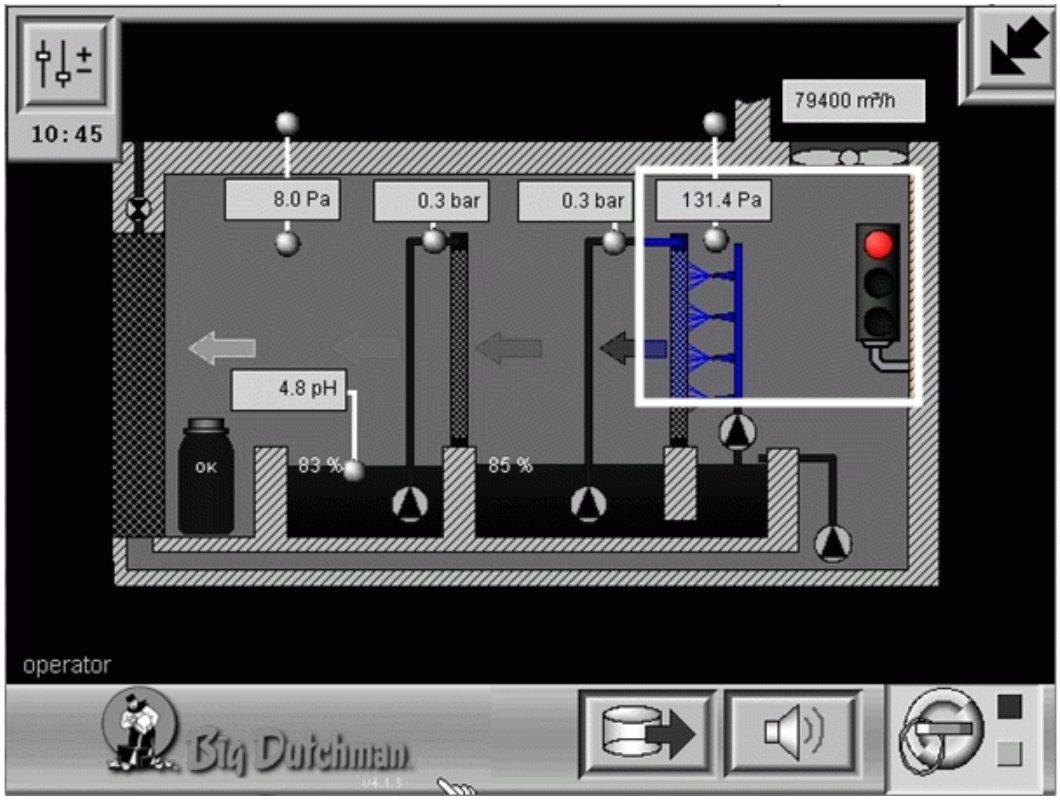


Possible causes:

➲	The pH value is above 6.5 **(max. alarm)**.	
	☑	Check the acid store.
	☑	Check the function of the acid dosing pump.
	☑	Check the suction line from the acid barrel to the dosing pump for trapped air. Bleed the dosing pump again and observe the instructions in this manual (see chapter 6.7.5).

11.4 Alarm differential pressure

Alarm differential pressure	➲	**The displayed differential pressure between the individual cleaning stages does not lie within the prescribed differential pressure levels.**

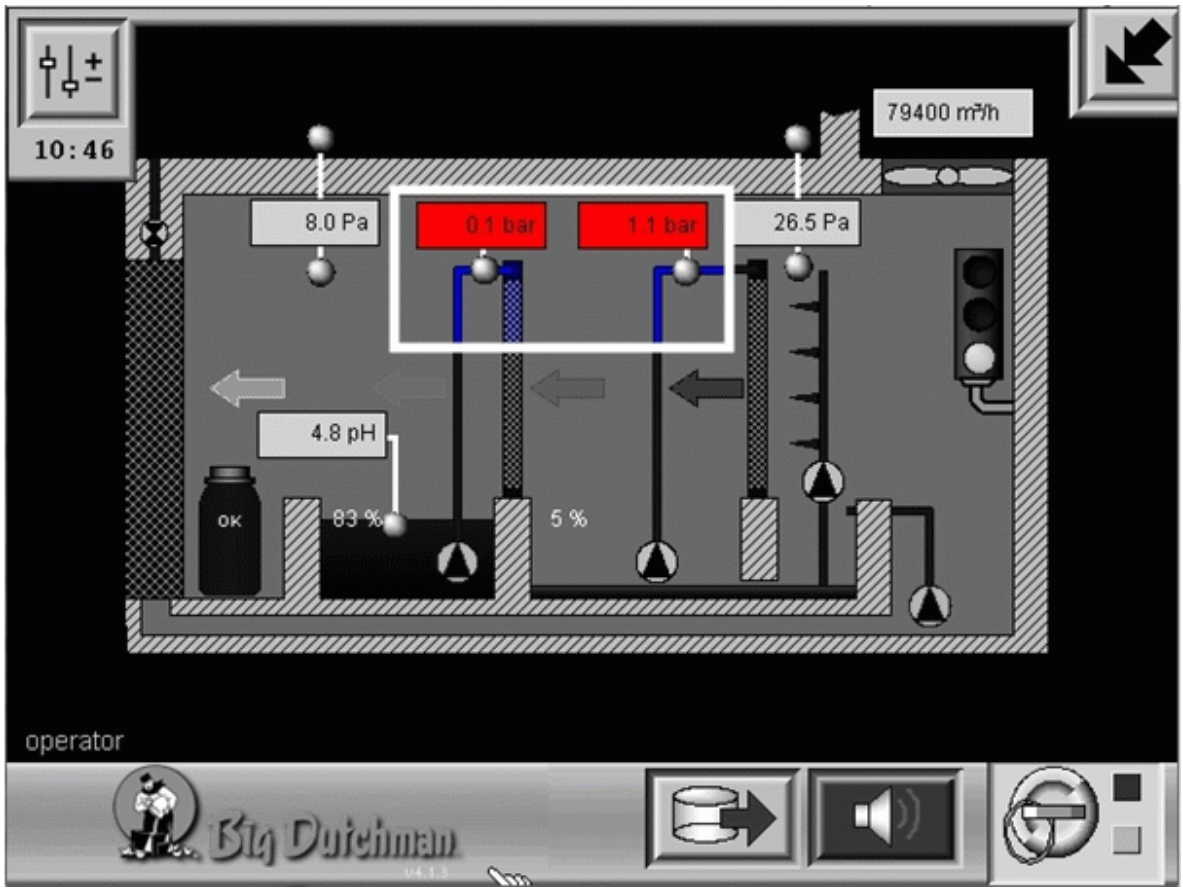


Possible causes:

➲	The pressure increase via the wet filter walls is too high **(max. alarm)**.	
	☑	Check the condition of the wet filter walls. Clean the wet filter walls immediately if they should be contaminated even if the cleaning intervals as stated in the operation and maintenance instructions were maintained.
	☑	Check the zero point adjustment of the pressure sensors used by removing all pressure hoses entering the filter stages from the sensor. All pressure sensor should display a value of approx. 0 Pa. If this is not the case, the sensor must be checked by a Big Dutchman service technician.
	☑	Remove all pressure hoses from the sensors and clean them to eliminate possible blockages caused by water or dust.

11.5 Alarm pump pressure

Alarm Pump pressure	➲	**The pump pressures displayed for the individual cleaning stages do not lie within the prescribed pressure levels.**



Possible causes:

➲	The pump pressure is above 0.8 bar **(max. alarm)**.	
	☑	Rinse the sprinkling line as described in chapter 6 .
	☑	Check whether and which pipes are blocked. Switch the pump off and clean the respective pipe. Set the pump back to automatic mode.
	☑	Check the pressure sensor. If this is blocked, e.g. due to contaminant deposits, clean it. If this error cannot be corrected, please contact the **Big Dutchman** service.

➲	The pump pressure is less than 0.1 bar **(min. alarm)**.	
	☑	Check whether the sprinkling pumps in the corresponding water basin are operating correctly.
	☑	Check whether and which pipes are leaking. Switch the pump off and eliminate the leak in the respective pipe. Set the pump back to automatic mode.
	☑	Check the pressure sensor. If this is blocked, e.g. due to contaminant deposits, clean it. If this error cannot be corrected, please contact the **Big Dutchman** service.

 **WARNING**	**Risk of injury and danger to life** **Operational safety is of paramount importance!** Spare parts not released or recommended by **Big Dutchman** can cause severe injuries as their suitability for **Big Dutchman** systems cannot be assessed beforehand. • Only use spare parts released or recommended by **Big Dutchman** for your own safety.

11.6 Formation of foam in the water basins

Due to the constant agitation inside the water basin, the dust from the house dissolving in the water may form foam. In the 2nd filter stage, foam can also form due to the emission of carbon dioxide. This can happen especially after the acid dosing has been interrupted.

An anti-foaming agent must be used before the foam spills over the basin edges or affects the level sensor or the float switch.

The anti-foaming agent "Struktol", which is included in the delivery of this exhaust air cleaning system, has proven to be very efficient for this purpose. The amount used should be adapted to the local conditions. We recommend to use approx. ½ litre over the entire width of each basin.

The foam should become less within the hour. If it forms again the next day, increase the dosage so that the foam is confined for at least a few days.

12 EU safety data sheet - sulphuric acid 96 %

Safety data sheet in accordance with regulation (EC) No 1907/2006 BÜFA Chemikalien GmbH & Co. KG

Trade name: Sulfuric acid ca. 96% Date revised: 13.04.10

1000908/1000908 Version: 2 / DE Master No. M-006 Date of printing: 05.05.10

01. Identification of the substance/preparation and of the company/undertaking

Trade name

Sulfuric acid ca. 96%

Use of the substance/preparation

Base chemical with not specially defined use

Company/undertaking identification

Address

BÜFA Chemikalien GmbH & Co.KG
An der Autobahn 14
27798 Hude / Altmoorhausen

Telephone no.	+49 4484 9456 852
Fax no.	+49 4484 9456 863
Information provided by / telephone	Department product safety
Emergency telephone	Giftzentrale Göttingen: +49 551 19 240
E-mail address of person responsible for this SDS	produktsicherheit-c@buefa.de

02. Hazards identification

Classification

Classification	C, R35

Hazard symbols

C	Corrosive

R phrases

35	Causes severe burns.

03. Composition / information on ingredients ***

Hazardous ingredients ***

Sulphuric acid ...%

CAS no.	7664-93-9			
EINECS no.	231-639-5			
Concentration		>=	50	%
Classification	C, R35			

Complete text of R-phrases in Chapter 16

04. First aid measures

General information

Remove affected person from danger area, lay him down. Remove contaminated, soaked clothing immediately and dispose of safely. Irregular breathing/no breathing: artificial respiration. If the patient is likely to become unconscious, place and transport in stable sideways position.

After inhalation

Remove the casualty into fresh air and keep him calm. Keep warm, calm and covered up. If the patient is likely to become unconscious, place and transport in stable sideways position. Summon a doctor immediately.

Safety data sheet in accordance with regulation (EC) No 1907/2006 BÜFA Chemikalien GmbH & Co. KG

Trade name: Sulfuric acid ca. 96% Date revised: 13.04.10

1000908/1000908 Version: 2 / DE Master No. M-006 Date of printing: 05.05.10

After skin contact

Wash immediately with plenty of water for several minutes. Summon a doctor immediately.

After eye contact

Separate eyelids, wash the eyes thoroughly with water (15 min.). Summon a doctor immediately.

After ingestion

Rinse out mouth and give plenty of water to drink. Do not induce vomiting. Summon a doctor immediately.

05. Fire-fighting measures

Suitable extinguishing media

Carbon dioxide, Dry powder, Water spray jet, Alcohol- resistant foam

Non Suitable extinguishing media

Full water jet

Special exposure hazards arising from the substance or preparation itself, its combustion products or from resulting gases

In case of combustion evolution of dangerous gases possible.

Special protective equipment for fire-fighting

Use self-contained breathing apparatus. Acid-resistant protective clothing

Other information

Collect contaminated fire-fighting water separately, must not be discharged into the drains.

06. Accidental release measures

Personal precautions

Use personal protective clothing. Ensure adequate ventilation. Avoid contact with skin, eyes and clothing. Use breathing apparatus if exposed to vapours/dust/aerosol.

Environmental precautions

Do not allow to enter drains or waterways. Do not discharge into the subsoil/soil. In case of gas escape or of entry into waterways, soil or drains, inform the responsible authorities.

Methods for cleaning up

Pick up with absorbent material (e.g. sand, sawdust, general-purpose binder, kieselguhr). When picked up, treat material as prescribed under heading "Disposal".

07. Handling and storage

Handling

Advice on safe handling

Keep container tightly closed. Open and handle container with care. Avoid formation of aerosols. When diluting, always stir product into water.

Advice on protection against fire and explosion

No special measures necessary. The product is not combustible.

Storage

Requirements for storage rooms and vessels

Provide acid-resistant floor. Keep only in the original container.

Hints on storage assembly

Do not store together with: Alkalies, Metals, Reducing agents

Further information on storage conditions

Keep container tightly closed and dry in a cool, well-ventilated place.

VCI storage category

Safety data sheet in accordance with regulation (EC) No 1907/2006 BÜFA Chemikalien GmbH & Co. KG

Trade name: Sulfuric acid ca. 96% Date revised: 13.04.10

1000908/1000908 Version: 2 / DE Master No. M-006 Date of printing: 05.05.10

VCI storage category 8B Non-combustible corrosive substances

08. Expose controls/personal protection ***

Exposure limit values ***

Sulphuric acid ...%

Type	MAK	
Value	0,1	mg/m³
Ceiling limit value	1	
Pregnancy group	Y	
Remarks	35, TRGS 901-104, DFG	

General protective and hygiene measures

Remove soiled or soaked clothing immediately. Avoid contact with eyes and skin. Keep seperated from food-stuffs and feed-stocks. At work do not eat, drink, smoke or take drugs. Wash hands before breaks and after work. Do not inhale gases/vapours/aerosols.

Respiratory protection

Short term: filter apparatus, combination filter B-P3; Self-contained breathing apparatus.

Hand protection

impermeable gloves

Appropriate Material	viton		
Material thickness	>=	0,7	mm
Penetrating time	>=	480	min

Eye protection

Tightly fitting safety glasses

Skin protection

Acid-resistant protective clothing

09. Physical and chemical properties

General information

Form	liquid
Colour	colourless
Odour	odourless

Boiling point

Value	appr.	310	°C

Melting point

Value	appr.	-10	°C

Vapour pressure

Value	<	0,0001		hPa
temperature		20	°C	

Density

Value	1,835		g/cm³
temperature	20	°C	

Viscosity

dynamic

Value	21,6		mPa.s
temperature	20	°C	

Solubility in water

Remarks	Completely miscible

pH

Value	<	1	
temperature		20	°C

Safety data sheet in accordance with regulation (EC) No 1907/2006 BÜFA Chemikalien GmbH & Co. KG

Trade name: Sulfuric acid ca. 96% Date revised: 13.04.10

1000908/1000908 Version: 2 / DE Master No. M-006 Date of printing: 05.05.10

10. Stability and reactivity

Conditions to avoid

No decomposition if used as prescribed.

Materials to avoid

Reactions with metals, with evolution of hydrogen. Reacts strongly with water. Addition of water leads to increase in temperature. Reactions with alkalies.

Hazardous decomposition products

sulphurous oxides (SOx)

Other information

When diluting, add acids to water, never the other way around.

11. Toxicological information

Acute toxicity / further data

Acute oral toxicity

Species	rat		
LD50		2140	mg/kg

Irritant/corrosive effects

Irritant effect on skin

valuation	strongly corrosive
Remarks	Irritating effects on the skin and mucous membrane.

Irritant effect on eyes

valuation	strongly corrosive

Sensitization

valuation	non-sensitizing

Effects after repeated or prolonged exposition (subacute, subchronic, cronic)

Other information

Phrase nicht verfügbar.

12. Ecological information

General information / ecology

Do not discharge into the drains/surface waters/groundwater. Do not allow to enter soil, waterways or waste water canal. Toxic to aquatic organisms. Phrase nicht verfügbar. Do not release into waterways untreated.

13. Disposal considerations

Disposal recommendations for the product

Allocation of a waste code number, according to the European Waste Catalogue (EWC), should be carried out in agreement with the regional waste disposal company.

Disposal recommendations for packaging

Packaging that cannot be cleaned should be disposed off in agreement with the regional waste disposal company.

14. Transport information

Land transport ADR/RID

UN number	1830
Class	8
Packing group	II

Safety data sheet in accordance with regulation (EC) No 1907/2006 BÜFA Chemikalien GmbH & Co. KG

Trade name: Sulfuric acid ca. 96% Date revised: 13.04.10

1000908/1000908 Version: 2 / DE Master No. M-006 Date of printing: 05.05.10

Label	8
Technical name	SULPHURIC ACID
Tunnel limitation code	E

Marine transport IMDG/GGVSee

UN number	1830
Class	8
Packing group	II
Technical name	SULPHURIC ACID
EmS	F-A, S-B

15. Regulatory information ***

Labelling in accordance with EC directives *

The product is classified and labelled in accordance with EC directives/the relevant national laws.

Registration no.

EC No.: 231-639-5

Hazard symbols

C Corrosive

Hazardous component(s) to be indicated on label

contains *** Sulphuric acid ...%

R phrases

35 Causes severe burns.

S phrases *

26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
36/37/39	Wear suitable protective clothing, gloves and eye/face protection.
45	In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
60	This material and its container must be disposed of as hazardous waste.

National regulations

Water Hazard Class (Ger.)

Water Hazard Class (Ger.) WGK 1

Classification according to VwVwS

16. Other information

R-phrases of the ingredients listed in chapter 3

35 Causes severe burns.

Department issuing safety data sheet

Department product safety

This information is based on our present state of knowledge. However, it should not constitute a guarantee for any specific product properties and shall not establish a legally valid relationship.

13 EU safety data sheet - anti-foaming agent

Safety data sheet
according to 1907/2006/EC

Printing date 24.07.2012 Version number 8 Revision: 24.07.2012

1 Identification of the substance/mixture and of the company/ undertaking

· **1.1 Product identifier**

· **Trade name: Struktol SB 2032**

· **Article number:** 02054
· **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.
· **Application of the substance / the preparation** Anti-foaming agent

· **1.3 Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**

Schill+Seilacher "Struktol" GmbH
Moorfleeter Str. 28
D-22113 Hamburg
Phone: +49 / (0)40 / 73362-0
Fax: +49 / (0)40 / 73362-194
· **Further information obtainable from:**
QW Gefahrgut / -stoffe
E-Mail: msds@struktol.de
· **1.4 Emergency telephone number:**
GIZ-Nord
Phone: +49 / (0)551 / 19240

2 Hazards identification

· **2.1 Classification of the substance or mixture**
· **Classification according to Regulation (EC) No 1272/2008**
The product is not classified according to the CLP regulation.

· **Classification according to Directive 67/548/EEC or Directive 1999/45/EC**
Not applicable.
· **Information concerning particular hazards for human and environment:**
The product does not have to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.

· **2.2 Label elements**

· **Labelling according to EU guidelines:**
Observe the general safety regulations when handling chemicals.
The product is not subject to identification regulations under EU Directives and the Ordinance on Hazardous Materials (German GefStoffV).
· **2.3 Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

3 Composition/information on ingredients

· **3.2 Chemical characterization: Mixtures**
· **Description:** Modified fatty alcohols.

· **Dangerous components:** Void

(Contd. on page 2)

Safety data sheet
according to 1907/2006/EC

Printing date 24.07.2012 Version number 8 Revision: 24.07.2012

Trade name: Struktol SB 2032

(Contd. of page 1)

· **Additional information:**
This information refers to the product in concentrated form only.
For the wording of the listed risk phrases refer to section 16.

4 First aid measures

· **4.1 Description of first aid measures**
· **After inhalation:**
Supply fresh air and to be sure call for a doctor.
In case of unconsciousness place patient stably in side position for transportation.
· **After skin contact:**
Wash off with water and soap.
Immediately wash with water and soap and rinse thoroughly.
If skin irritation continues, consult a doctor.
· **After eye contact:**
Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.
· **4.2 Most important symptoms and effects, both acute and delayed** Allergic reactions
· **4.3 Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

5 Firefighting measures

· **5.1 Extinguishing media**
· **Suitable extinguishing agents:**
CO2, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
· **For safety reasons unsuitable extinguishing agents:** Water with full jet
· **5.2 Special hazards arising from the substance or mixture**
In case of fire, the following can be released:
Carbon monoxide and carbon dioxide
· **5.3 Advice for firefighters**
· **Protective equipment:** Do not inhale explosion gases or combustion gases.

6 Accidental release measures

· **6.1 Personal precautions, protective equipment and emergency procedures**
Wear protective clothing.
· **6.2 Environmental precautions:**
The product should not be released into the aquatic environment without preliminary treatments (purification plant).
Do not allow to enter sewers/ surface or ground water.
Do not allow to penetrate the ground/soil.
· **6.3 Methods and material for containment and cleaning up:**
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Dispose of the material collected according to regulations.
· **6.4 Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.

(Contd. on page 3)

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according to 1907/2006/EC

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Trade name: Struktol SB 2032

(Contd. of page 2)

See Section 13 for disposal information.

*
7 Handling and storage

· **7.1 Precautions for safe handling**
The usual precautionary measures are to be adhered to when handling chemicals.
· **Information about fire - and explosion protection:** No special measures required.

· **7.2 Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:** Store in a cool location.
· **Information about storage in one common storage facility:** Not required.
· **Further information about storage conditions:**
Store in dry conditions.
Store in a cool place.
· **7.3 Specific end use(s)** No further relevant information available.

*
8 Exposure controls/personal protection

· **Additional information about design of technical facilities:**
No further data; see item 7.

· **8.1 Control parameters**
· **Ingredients with limit values that require monitoring at the workplace:**
The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.
· **Additional information:** The lists valid during the making were used as basis.

· **8.2 Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:**
Immediately remove all soiled and contaminated clothing
Wash hands before breaks and at the end of work.
Avoid contact with the skin.
Avoid contact with the eyes and skin.
· **Protection of hands:**
chemical resistant protective gloves (EN 374)
Oil resistant gloves
Neoprene gloves
If only a short-term loading of the glove material by splashes is expected, tricoted gloves with higher wearability for the better acceptance of the users are recommended.
· **Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.
· **Penetration time of glove material**
The exact break trough time has to be found out by the manufacturer of the protective gloves and has to be observed.
· **Eye protection:** Goggles recommended during refilling
· **Body protection:** Protective work clothing

GB

(Contd. on page 4)

Safety data sheet
according to 1907/2006/EC

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Trade name: Struktol SB 2032

(Contd. of page 3)

9 Physical and chemical properties

· **9.1 Information on basic physical and chemical properties**	
· **General Information**	
· **Appearance:**	
Form:	Fluid
Colour:	Yellowish
· **Odour:**	Weak aromatic
· **Change in condition**	
Melting point/Melting range:	Not determined.
Boiling point/Boiling range:	Not determined.
· **Flash point:**	> 120°C (DIN EN ISO 2592)
· **Ignition temperature:**	ca. 200°C
· **Self-igniting:**	Product is not selfigniting.
· **Danger of explosion:**	Product does not present an explosion hazard.
· **Density at 20°C:**	0.88 g/cm³ (DIN 53479)
· **Solubility in / Miscibility with water:**	Not miscible or difficult to mix.
· **Viscosity:**	
Dynamic at 20°C:	23 mPas (DIN 51550)
· **Solvent content:**	
Organic solvents:	0.0 %
· **9.2 Other information**	No further relevant information available.

10 Stability and reactivity

· **10.1 Reactivity**
· **10.2 Chemical stability**
· **Thermal decomposition / conditions to be avoided:**
No decomposition if used according to specifications.
· **10.3 Possibility of hazardous reactions** No dangerous reactions known.
· **10.4 Conditions to avoid** No further relevant information available.
· **10.5 Incompatible materials:** No further relevant information available.
· **10.6 Hazardous decomposition products:**
No dangerous decomposition products known.

11 Toxicological information

· **11.1 Information on toxicological effects**
· **Acute toxicity:**
· **Primary irritant effect:**
· **on the skin:** No irritating effect.
· **on the eye:** No irritating effect.
· **Sensitization:** No sensitizing effects known.

(Contd. on page 5)

Safety data sheet
according to 1907/2006/EC

Printing date 24.07.2012 Version number 8 Revision: 24.07.2012

Trade name: Struktol SB 2032

(Contd. of page 4)

· **Additional toxicological information:**
The product is not subject to classification according to the calculation method of the General EU Classification Guidelines for Preparations as issued in the latest version.
When used and handled according to specifications, the product does not have any harmful effects to our experience and the information provided to us.

12 Ecological information

· **12.1 Toxicity**
· **Aquatic toxicity:** No further relevant information available.
· **12.2 Persistence and degradability** No further relevant information available.
· **12.3 Bioaccumulative potential** No further relevant information available.
· **12.4 Mobility in soil** No further relevant information available.
· **Additional ecological information:**
· **General notes:**
The product should not be released in concentrated form into the aquatic environment without preliminary treatments (purification plant).
Negative ecological effects are, according to the current state of knowledge, not expected.
· **12.5 Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **12.6 Other adverse effects** No further relevant information available.

13 Disposal considerations

· **13.1 Waste treatment methods**
· **Recommendation**
Disposal must be made according to official regulations.
Must not be disposed together with household garbage. Do not allow product to reach sewage system.

· **Uncleaned packaging:**
· **Recommendation:** Disposal must be made according to official regulations.

14 Transport information

· **14.6 Special precautions for user**	Not applicable.
· **14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **Transport/Additional information:**	Not dangerous according to the above specifications.

GB

(Contd. on page 6)

Safety data sheet
according to 1907/2006/EC

Printing date 24.07.2012 Version number 8 Revision: 24.07.2012

Trade name: Struktol SB 2032

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15 Regulatory information

· **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**

· **National regulations:**

· **Breakdown regulations:**

· **Breakdown regulations, Annex II, No.:**
None of the ingredients is listed.

· **15.2 Chemical safety assessment:**
A Chemical Safety Assessment has not been carried out.

16 Other information

This information refers to the product in concentrated form only.
This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

· **Department issuing MSDS:** QW Gefahrgut / -stoffe
· **Abbreviations and acronyms:**
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
· *** Data compared to the previous version altered.**

GB

14 Notes

15 Copy templates (operating directive and operations diary)

Big Dutchman
PIG EQUIPMENT

OPERATING INSTRUCTIONS

in accordance with §14 GefStoffV[1]

RECEIVING COMPANY:

WORK AREA: EXHAUST AIR CLEANING SYSTEM
WORKPLACE: ACID SUPPLY

TASK: Replacing the acid store

AUTHORISED PERSON: _____

Name of hazardous substance

Concentrated sulfuric acid (96 %) – H_2SO_4

Dangers for persons and environment

- Causes severe burns and injuries which only heal very slowly
- Released vapours and aerosols can damage mucosa and eyes
- Mixing with water causes strong heat development
- Concentrated sulfuric acid can destroy organic substances (charring)

Protective measures and directives

- Ensure sufficient ventilation before starting to work
- Do not inhale acid fogs (aerosol)
- Avoid contact with the skin and eye mucosa by:
  - wearing acid-resistant protective clothing
  - wearing protective gloves with cuffs
  - wearing tight-fitting goggles
- Keep acids away from food and drinks
- When using, do not eat, drink or smoke
- Wash hands thoroughly before breaks and after completing work with the acid
- Carefully open and tightly close acid containers
- Only authorised persons are permitted to handle acids.

In case of danger

- Neutralize spilled acid with lime or soda and rinse with plenty of water
- Immediately leave the danger zone in case of larger quantities of vapour or fog
- Wear respiratory protection masks with filter P2 (white)

Emergency number 112

First aid

- Immediately take off wetted clothing
- Rinse wetted skin immediately with plenty of water (for at least 15 minutes)
- After contact with eyes: Rinse eyes using an eyewasher or under running water while holding the lid open (for at least 15 minutes)
- Inform the first aider and seek medical advice immediately

Emergency number 112

Correct disposal

Do not empty into drains. Immediately clean the floor and contaminated objects. Return empty and no longer usable packaging at the appropriate disposal point.

Date: _____ Responsible: _____

[1] German for *Gefahrstoffverordnung*, English: Hazardous Substances Ordinance

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Hausanschrift / Delivery address:
Big Dutchman Pig Equipment GmbH
Calveslage • Auf der Lage 2 • 49377 Vechta

Big Dutchman PIG EQUIPMENT

Page 1

Date: _____

Operations diary

1. Details about the Operator from the Exhaust Air Cleaning system

Name: _____

Address: _____

Country: _____

Kind of washer _____

Animal species: _____

Service and maintenance interval

Date	Water changed	Cleaning	Calibration pH-Sensor	General	acid basin changed	Service BD	Note	Signature
12.12.2000	X	X	X			X	example	