

Defensor PH15/PH15A

Adiabatic Humidifiers



OPERATING INSTRUCTIONS

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1 Introduction

1.1 To the very beginning

We thank you for having purchased an **air purifier/air humidifier Defensor PH15 or PH15A**.

The air purifier/air humidifier Defensor PH15/PH15A incorporates the latest technical advances and meets all recognized safety standards. Nevertheless, improper use of the Defensor PH15/PH15A may result in danger to the user or third parties and/or impairment of material assets.

To ensure a safe, proper, and economical operation of the air purifier/air humidifier Defensor PH15/PH15A, please observe and comply with all information and safety instructions contained in the present operating instructions as well as the instructions given in the manuals for the components used in the humidification system.

If you have questions, which are not or insufficiently answered in this documentation, please contact your Defensor supplier. They will be glad to assist you.

1.2 Notes on the operating instructions

Limitation

The subject of this operating instructions are the air purifiers/air humidifiers Defensor PH15 and PH15A. The various accessories are only described insofar as this is necessary for proper operation of the equipment. Further information on accessories can be obtained in the respective instructions.

This operating instructions are restricted to the **installation, commissioning, operation, servicing and trouble shooting** of the air purifier/air humidifier Defensor PH15/PH15A and is meant for **well trained personnel being sufficiently qualified for their respective work**.

The operating instructions are supplemented by various separate items of documentation (e.g. manuals for accessories). Where necessary, appropriate cross-references are made to these publications in the operating instructions.

Symbols used in this manual

CAUTION!

The catchword "CAUTION" designates notes in this operating instructions that, if neglected, may cause **damage and/or malfunction of the unit or other material assets**.



WARNING!

The catchword "WARNING" used in conjunction with the general caution symbol designates safety and danger notes in this operating instructions that, if neglected, may cause to **injury to persons**.



DANGER!

The catchword "DANGER" used in conjunction with the general caution symbol designates safety and danger notes in this operating instructions that, if neglected, may lead to **severe injury or even death of persons**.

Safekeeping

Please safeguard this operating instructions in a safe place, where it can be immediately accessed. If the equipment changes hands, the documentation should be passed on to the new operator.

If the documentation gets mislaid, please contact your Defensor supplier.

Language versions

This operating instructions are available in various languages. Please contact your Defensor supplier for information.

Copyright protection

The present operating instructions are protected under the Copyright Act. Passing-on and reproduction of the manual (or part thereof) as well as exploitation and communication of the contents are prohibited without written permission by the manufacturer. Violation of copyright terms is subject to legal prosecution and arises liability for indemnification.

The manufacturer reserves the right to fully exploit commercial patent rights.

2 For your safety

General

Every person working with the Defensor PH15/PH15A must have read and understood the Operating instructions before carrying out any work.

Knowing and understanding the contents of the Operating instructions is a basic requirement for protecting the personnel against any kind of danger, to prevent faulty operation, and to operate the unit safely and correctly.

All ideograms, signs and markings applied to the unit must be observed and kept in readable state.

Qualification of personnel

All actions described in the present Operating instructions (installation, operation, maintenance, etc.) must be carried out only by **well trained and sufficiently qualified personnel authorised by the owner**.

For safety and warranty reasons any action beyond the scope of this manuals must be carried out only by qualified personnel authorised by your Defensor supplier.

It is assumed that all persons working with the Defensor PH15/PH15A are familiar and comply with the appropriate regulations on work safety and the prevention of accidents.

This unit may not be used by persons (including children) with reduced physical, sensory or mental abilities or persons with lacking experience and/or knowledge, unless they are supervised by a person responsible for their safety or they received instructions on how to operate the unit.

Children must be supervised to make sure that they do not play with unit.

Intended use

The air purifier/air humidifier Defensor PH15/PH15A is intended exclusively for **air purification and air humidification within the specified operating conditions** (see chapter 9 "Product specifications"). Any other type of application without the express written consent of the manufacturer is considered as not conforming with the intended purpose and may lead to the Defensor PH15/PH15A becoming dangerous.

Operation of the equipment in the intended manner requires **that all the information in these instructions are observed (in particular the safety instructions)**.

Danger that may arise from the unit

DANGER! Danger of electric hazard!

The Defensor PH15/PH15A is mains powered. One may get in touch with live parts when the unit is open. Touching live parts may cause severe injury or danger to life.

Prevention: Before carrying out any work set the Defensor PH15/PH15A out of operation (switch off the unit, disconnect it from the mains, close water supply) and secure the unit against inadvertent power-up.

WARNING!

Poorly maintained humidifiers can endanger your health. If the Defensor PH15/PH15A is insufficiently maintained harmful germs can build up in the water and the filters can affect the ambient air.

Prevention: The Defensor PH15/PH15A has to be cleaned in regular intervals according to chapter 6 "Maintenance". The cleaning work has to be carried out correctly and the evaporator mat as well as the filters have to be replaced after the specified lifetime.

Handling the mains cable

Handle the mains cable with care: keep it away from sharp edges and do not jam or strain it.

Never remove the mains plug by pulling the mains cable. Make sure your hands are absolutely dry when pulling the plug out of the socket.

Lay out the mains cable so that it does not become a stumbling trap.

Connect mains cable only to a mains socket with protection earth. Any extension cable used must be equipped with a protection earth too.

Behaviour in case of danger

If it is suspected that **safe operation is no longer possible**, then the Defensor PH15/PH15A should immediately **be disconnected from the mains (disconnect mains connector) and secured against accidental power-up**. This can be the case under the following circumstances:

- if the Defensor PH15/PH15A is damaged
- if the Defensor PH15/PH15A is no longer operating correctly
- if connections and/or piping are not sealed
- if the mains cable is damaged

All persons working with the Defensor PH15/PH15A must report any alterations to the unit that may affect safety to the owner without delay.

Prohibited modifications to the unit

No modifications must be undertaken on the Defensor PH15/PH15A without the express written consent of the manufacturer.

For the replacement of defective components use exclusively **original accessories and spare parts** available from your Defensor supplier.

3 Product Overview

3.1 Unit versions

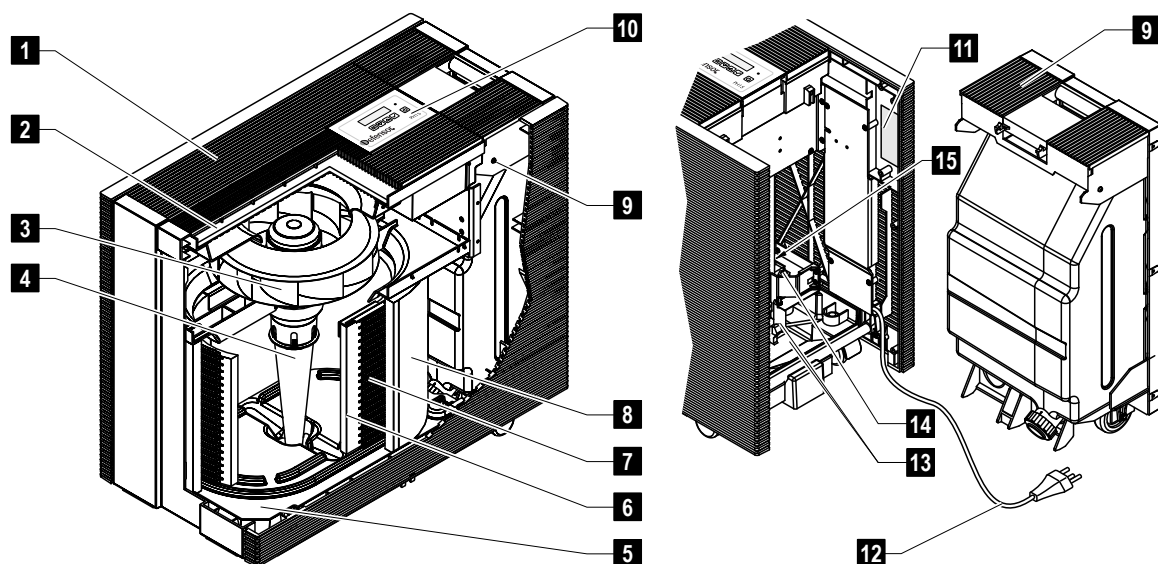
The Defensor PH15/PH15A air purifier/air humidifier is available in two basic versions:

- **PH15:** version with integrated water tank
- **PH15A:** version with inlet valve for the connection to the drinking water system

Both versions are equipped as standard with a Quattro filter and an activated carbon evaporator mat to operate the unit as an air purifier (summer time operation).

3.2 Unit construction

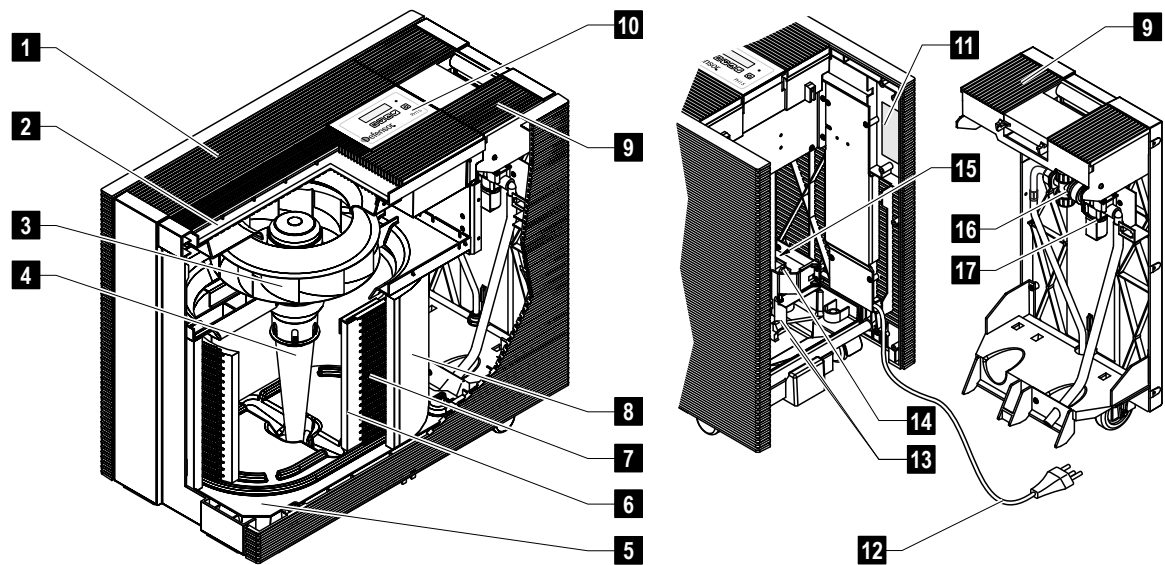
PH15



- 1 Air inlet lattice
- 2 Coarse filter
- 3 Radial fan
- 4 Centrifuge
- 5 Mobile base with cover
- 6 Flock-coated evaporator mat or activated carbon evaporator mat
- 7 Droplet trap

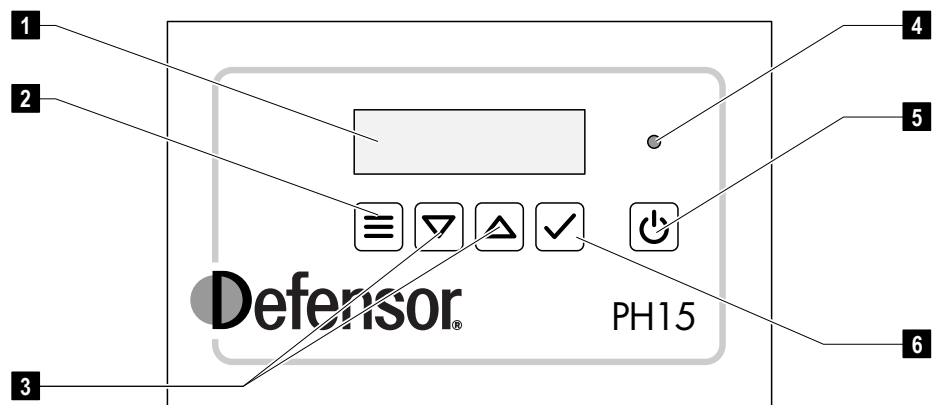
- 8 Coarse dust filter or Quattro filter
- 9 Carriage with water tank
- 10 Operating panel with display
- 11 Type plate
- 12 3 pole mains cable
- 13 Silver ionisation electrodes (option)
- 14 Level switch
- 15 Safety switch

PH15A



- | | |
|--|--|
| 1 Air inlet lattice | 9 Carriage |
| 2 Coarse filter | 10 Operating panel |
| 3 Radial fan | 11 Type plate |
| 4 Centrifuge | 12 3 pole mains cable |
| 5 Mobile base with cover | 13 Silver ionisation electrodes (option) |
| 6 Flock-coated evaporator mat or activated carbon evaporator mat | 14 Level switch |
| 7 Droplet trap | 15 Safety switch |
| 8 Coarse dust filter or Quattro filter | 16 Water filter |
| | 17 Inlet valve |

3.3 Operating panel



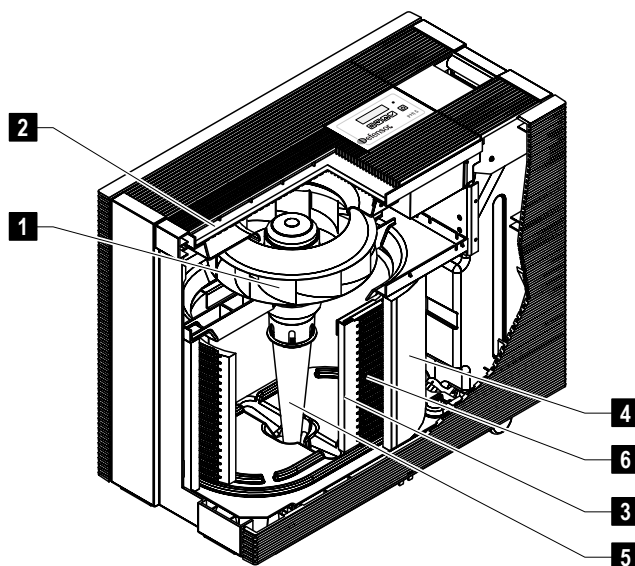
- | | |
|---------------------------|--------------------------------------|
| 1 LC display | 4 Error indicator |
| 2 <Menu> key | 5 <On/Off> key (On/Off) |
| 3 Arrow keys | 6 <OK> key |

3.4 Identification of the unit

The identification of the unit is found on the type plate (for the location of the type plate see unit overview):

	Type designation	Serial number	Month/Year
	Condair Group AG, Gwattstrasse 17, 8808 Pfäffikon SZ, Switzerland		
Unit voltage	Type: PH15A	Serial: XXXXXXXX	07.11
	Voltage: 220...240VAC / 50...60 Hz	Power: max. 72 W	
Admissible water supply pressure (PH15A only)	Water pressure: 0.5...6 bar		
Field with certification symbols			
Power consumption	Made in Portugal		

3.5 Functional description/Operating modes



Functional description

The radial fan (1) takes in the air from the top via the coarse filter (2). After passing through the evaporator mat (3) (or the activated carbon evaporator mat) and the coarse dust filter (4) (or the Quattro filter) the air is blown out via the outlet lattice on both sides of the unit.

The unit continuously measures the air humidity in the room with the integrated humidity sensor and compares it with the set reference humidity value. If the actual value (e.g. 40 %rh) is below the reference value (e.g. 45 %rh) the centrifuge (5) starts and projects fine drops towards the evaporator mat. The air passing through the evaporator mat absorbs the humidity.

The coarse dust filter retains dust particles up to 100 µm. If the Defensor PH15/PH15A is equipped with a Quattro filter it can retain dust particles up to 0.1 µm. In addition the activated charcoal layer in the Quattro filter removes unpleasant odour.

The water level in the base tub is monitored by the level regulating valve in the water tank (Defensor PH15) or by the level controlled inlet valve (Defensor PH15A).

Operating modes

The Defensor PH15/PH15A can be operated in the following operating modes:

– Operation as air humidifier

In the humidifier mode the ventilator and the centrifuge are running only, if the actual humidity value is below the set reference value.

Note: if the actual humidity value remains below the reference value for a prolonged period of time, the fan must be switched to the next highest level.

– Operation as air purifier with humidification

In this operating mode the fan is running continuously. The centrifuge is only switched on if the actual humidity value is below the set reference value.

– Operation as air purifier without humidification

In this operating mode the fan is running continuously. The centrifuge remains switched off.

3.6 Options

	Defensor PH15	Defensor PH15A
Silver ionisation Assembly kit to equip the unit with silver ionisation electrodes to degerminate the water in the base tub with silver ions. Note: The silver ionisation kit must be installed and configured only by a service technician of your Defensor representative.	•	•
Radio humidity sensor The radio humidity sensor can be used instead of the integrated humidity sensor. The maximum range of the radio humidity sensor in an open room is 25 m Note: the radio humidity sensor as well as the receiver board must be installed and configured only by a service technician of your Defensor representative.	•	•
Leakage sensor Assembly kit to equip the Defensor PH15/PH15A with a leakage sensor. If the leakage sensor detects a leakage, the inlet valve (PH15A only) is closed and error message is triggered. Note: The leakage sensor must be installed and configured only by a service technician of your Defensor representative.	•	•

3.7 Accessories

	Defensor PH15	Defensor PH15A
Filter set “Winter” Filter set for the operation of the unit during winter season. The set consist of: – Coarse filter (air intake) – Flock-coated evaporator mat – Coarse dust filter	•	•
Filter set “Summer” Filter set for the operation of the unit during summer season. The set consist of: – Coarse filter (air intake) – Activated carbon evaporator mat – Quattro filter	•	•
Filter valve “Z261” Filter valve to use as a shut-off valve in the water supply line (PH15A only)		•

3.8 Standard delivery

The air purifier/air humidifier Defensor PH15/PH15A is delivered in a cardboard box (B: 816 mm x H: 684 mm T: 456 mm, transport weight: 28 kg), ready for use. The standard delivery includes:

- **Air purifier/Air humidifier Defensor PH15 or PH15A**, equipped with the “Summer” filter set (Quattro filter, activated carbon evaporator mat) and the options as ordered.
- **Cleaning brush**
- **Filling hose** approx. 1,2 m (PH15 only)
- **Operating instructions** (this document)

The ordered accessories with operating instructions according chapter 3.6 are packed separately.

4 Commissioning

4.1 Unpacking the unit and checking the scope of delivery

Unpacking the unit

Open the packing and remove the unit and the accessories. Check the delivery for completeness (standard delivery, see chapter 3.8). Please contact your Defensor supplier in case something is lacking, they will be glad to send you the missing part without delay.

Please check the equipment for damage. Please report any damage to your Defensor supplier and to the carriers, as required.

Packaging

The original packaging of the Defensor PH15/PH15A was designed for optimum safety during transportation. Please preserve the original packing material in case you once have to return the unit for some reason.

In case you wish to dispose of the packaging, observe the local regulations on waste disposal. Never dispose of the packaging to the environment.

4.2 Transporting/storing the unit

Transport

The Defensor PH15/PH15A is equipped with built-in rollers for effortless displacement. If you have to lift the unit for displacement or relocation ask another person for assistance (weight of the empty unit: 25 kg).

Important! To prevent the water from running out make sure the water tank and the base tub are empty before moving the unit.

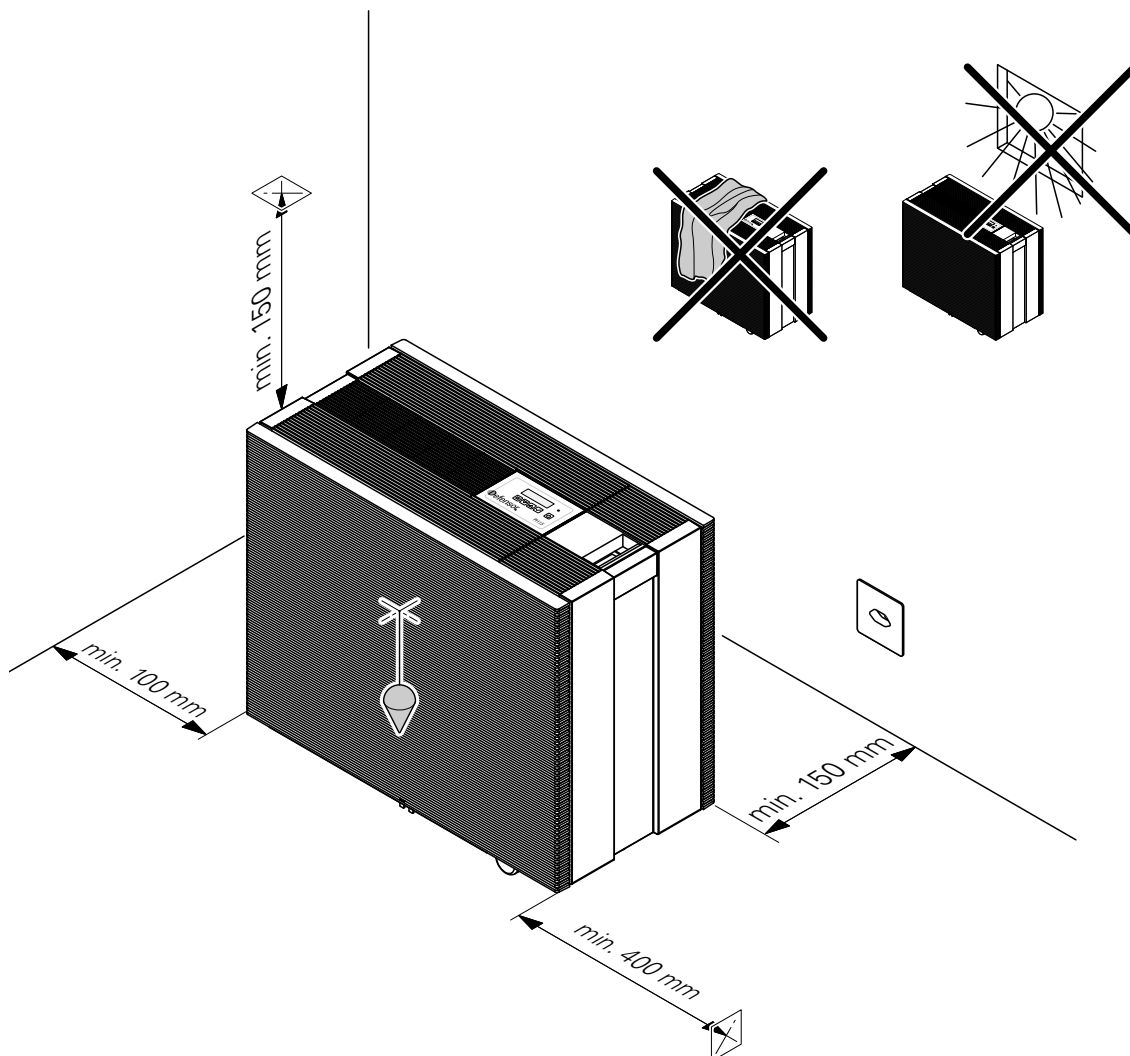
Storing

Store the unit in a protected area meeting the following requirements:

- room temperature: 1 ... 40 °C
- room humidity: 10 ... 75 %rh

4.3 Choose location

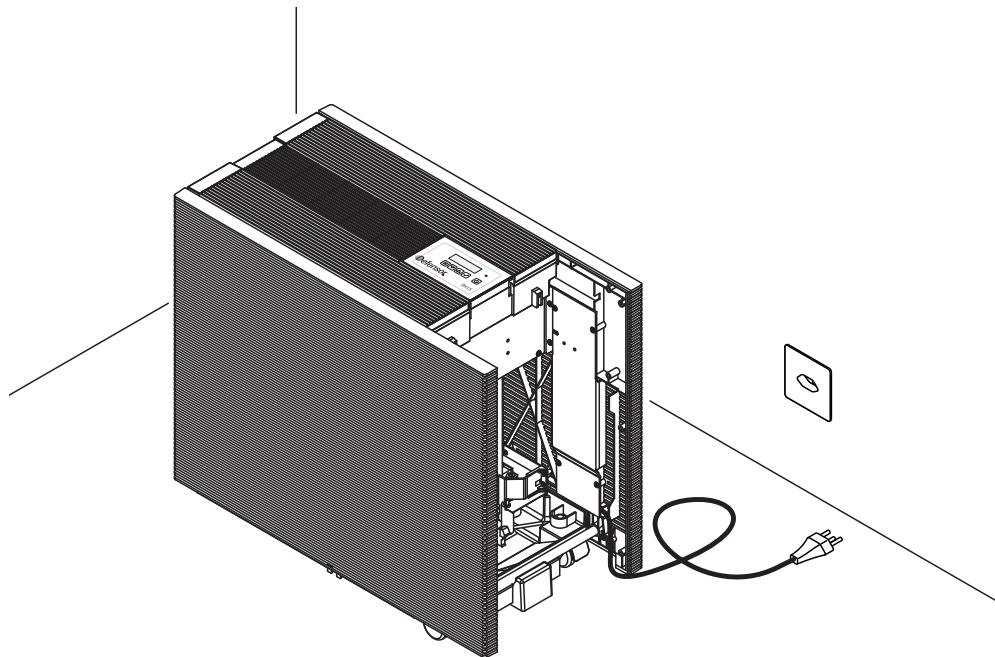
Please observe the following notes for the correct positioning of the Defensor PH15/PH15A:



- Place the unit on a solid horizontal surface, if possible free-standing and freely accessible (observe minimal distances).
- A mains socket should be located close to the unit.
- To ensure the entire volume of air is fully recirculated, do not place the unit in recessed compartments, closed corridors, behind curtains, etc.
- Do not place any objects on the unit (performance reduction).
- Make sure the air flow is not directed towards obstacles (pillars, furniture, etc.) or cold outer walls (risk of condensation).
- Continuous direct sunlight is harmful for the unit and can affect the correct function of the integrated humidity sensor. Therefore do not expose the unit to continuous direct sunlight.
- The unit must not be installed in hazardous locations and in rooms where water splashes may occur.

After locating the unit:

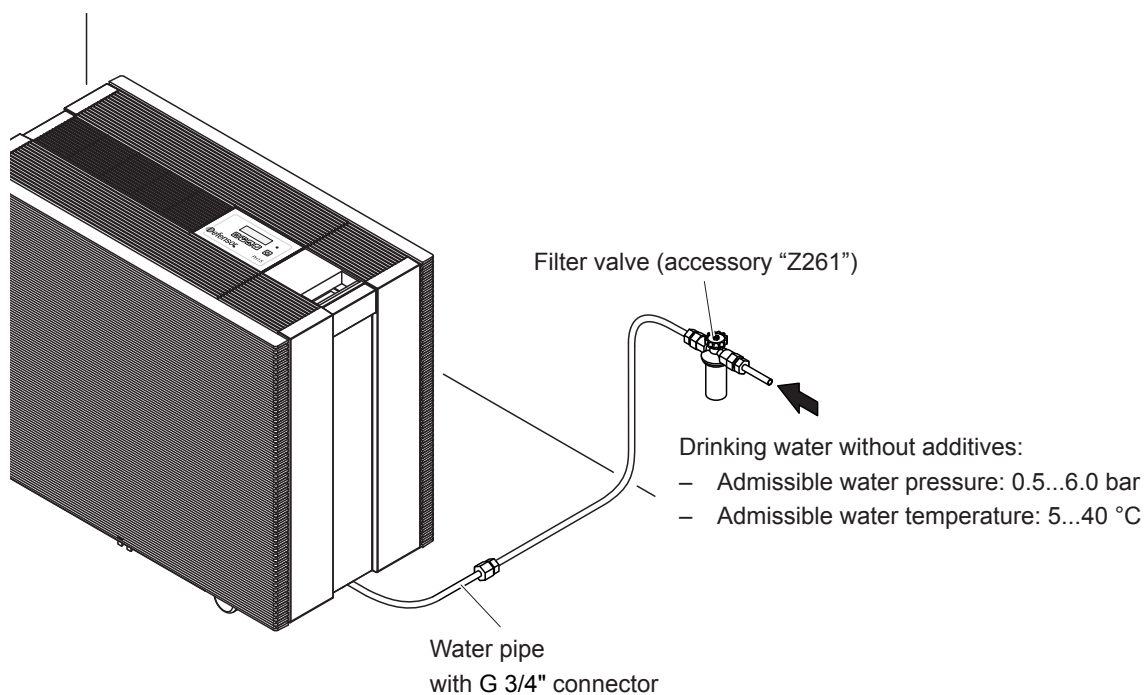
- Completely unwind the mains cable (at the point of the delivery the mains cable is winded up in the unit) and take it out of the unit as shown below.



4.4 Connecting the water supply (PH15A only)

The water supply has to be connected to the unit by a qualified specialist according to the illustration below. The installation data has to be maintained.

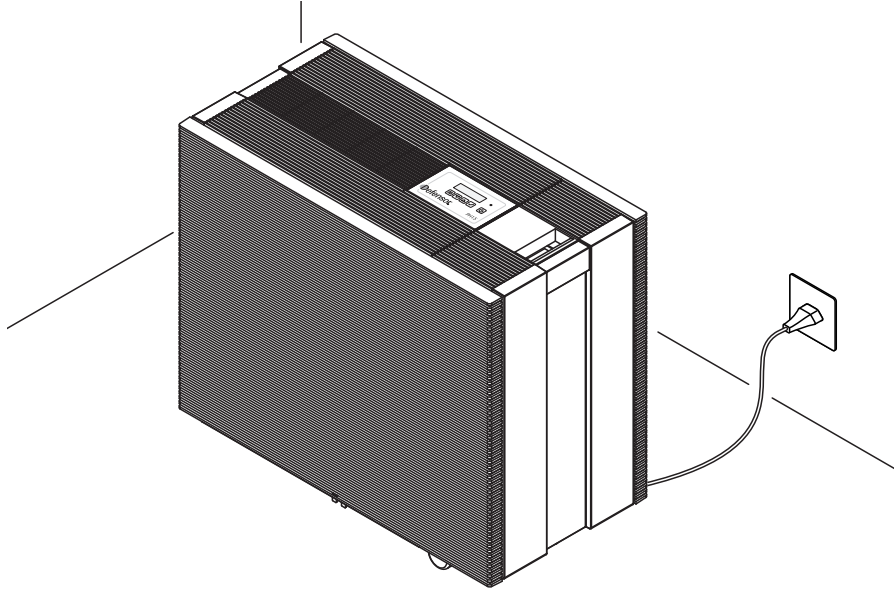
Important! The local regulations regarding the connection of units to drinking water systems must be observed.



4.5 Putting the unit into operation

Proceed as follows to put the Defensor PH15/PH15A into operation:

- PH15: fill the water tank (see chapter 5.1)
- PH15A: open the shut-off valve in the water supply line.
- Connect unit to the mains.



CAUTION!

Make sure the required supply voltage (see type plate) matches the local mains voltage, otherwise do not connect the Defensor PH15/PH15A to the mains!

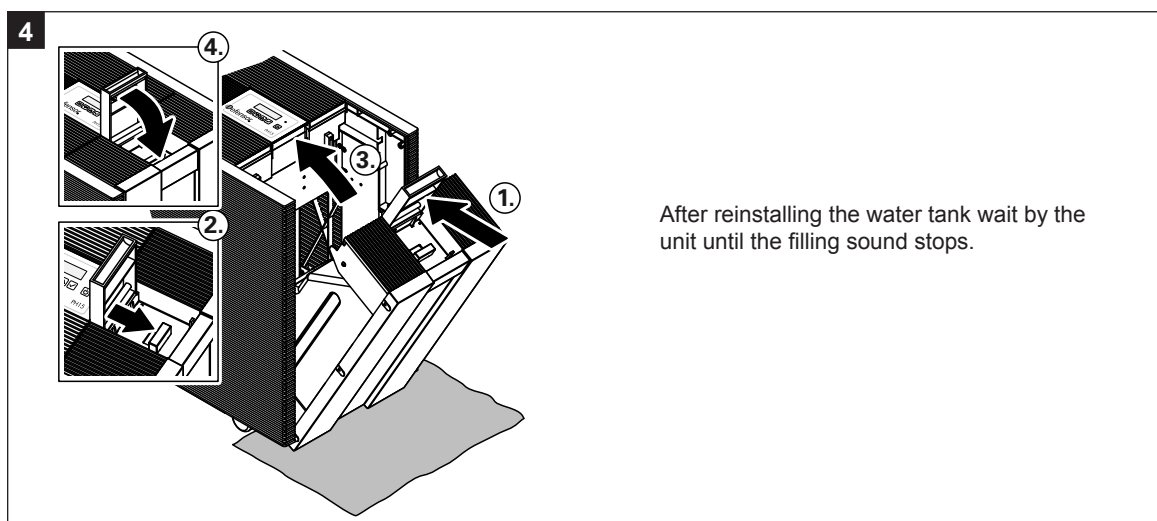
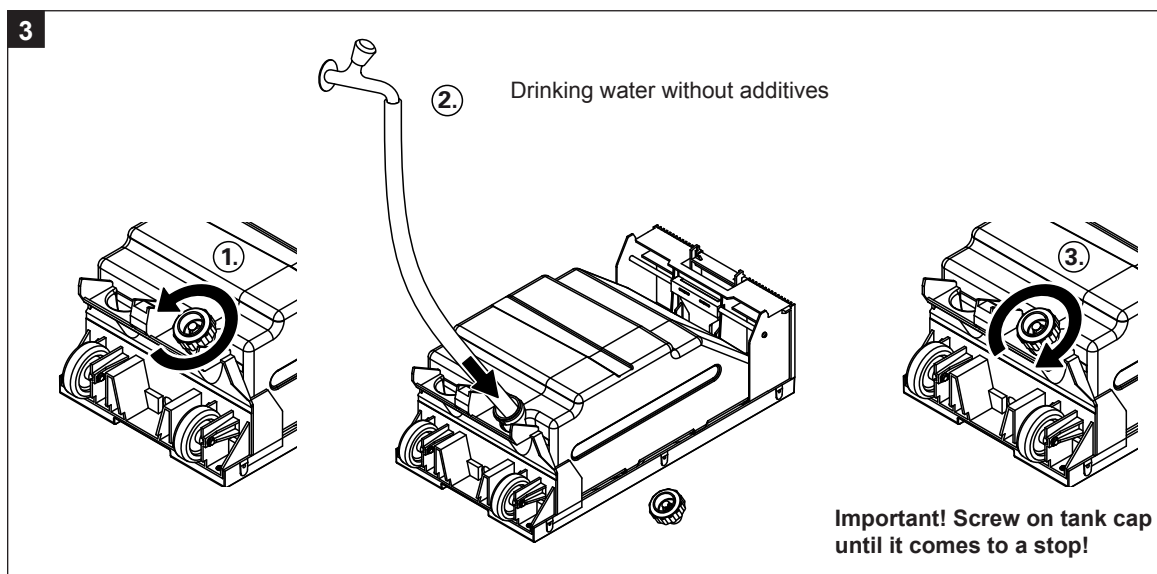
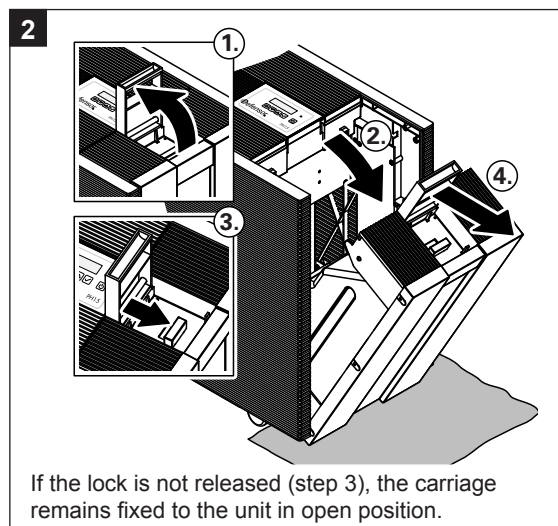
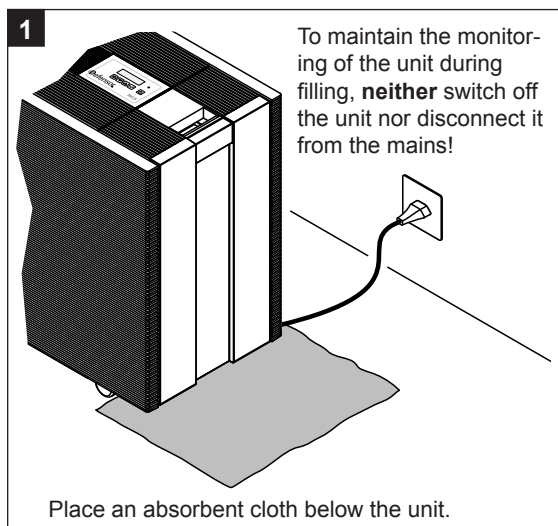
CAUTION!

The Defensor PH15/PH15A must be connected only to grounded mains. Never connect the unit to an outlet without protective earthing.

The Defensor PH15/PH15A is now ready for operation. The next chapter provides detailed information on the operation of the unit.

5 Operation

5.1 Filling the water tank (PH15 only)



5.2 Switching the unit on and off

Switching the unit on

- Press the **<On/Off>** key.

The unit loads the settings that were active when the device was shut down last. Upon completion the **operating display** appears. The look of the operating display depends whether the Defensor PH15/PH15A is operated in “Normal operating mode” or in “Program mode”.

Normal operating mode	Program mode
Status humidity sensor (active=^) Actual humidity value in %rh Note: The actual humidity value is always displayed (even in air purification mode) and updated every 5 seconds. Operating mode H: air humidification P: Air purification (without humidification) C: Combined mode (purification/humidification) Fan step 1, 2, 3, 4 or A1, A2, A3, A4 ^Act 38%rH HA3 Set 45%rH Day of the week Format: “Mo”, “Tu”, “We”, “Th”, “Fr”, “Sa”, “Su” (appears only in program mode) Hour Format “hh:mm” (appears only in program mode) Set humidity setpoint	
	^Act 38%rH HA3 Fr 12:28

The fan starts in all operating modes with a delay of approx. 1 minute. Until the fan starts the operating mode and the fan step are blinking.

If, after switching on the unit a warning or error message is displayed, please observe the notes in chapter 7.

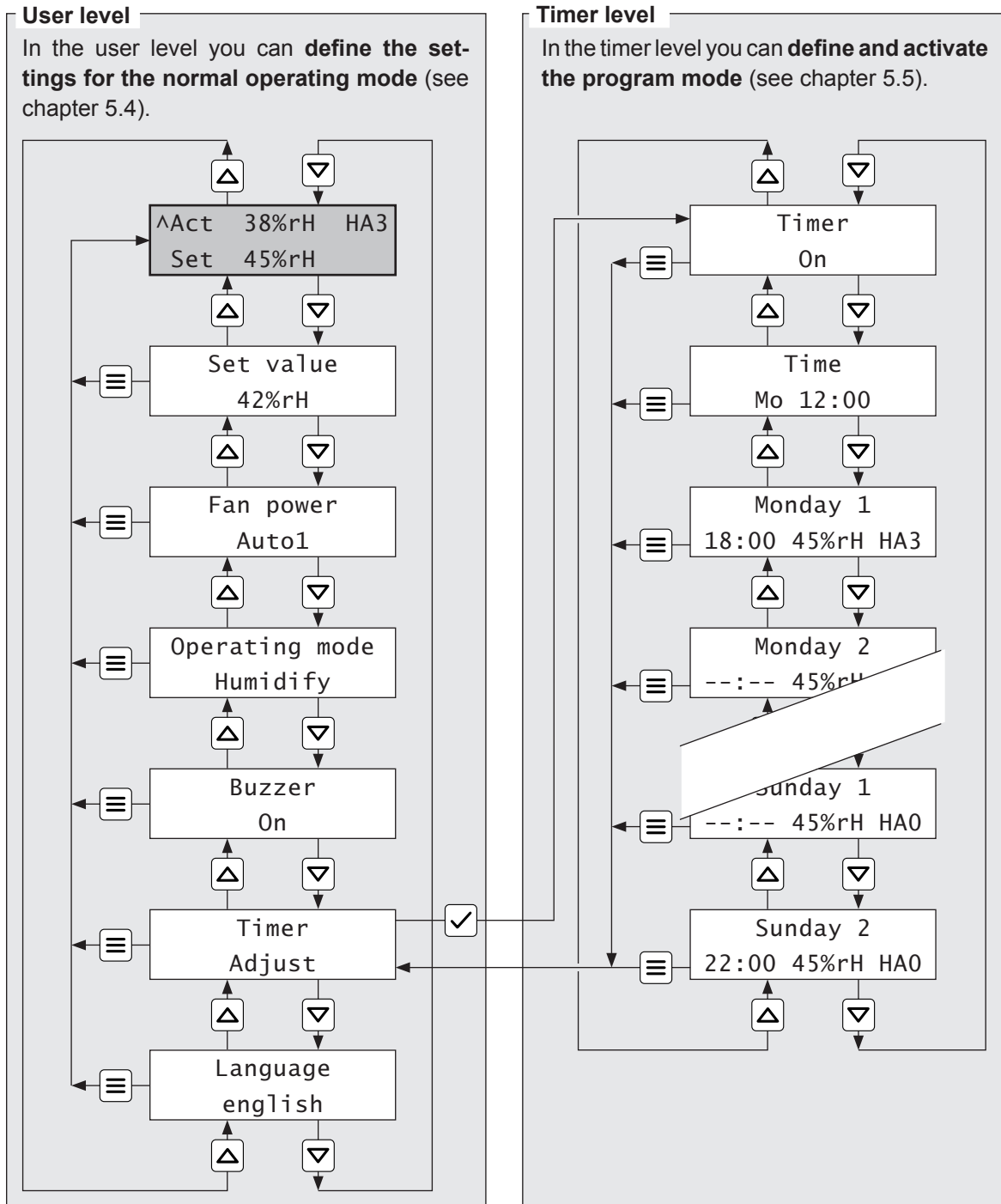
Switching the unit off

- Press the **<On/Off>** key.

The currently active settings will be stored upon shutdown.

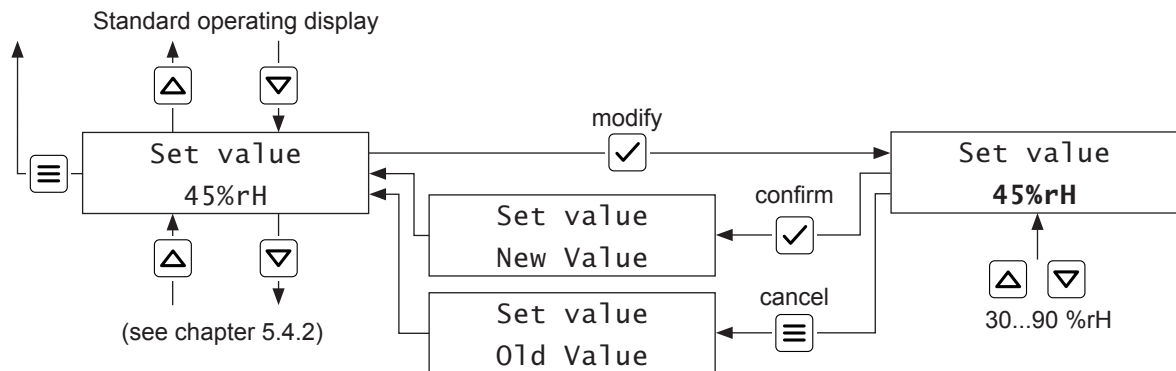
5.3 Menu overview

The following diagram shows the menu overview of the Defensor PH15/PH15A. After switching on, the unit is in the user level.



5.4 Unit settings (normal operating mode)

5.4.1 Setting the desired humidity value



Note: The reference humidity value can be modified only if program mode is deactivated (see chapter 5.5).

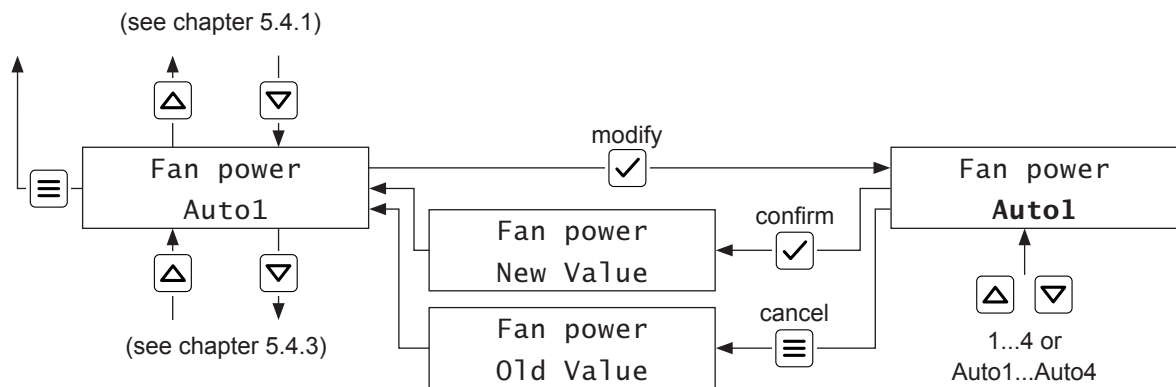
Setting range: 30...90 %rH

Factory setting: 45 %rH

Notes on setting: The optimum reference value depends on various factors. For apartments we recommend a value of 40 – 45 %rH.

Note: After initial commissioning or replacement of the vaporizer mat the humidification performance of the Defensor PH15/PH15A will be slightly reduced because the evaporator mat takes a few days to become fully saturated with water. Maximum performance is available after one week, approximately. Furthermore, the humidification performance depends on the ambient temperature.

5.4.2 Setting the fan step



Note: The fan step can be modified only if program mode is deactivated (see chapter 5.5).

Available settings: 1, 2, 3, 4 or Auto1, Auto2, Auto3, Auto4

Operating mode	Fan step	Behaviour
"H" (Humidification)	Auto 1	runs fixed with fan step 1
	Auto 2	automatic switching between fan steps 1..2
	Auto 3	automatic switching between fan steps 1..3
	Auto 4	automatic switching between fan steps 1..4
"P" (Purification) "C" (Combined mode)	1	runs fixed with fan step 1
	2	runs fixed with fan step 2
	3	runs fixed with fan step 3
	4	runs fixed with fan step 4

Factory setting: 1

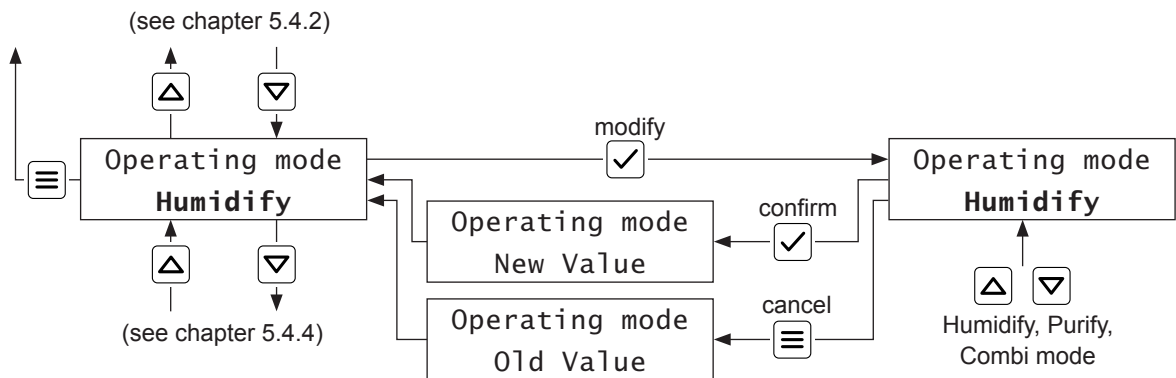
Notes on setting: The fan step to be selected depends on the operating mode and the size of the room. The table below is meant to assist you in finding the optimum fan step.

Fan step	max. room volume in m³ for purification (without humidification)				max. room volume in m³ for humidification
	Air changes per hour				
	1	2	3	4	
1	155	77	52	39	155
2	195	97	65	49	195
3	280	140	93	70	280
4	340	170	113	85	340

The following recirculation cycles per hour are recommended for air purification:

- Normal load: 1 – 2
- heavily polluted air (e.g. pollen, smoke, etc.): 3 – 4

5.4.3 Selecting the operating mode



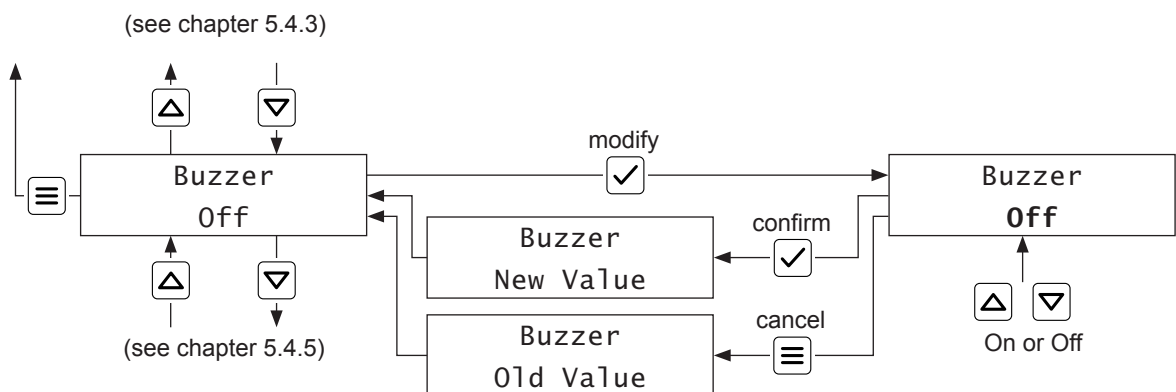
Note: The operating mode can be modified only if program mode is deactivated (see chapter 5.5).

Available settings: Humidify (air humidification), Purify (air purification without humidification) and Combi mode (air purification with humidification)

Factory setting: Humidify

Notes on setting: The selection of the operating mode depends on whether the Defensor PH15/ PH15A shall be operated as humidifier, as purifier without humidification or as purifier with humidification. If the unit shall be operated as purifier without humidification the base tub and the water tank should be emptied.

5.4.4 Switching the buzzer on and off

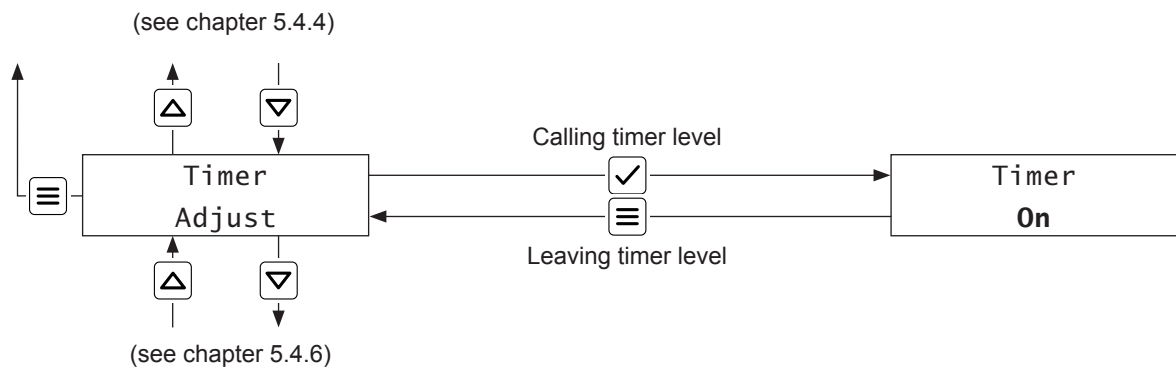


Available settings: On (buzzer on) or Off (buzzer off)

Factory setting: Off

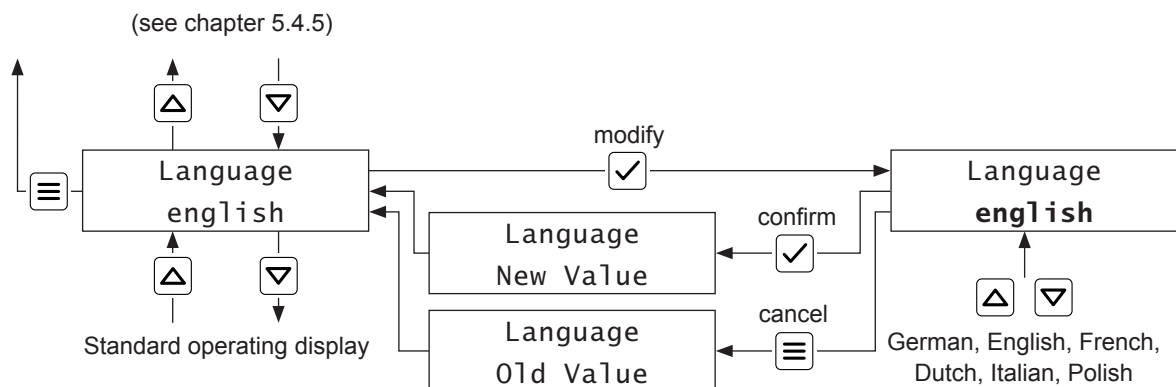
Notes on setting: If the buzzer is on an acoustic signal is triggered in case of a malfunction or an irregularity during operation.

5.4.5 Calling timer level



For detailed information regarding the settings in the timer level see chapter 5.5 “program operation”.

5.4.6 Selecting the dialogue language



Available settings: German, English, French, Dutch, Italian, Polish

Factory setting: Country specific

Notes on setting: After confirmation, the unit switches automatically to the selected dialogue language.

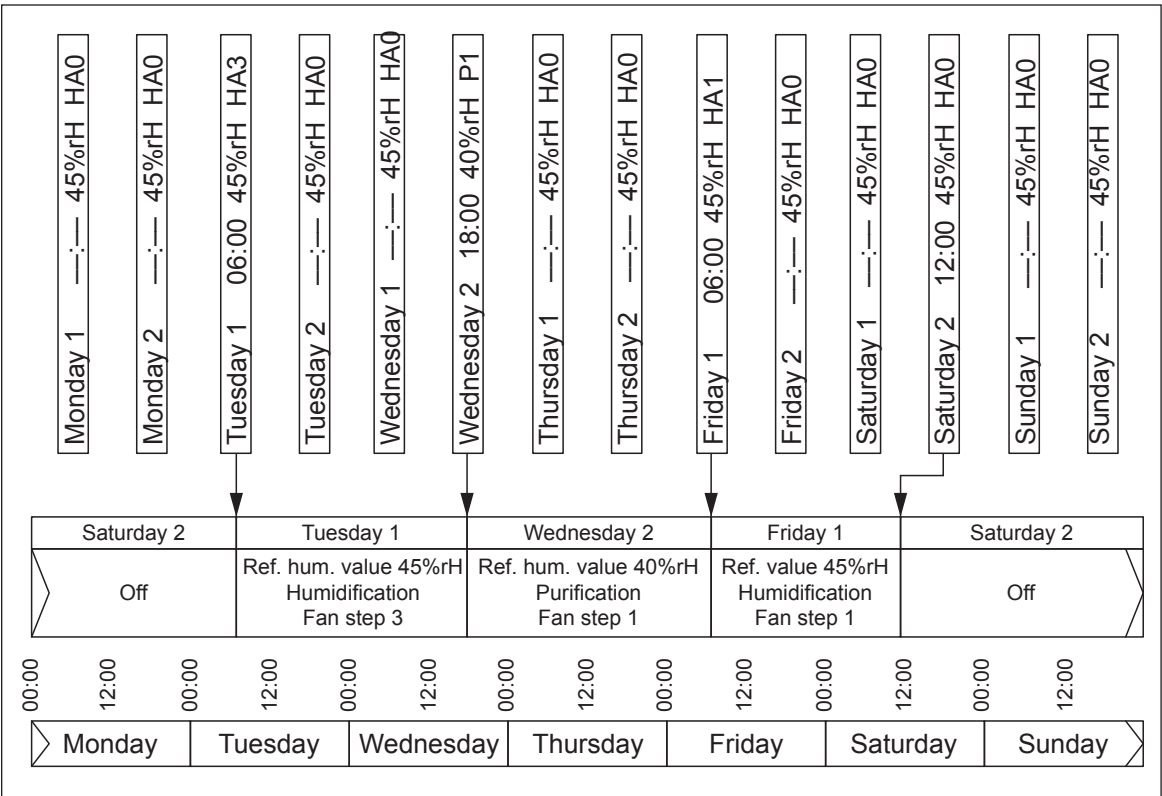
5.5 Program operation

The operation of the Defensor PH15/PH15A can be controlled via customisable operating programs. These programs allow to operate the unit at a preset time with the requested operating mode and fan step. This greatly facilitates the adaption of the Defensor PH15/PH15A to your particular requirements (e.g. adjusted to the business hours and/or working time).

Every program consists of a **starting point** (day of the week and hour), a **reference humidity value**, the **operating mode** and the desired **fan step**. **Up to 2 starting points with individual programs may be set up per day.**

In program mode the current program remains active until the following program starts (on the same or on any other day).

Example diagram:



The program settings and the activation of the program mode takes place in the “Timer level”.

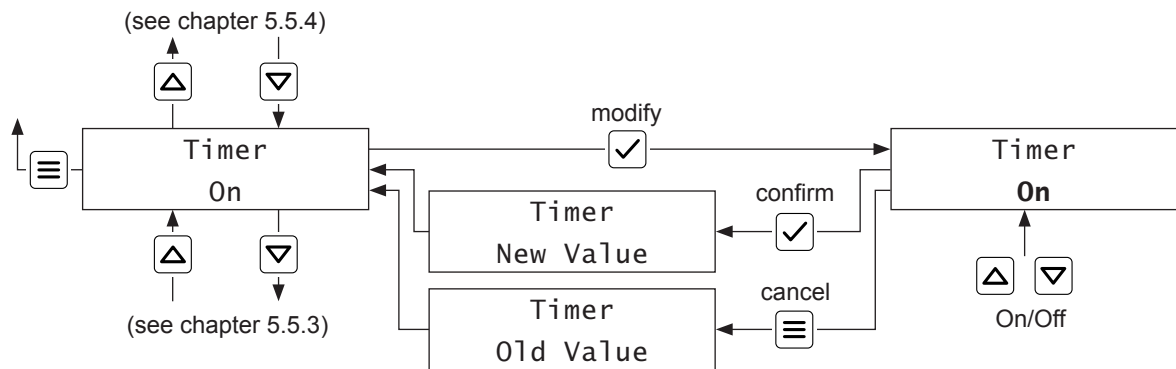
5.5.1 Calling the timer level

Within the user level call the timer level (see chapter 5.4.5). In the timer level:

- you can activate and deactivate the program mode (see chapter 5.5.2)
- you can set the day of the week and the hour (see chapter 5.5.3)
- you can define the individual operating programs with their starting points (see chapter 5.5.4)

Note: If no key is pressed in the timer level for a certain time, the unit automatically returns to standard operation.

5.5.2 Activating/Deactivating the program mode

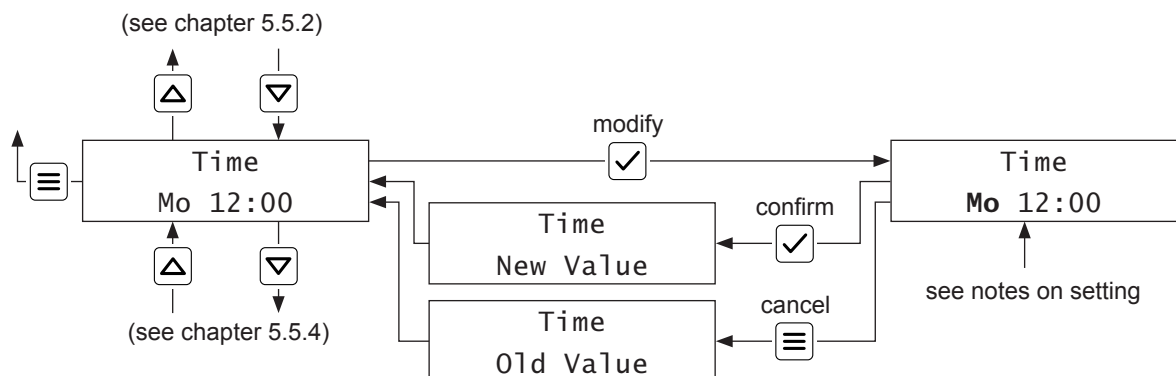


Available settings: On (program mode activated) or Off (program mode deactivated)

Factory setting: Off

Notes on setting: If program mode is activated the Defensor PH15/PH15A operates time-controlled with the operating programs (see chapter 4.3.4). If no programs or starting points are defined the unit operates with the settings of the normal operating mode.

5.4.3 Setting the current time



Available settings: Day of the week (Mo, Tu, We, Th, Fr, Sa, Su)
Hour (Format: hh)
Minute (Format: mm)

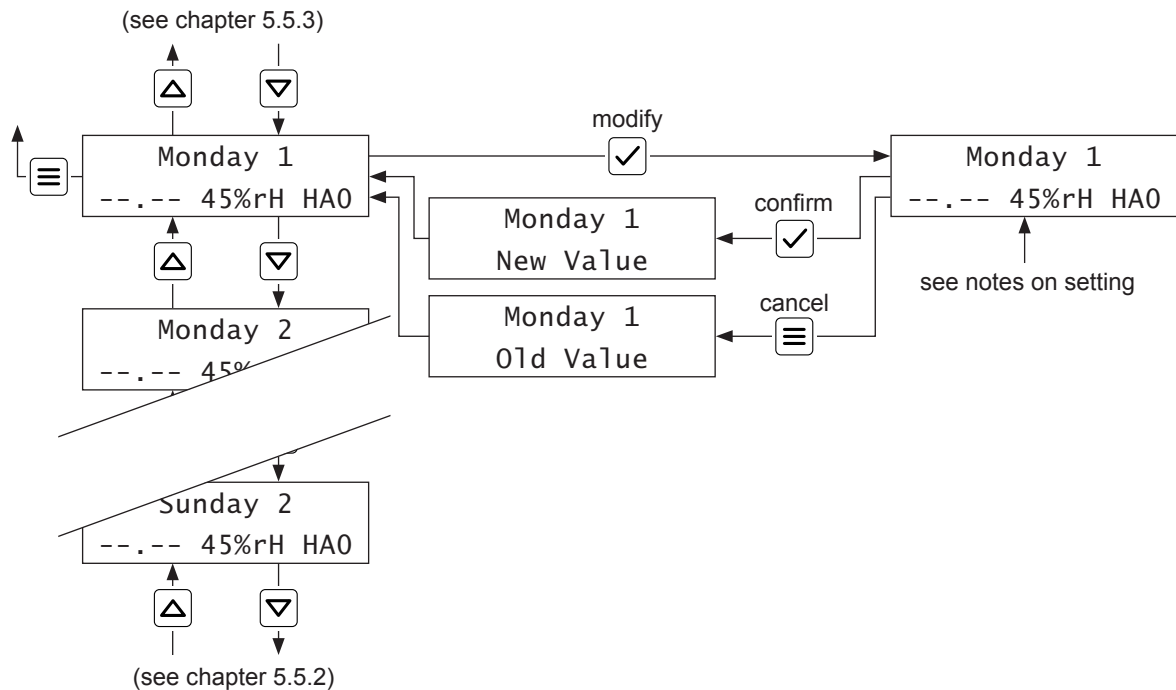
Factory setting: ---

Notes on setting: The current day of the week and the current time serve as basis for the program mode. If these settings are not set correctly the program timing is wrong.

After calling the modification mode set the current day of the week, the current hour and the current minute. Confirm each setting with the **<OK>** key.

Note: If the Defensor PH15/PH15A has lost the time settings due to power failure, the time indication (---) in the operating display flashes.

5.5.4 Setting the starting points and the operating programs



First select the desired day of the week or the starting point, respectively (Monday 1, Monday 2 Sunday 1, Sunday 2), then define the operation settings which should become active at the starting point.

Available settings: Hours (Format: hh)
 Minutes (Format: mm)
 Reference humidity value in %rH
 Operating mode ("H": for humidification, "P": for purification (without humidification) and "C": for combined mode (purification and humidification))
 Fan step (0, 1, 2, 3, 4)

Factory setting: "-- : -- 45%rH HA0"

Notes on setting: After calling the modification mode set the hour, the minute, the reference humidity value, the operating mode and the fan step for the selected starting point. Confirm each setting with the **<OK>** key.

To deactivate a starting point (display: -- : --) press both arrow keys simultaneously when the hour field flashes. Confirm with the **<OK>** key. Repeat this procedure with the minute field.

To switch off the unit at a certain time select fan step "0".

5.6 Locking/unlocking the keyboard

The keyboard of the Defensor PH15/PH15A can be locked to prevent unauthorized access to the stored settings.

Key Lock
Set 50%rH

- To lock the keyboard, press **<Menu>** key until (approx. 4 seconds) the adjacent message appears in the display. The keyboard is locked now. Each time you press any key the adjacent message appears again.

Act 30%rH HA3
Set 50%rH

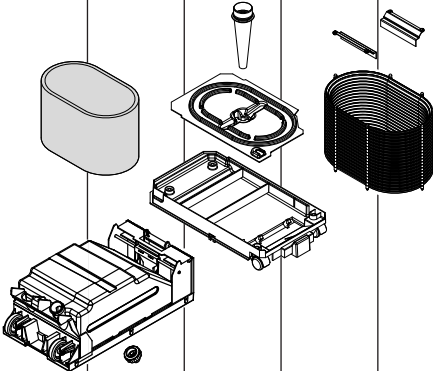
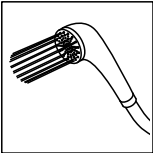
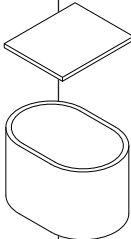
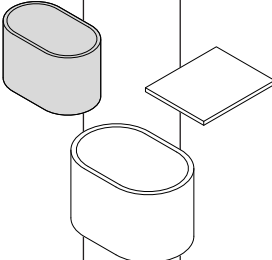
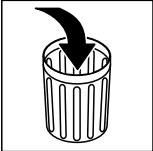
- To unlock the keyboard, press **<Menu>** key until (approx. 4 seconds) the message "Key lock" disappears and the operating display is shown.

6 Maintenance

6.1 Maintenance intervals

The Defensor PH15/PH15A can only provide full humidification and purification performance if the unit is regularly cleaned and the wearing parts are replaced. The maintenance intervals mostly depend on the load of the ambient air, the water quality and the operating time.

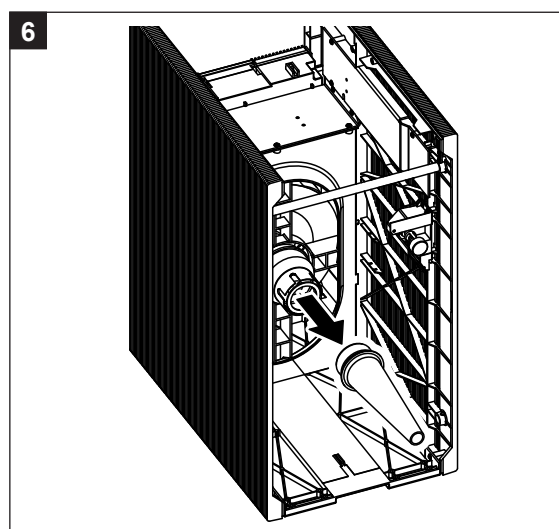
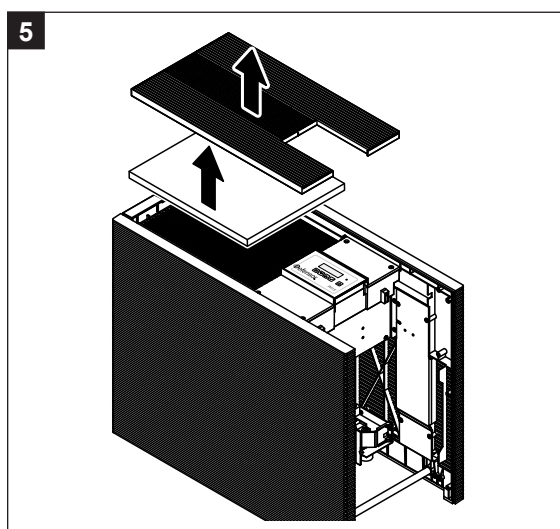
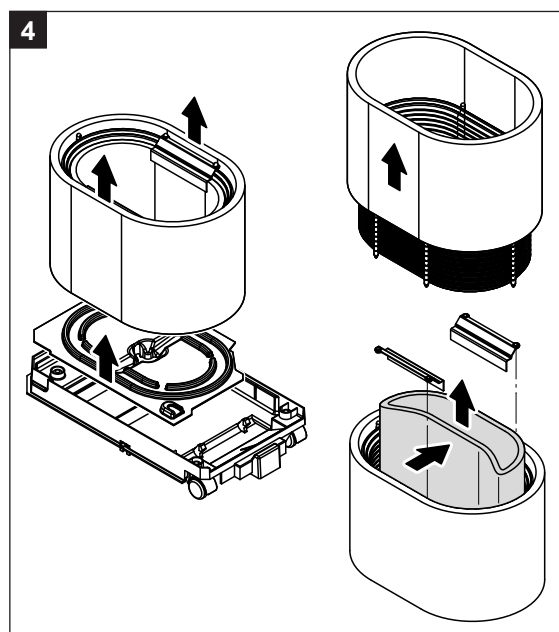
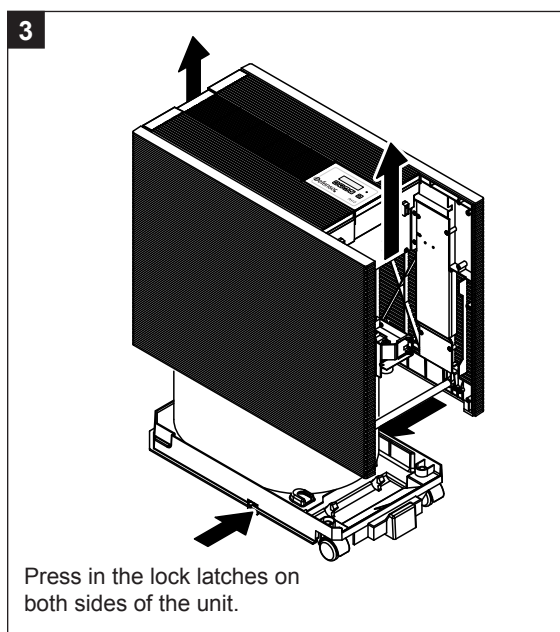
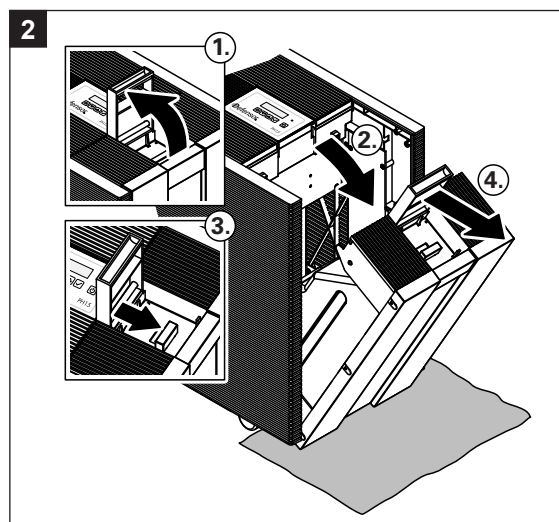
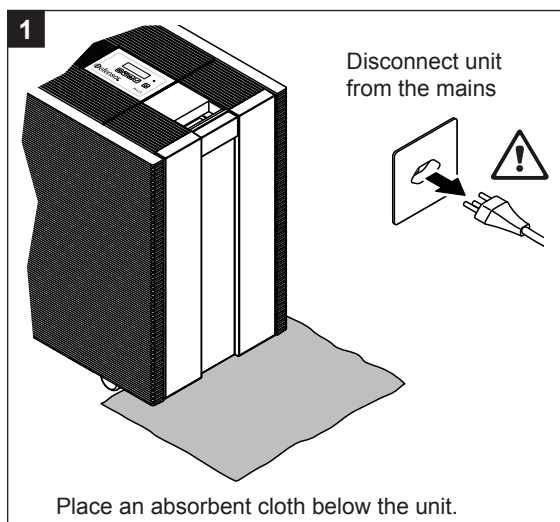
Please consider the intervals for cleaning and replacing the individual components in the table below as approximate values. If the room air is heavily contaminated the filters must be cleaned/replaced more often. If the water is very hard the parts in contact with water must be cleaned more often.

Month											
1	2	3	4	5	6	7	8	9	10	11	12
											
											
					Warning 6 Filter change 						

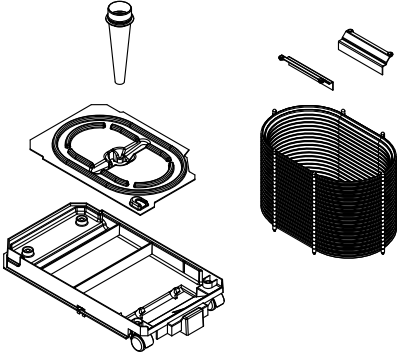
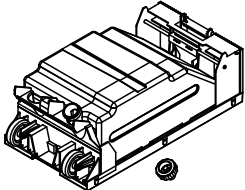
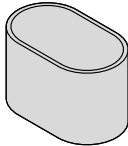
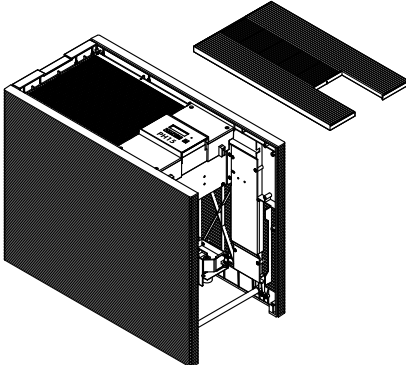
Note: If your unit is equipped with silver ionisation electrodes and if they are worn, slime will accumulate in the base tub and on the centrifuge. In this case replace the silver ionisation electrodes.

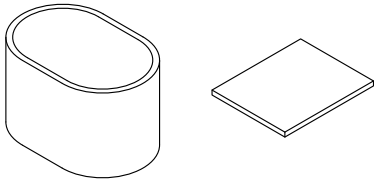
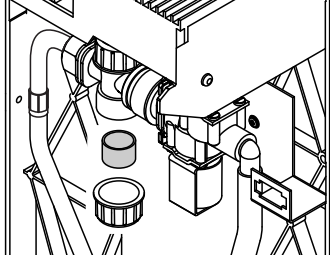
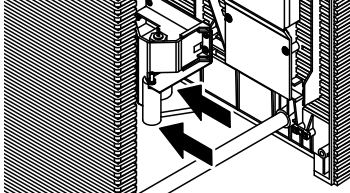
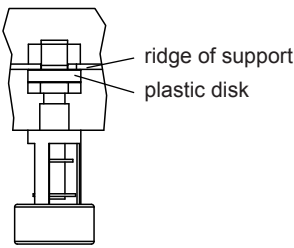
6.2 Maintenance work

6.2.1 Disassembling the unit



6.2.2 Cleaning work

Unit component	What to clean and how to clean
Centrifuge Droplet trap Mat holder Base tub cover Base tub 	- Wash parts with a lukewarm soap solution and rinse well with tap water. Additionally clean the centrifuge inside with the brush supplied. - Occasionally remove scale coating with a household decalcify agent (observe safety notes in chapter 6.6). Finally rinse the parts well with tap water.
Water tank 	- Flush water tank with a lukewarm soap solution and rinse well with tap water. - Wash screw cap with a lukewarm soap solution and rinse well with tap water. Occasionally remove scale coating with a household decalcify agent (observe safety notes in chapter 6.3). Finally rinse the screw cap well with tap water.
Flock-coated evaporator mat (activated carbon evaporator mat) 	Rinse the evaporator mat thoroughly with lukewarm water without any additives. Note: As soon as the filter replacing message appears in the display (see error messages in chapter 7) replace the evaporator mat together with the filters.
Air intake and air outlet lattices 	Clean the air intake and air outlet lattices on both sides with a vacuum cleaner.

Unit component	What to clean and how to clean
Coarse filter Coarse dust filter (or Quattro filter, respectively) 	• Clean coarse filter on the air inlet side and the coarse dust filter (or the Quattro filter) on the inner side with a vacuum cleaner (lowest power step). Note: As soon as the filter replacing message appears in the display (see error messages in chapter 7) replace coarse filter, coarse dust filter (Quattro filter) together with the evaporator mat. CAUTION! Make sure the filters do not get wet. Wet filters must be dry before reinstalling.
Water filter (PH15A only) 	• Clean water filter with a brush, then rinse filter well with tap water.
Level switch Safety switch Silver ionisation electrodes (option)  	• Carefully wipe the silver ionisation electrodes (option) with a damp cloth. • Carefully clean level switch and safety switch and remove any lime scale if necessary. After cleaning rinse level switch and safety switch with tap water. Important: if the level switch is removed from the support for cleaning, make sure the plastic disk is placed below the ridge of the support when remounting the level switch (see adjacent figure).

6.3 Notes on cleaning agent

Only use cleaning agents stated in the table above. The use of disinfectants is only permitted if they do not leave any toxic residues. In any case the parts must be thoroughly rinsed with water after cleaning.

DANGER!

Household decalcify agent attacks the mucous membranes and the skin. Protect the hands, eyes and respiratory tracts therefore from contact with the agent and its vapour (wear gloves, goggles and work in a well ventilated room or outside).

CAUTION!

Do not use any solvents, aromatised or halogenised hydrocarbons or other aggressive substances, they may damage the unit components.

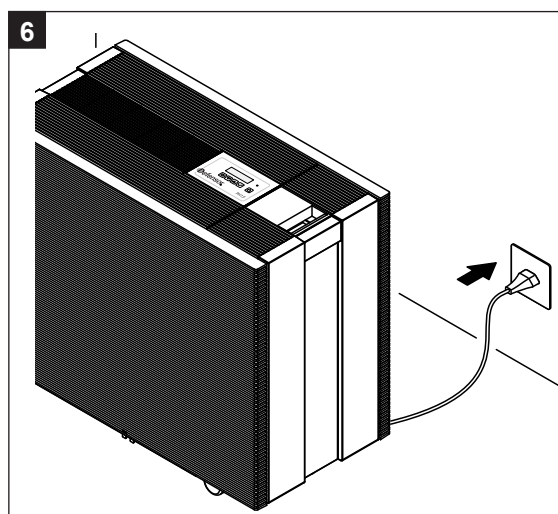
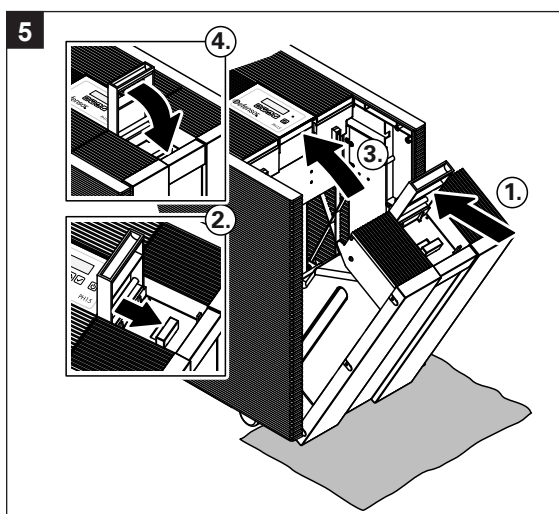
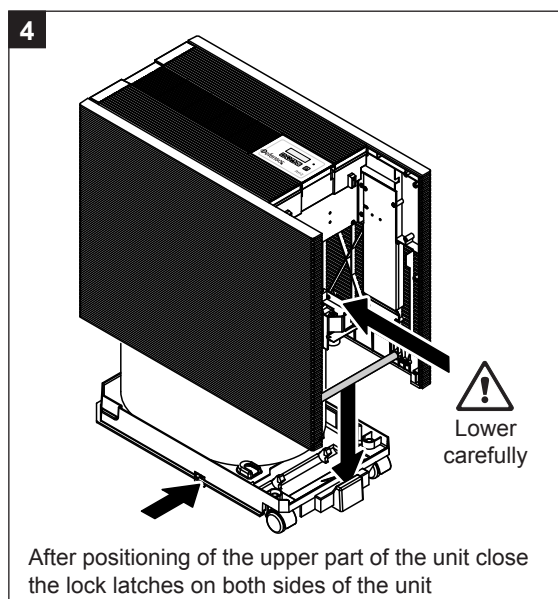
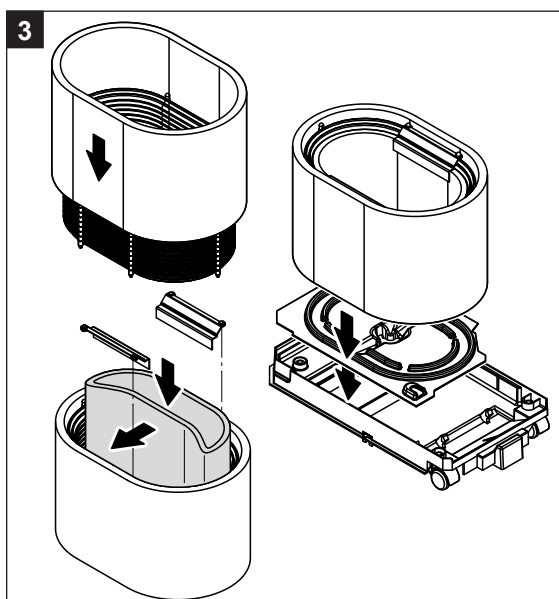
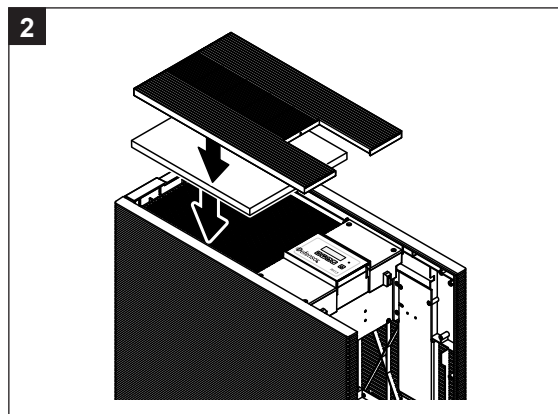
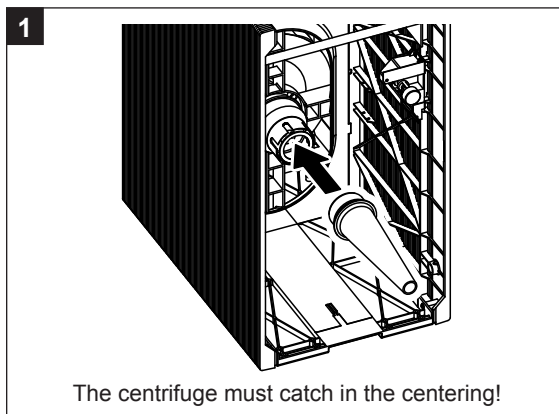
The information and instructions regarding cleaning agents are to be unconditionally observed and implemented. In particular: Information relating to the protection of personnel, environmental conservation and restrictions regarding usage.

6.4 Reassembly of the unit

CAUTION!

Before reassembling the Defensor PH15 check all components for possible damage. Do not reuse damaged parts but replace them before reassembling the unit

Reassemble the unit as follows:



6.5 Resetting the filter changing message

After the replacement of the filters and the evaporator mat the filter changing message can be reset as follows:

Warning 6 Filter change

Filter change
ESC OK

1. Switch on the unit (the filter changing message appears).
2. Press the **<Menu>** and **<OK>** keys simultaneously until the opposite message appears.
3. Press the **<OK>** key to reset the filter changing message and the interval counter. The standard operating display appears.
Note: By pressing the **<Menu>** key the reset procedure can be cancelled without action. The filter changing message is then displayed again.

7 Fault elimination

7.1 Event messages

Display	Description
Radio sensor K1 ESC Install? OK	Cause: If a new battery is inserted into the radio humidity sensor (option) and the radio channel of the radio humidity sensor does not correspond to the active channel of the Defensor PH15/PH15A a beep sounds briefly (if the buzzer is activated) and a new radio channel (e.g. K1) will be proposed. Action: Press the <OK> key if you want to confirm the suggested channel. The Defensor PH15/PH15A switches to the new channel and returns to the standard operating display. Press the <Menu> key if you want to reject the suggested channel. The Defensor PH15/PH15A returns to the standard operating display and uses the old signal source.
Radio sensor K1 Test	Cause: If a new battery is inserted into the radio humidity sensor (option) and the radio channel of the radio humidity sensor does correspond to the active channel of the Defensor PH15/PH15A a beep sounds briefly (if the buzzer is activated) and the unit confirms the correct channel. Action: To reset the message and to return to the standard operating display press the <OK> or the <Menu> key.

7.2 Warning messages

Display	green LED	Buzzer	Error relay	Resetting
Warning 6 Filter change Warning message is alternating with the standard operating display.	lights	—	activated	see chapter 6.5.
Cause: Maximum lifetime of the filter set expired. Action/Remedy: Replace filter set (see chapter 6 "Maintenance"), then reset warning message.				
Warning 7 No water Warning message is displayed until the water level in the base tub is ok. again.	lights	—	activated	Automatic resetting as soon as the water level in the base tub is at normal level again.
Note: This message is displayed only on the Defensor PH15 Cause: The water level in the base tub is too low, level switch has triggered. Action/Remedy: Check/refill water tank. Check/clean level switch.				
Warning 8 Battery radio Warning message is alternating with the standard operating display.	lights	beeps briefly every 30 minutes	activated	Automatic resetting after replacement of the battery.
Cause: Battery in radio humidity sensor (option) is empty. Action/Remedy: Replace battery of the radio humidity sensor (see separate instructions of radio humidity sensor).				

7.3 Error messages

Display	green LED	Buzzer	Error relay	Resetting
Error 1 Cover open Error message is displayed until the carriage is inserted correctly and locked.	flashes	—	activated	Automatic resetting as soon as the carriage is inserted correctly and locked.
Cause: Carriage not inserted and locked. Action/Remedy: Correctly insert the carriage and flap down the handle.				
Error 2 Max Niveau Error message is displayed until reset.	flashes	buzzes loudly (can not be switched off)	activated	Switch unit off, then on again.
Cause: Maximum water level in the base tub exceeded. Safety switch has triggered. PH15: water tank not tight (tank cap not tight and/or level regulating valve in the tank cap blocked or defective). PH15A: inlet valve defective. Action/Remedy: PH15: Remove the tank immediately. Check/clean filler neck, tank cap and level regulating valve in tank cap (replace tank cap if necessary), then close tank cap correctly. PH15A: check/replace inlet valve.				
Error 3 Filltime Error message is displayed until reset.	flashes	buzzes	activated	Switch unit off, then on again.
Note: This message is displayed only on the Defensor PH15A Cause: Shut-off valve in the water supply line closed. Internal water filter (near to the inlet valve) blocked. Inlet valve defective. Action/Remedy: open shut-off valve in the water supply line. Clean water filter (see chapter 6.3). Check/replace inlet valve.				
Error 4 No signal Error message is alternating with the standard operating display.	flashes	beeps briefly every 6 minutes	activated	Automatic resetting as soon as the unit receives a signal from the radio humidity sensor.
Cause: The Defensor PH15/PH15A does not receive any signal from the radio humidity sensor (option). Battery of the radio humidity sensor soon empty or radio humidity sensor defective. Radio humidity sensor installed outside the signal range of 25 m. Note: As long as the unit does not receive any signal from the radio humidity sensor it switches to the internal humidity sensor. Action/Remedy: Replace the battery of the radio humidity sensor. Check/replace radio humidity sensor. Install radio humidity sensor inside the signal range.				
Error 5 Leakage sensor Error message is displayed until reset.	flashes	buzzes loudly (can not be switched off)	activated	Switch unit off, then on again.
Cause: PH15: Water tank not tight (tank cap not tight and/or level regulating valve in the tank cap blocked or defective). Unit is not placed on a horizontal surface. Safety switch defective. PH15A: Inlet valve defective. Level switch defective. Safety switch defective. Action/Remedy: PH15: Check/clean filler neck, tank cap and level regulating valve in tank cap (replace tank cap if necessary), then close tank cap correctly. Place unit on a horizontal surface. Check/replace safety switch. PH15A: Check/replace inlet valve. Check/replace level switch. Check/replace safety switch.				

7.4 What, if...?

The following table lists symptoms of malfunction that may occur in daily operation of the Defensor PH15/PH15A, together with possible causes and suggested remedies.

Symptom	Cause	Remedy
Unit does not work, LC display remains dark	Unit is not connected to the mains.	Connect unit to the mains.
	Unit fuse blown.	Have a service technician of your Defensor supplier check the unit.
Unit does not humidify.	Ambient air humidity is higher than selected reference value.	No remedy required, change reference humidity value if necessary.
	Float of the level switch is stuck.	Clean level switch and carefully remove any lime scale if necessary.
	Level switch is defective. Therefore no error message is displayed even though the water level in the base tub is too low.	Have a service technician of your Defensor supplier replace the level switch
Room air does not reach the set reference humidity value.	Evaporator mat not installed.	Install evaporator mat.
	Room temperature too high.	Reduce room temperature to 20-22°C.
	Unit very dirty.	Perform maintenance (see chapter 6)
	Doors or windows are open.	Close doors and windows.
	Prolonged ventilation of the room. Therefore continuous replacement of the humidified room air by dry outdoor air.	Ventilate room only a short time!
	Room too large.	Contact your Defensor supplier.
Actual humidity much higher than the reference value.	The actual humidity is higher than the set reference air humidity.	Let unit running as air purifier.
Fan does not run	Humidification mode "Humidification" selected. Ambient humidity is higher than selected reference value.	None. Unit is working properly.
	Unit is in program mode. The currently active program sets the fan step to "0".	None. Unit is working properly.
	Fan defective.	Contact your Defensor supplier.
Base tub and evaporator mat have heavy slime accumulation.	Silver coating on the water ionisation electrodes is worn.	Have a service technician of your Defensor supplier replace the water ionisation electrodes.

7.5 Notes on fault elimination

DANGER!

For the elimination of faults set the Defensor PH15/PH15A out of operation, separate the unit from the mains and secure it against inadvertent power-up.

The elimination of faults must be carried out only by qualified and well trained professionals. Malfunctions relating to the electrical installation must only be repaired by authorized personnel or by your Defensor representative's service technician.

Repair work and the replacement of faulty components must be carried out only by your Defensor representative's service technician!

8 Taking out of service/Disposal

8.1 Taking out of service

If the Defensor PH15/PH15A must be replaced or if the unit is not needed any more, proceed as follows:

1. Switch off the unit, separate it from the mains and secure it against inadvertent power-up. Close shut-off valve in the water supply line (PH15A only).
2. Have the unit (and all other system components, if necessary) unmounted by a qualified service technician.

8.2 Disposal/Recycling

At the end of the life-span the unit and its components must be returned to the manufacturer or brought to an authorised collection point for correct disposal and/or recycling according to the local regulations.

In case of doubt please contact your local administration or your Defensor supplier.

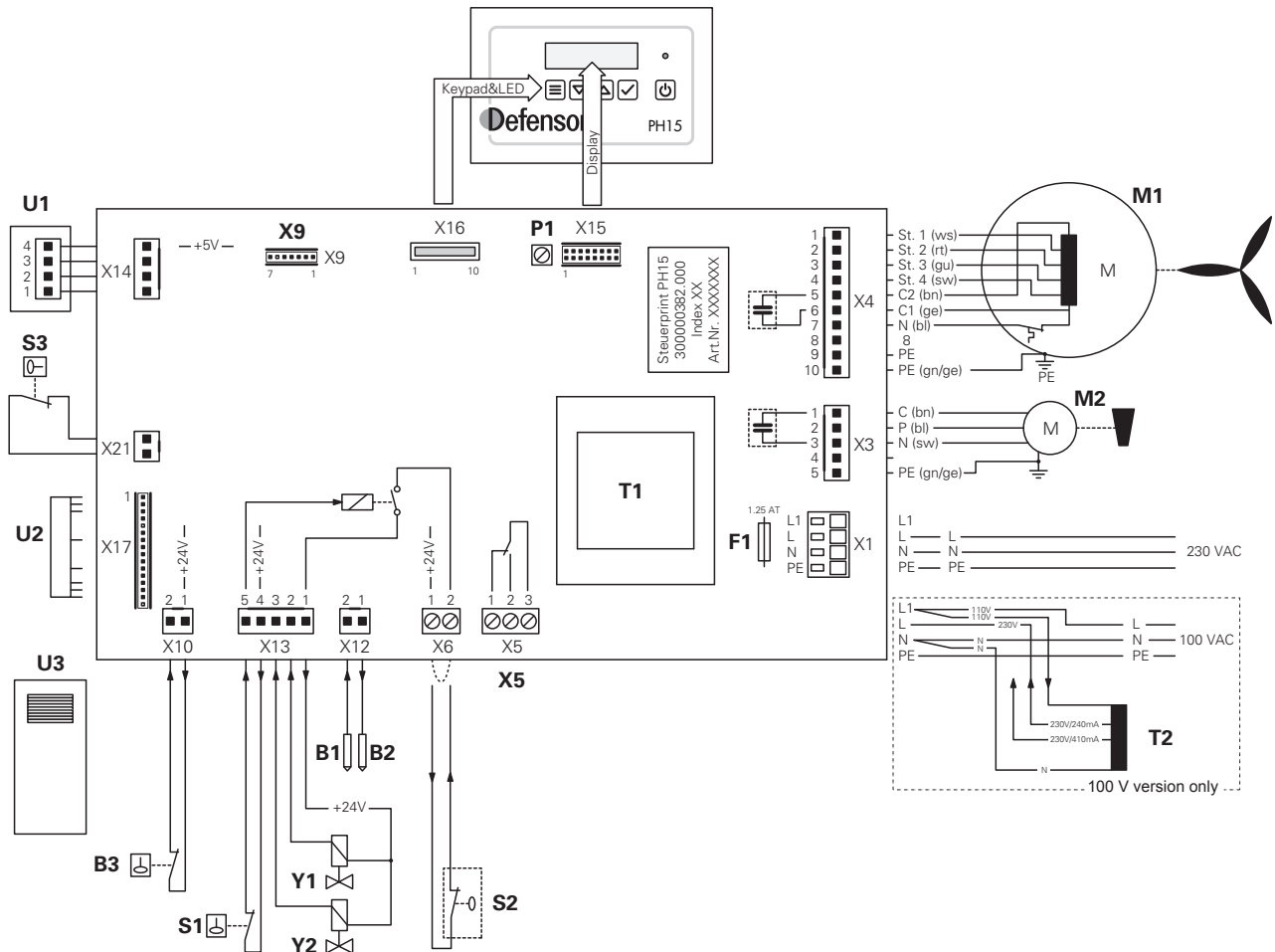
9 Unit specifications

Dimensions (B x H x T)	730 x 610 x 370 mm			
Weight (empty)	25 kg			
Water tank capacity	20 l			
Mains voltage	220...240 VAC/50...60 Hz or 90...110 VAC/50...60 Hz			
Power consumption	max. 72 Watt			
Capacity levels ¹⁾	1	2	3	4
Air circulation rate	155 m³/h	195 m³/h	280 m³/h	340 m³/h
Humidification capacity (at 25 °C and 20 %rh)	0.8 l/h	1.1 l/h	1.5 l/h	1.7 l/h
Humidification capacity (at 23 °C and 45 %rh)	0.6 l/h	0.8 l/h	1.0 l/h	1.3 l/h
For rooms up to a max. of	280 m³	380 m³	510 m³	580 m³
Sound pressure level	33 dBA	38 dBA	45 dBA	50 dBA
Sound power level (according EN ISO 3741)	47 dBA	52 dBA	59 dBA	64 dBA
Admissible ambient temperature	5...40 °C			
Admissible ambient humidity	0...85 %rh non condensing			
Unit version PH15A				
– Water supply connector	G 3/4" (female connector)			
– Admissible water pressure	0.5...6.0 bar			
– Admissible water temperature	5...40 °C			
Certificates	VDE, CE, GS, GOST			

¹⁾ The performance data are based on a unit with basic equipment for humidifier operation

10 Appendix

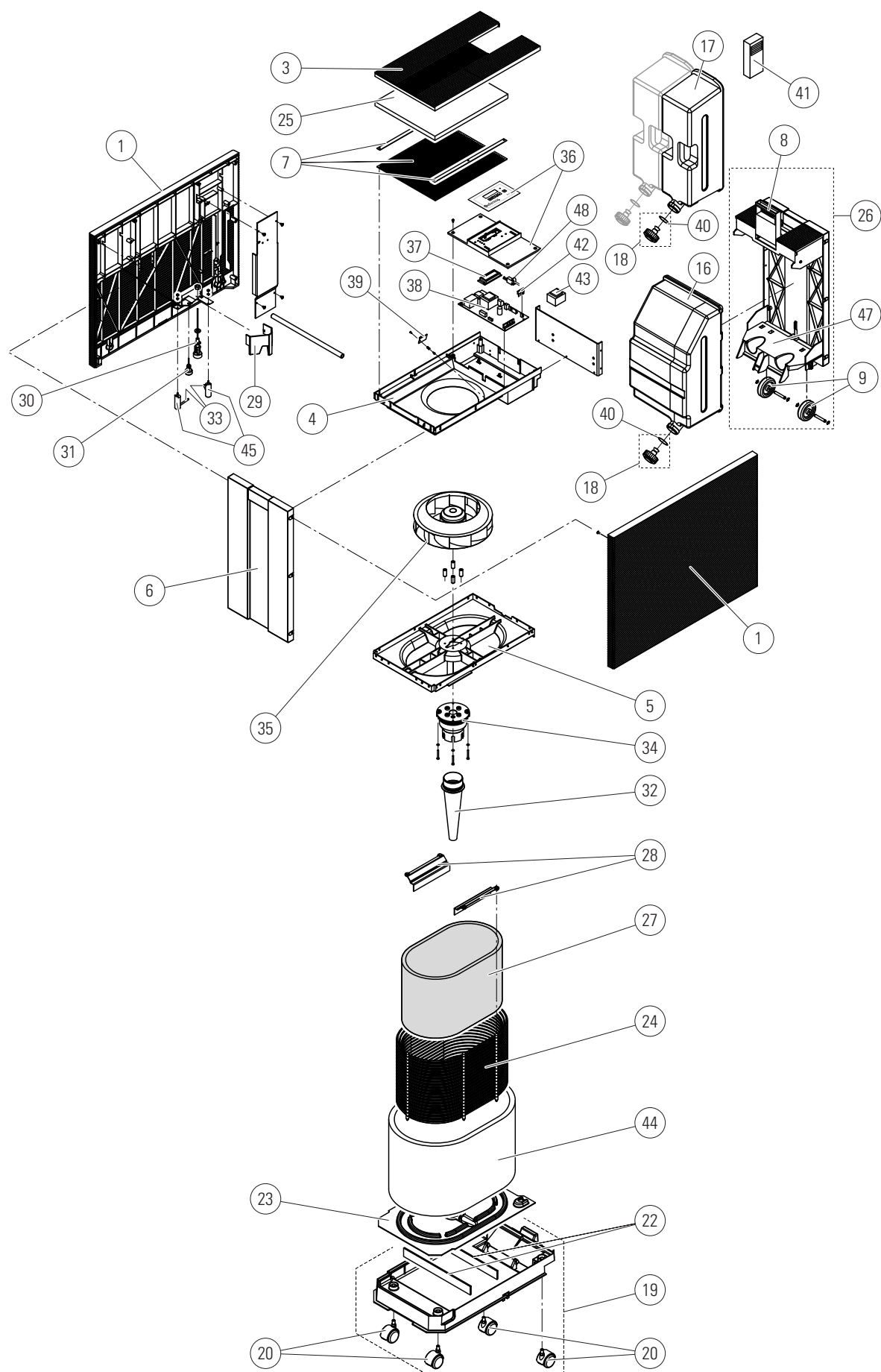
10.1 Wiring diagram



B1, B2 Ionisation electrodes
 B3 Level switch
 F1 Fuse control board (1.25 A, slow acting)
 M1 4-step fan
 M2 Centrifuge motor
 P1 Potentiometer display contrast
 S1 Safety switch
 S2 Leakage sensor (option)
 S3 Micro switch carriage

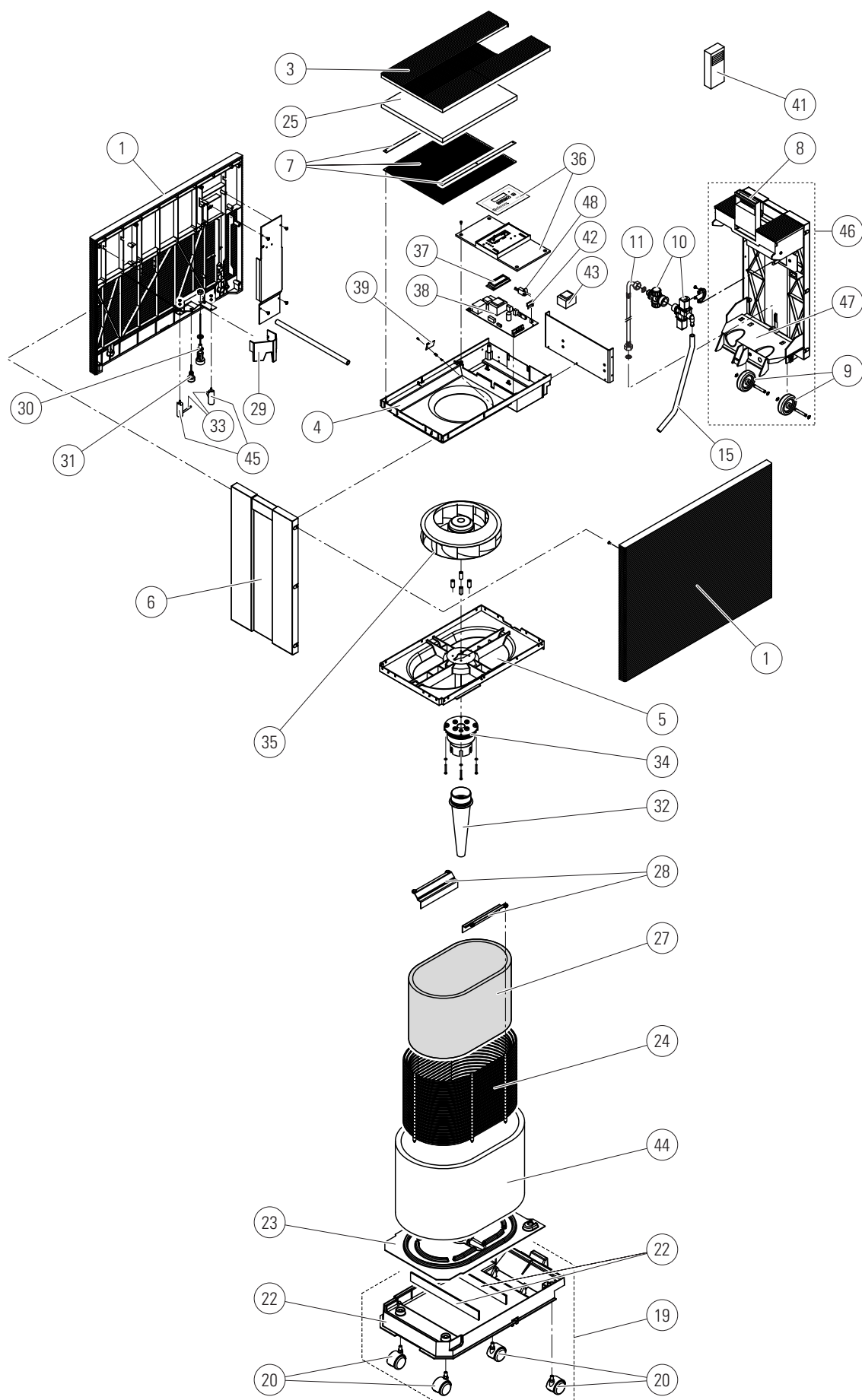
U1 Internal humidity sensor
 U2 Radio receiver (option)
 U3 External radio humidity sensor (option)
 T1 Transformer control board
 T2 Transformer 100 V version
 X5 Error contact, max. 250 VAC
 X9 Programming interface
 Y1 Inlet valve
 Y2 Inlet valve (safety valve)

10.2 Spare parts list PH15



Pos.	Art.-No.	Spare parts designation
1	2525254	Air outlet grill
3	2525318	Top cover grill
4	2525255	Frame
5	1103777	Motor support
6	2525306	Side board
7	2525256	Protecting grill cpl.
8	2525257	Handle
9	2525258	Roll water carriage (2 pcs)
16	2527094	Water tank (20 l)
17	1104570	Water tank (10 l, 1 pc)
18	1104450	Level control valve
19	2525273	Mobile base cpl.
20	2525275	Double roll (2 pcs)
22	2525277	Swash chicane (2 pcs)
23	1103179	Base cover
24	1104457	Droplet trap
25	1102319	Coarse dust filter (5 pcs)
26	2525692	Water carriage
27	1100465	Evaporator mat
	1110398	Activated charcoal evaporator mat
28	1102685	Connecting bars with support
29	2525278	Float cover
30	2571368	Level switch
31	1103785	Level safety switch
32	1104467	Impeller
33	1115356	Ionisation electrode (2 pcs)
34	2525279	Impeller motor
35	2525280	Fan cpl.
36	2525281	Control panel
37	1115515	Display LCD
38	2525304	Control PCB
39	1103719	Humidity sensor cpl.
40	1113552	Gasket level control valve
41	2524759	Radio humidity sensor
42	2525353	Receiver module
43	2525305	Transformer Japan
44	1101225	Coarse dust filter
	1110259	Quattro filter
45	2525859	Support ionisation electrode cpl. (2 pcs)
47	2544589	Base water carriage
48	2549653	Door switch
--	1110326	Brush for impeller
--	2527171	Leakage sensor
--	2529755	Salt pill leakage sensor (5 pcs)
--	1119520	Ionisation cable

10.3 Spare parts list PH15A



Pos.	Art.-No.	Spare parts designation
1	2525254	Air outlet grill
3	2525318	Top cover grill
4	2525255	Frame
5	1103777	Motor support
6	2525306	Side board
7	2525256	Protecting grill cpl.
8	2525257	Handle
9	2525258	Roll water carriage (2 pcs)
10	2525260	Valve unit cpl.
11	2558173	Water connection hose
15	2525263	Inlet hose
19	2525349	Mobile base A-type cpl.
20	2525275	Double roll (2 pcs)
22	2525277	Swash chicane (2 pcs)
23	1103179	Base cover
24	1104457	Droplet trap
25	1102319	Coarse dust filter (5 pcs)
27	1100465	Evaporator mat
	1110398	Activated charcoal evaporator mat
28	1102685	Connecting bars with support
29	2525278	Float cover
30	2571368	Level switch
31	1103785	Level safety switch
32	1104467	Impeller
33	1115356	Electrodes ionisation
34	2525279	Impeller motor
35	2525280	Fan cpl.
36	2525281	Control panel
37	1115515	Display LCD
38	2525304	Control PCB
39	1103719	Humidity sensor cpl.
41	2524759	Radio humidity sensor
42	2525353	Reiceiver module
43	2525305	Transformer Japan
44	1101225	Coarse dust filter
	1110259	Quattro filter
45	2525859	Support ionisation electrode cpl. (2 pcs)
46	2543815	Water carriage A-type
47	2544589	Base water carriage
48	2549653	Door switch
--	1110326	Brush for impeller
--	2527171	Leakage sensor
--	2529755	Salt pill leakage sensor (5 pcs)
--	1119520	Ionisation cable

Notes

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