

Condair CS 2.0/4.0

Resistive Humidifiers



INSTALLATION AND OPERATING INSTRUCTIONS

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1 Introduction

1.1 To the very beginning

We thank you for having purchased the **steam humidifier Condair CS**.

The steam humidifier Condair CS incorporates the latest technical advances and meets all recognized safety standards. Nevertheless, improper use of the steam humidifier Condair CS 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 steam humidifier Condair CS, please observe and comply with all information and safety instructions contained in the present installation and operating instructions.

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

1.2 Notes on the installation and operating instructions

Limitation

The subject of these installation and operating instructions is the steam humidifier Condair CS. The various accessories (e.g. steam distributor, filter valve, etc.) 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.

These installation and operating instructions are restricted to the **installation, commissioning, operation, servicing, and trouble-shooting** of the steam humidifier Condair CS and is meant for **well trained personnel being sufficiently qualified for their respective work**.

The installation and operating instructions are supplemented by various separate items of documentation (spare parts list, manuals for accessories, etc.). Where necessary, appropriate cross-references are made to these publications in the installation and operating instructions.

Symbols used in this manual

CAUTION!

The catchword "CAUTION" designates notes in this documentation 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 documentation 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 documentation that, if neglected, may lead to **severe injury or even death of persons.**

Safekeeping

Please safeguard these installation and operating instructions in a safe place, where they can be immediately accessed. If the equipment changes hands, the documentation must be passed on to the new operator.

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

Language versions

These installation and operating instructions are available in various languages. Please contact your Condair supplier for information.

Copyright protection

The present installation and operating instructions is 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 Condair CS must have read and understood the installation and operating instructions before carrying out any work.

Knowing and understanding the contents of the installation and 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 work (installation, operating, servicing , etc.) described in these installation and operating instructions **may only be carried out by specialist who are well trained and adequately qualified and are authorized by the customer.**

For safety and warranty reasons any action beyond the scope of this manual must be carried out only by qualified personnel authorised by the manufacturer.

It is assumed that all persons working with the Condair CS 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

Steam humidifiers Condair CS are intended exclusively for **direct air humidification via a steam distributor approved by the manufacturer** within the specified operating conditions (see chapter 9 "Product specifications". Any other type of application, without the written consent of your Condair supplier, is considered as not conforming with the intended purpose and may lead to the Condair CS 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 electrical shock!

The Condair CS 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 Condair CS out of operation as described in chapter 5.5 (switch off the unit, disconnect it from the mains and stop the water supply) and secure the unit against inadvertent power-up.



WARNING!
Hot water vapour - Danger of scalding!

The Condair CS produces hot water vapour. There is danger of scalding when getting in touch with hot water vapour.

Prevention: Do not carry out any work on the steam system during operation (steam lines, steam distributor, etc.). If the steam system is leaky set the Condair CS immediately out of operation as described in chapter 5.5. Correctly seal the steam system before putting the unit into operation again.



WARNING!
Danger of burning!

During operation the components of the steam system get very hot (up to 100 °C). There is danger of burning when touching the hot components.

Prevention: Before carrying out any work on the steam system set the Condair CS out of operation as described in chapter 5.5, then wait until the components have cooled down sufficiently thus preventing danger of burning.

Behaviour in case of danger

If it is suspected that **safe operation is no longer possible**, then the Condair CS should immediately **be shut down and secured against accidental power-up** according to chapter 5.5. This can be the case under the following circumstances:

- if the Condair CS is damaged
- if the Condair CS is no longer operating correctly
- if connections and/or piping are not sealed or cables are loose

All persons working with the Condair CS must report any alterations to the unit that may affect safety to the owner without delay.

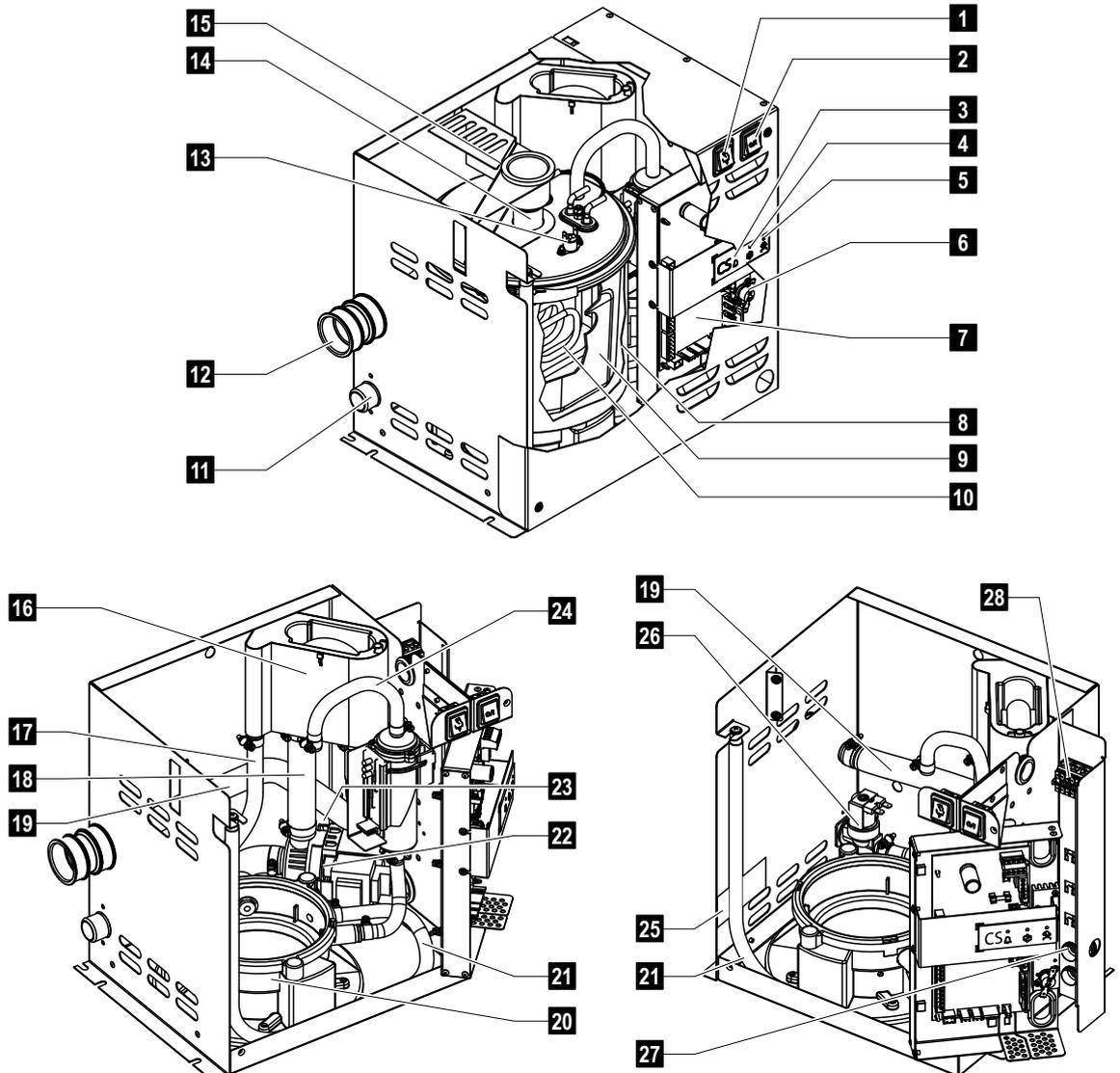
Prohibited modifications to the unit

No modifications must be undertaken on the Condair CS without the express written consent of the manufacturer.

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

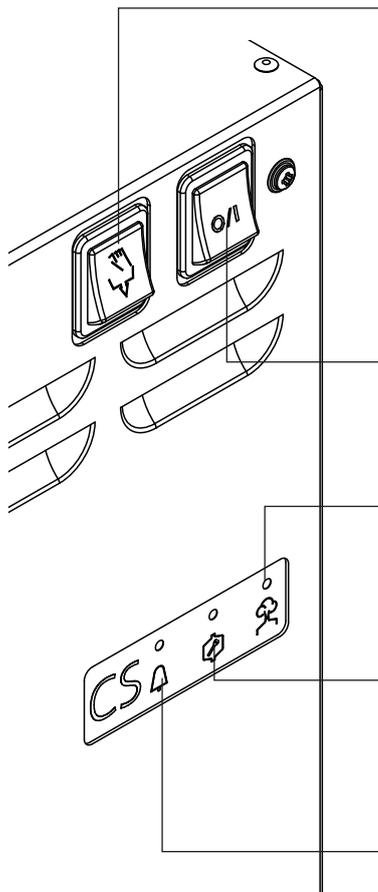
3 Product overview

3.1 Steam humidifier construction



- | | | | |
|----|--|----|----------------------------------|
| 1 | Drain key | 15 | Steam cylinder support |
| 2 | Unit switch (On/Off) | 16 | Water cup |
| 3 | LED red "Error" | 17 | Water supply hose |
| 4 | LED yellow "Warning" | 18 | Filling hose |
| 5 | LED green "Steam production" | 19 | Overflow/drain hose |
| 6 | Excess temperature switch electronic | 20 | Coupling sleeve |
| 7 | Control board | 21 | Auxiliary drain hose |
| 8 | Steam cylinder | 22 | Drain pump |
| 9 | Cylinder insert | 23 | Float switch base tub |
| 10 | Heating elements | 24 | Pressure equalizing hose |
| 11 | Water supply connector R 3/4" | 25 | Type plate |
| 12 | Water drain connector \varnothing 40 mm | 26 | Inlet valve |
| 13 | Excess temperature switch steam cylinder | 27 | Cable openings |
| 14 | Steam outlet connector \varnothing 30 mm | 28 | Connection terminal mains supply |

3.2 Function of the display and operating elements



Drain key

- Functions:
- Manual flushing (water supply open) or manual draining (water supply closed) of the steam cylinder. By pressing the key the drain pump starts. By pressing the key again the drain pump stops.
 - Resetting the maintenance counter/maintenance indication (yellow LED “Warning” flashes 8x) With the unit switched off, depress and hold the drain key then, switch on the unit.

Unit switch

Function: Switching the unit on and off

green LED “Steam”

Function: flashes 1x: unit is ready for operation
flashes 2x: test of level unit in progress
lights: unit is producing steam

yellow LED “Warning”

Function: flashes if a malfunction is present but further operation is still possible (the number of flashes indicates the type of malfunction, see chapter 7).

red LED “Error”

Function: flashes if a malfunction is present which obstructs further operation of the unit (the number of flashes indicates the type of malfunction, see chapter 7).

3.3 Product designation

The product designation is found on the rating plate:

	Type designation	Serial number (7-digit)	Month/Year
	Condair AG, CH-8806 Pfäffikon		
Supply voltage	CS 4.0	XXXXXXX	11.06
	AC 230V 50Hz		3.0 kW
Maximum steam capacity	Max. Dampf 4kg/h		
Admissible water supply pressure	Zuleitungsdruck 1...10 bar		
Field with certification symbols			
Power consumption			
	Made in Switzerland		

3.4 Functional description

The Condair CS steam humidifier is an unpressurized steam generator. It operates on the resistance heating principle and is designed for air humidification via a steam distribution pipe.

Water supply

The water is taken via a filter valve (accessory "Z261") to the steam humidifier. It reaches the steam cylinder via the inlet valve (level controlled) and the open water cup.

Level regulation

The water level in the steam cylinder is continuously monitored with the level unit. If the water level reaches a preset level (owing to the evaporation process) the level unit supplies a signal to the controller. This opens the inlet valve and the steam cylinder is filled up. When the preset operating level is reached, the level unit supplies another signal to the controller to close the inlet valve.

The pressure equalizing pipe between the steam connection and the level unit ensures that the water levels are the same in the steam cylinder and the level unit.

Steam generation regulation

The steam is produced in the steam cylinder by two resistance heating elements. The steam production is controlled via an external humidistat (On/Off control) or an external continuous humidity controller 0...10 V (continuous control).

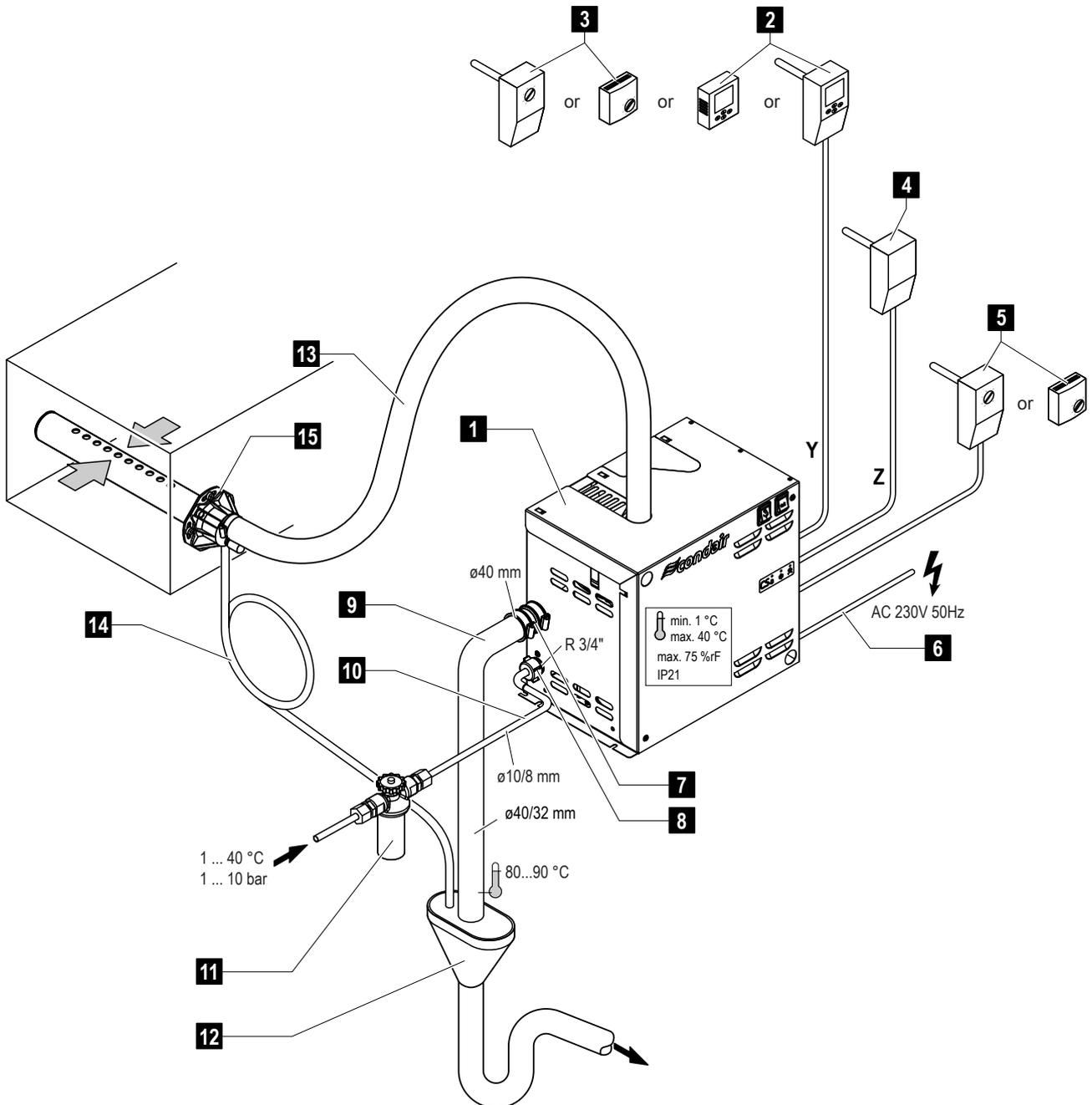
Flushing

The evaporation process increases the concentration of minerals in the water of the steam cylinder. A suitable volume of water must be flushed through the steam cylinder from time to time and replaced by fresh water to ensure that this concentration does not exceed a specific value unsuitable for operation. The Condair CS steam humidifier performs an auto-adaptive flushing. This consists of the following two forms of flushing:

- **Automatic flushing** takes place as soon as the water in the steam cylinder exceeds the upper operating level (e.g. by foaming of the water).
- **Flushing dependent on time** performs the flushing process at preselected time intervals (in accordance with the local water quality).

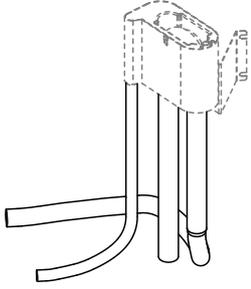
Automatic or time-dependent flushing takes place depending on the water quality and the operating data. If the lowest operating level is reached during the flushing process, the inlet valve remains open until the water level in the steam cylinder has reached the normal working level again. If the lowest operating level is not reached, the inlet valve is closed.

3.5 Humidification system overview



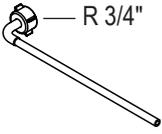
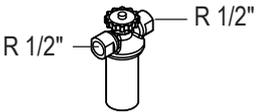
- | | | | |
|---|---|----|--|
| 1 | Steam humidifier | 8 | Water supply connector |
| 2 | Continuous humidity controller 0...10 V (room or duct) | 9 | Drain pipe (by customer) |
| 3 | On/Off humidistat (room or duct) | 10 | Water supply hose (accessory "WIT") |
| 4 | Humidity sensor 0-10 V (supply air limitation, signal ZI) | 11 | Filter valve (accessory "Z261") |
| 5 | Safety humidistat (room or duct) | 12 | Water drain building side (funnel with siphon) |
| 6 | Voltage supply | 13 | Steam hose (accessory "DS60") |
| 7 | Water drain connector | 14 | Condensate hose (accessory "KS10") |
| | | 15 | Steam distribution pipe (accessory "61-..") |

3.6 Options

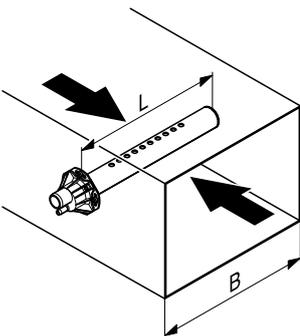
Option	Designation	Description
Pressure compensation kit 	PCK	Kit of hoses for mounting the water cup above the unit cover of the Condair CS to compensate back pressure in the steam hose of up to 2'000 Pa.

3.7 Accessories

Accessories for water installation

Accessory	Designation	Description
Water supply hose 	WIT	Water connection pipe $\varnothing 10/8$ mm made of plastic with R 3/4" union nut (pressure-proofed and certified for drinking water supply systems). Pipe length 2 m.
Filter valve 	Z261	Shut-off valve with integrated filter for the installation in the water supply line.

Accessories for steam installation

Accessory	Designation	Description																		
Steam hose $\varnothing 29/38$	DS60	Heat-resistant plastic hose specially designed for the steam line. Specify the length in meter when ordering.																		
Condensate hose	KS10	Specify the length in meter when ordering.																		
Steam distribution pipe 	61-..	<table border="1"> <thead> <tr> <th>Type ¹⁾</th> <th>Length (L) ²⁾ steam distribution pipe in mm</th> <th>Duct width (B) in mm</th> </tr> </thead> <tbody> <tr> <td>61-200</td> <td>200</td> <td>250...400</td> </tr> <tr> <td>61-350</td> <td>350</td> <td>400...600</td> </tr> <tr> <td>61-500</td> <td>500</td> <td>550...750</td> </tr> <tr> <td>61-650</td> <td>650</td> <td>700...900</td> </tr> <tr> <td>61-800</td> <td>800</td> <td>900...1100</td> </tr> </tbody> </table> <p>¹⁾ material: CrNi steel ²⁾ special length on request</p>	Type ¹⁾	Length (L) ²⁾ steam distribution pipe in mm	Duct width (B) in mm	61-200	200	250...400	61-350	350	400...600	61-500	500	550...750	61-650	650	700...900	61-800	800	900...1100
Type ¹⁾	Length (L) ²⁾ steam distribution pipe in mm	Duct width (B) in mm																		
61-200	200	250...400																		
61-350	350	400...600																		
61-500	500	550...750																		
61-650	650	700...900																		
61-800	800	900...1100																		

3.8 Standard delivery

The standard delivery includes:

- Steam humidifier Condair CS compl. in cardboard box (WxHxD: 445 mm x 440 mm x 330 mm, transport weight: 13 kg) with:
 - water supply hose
 - Fixing set
 - Installation and operating instructions (this document)
- Ordered options with operating instructions according to chapter 3.6, packed separately.
- Ordered accessories with operating instructions according to chapter 3.7, packed separately.

3.9 Storing/Transport/Packaging

Storing

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

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

Transport

For optimum protection always transport the unit in the original packaging.

To transport the unit without packaging hold the unit with both hands on its base tub (net weight of the unit: 11.5 kg). Always place the unit on its bottom side.

Packaging

Keep the original packaging of the Condair CS for later use.

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 Installation

4.1 Important notes on the installation

Qualification of personnel

All mounting and installation work must be carried out only by **well qualified personnel authorised by the owner**. It is the owner's responsibility to verify proper qualification of the personnel.

General note

Strictly observe and comply with all information given in the present installation and operating instructions regarding the location of the unit and the installation of water, steam and electricity.

Observe and comply with all local regulations dealing with water, steam and electrical installations.

Safety

Some installation work requires removal of the unit cover. Please note the following:



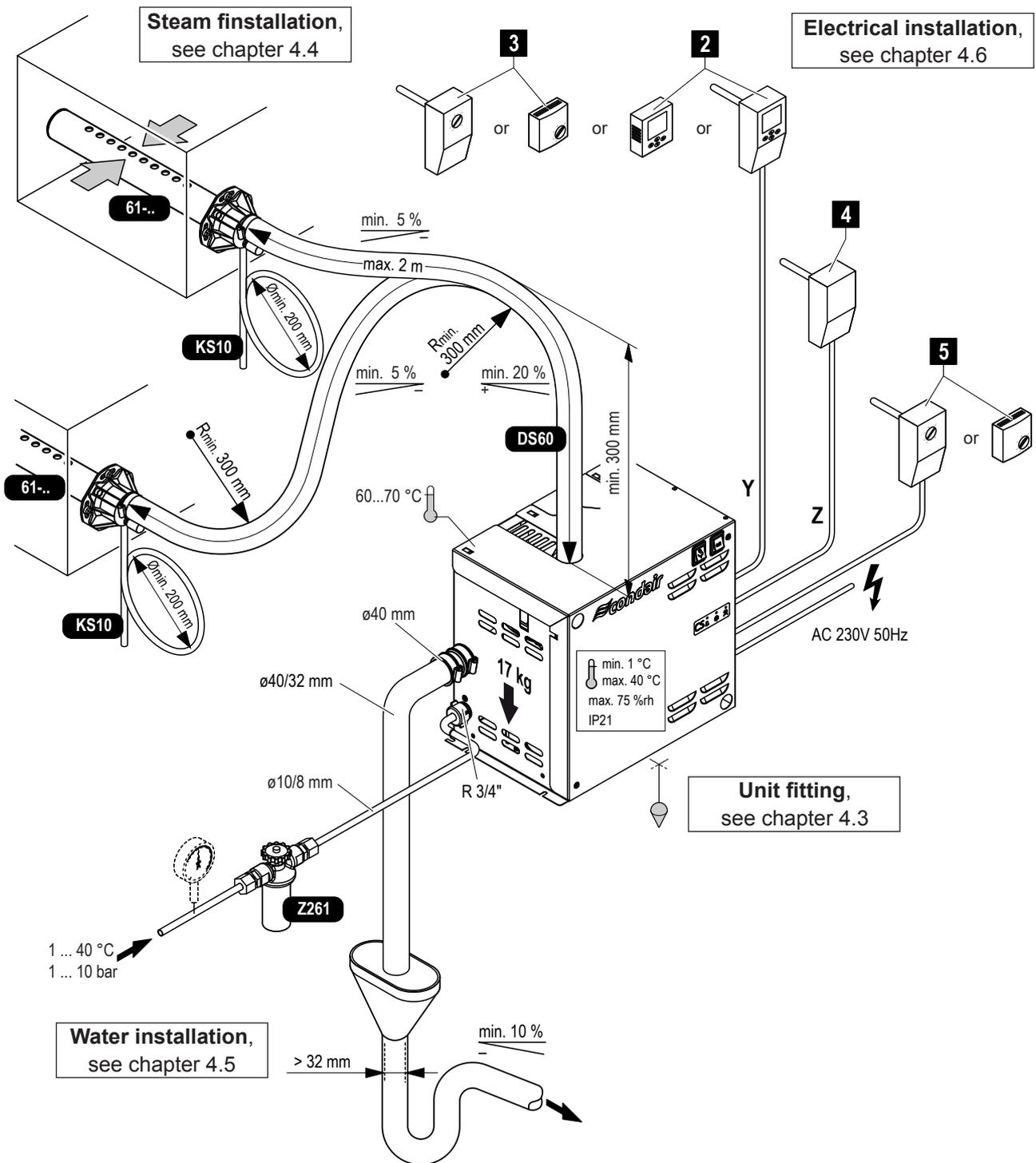
DANGER!
Danger of electrical shock!

You may get in touch with live parts when the unit is open. The steam humidifier must be connected to the mains only after all mounting and installation work has been completed and the cover has been relocated properly.

CAUTION!

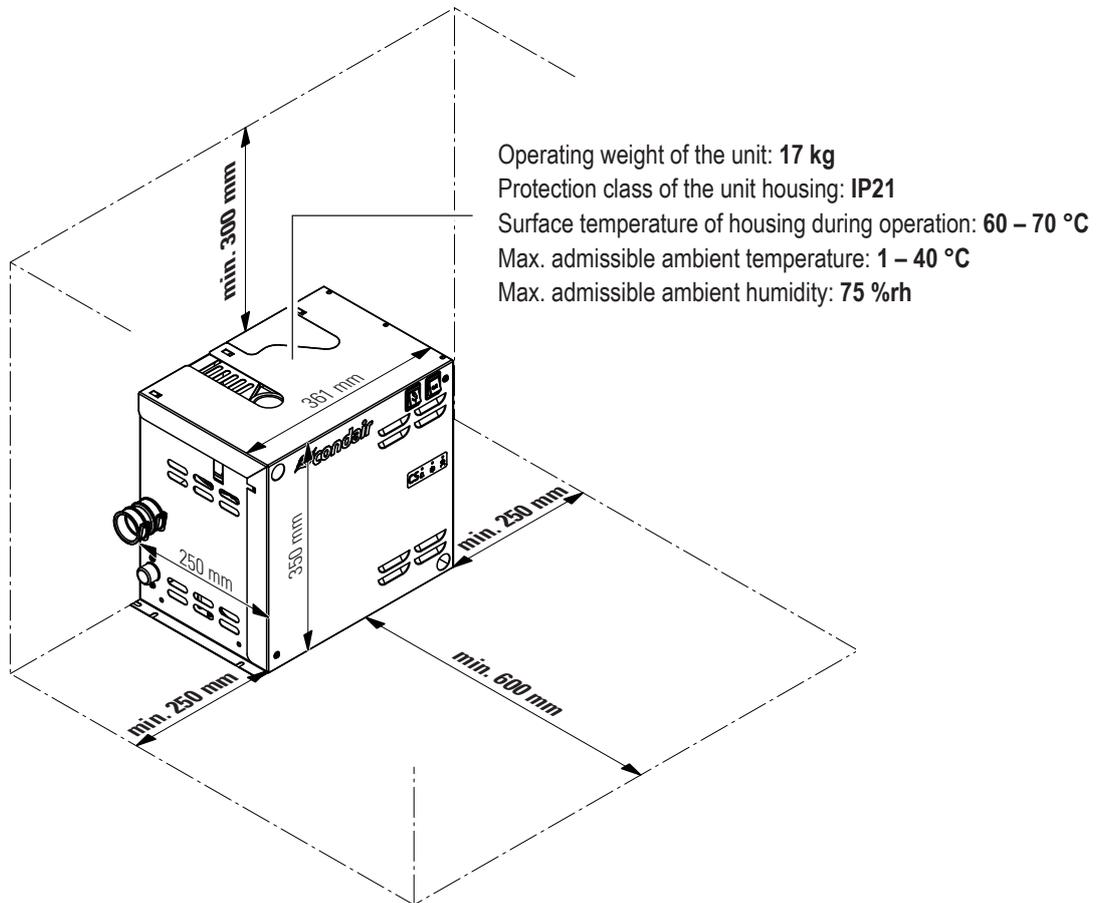
The **electronic components** inside the humidifier are **very sensitive to electrostatic discharge**. When the unit is open for installation work, appropriate measures must be taken to **protect these components against damage caused by electrostatic discharge (ESD protection)**.

4.2 Installation overview



4.3 Unit fitting

4.3.1 Note on locating and fitting the unit



The following points must be considered and observed:

- Install the steam humidifier so that the length of the steam hose is kept as short as possible (**max. 2 m**) and the requirements regarding the leading of the steam hose can be met (see chapter 4.4).
- The steam humidifiers Condair CS are designed for wall- and floor mounting. Make sure that the construction (wall, pillar, floor-mounted console, etc.) to which the humidifier is to be mounted, offers a sufficiently high load-bearing capacity (operating weight of unit: 17 kg), and is suitable for the installation.

CAUTION!

Do **not** mount the steam humidifier directly to the ventilation duct (insufficient stability).

- The housing of the Condair CS is retaining heat during operation (max. surface temperature of the metal housing approx. 60 - 70 °C). Make sure, therefore, that the construction (wall, pillar, etc.) to which the unit is to be mounted, does not consist of heat-sensitive material.
- Install the steam humidifier in such a manner that it is **freely accessible** with sufficient space available for maintenance purposes (refer to the illustration above for **minimum distances**).
- The Condair CS is protected according to **IP21**. Make sure the unit is installed in a drip-proof location and the admissible ambient conditions are complied with.

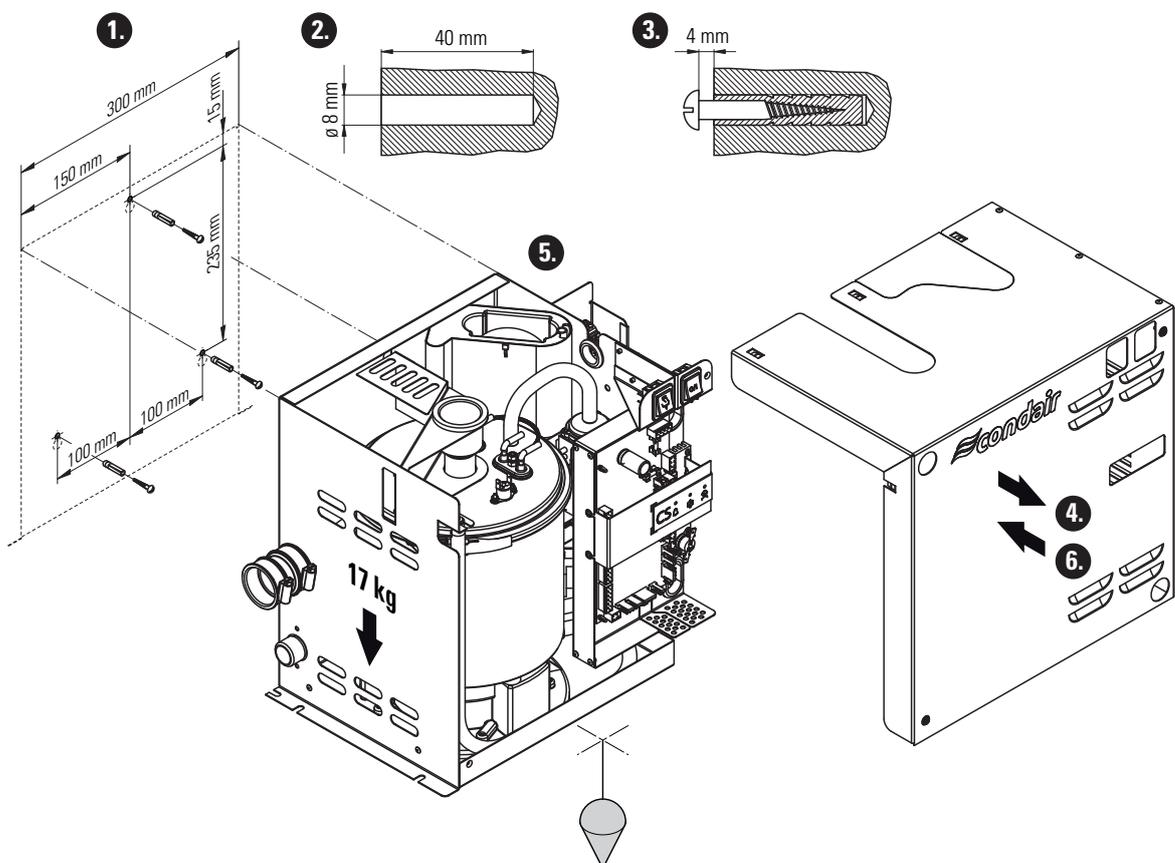
- The steam humidifier Condair CS may only be installed in rooms with a floor drain.

CAUTION!

If for some reason the Condair CS must be installed in a location without floor drain, it is mandatory to provide a leakage monitoring device to safely interrupt the water supply in case of leakage.

- When fixing the Condair CS, use only the fixing materials supplied with the unit. If fixing with the materials supplied is not possible in your particular case, select a method of fixing that is of similar stability.

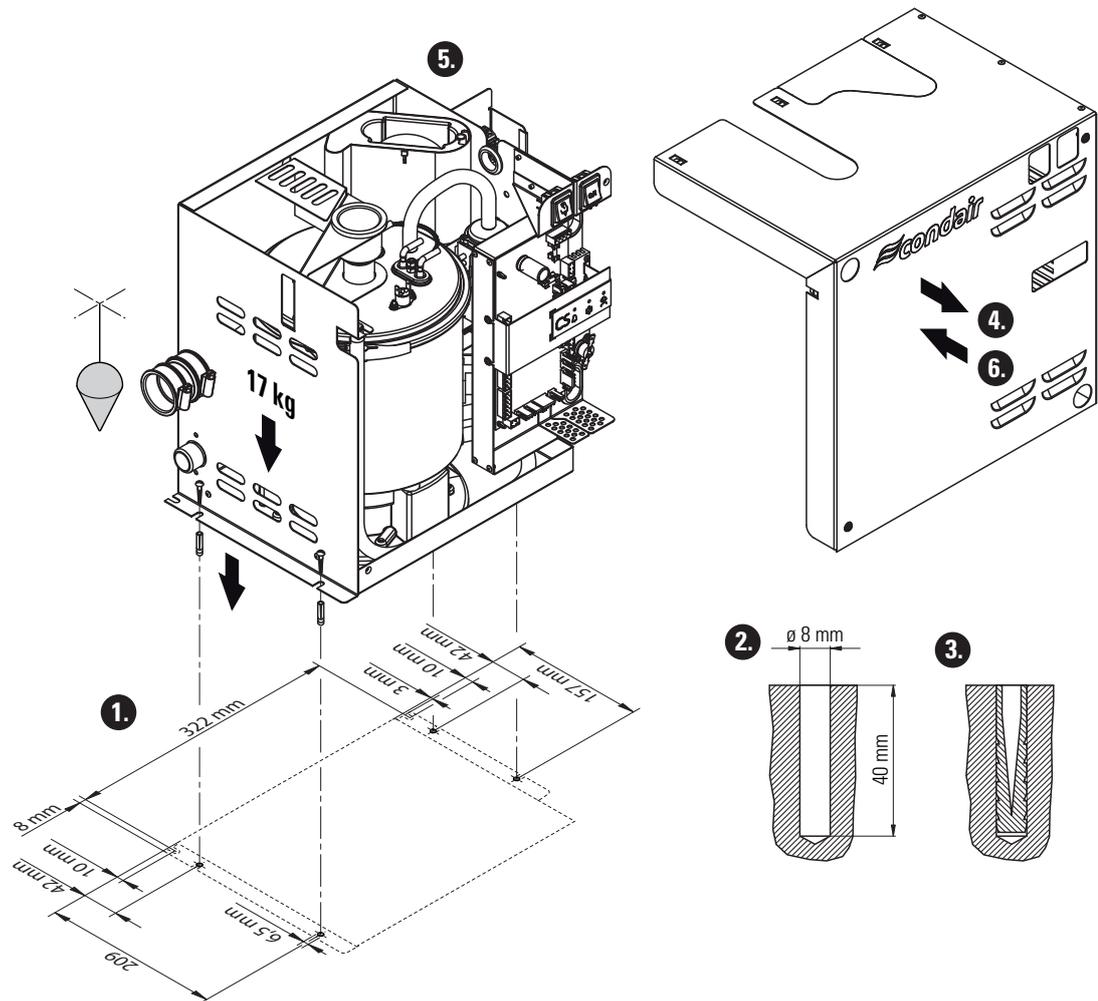
4.3.2 Wall mounting



Procedure

1. Mark the three attachment points on the wall.
2. Drill holes (diameter: 8 mm, depth: 40 mm).
3. Insert the supplied plastic plugs into the holes, and tighten the screws until the distance between the wall and the screw head is 4 mm.
4. Unlock the two screws and remove the unit cover.
5. Hang up the unit on the screws. Use the spirit level to adjust the unit horizontally and vertically then, tighten the topmost screw.
6. Reattach the unit cover and lock it with the two screws.

4.3.3 Floor mounting



Procedure

1. Mark the attachment points on the floor (two on each side of the unit).
Note: The mounting surface must be exactly horizontal (check with spirit level).
2. Drill holes (diameter: 8 mm, depth: 40 mm).
3. Insert the supplied plastic plugs into the holes.
4. Unlock the two screws and remove the unit cover.
5. Fix the unit to the floor using the four screws supplied.
6. Reattach the unit cover and lock it with the two screws.

4.3.4 Inspecting the installed unit

Check the following points:

- Is the unit in the correct place (see chapter 4.3.1)?
- Is the load-bearing capacity of the construction to which the unit is to be mounted sufficient?
- Is the unit correctly aligned vertically and horizontally?
- Is the unit properly secured (see chapters 4.3.2 and 4.3.3)?
- Is the unit cover reattached and secured with the two screws?

4.4 Steam installation

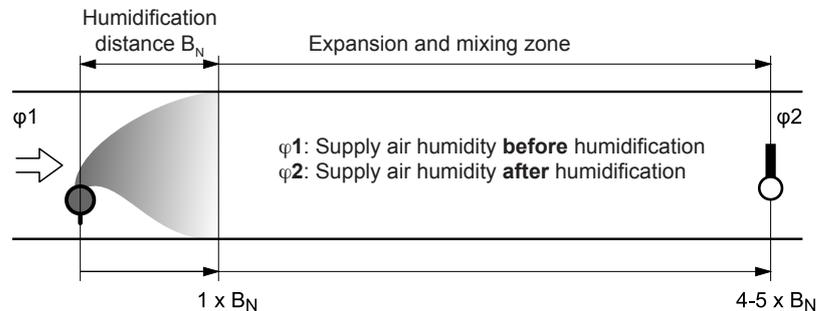
4.4.1 Steam distribution pipe

4.4.1.1 Positioning of the steam distribution pipe

The location for the steam distribution pipe should be determined at the time of dimensioning the air conditioning system. Please note the following instructions to ensure proper humidification of the duct air.

Calculating the humidification distance

The water vapour, emitting from the steam distribution pipes, requires a certain distance to be absorbed by the ambient air so that it is no longer visible as steam. This distance is referred to as **humidification distance “ B_N ”** and serves as a basis for the determination of the minimum distances from the upstream components in the system.



The calculation of the humidification distance “ B_N ” is dependent on several factors. For a rough estimation of the humidification distance “ B_N ”, the following table is useful. Recommended standard values listed in this table are based on a supply-air temperature range of 15 °C to 30 °C. The values **only apply to steam distribution pipe 61-....**

Humidity at inlet $\varphi 1$ in %rh	Length of humidification distance B_N in m					
	Humidity at outlet $\varphi 2$ in %rh					
	40	50	60	70	80	90
5	0,9	1,1	1,4	1,8	2,3	3,5
10	0,8	1,0	1,3	1,7	2,2	3,4
20	0,7	0,9	1,2	1,5	2,1	3,2
30	0,5	0,8	1,0	1,4	1,9	2,9
40	–	0,5	0,8	1,2	1,7	2,7
50	–	–	0,5	1,0	1,5	2,4
60	–	–	–	0,7	1,2	2,1
70	–	–	–	–	0,8	1,7

$\varphi 1$ in %rh: Relative supply air humidity prior to humidification at the lowest supply air temperature

$\varphi 2$ in %rh: Relative supply air humidity after the steam distribution pipe at maximum capacity

Example

given:

$\varphi 1 = 30$ %rh, $\varphi 2 = 70$ %rh

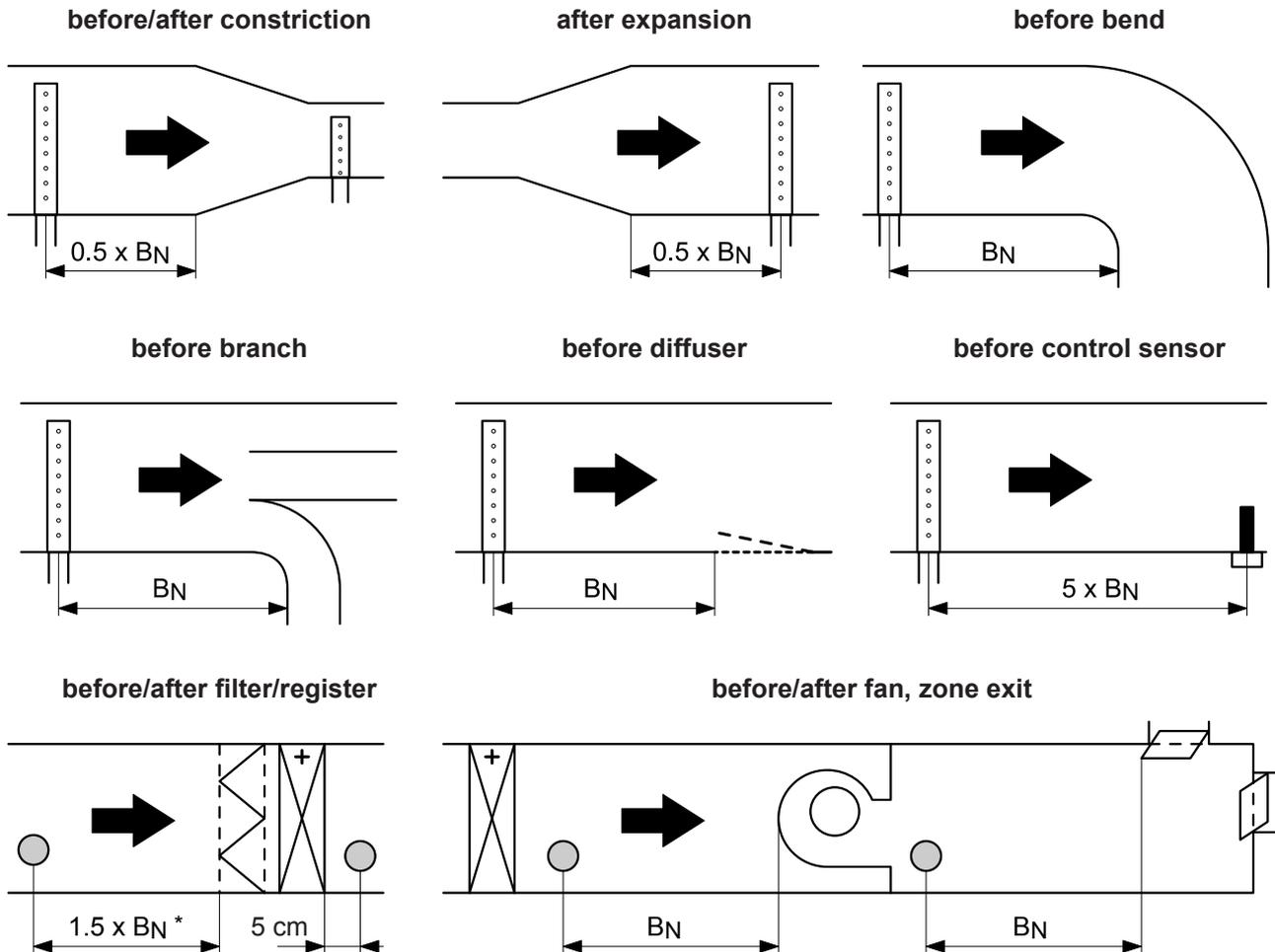
humidification distance B_N :

1,4 m

Note: If the humidification distance has to be reduced for technical reasons, the amount of steam must be divided between **two steam distribution pipes**. If this is the case, contact your Condair supplier.

Minimum distances to be observed

To prevent the water vapour, that is emitting from the steam distribution pipe, from condensing on downstream system components, a minimum distance to the steam distribution pipe must be observed (depends on the humidification distance " B_N ").



$2,5 \times B_N$ before aerosol filter

Caution! The humidification distance and derived from it the minimum distance between the steam distributor and system components located downstream in the duct are determined on the basis of the expected operating parameters (e.g. air speed, supply air temperature, etc.) when planning the system. An alteration of these operating parameters at a later time may induce that the determined humidification distance is not correct any longer and steam is condensing during operation on system components located downstream in the duct. This may lead to damage of the system and/or an excessive growing of germs.

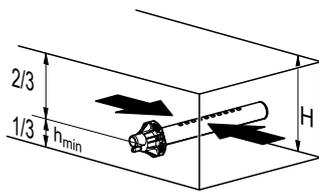
Installation notes and dimensions

The steam distribution pipes are designed for either **horizontal** installation (on the duct wall) or, with accessories, for **vertical** installation (in the duct floor). The **outlet orifices should always point upwards and at right angles to the airflow**.

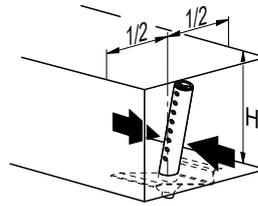
If possible, the steam distribution pipes should be installed on the **pressure side** of the duct (**max. duct pressure 300 Pa**). If the steam distribution pipes are installed on the suction side of the duct, the **maximum vacuum must not exceed 300 Pa**.

Select a location for the installation, tailored to suit your duct (see the following illustrations) and position the steam distribution pipes in the duct so that a uniform distribution of steam is achieved.

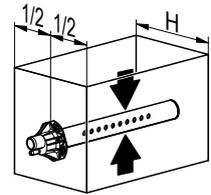
In positioning the steam distribution pipes, the following dimensions should be observed:



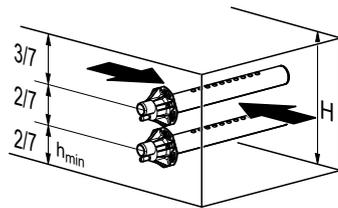
H min.= 250 mm



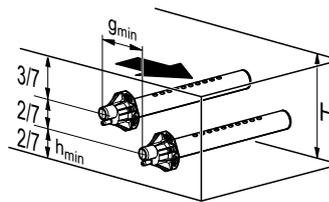
H ≥ 400 mm



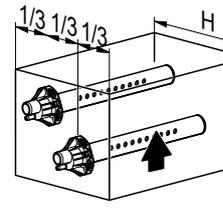
H min.= 200 mm



H min.= 400 mm



H min.= 350 mm



H min.= 300 mm

g min.= 100 mm
h min.= 85 mm

Guidelines for dimensioning the ventilation ducts

- To facilitate the installation of the steam distribution pipes and for control purposes, a sufficiently sized control opening should be planned.
- Within the range of the humidification distance, the ventilation duct should be waterproofed.
- Air ducts passing through cold rooms should be insulated to prevent the humidified air from condensing along the duct wall.
- Poor airflow conditions within the air duct (e.g. caused by obstacles, tight bends, etc.) can lead to condensation of the humidified air.
- Steam distribution pipes must not be mounted to round ducts.

If you have questions relating to the dimensioning of ventilation ducts in combination with steam humidifiers Condair CS, contact your Condair supplier.

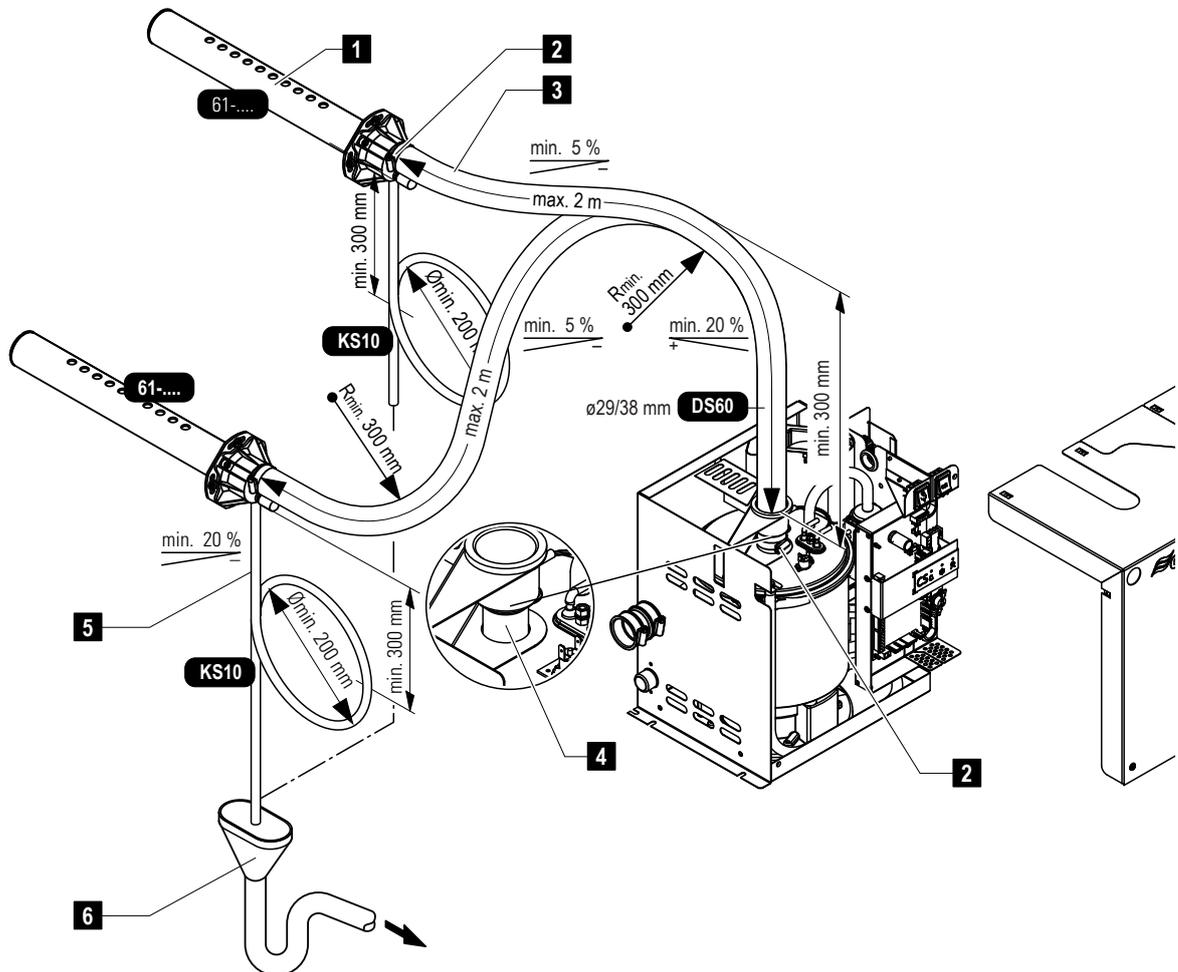
4.4.1.2 Installing the steam distribution pipe

Detailed information on the installation of steam distribution pipe 61-... can be found in the separate Mounting Instructions for this products.

4.4.2 Installation of the steam and condensate line

4.4.2.1 Layout with steam hose DS60

Overview



- 1 Steam distribution pipe 61-...
- 2 Hose clamps
- 3 Steam hose DS60 (\varnothing 29/38 mm)
- 4 Steam connector (\varnothing 30/28 mm)
- 5 Condensate hose KS10
- 6 Drain funnel with siphon (by client)

CAUTION!

Use original Condair steam hose and condensate hose exclusively. Other types of hoses can cause undesired operational malfunctions.

Note on leading the steam hose

- Initially, lead the steam hose **at least 300 mm perpendicularly upward above the top edge of the humidifier**, then lead the hose with a **minimum upslope of 20%** and/or a **minimum downslope of 5%** to the steam distribution pipe.

- The steam hose should be kept as short as possible (**max. 2 m**) while observing the **minimum bend radius of 300 mm**.

Note: the **maximum admissible pressure loss** over the entire steam line is **300 Pa**. Allowance must be made for a **pressure loss of 10 mm water column (approx. 100 Pa)** per meter steam hose or per 90° bow.

Note: If your particular installation exceeds the maximum steam hose length of 2 m contact your Condair representative. In any case, **steam hoses longer than 2 m must be insulated in their entire length**.



DANGER!

Reducing the cross section or the complete closure of the steam pipe will cause an excessive increase in pressure in the steam cylinder when the unit is operating and could lead to the risk of scalding accidents. Therefore you must comply with the following instructions:

- When installing make sure the steam pipe is open over the entire length and through the whole cross section. Any sealing plugs, adhesive sealing sheets etc. must be removed before connecting the steam pipe and reductions in cross section by kinking, for example, must be avoided.
 - Steam hoses must be prevented from sagging (condensate pockets); if necessary, support steam hose with pipe clamps, trough, or wall brackets, or install a condensate drain at lowest point in the steam hose.
 - It is **not permitted to install a stop valve** (e.g. a manually controlled stop valve, solenoid valve, etc.) in the steam pipe.
-
- **Important!** When deciding on the length and layout of the hose, it should be noted that the steam hose may become somewhat shorter with progressive ageing.

Securing the hose

The steam hose must be secured to the steam distribution pipe and the humidifier steam outlet by means of **hose clamps**.

CAUTION!

To prevent the steam connector of the unit to be damaged, do not overtighten the hose clamp.

After having secured the steam hose to the steam outlet of the unit reattach the unit cover and lock it with the two screws.

Note on leading the condensate hose

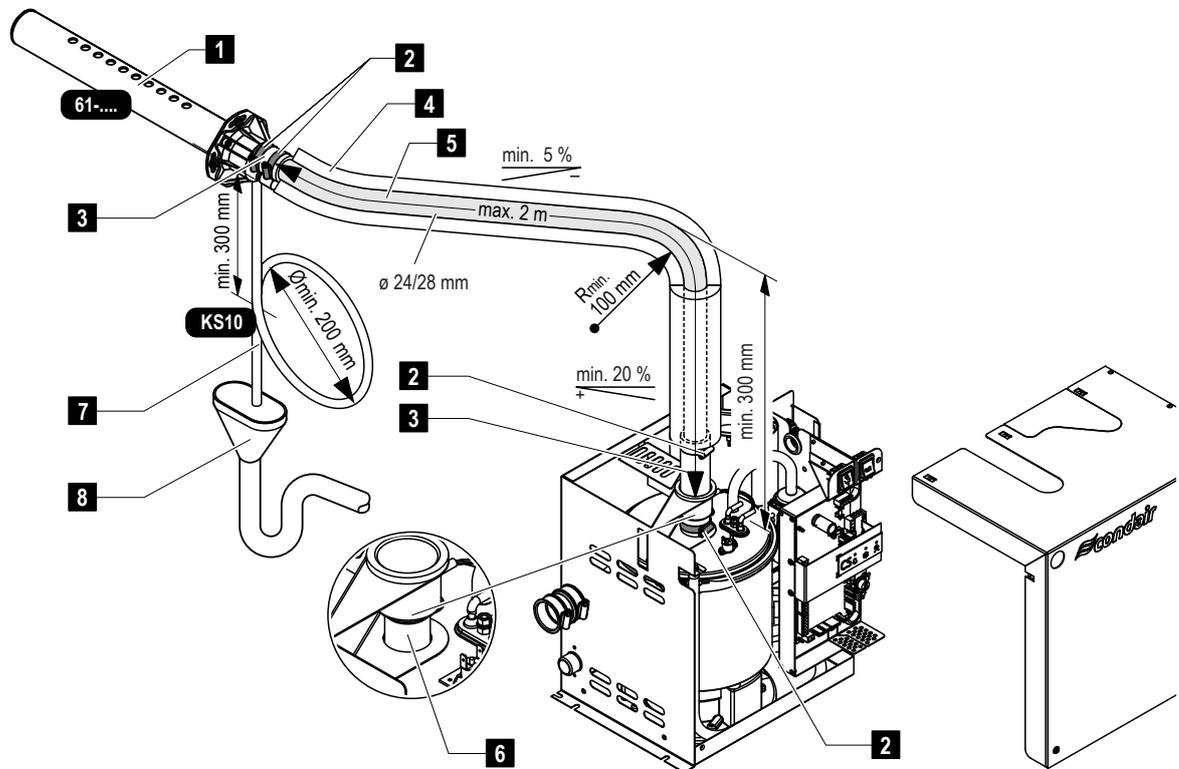
Condensate hose is led down with a **minimum slope of 20 %**, in the form of a **siphon (min. hose bend diameter Ø200 mm)**, directly into a discharge funnel with siphon.

Note: If your unit feeds a number of steam distribution pipes, the individual condensate hoses are to be led into the discharge funnel.

Important! Before putting the unit into operation, the siphon of the condensate hose must be filled with water.

4.4.2.2 Layout with fixed piping

Overview



- 1 Steam distribution pipe 61-...
- 2 Hose clamps
- 3 Piece of steam hose (DS60)
- 4 Steam line made from stainless steel (min. DIN 1.4301)
- 5 Insulation (mandatory)
- 6 Steam connector (ø 30/28 mm)
- 7 Condensate hose KS10
- 8 Drain funnel with siphon (by client)

CAUTION!

Use original Condair condensate hose exclusively. Other types of condensate hoses can cause undesired operational malfunctions.

Notes on making the steam line with fixed piping

For steam lines with fixed piping, the same instructions apply to the laying and the maximum length of the piping, as for the version with steam hose DS60. The following additional notes must be observed:

- The **minimum internal diameter of 24 mm** must be applied over the whole length of the piping.
- Use exclusively stainless steel piping (min. DIN 1.4301).
- To minimize the condensate formation (=loss), the steam pipes must be insulated over the entire length.
- The **minimum bend radius** for rigid piping is **100 mm**.
- Allowance must be made for a **pressure loss of 10 mm water column (approx. 100 Pa)** per meter line length or per 90° angle.

Securing the steam line

The connection of the steam pipe to the steam distributor and the steam outlet of the steam humidifier is effected by means of short lengths of steam hose (**use steam hose DS60**) secured with hose clamps.

CAUTION!

To prevent the steam connector of the unit to be damaged, do not overtighten the hose clamp.

After having secured the pieces of steam hose to the steam outlet of the unit reattach the unit cover and lock it with the two screws.

Note on leading the condensate hose

Condensate hose is led down with a **minimum slope of 20 %**, in the form of a **siphon (min. hose bend diameter Ø200 mm)**, directly into a discharge funnel with siphon.

Note: If your unit feeds a number of steam distribution pipes, the individual condensate hoses are to be led into the discharge funnel.

Important! Before putting the unit into operation, the siphon of the condensate hose must be filled with water.

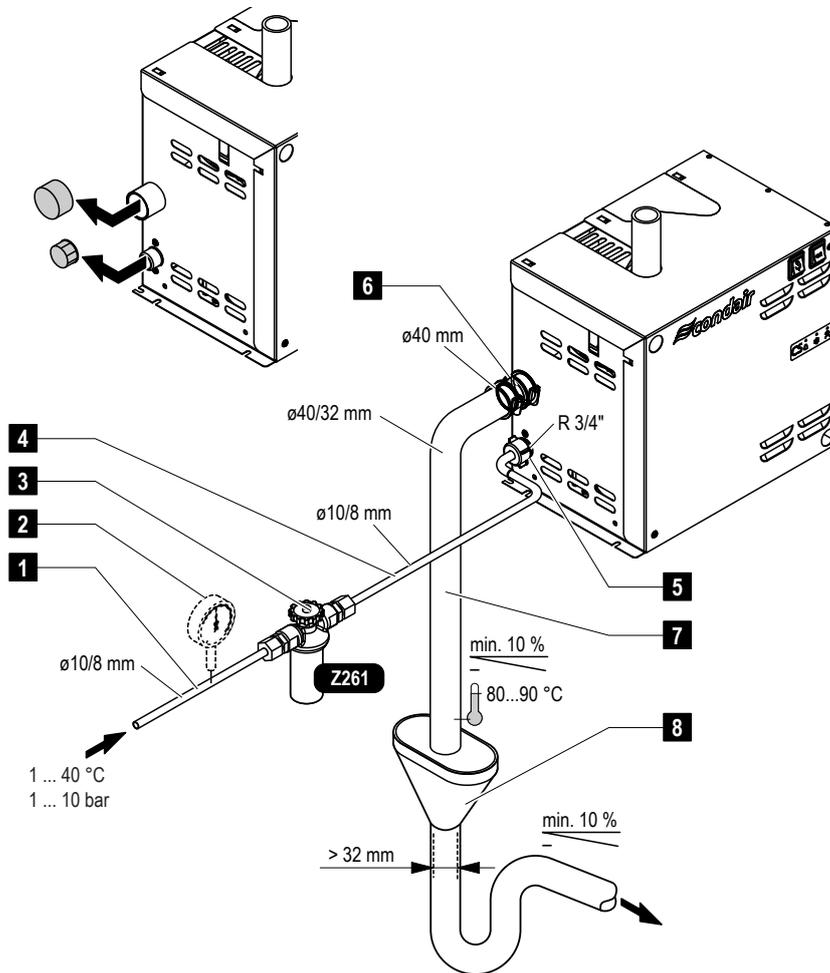
4.4.3 Inspecting the steam installation

Check the following points:

- Steam distribution pipe
 - Steam distributors (steam distribution pipe or OptiSorp steam distribution system) correctly positioned and secured (screws tightened)?
 - Are the outlet orifices at right angles to the air flow direction?
- Steam line
 - Is the maximum length of 2 m maintained?
 - Is the minimum bend radius of 300 mm (100 mm with fixed piping) maintained?
 - Have the instructions for layout of the steam line been followed (see chapter 4.4.2.1 and 4.4.2.2)?
 - Is the steam pipe open over the entire length and through the whole cross section?
 - Steam hose: no sagging (condensate pocket) or is a condensate drain with siphon (hose bend with min. diameter of 200 mm) installed at the lowest point in the steam line?
 - Rigid steam lines: properly insulated? Correct installation material used? Minimal internal diameter maintained?
 - Steam hose (or pieces of steam hose, respectively) securely attached with clamps?
 - Heat expansion during operation and shortening of the hose with ageing taken into consideration?
 - Is the unit cover reattached and secured with the two screws?
- Condensate hose
 - Downslope of at least 20 %?
 - Siphon (min. \varnothing 200 mm) existing and filled with water?
 - Condensate hose correctly fixed and not kinked?

4.5 Water installation

4.5.1 Overview water installation



- 1 Supply line (min. inner diameter: 8 mm)
- 2 Manometer (installation recommended, building side)
- 3 Filter valve (accessory "Z261", installation mandatory)
- 4 Water supply hose 90° with union nut R 3/4" (accessory "WIT")
- 5 Water supply connector, outside thread R 3/4"
- 6 Water drain connector, inner diameter 40 mm
- 7 Drain line (building side, min. inner diameter: 32 mm, min. down-slope 10%)
- 8 Drain line building side (funnel with siphon, min. inner diameter: 32 mm)

4.5.2 Note on water installation

Important: Before connecting the water supply and water drain remove plastic sealing caps from the connectors on the unit.

Water supply

The water supply is to be carried out according to the figure found in chapter 4.5.1 and the applicable local regulations for water installations. The indicated connection specifications must be observed.

- The installation of the **filter valve** (accessory Z261, alternatively, a **shut-off valve** and a **water filter** may be installed) should be made as close as possible to the steam humidifier

CAUTION!

The thread at the humidifier connection is made of plastic. To avoid overtightening, the union nut of the water pipe must be **tightened by hand** only.

– Notes on water quality:

- For the water supply of the Condair CS, use **fully demineralised water**.
Note: The use of fully demineralised water reduces the time for maintenance and cleaning to a minimum.
- The **use of additives** such as corrosion inhibitors, disinfectants, etc. is **not allowed**, since these additives may endanger health and affect proper operation.
- If the Condair CS shall be operated with untreated drinking water, softened or partly softened water, please contact your Condair supplier.
- The connection material must be **pressure-proof** and certified for use in **drinking water supply systems**.
When making connections to a fully demineralised water system, **use exclusively plastic or stainless steel installation materials** (min. DIN 1.4301). Other materials will be attacked by the fully demineralised water.
- **Important!** Before connecting the water line to the unit, the line must be flushed thoroughly.

Water drain

The water drain is to be carried out according to the figure found in chapter 4.5.1 and the applicable local regulations for water installations. The indicated connection specifications must be observed.

- Make certain that the drain pipe is correctly fixed and easily accessible for inspections and cleaning purposes.
- The drainage temperature is: **80...90 °C**. Use only **temperature-resistant** installation material!
- When operating the Condair CS with fully demineralised water, use exclusively **plastic or stainless steel installation materials** (min. DIN 1.4301). Other materials will be attacked by the fully demineralised water.

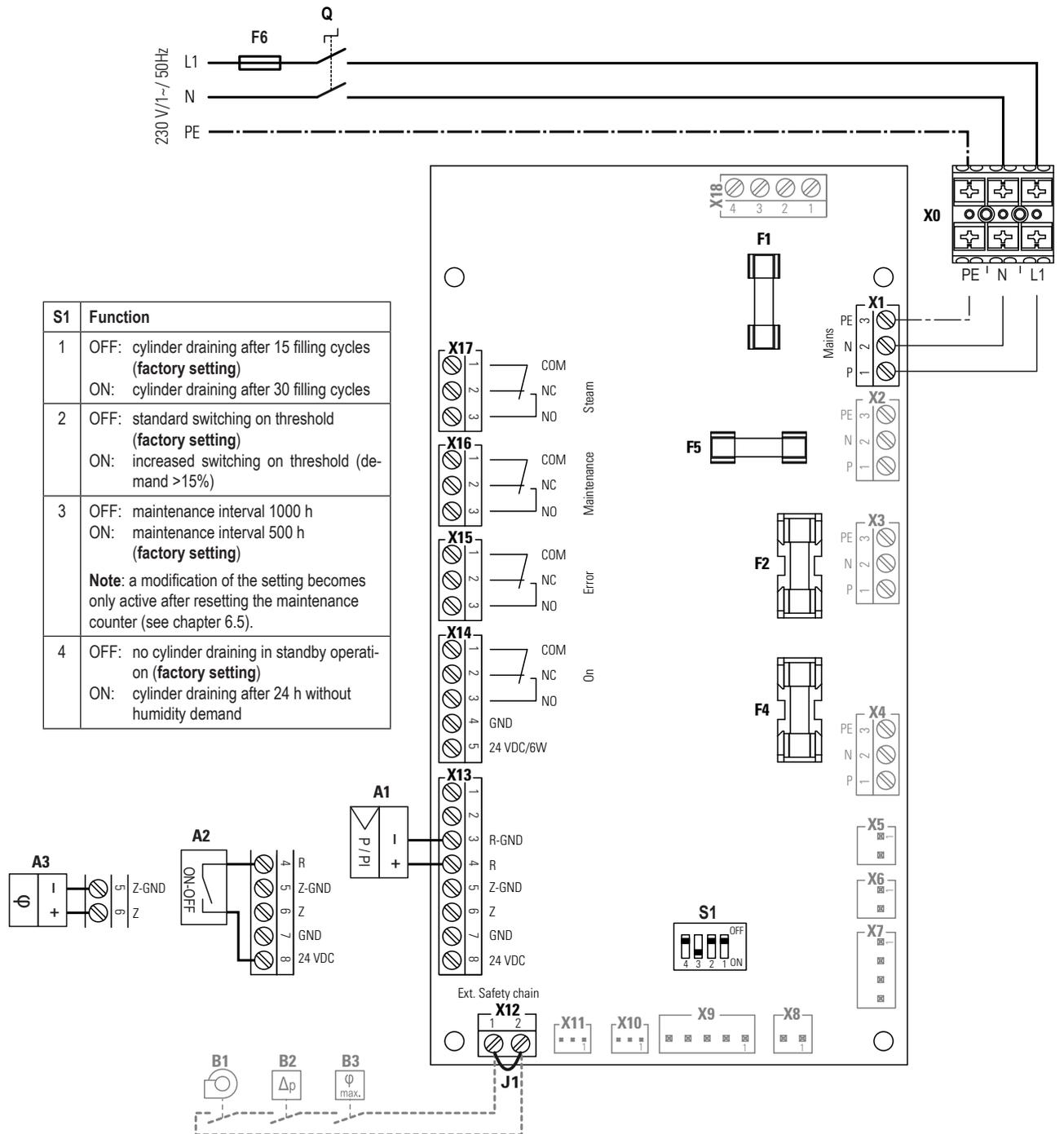
4.5.3 Inspecting the water installation

Check the following points:

- Water supply
 - Has filter valve or shut-off valve and filter 5 µm respectively been installed in supply line?
 - Have admissible water pressure (1 – 10 bar) and temperature (1 – 40 °C) been observed?
 - Is the minimum inside diameter of the supply pipe maintained throughout the entire length?
 - Are all pipes properly secured (threaded connections tightened)?
 - Is the feed pipe properly sealed?
 - Does the water supply installation meet the requirements of the local regulations for water installations?
- Water drain
 - Is the minimum inside diameter of the drain pipe of 40 mm maintained throughout the entire length?
 - Has drain pipe been installed with a downslope of at least 10 %?
 - Has the heat resistance of the material used been verified to be at least 100 °C?
 - Are hoses and lines properly secured (hose clamps and threaded connections tightened)?
 - Does the water drain installation meet the requirements of the local regulations for water installations?

4.6 Electric installation

4.6.1 Wiring diagram



A1 Continuous humidity controller 0...10 V (signal Y)

A2 On/Off humidistat

A3 Humidity sensor 0...10 V (supply air limitation signal Z)

B1 Ventilation interlock

B2 Airflow monitor

B3 Safety humidistat

F1 Fuse control board (3, 15 A, slow acting)

F2 Fuse Heating High (10 A, slow acting)

F4 Fuse Heating Low (10 A, slow acting)

F5 Fuse drain pump (500 mA, slow acting)

F6 External fuse voltage supply (16 A, slow acting)

J1 Short circuited, if no external monitoring devices (e.g. ventilation interlock "B1", airflow monitor "B2", Safety humidistat "B3") are connected to connection terminal X12

Q External service switch (with minimum contact opening of 3 mm)

S1 DIP switch (function see table in the above wiring diagram)

X0 Connection terminal voltage supply (see following table)

X.. Connection terminal (see following table)

Connection	Description	Connection- No.	Designation of connection	Cable cross section in mm ²
X0	Mains supply AC 230V 50Hz	N	Neutral	1.5
		L1	Phase	1.5
		PE	Ground	1.5
X12	External safety chain Cable bridge "J" installed	1	--	0.34
		2	--	0.34
X13	External continuous humidity controller 0...10 V, connected to terminals 3 (-) and 4 (+) or External On/Off humidistat, connected to terminals 4 and 8 Supply air limitation signal: humidity sensor 0...10 V, connected to terminals 5 (-) and 6 (+)	1	--	--
		2	--	--
		3	R-GND	0.34
		4	Request	0.34
		5	Z-GND	0.34
		6	Z	0.34
		7	GND	0.34
		8	24 VDC	0.34
X14	Relay outlet "On" The relay is activated if the unit is switched on and in stand-by mode (no steam production in progress). Max. contact loading: 24V/1A (AC/DC)	1	Common	0.34
		2	NC	0.34
		3	NO	0.34
		4	GND	0.34
		5	24 VDC	0.34
X15	Relay outlet "Error" The relay is activated if a malfunction is present. Max. contact loading: 24V/1A (AC/DC)	1	Common	0.34
		2	NC	0.34
		3	NO	0.34
X16	Relay outlet "Service" The relay is activated as soon as the maintenance counter has expired. Max. contact loading: 24V/1A (AC/DC)	1	Common	0.34
		2	NC	0.34
		3	NO	0.34
X17	Relay outlet "Steam" The relay is activated as soon as steam is produced. If the water supply is interrupted the relay is activated and deactivated 3 times for a short time followed by a longer period of inactivity. Max. contact loading: 24V/1A (AC/DC)	1	Common	0.34
		2	NC	0.34
		3	NO	0.34

4.6.2 Notes on electric installation

- The electric installation must be carried out according to the wiring diagram in chapter 4.6.1 and the applicable local regulations. All information given in the wiring diagram and the connection table to the wiring diagram must be followed and observed.
- All cables must be lead into the unit via the cable openings and must be secured to the latches in the housing wall by means of cable straps (strain relief).

4.6.3 Inspecting the electrical installation

Check the following points:

- Does the mains voltage applied correspond to the respective data stated on the type plate?
- Is the service switch “Q” (with a minimum contact opening of 3 mm) installed in the mains supply line?
- Are all components correctly connected in accordance with the wiring diagram (see chapter 4.6.1)?
- Are the minimum cross sections of the cables maintained (see table in chapter 4.6.1)?
- Are all cables lead into the unit via the cable openings and correctly secured with cable straps to the latches in the housing wall?
- Does the electric installation meet the applicable local regulations for electric installations?
- Is the unit cover reattached and secured with the two screws?

5 Operation

5.1 Putting into operation

Proceed as follows when putting the unit into operation:

1. When putting the steam humidifier into operation the first time or when putting the steam humidifier into operation after work has been carried out on the steam system, the commissioning personnel must mandatory check whether the steam pipe is open over the entire length. To do this proceed as follows:
 - Undo the two screws of the Condair CS unit cover, then remove the cover.
 - Undo the hose clamp of the steam hose, then remove steam hose from the connector of the steam cylinder.
 - Start up the ventilation system and check whether a clear draught that corresponds approximately to the pressure in the ventilation system (positive or negative pressure) can be detected at the open end of the steam hose removed.



DANGER!

A steam pipe that is reduced in cross section or completely closed will cause an excessive increase in pressure in the steam cylinder when the unit is operating and could lead to the risk of scalding accidents!

Therefore: If no draught or only a slight one can be detected the steam pipe must be checked for blockages and reductions in cross section before continuing with commissioning and you must ensure that the steam pipe is open across the entire length and through the whole cross section.

2. **Examine the steam humidifier and installation for possible damage.**



DANGER!

Damaged devices or devices with damaged installation may present danger to human life or cause severe damage to material assets.

Damaged units and/or units with damaged or faulty installation must not be operated.

3. Mount unit cover and fix it with the two screws.
4. Open the **filter valve** / **shut-off valve** in the water supply line.
5. Switch on the service switch for the mains supply.
6. Switch on the steam humidifier main switch.

The switch lights. The steam humidifier carries out a **system test**. The three LEDs light for approx. 3 seconds.

If a fault is detected during the system test, a corresponding fault message is triggered (see chapter 7).

If the system test is successful, the steam cylinder fills up and a **float test** is carried out (function check on the level unit). During the float test the green LED flashes 2x.

Note: If a fault is detected during the float test, a corresponding fault message is triggered (see chapter 7).

If the float test is successful, the Condair CS will be in **stand-by mode**. The green LED flashes 1x.

7. The following procedure must be carried out only on the initial commissioning:

- Check for correct functioning of the monitoring equipment (external safety circuit).
- Check the function of the steam humidifier:
Switch on the humidification by raising the set humidity value on the humidity controller/humidistat.
Switch off the humidification by lowering the set humidity value on the humidity controller/humidistat.
- Set the desired humidity value on the humidity controller/humidistat.

As soon as the humidistat or the humidity controller requires humidity, power is switched on for heating. The green LED lights up and after a few minutes (approx. 10 minutes) steam is produced.

5.2 Indication of the operating status on the unit

The LEDs on the unit indicate the following operating status:

Indication on unit		Meaning
green LED "Steam"  	flashes 1x	The unit is switched on ready for operation.
	flashes 2x	The unit performs a float test.
	lights	The unit produces steam.
yellow LED "Warning"  	flashes with different intervals	A Warning is present (e.g. Maintenance due, yellow LED flashes 8x). ---> see chapter 7 "Malfunctions"
red LED "Error"  	flashes with different intervals	An Error is present. ---> see chapter 7 "Malfunctions"

5.3 Function of the remote indication relays during operation

Detailed information regarding the function of the remote indication relays during operation can be found in the table to the wiring diagram in chapter 4.6.1.

5.4 Notes on operation

During operation of the Condair CS the humidification system has to be inspected weekly. On this occasion check the following:

- the water and steam installation for any leakage.
- the steam humidifier and the other system components for correct fixing and any damage.
- the electric installation for any damage.

If the inspection reveals any irregularities (e.g. leakage, error indication) or any damaged components take the Condair CS out of operation as described in chapter 5.5. Then, have the malfunction be eliminated or the damaged component be replaced by a well trained specialist.

5.5 Taking out of operation

The following procedure is followed when it is required to shut down the steam humidifier:

1. If the unit has to be switched off because of a malfunction, please note the error code (number of flashes of the yellow or red LED).
2. Close the filter valve/shut-off valve in the water supply line.
3. This step must only be carried out if the unit has been opened (e.g. for maintenance work) or if the unit is taken out of operation for an extended period of time: Press the drain key, wait until the pump has emptied the steam cylinder then, press the drain key again (drain pump stops).
If the drain pump is defective or if a malfunction is present (red LED flashes) the steam cylinder must be drained manually via the drain hose. After draining the steam cylinder close drain hose correctly and reattach the hose to the corresponding holder in the unit.
4. Actuate the unit switch.
5. Isolate the steam humidifier from the mains: Switch off service switch in the mains supply line.
Mark the service switch to prevent it from being switched on accidentally.



WARNING!
Danger of burning!

If steam was produced just before the unit is taken out of operation, wait before opening the unit and let the steam cylinder cool down to prevent danger of burning.

6 Maintenance

6.1 Important notes on maintenance

Qualification of personnel

All maintenance work must be carried out only by **well qualified and trained personnel authorised by the owner**. It is the owner's responsibility to verify proper qualification of the personnel.

General note

The instructions and details for maintenance work must be followed and upheld.

Only the maintenance work described in this documentation may be carried out.

Only use original Condair spare parts to replace faulty parts.

Safety

Some maintenance work requires removal of the unit cover. Please note the following:



DANGER!
Danger of electrical shock!

You may get in touch with live parts when the unit is open. Touching live parts may cause severe injury or even lethal violation.

Prevention: Before carrying out any maintenance work set the Condair CS out of operation as described in chapter 5.5 (switch off the unit, disconnect it from the mains and stop the water supply) and secure the unit against inadvertent power-up.

CAUTION!

The **electronic components** inside the humidifier are **very sensitive to electrostatic discharge**.

Prevention: Before carrying out any maintenance work to the electrical or electronic equipment of the humidifier, appropriate **measures must be taken to protect the respective components against damage caused by electrostatic discharge (ESD protection)**.

6.2 Maintenance intervals/Maintenance list

The Condair CS is equipped with a maintenance counter which triggers a maintenance indication after a specific period of operation. The interval time depends on the water quality and the amount of steam produced. Ex works, the set interval time of the maintenance counter is based on a water hardness of 11 °DH.

As soon as the **maintenance indication** appears:

yellow LED flashes 8x

a **complete maintenance** must be carried out. The complete maintenance includes the following work:

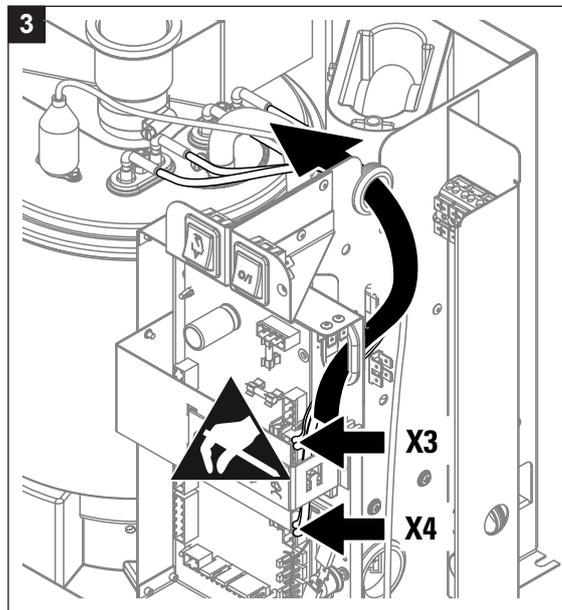
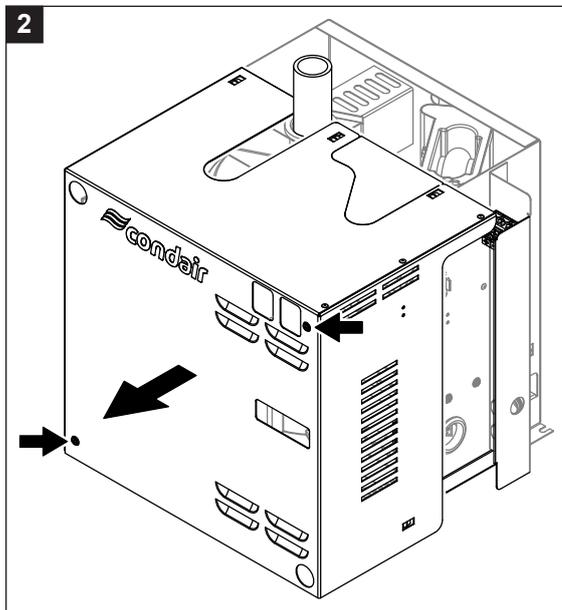
- Inspect the water and steam installations for correct sealing and damage.
- Inspect the drain line for soiling, clean if necessary.
- Inspect the electrical installation for loose cables and damaged components.
- Inspect the steam-air humidifier for damage.
- Dismantle the steam cylinder and the components of the internal water system according chapter 6.3.
- Check and clean the steam cylinder, the components of the internal water system and the unit inner chamber according chapter 6.4.

Note: If you discover an excessive calcifying of the components when maintaining the unit the maintenance interval time must be decreased. In that case please contact your Condair representative.

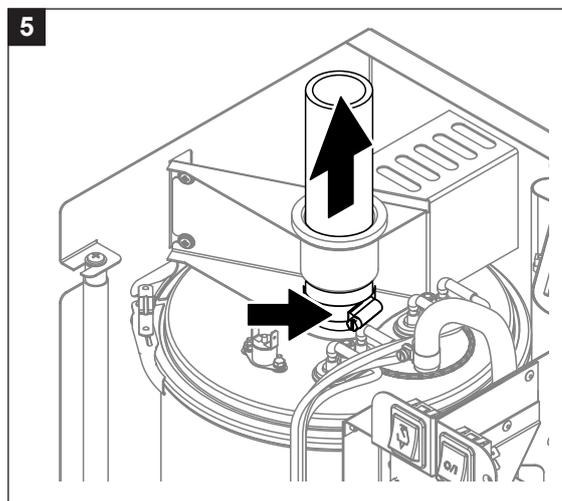
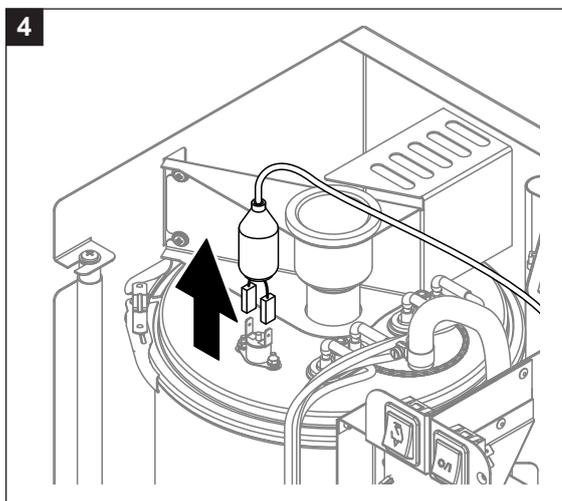
Note: The customer is responsible for the regular inspection, cleaning and disinfection of the duct section in which the steam distributor is installed. This must be performed in accordance with the hygiene regulations in force for operating air handling units.

6.3 Removing and installing parts for maintenance

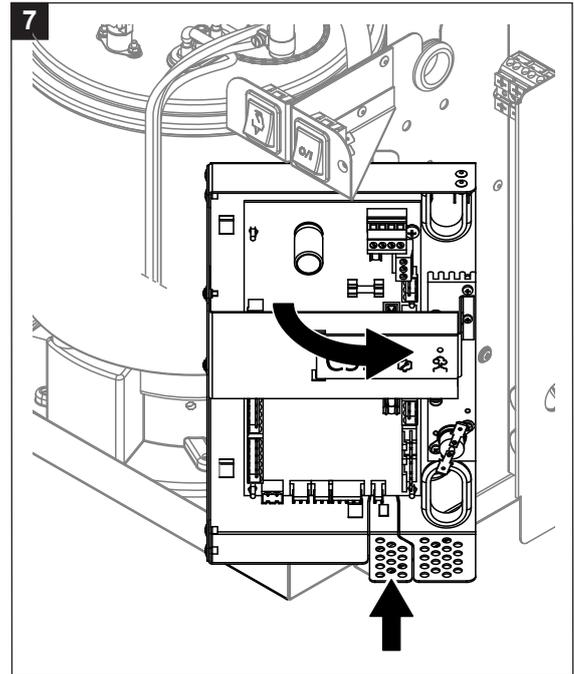
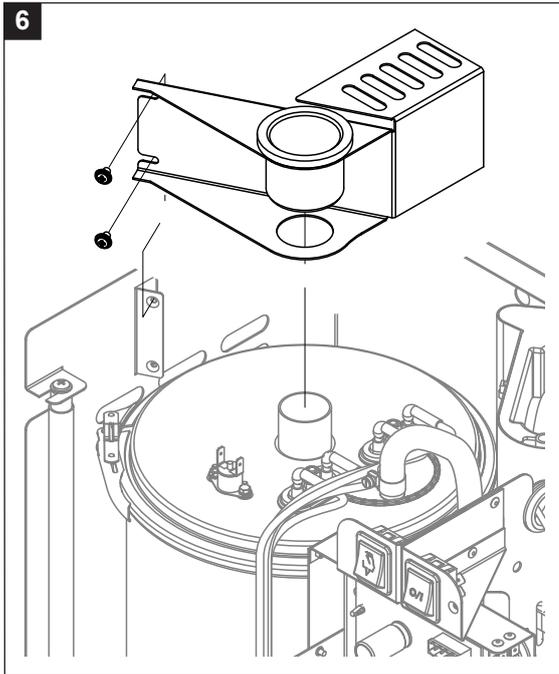
1. Set the Conclair CS out of operation as described in chapter 5.5, disconnect it from the mains and secure the unit against inadvertent power-up.



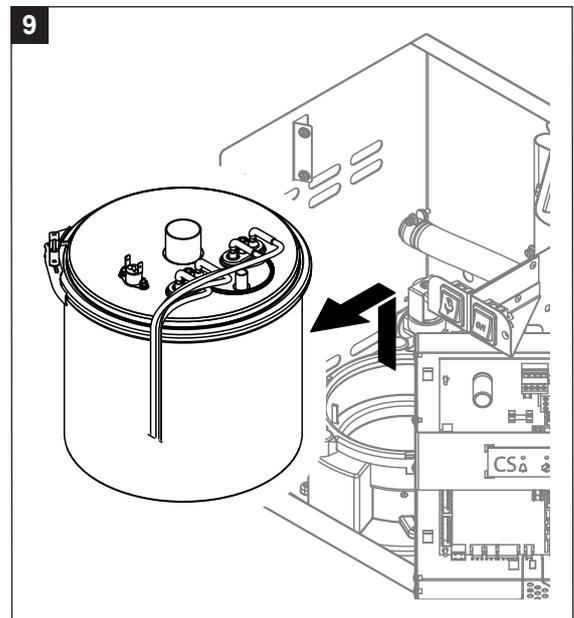
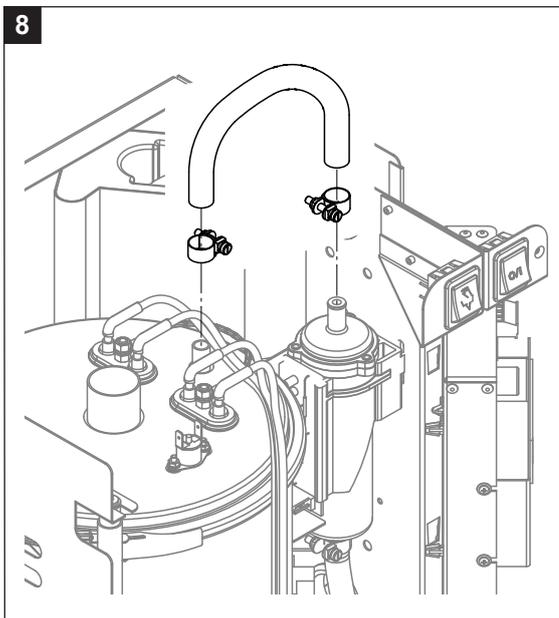
2. Undo the two screws of the unit cover, then remove the unit cover.
3. Disconnect the cables of the heating elements on the control board (terminals X3 and X4), then carefully pull the cables through the openings into the cylinder compartment.



4. Push the protecting sleeve of the excess temperature switch upwards, then carefully disconnect cables.
5. Release the hose clamp on the steam outlet of the unit, then detach the hose from the steam outlet connection.



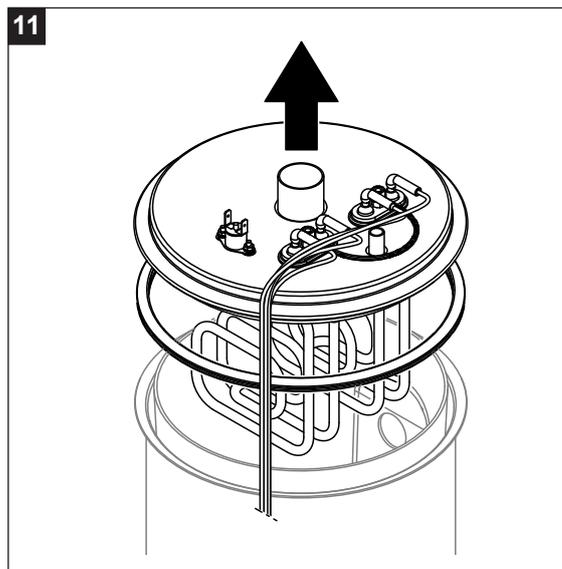
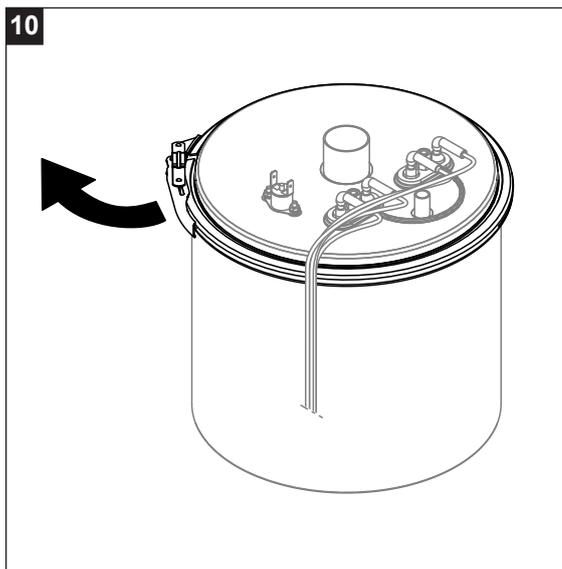
6. Undo the two screws of the steam cylinder support, then remove the cylinder support.
7. Push the lock of the control board assembly upwards, then slightly lift the control board assembly and turn it to the right until it comes to a stop.



8. Release the hose clamps on the steam cylinder and on the level unit using screwdriver, then detach the pressure compensating hose from the connections.
9. Carefully lift the steam cylinder out of the coupling sleeve, then remove it to the front.

CAUTION!

Put steam cylinder down carefully to avoid damage to the lower connection piece!



10. Open and remove the steam cylinder cover clamping ring.

11. Carefully lift off the cover with the heating elements, then remove Duro sealant from the cover.

CAUTION!

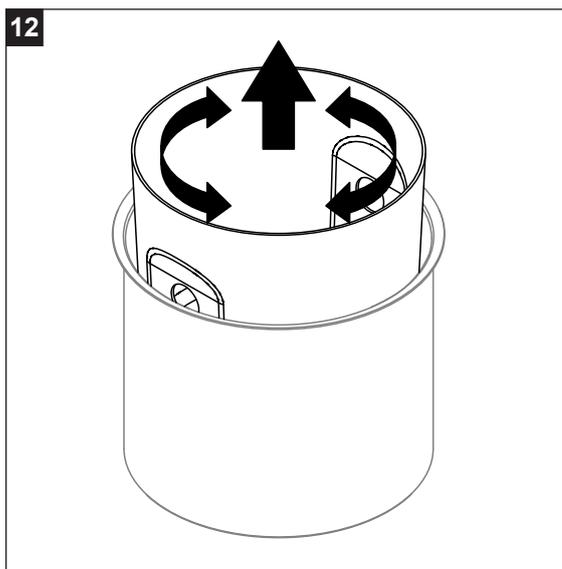
Take care with the cover whilst it is removed, so as **not to damage the heating elements**.

If the cover cannot be removed due to heavy calcification (maintenance period exceeded), place the steam cylinder in a basin of formic acid (8 %) until it can be removed (**Caution!** Therefore observe instructions on the safe use of this cleaning agent).

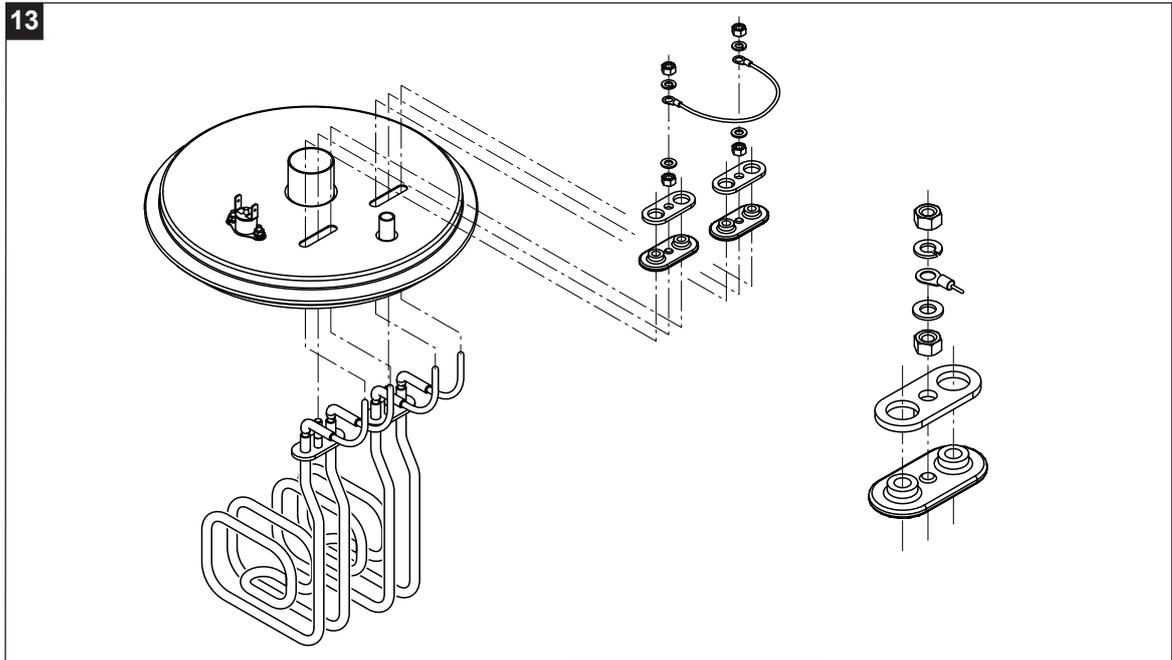


WARNING!

Formic acid attacks the mucous membranes. Therefore observe instructions on the safe use of this cleaning agent, wear goggles and gloves and work in a well ventilated room or outside.



12. If necessary, loosen the cylinder insert by lightly rotating it in either direction and lift it from the steam cylinder.

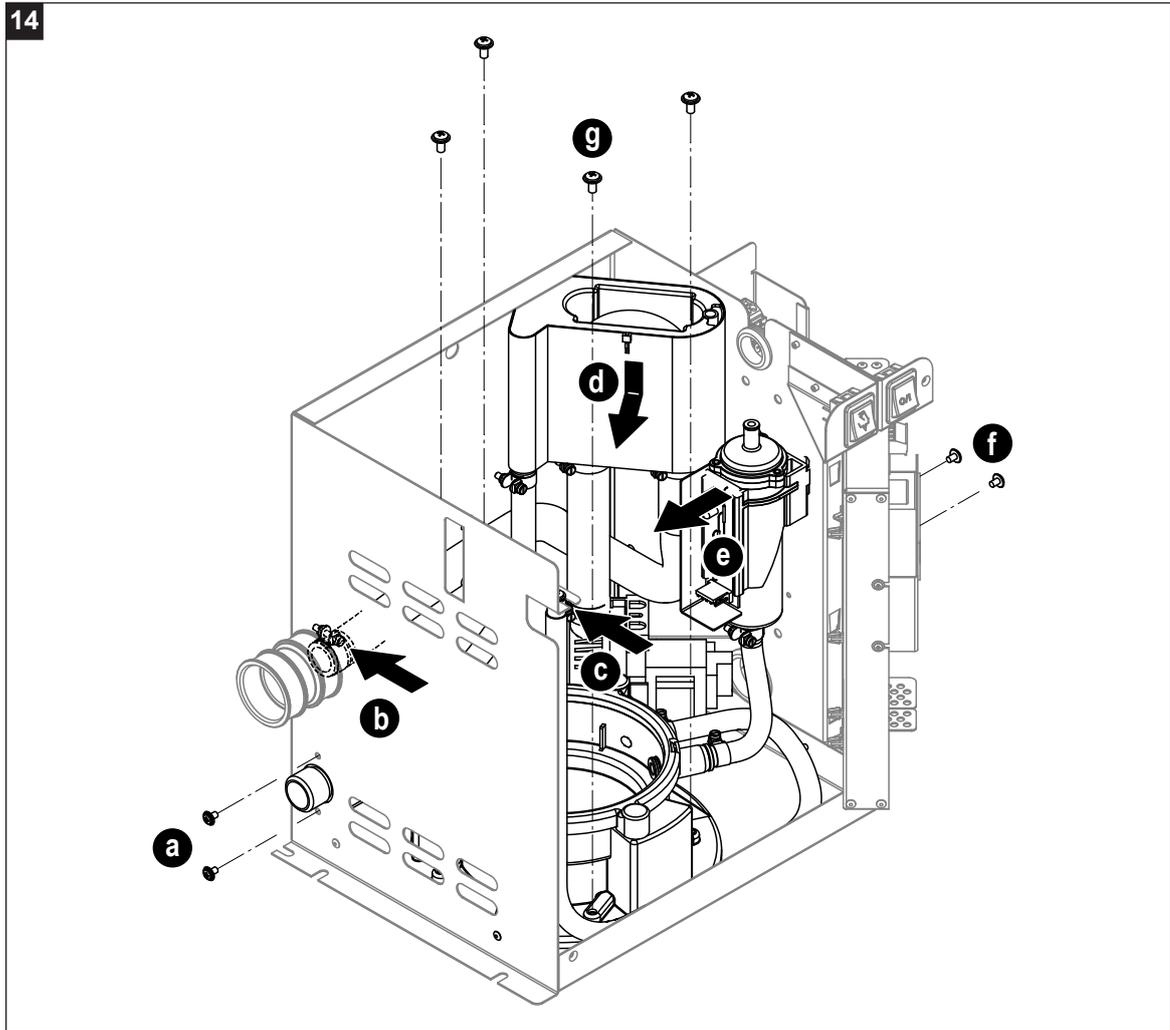


13. If a heating element has to be replaced during servicing, dismantle the corresponding heating element downwards as shown in the illustration above.

Assembly and installation of the steam cylinder

Assembly of the steam cylinder takes place in reverse sequence of the steps 2 to 13. Please note the following instructions:

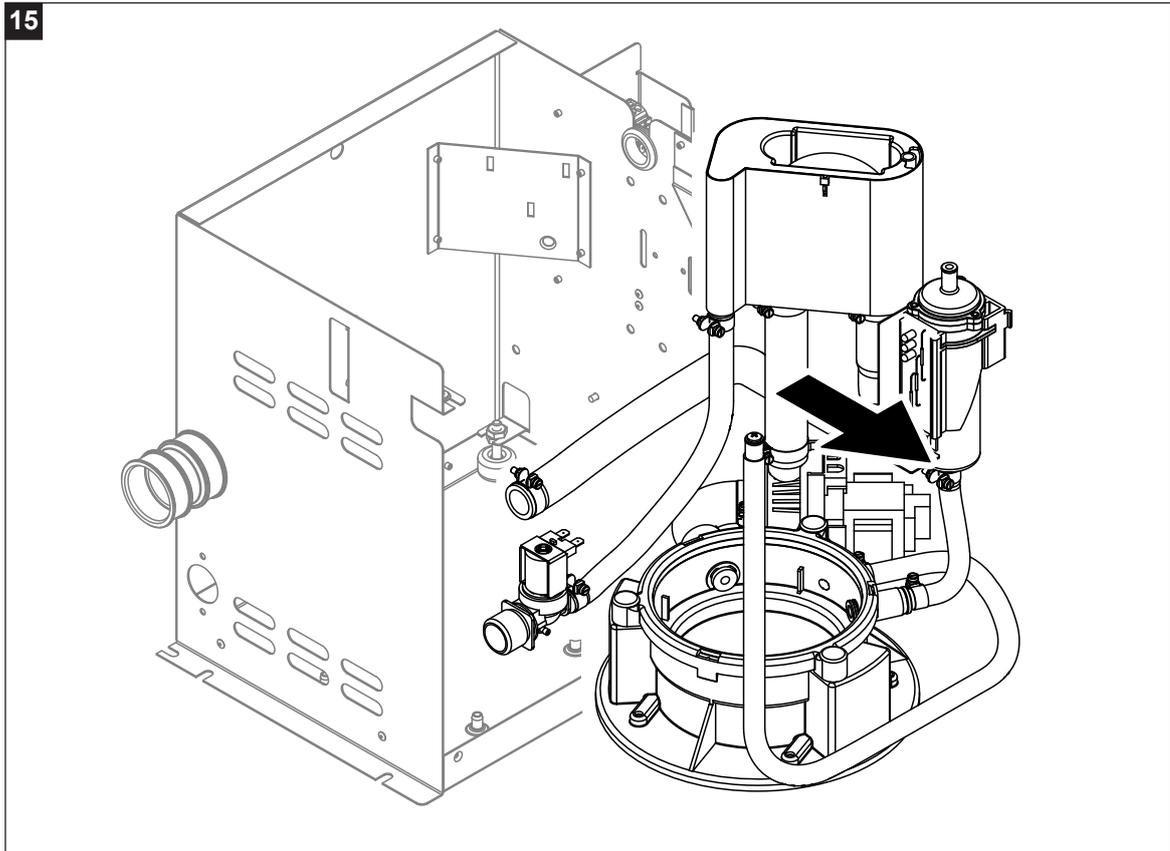
- Installation of any heating elements which have been removed should follow the illustration in step 13. The heating elements are identical and can be interchanged among each other. Connect the cables of the heating elements to terminals P and N of the terminal strips X3 or X4 on the control board.
- Before installation of the steam cylinder cover place the Duro sealant around the edge of the cover. The Duro sealant must be clean and undamaged (replace if necessary).
- Before installation of the steam cylinder in the unit check O-rings in the coupling bush for damage and replace if necessary.
- Align steam cylinder in the unit so that the pressure compensation hose can be connected to the respective connection on the steam cylinder without tension.
- Fasten steam hose with hose clamps. A leaky steam hose can cause damp damage in the interior of the unit.



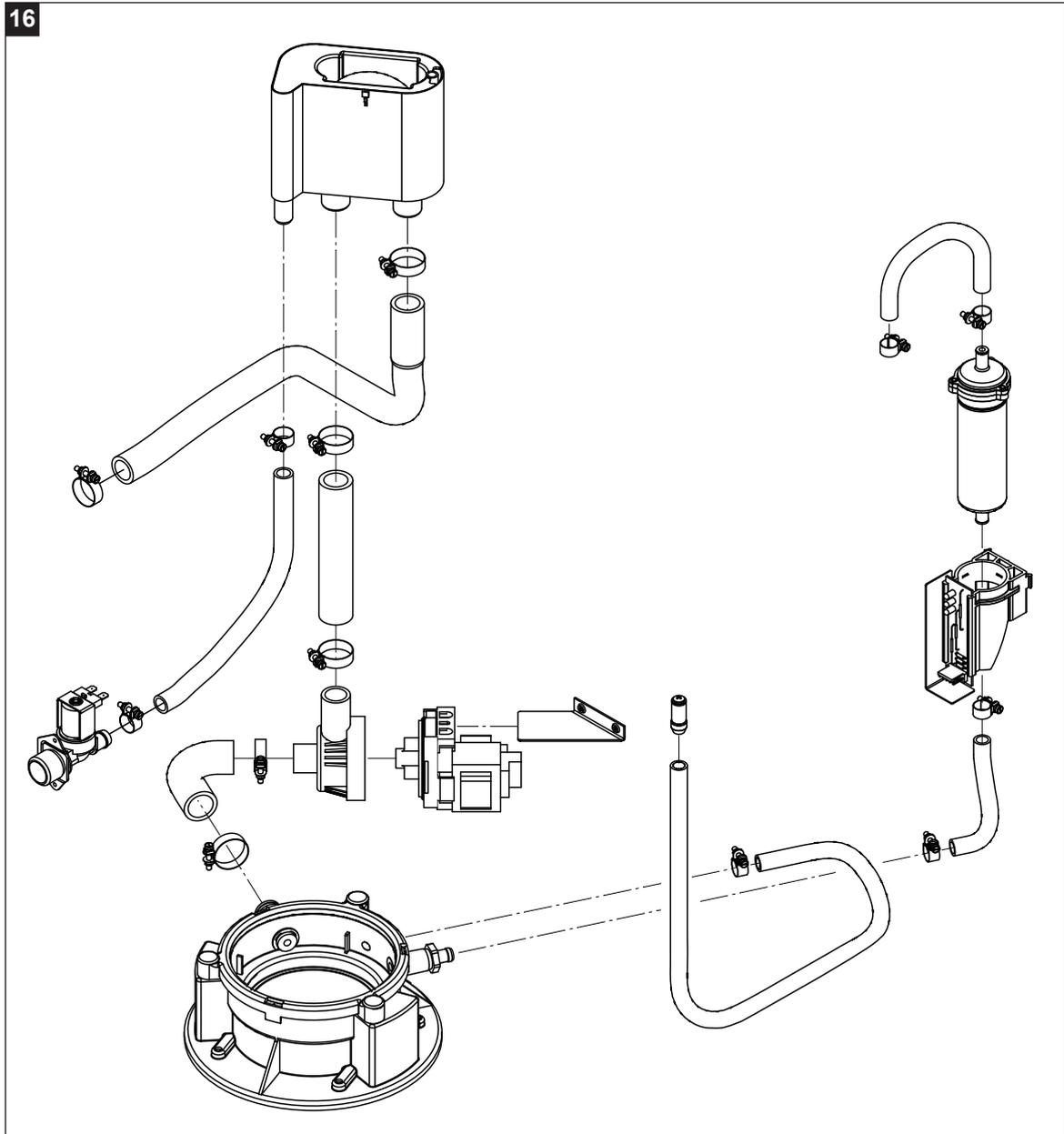
14. Because of the compact design of the Condair CS we recommend to remove the components of the internal water systems as an assembly and disassemble the individual components afterwards. Proceed as follows:

- a) Undo the two screws at the water supply connector and push the inlet valve into the unit.
- b) Release the hose clamp of the water drain hose inside the unit, then remove the hose from the connection.
- c) Undo the screw, then remove the auxiliary drain hose from the holder.
- d) **Carefully** pull fixing clip of the water cup to the front, then push water cup down and forward and free it from the holding device.
- e) **Carefully** compress the holding device of the level unit (from outside), then pull the level unit and free it from the unit wall.
- f) Undo the two screws of the drain pump support on the right side of the unit.
- g) Undo the four screws of the coupling sleeve.

Now remove the electrical cables from the respective connections of the inlet valve, the level unit and the drain pump. Place the cables in a way that they can not be damaged when the water system assembly is removed.



15. Carefully lift the water system assembly and remove it to the front.



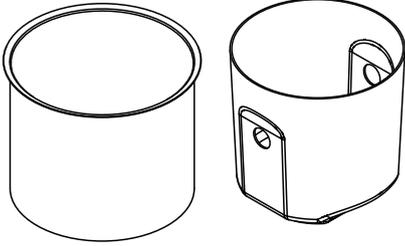
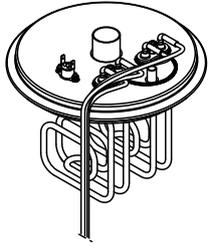
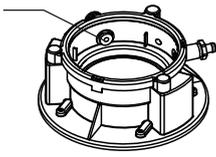
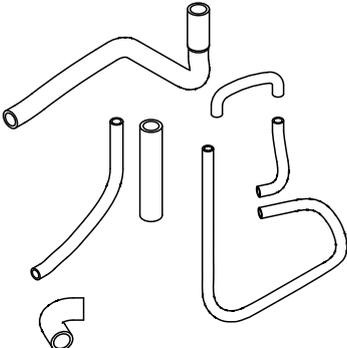
16. Disassemble the components of the water system as shown in the figure above.

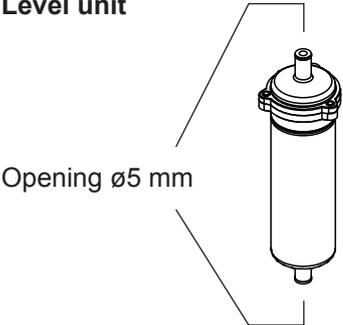
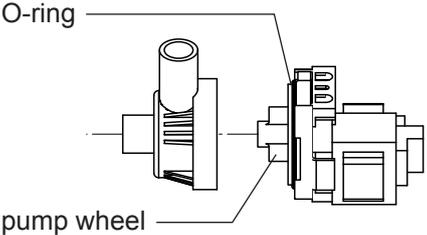
Assembly and installation of the water system

The assembly and the installation of the water system takes place in reverse sequence of the steps 14 to 16. Observe the following notes:

- Assemble the water system as shown in the illustration in step 16 but do not tighten the hose clamps yet.
- After installing and fixing the water system assembly in the unit (step 14) align all hoses and fix them with the hose clamps.

6.4 Notes on cleaning the unit components

Unit component	What to clean and how to clean
<p>Steam cylinder and steam cylinder insert</p> 	<ul style="list-style-type: none"> • Knock off any lime scale as much as possible. If the parts are heavily calcified, place them in an 8% formic acid solution, until the lime scale comes off. • Finally wash parts in a lukewarm soap solution and rinse well with tap water.
<p>Cover with heating elements</p> 	<ul style="list-style-type: none"> • Immerse cover with the fitted heating elements (up to 2 cm below the rim of the cover) in a container with 8-percent formic acid. Allow the acid to take effect until the scale coating has dissolved. Note: The heating elements do not have to be entirely free from scale. • Finally rinse the heating elements well with tap water. <p>CAUTION! Ensure that the electrical connections and the electronic parts remain dry.</p> <p>CAUTION! On no account remove lime scale from the heating elements using tools (screwdriver, scraper, etc.) or by striking. This could damage the heating elements.</p>
<p>Coupling sleeve</p> <p>Orifice $\varnothing 6$ mm</p> 	<ul style="list-style-type: none"> • Remove O-rings from the coupling sleeve. Use a brush to remove any lime scale from the coupling sleeve (do not use a wire brush). Check the orifice with a drill $\varnothing 6$ mm. • Finally wash coupling sleeve in a lukewarm soap solution and rinse well with tap water. Then, refit O-rings.
<p>Hoses</p> 	<ul style="list-style-type: none"> • Remove any lime scale by slightly knocking on the tubes using a rubber hammer. Then, rinse the tubes well with hot tap water.

Unit component	What to clean and how to clean
<p>Level unit</p>  <p>Opening $\varnothing 5$ mm</p>	<ul style="list-style-type: none"> • Flush level unit with a lukewarm soap solution, then flush well with tap water. • If the lower opening is heavily calcified: Undo the three screws, then remove float. Use a brush to remove any lime scale from the housing and the float (do not use a wire brush). Free upper and lower opening using a drill $\varnothing 5$ mm. Wash components with a lukewarm soap solution, then rinse well with tap water. Finally reassemble the level unit.
<p>Inlet valve</p>  <p>Strainer insert</p>	<ul style="list-style-type: none"> • Remove strainer insert with pointed pliers. Use a brush (do not use a wire brush) to remove any lime scale. • Wash strainer insert with a lukewarm soap solution, then rinse well with tap water. Remount strainer insert. <p>CAUTION! Ensure that the electrical connections remain dry.</p>
<p>Drain pump</p>  <p>O-ring</p> <p>pump wheel</p>	<ul style="list-style-type: none"> • Disassemble the drain pump (bajonet catch with lock). • Use a brush to remove any lime scale from the pump housing and the pump wheel (do not use a wire brush). Wash the pump with a lukewarm soap solution and rinse well with tap water. • Reassemble the drain pump: moisten the O-ring and the centering of the housing, then place O-ring on the centering collar. Assemble the pump and lock it (bajonet catch). <p>CAUTION! Ensure that the electrical connections remain dry.</p>
<p>Interior of the unit (water side only)</p>	<ul style="list-style-type: none"> • Wipe the interior of the unit with a damp cloth without using any cleaning agent. <p>CAUTION! Ensure that the electrical connections and electronic components remain dry.</p>

Notes on cleaning agents

Only use cleaning agents stated in the table above. The use of disinfectants is only permitted if they leave no toxic residues. The components must be rinsed thoroughly with water after cleaning in all cases.



WARNING!

Formic acid is indeed harmless to the skin, but it attacks the mucous membranes. Therefore prevent your eyes and respiratory tracts from getting in touch with the acid and its vapours (wear goggles and work in a well ventilated room or outside).

CAUTION!

Do not use any solvents, aromatized or halogenized hydrocarbons or other aggressive substances as they may cause damage to the components of the unit.

It is mandatory to observe and comply with the information and instructions regarding cleaning agents. Observe in particular: all information relating to the protection of personnel, environmental protection and restrictions regarding usage.

6.5 Resetting the maintenance counter (maintenance indication)

When maintenance work has been completed, the **maintenance counter** can be reset as follows:

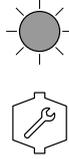
1. **With the unit switched off**, depress and hold the drain switch.
2. Switch on the steam-air humidifier with the unit switch.
3. Release drain switch.

The maintenance counter is reset and the unit ready for operation.

7 Malfunctions

7.1 Fault indication

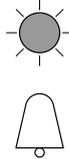
Warning: yellow LED flashes



In case of malfunction during operation, the humidifier control checks whether there is a temporary problem (e.g. water supply interrupted for a short time) or whether it can resolve the problem by taking necessary measures. As long as the control tries to resolve the problem the **yellow LED "Warning" flashes**.

If the cause of the malfunction disappears of its own accord or if the control can repair the malfunction, the warning message will automatically switch off.

Error: red LED flashes



If the control, after several attempts, fails to solve the problem (number of attempts depends on the type of malfunction) or if the problem obstructs further operation, the heating voltage is interrupted and the **red LED "Error" blinks**.

7.2 Malfunction list

Most operational malfunctions are not caused by faulty equipment but rather by improper installation or disregarding of planning guidelines. Therefore, a complete fault diagnosis always involves a thorough examination of the entire system. Often, the steam hose connection has not been properly executed, or the fault lies with the humidity control system.

The following table gives a list of possible malfunctions, the appropriate warning or error message, details of their cause, and notes on how to deal with each problem.

Malfunction/Indication		Cause	Remedy
Warning yellow LED  flashes ...	Error red LED  flashes ...		
1x Min. filling time not reached (Warning only)	—	Water feed to steam cylinder heavily calcified. Level in steam cylinder and level unit do not match.	Carry out a complete maintenance.

Malfunction/Indication		Cause	Remedy
Warning yellow LED   flashes ...	Error red LED   flashes ...		
2x External safety chain interrupted	—	One or more monitoring devices (ventilator interlock, flow monitor, safety humidistat, etc.) in the external safety chain have triggered.	Check monitoring devices in the external safety chain (ventilator interlock, flow monitor, safety humidistat, etc.) or check ventilation system and control system for malfunctions.
—	2x Internal safety chain interrupted	Connection to over-temperature switch on steam cylinder broken or over-temperature switch faulty.	Check connections or replace over-temperature switch.
		Ambient temperature sensor defective.	Replace ambient temperature sensor.
		Steam cylinder overheating, over-temperature switch has responded.	Inspect steam cylinder, clean if necessary. Reset excess temperature switch by pressing the red button.
		Electronic to hot, excess temperature switch on the control board has triggered.	Switch off unit and wait for approx. 30 minutes. Then, reset excess temperature switch by pressing the red button.
3x Max. filling time exceeded (Warning only)	—	Water feed blocked (main water tap closed, filter valve closed or blocked).	Check water feed (open main water tap, open or clean filter valve).
		Water pressure too low.	Raise water pressure (range 1 to 10 bar)
		Inlet valve does not open, filter sieve in Inlet valve blocked or inlet valve faulty.	Inspect electrical connections and fuse F2 on supply module. Clean filter sieve or replace Inlet valve.
		Feed hoses inside the steam humidifier not connected or kinked.	Inspect hoses inside unit and connect if necessary. Replace faulty hoses.
		Level unit not connected.	Connect level unit.
		Float in the level unit sticking or level unit faulty.	Clean or replace level unit.
4x Max. vaporization time exceeded	4x	Individual heating elements faulty.	Replace faulty heating elements.
		Fuses F2 and/or F4 on the control board faulty.	Replace fuses on control board.
		Mains voltage too low.	Check mains voltage and connections
		Steam lead too long or not insulated.	Maintain maximum lead lengths (max. 2 m), Insulate steam lead.
		This error may also occur upon a cold start.	None.

Malfunction/Indication		Cause	Remedy
Warning yellow LED  flashes ...	Error red LED  flashes ...		
5x Max. flushing time exceeded	5x	Drain pump not connected or faulty.	Connect or replace drain pump.
		Drain hose in unit kinked or blocked.	Inspect drain hose in unit, replace if necessary.
		Water outlet blocked (external drain pipe or siphon blocked).	Clean water outlet lead and siphon.
		Hoses to level unit blocked.	Clean or replace hoses.
—	6x Invalid level (Error only)	Level unit faulty.	Replace level unit.
		Magnetic field in vicinity of level unit.	Eliminate magnetic field.
—	7x Steam pressure supervision (Error only)	Steam hose blocked or restricted (water trap).	Check steam hose, clean if necessary and /or improve steam hose installation.
		Back pressure in steam hose too high because of a too long steam hose.	Reduce length of steam hose.
—	8x Safety level switch in base tub has triggered	Water accumulation in base tub, safety level switch has triggered.	Remove water from base tub, then find the cause for the water leakage and eliminate leakage.
		Safety level switch defective.	Replace safety level switch.
8x Maintenance indication	—	Maintenance interval expired.	Perform maintenance.

7.3 Notes on fault elimination



DANGER!

In order to eliminate faults, the steam humidifier **must be switched off and secured against unintentional reconnection** as described in chapter 5.5. Take care that the electricity supply to the main contactor is disconnected (check with voltage tester).

Only allow trained and qualified personnel to repair faults. Faults relating to electrical installation (e.g. change of unit fuse) must only be carried out by authorized personnel or your Condair representative's service technician.

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

7.4 Resetting error indication

To reset the error indication (red LED flashes):

Switch off steam humidifier for approx. 5 seconds and then switch on again.

Note: If the fault has not been eliminated the error indication appears again after a short time.

8 Taking out of service/Disposal

8.1 Taking out of service

If the Condair CS must be replaced or if the humidification system is not needed any more, proceed as follows:

1. Take the unit out of operation as described in chapter 5.5.
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 service life the unit and its components must be returned to the manufacturer or to a collecting point for disposal or recycling according to the local regulations.

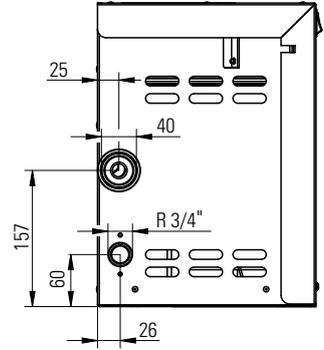
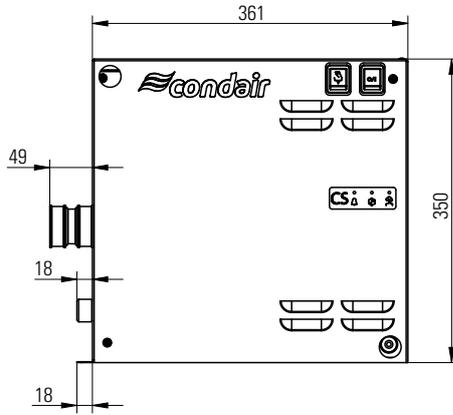
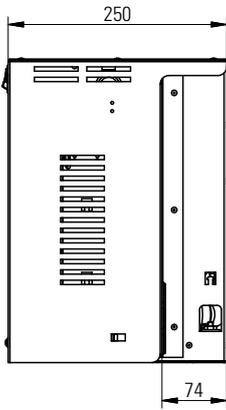
In case of doubt please contact your local administration or your Condair supplier.

9 Product specifications

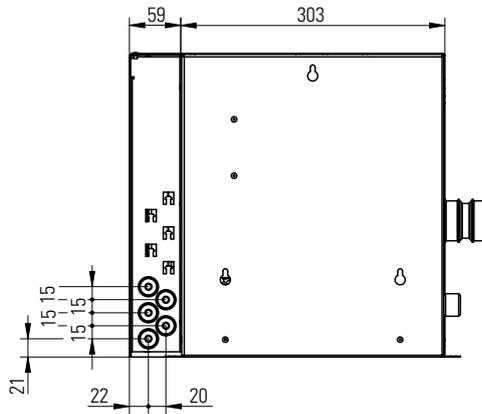
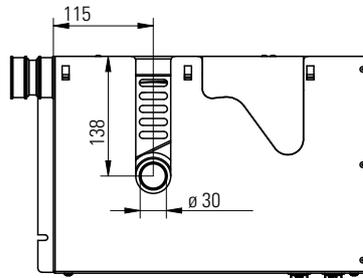
9.1 Technical data

	Condair CS 2.0	Condair CS 4.0
Max. Steam capacity	2 kg/h	4 kg/h
Nominal power consumption	1.5 kW	3.0 kW
Nominal current	6.5 A	13.0 A
Unit voltage	AC 230V 50Hz	
Control	via an external On/Off humidistat or an external continuous humidity controller 0...10 V	
Admissible ambient temperature	1 ... 40 °C	
Admissible ambient humidity	1 ... 75 %rh	
Steam connection	30 mm (outside diameter of connector)	
Max. back pressure at steam connection	300 Pa	
Water supply – Connection – Admissible water pressure – Admissible water temperature – Water quality	Outside thread R 3/4" 1 ... 10 bar 1 ... 40 °C fully demineralised water with max. 20 µS/cm	
Water drain – Connection – Drain temperature	Drain sleeve with inner diameter 40 mm max. 90 °C	
Weights – Transport weight – Net weight – Operation weight	13 kg 11.5 kg 17 kg	
Dimensions (H x W x D)	350 x 250 x 361 mm	
Conformity	CE, VDE, GS	
Protection class	IP21	

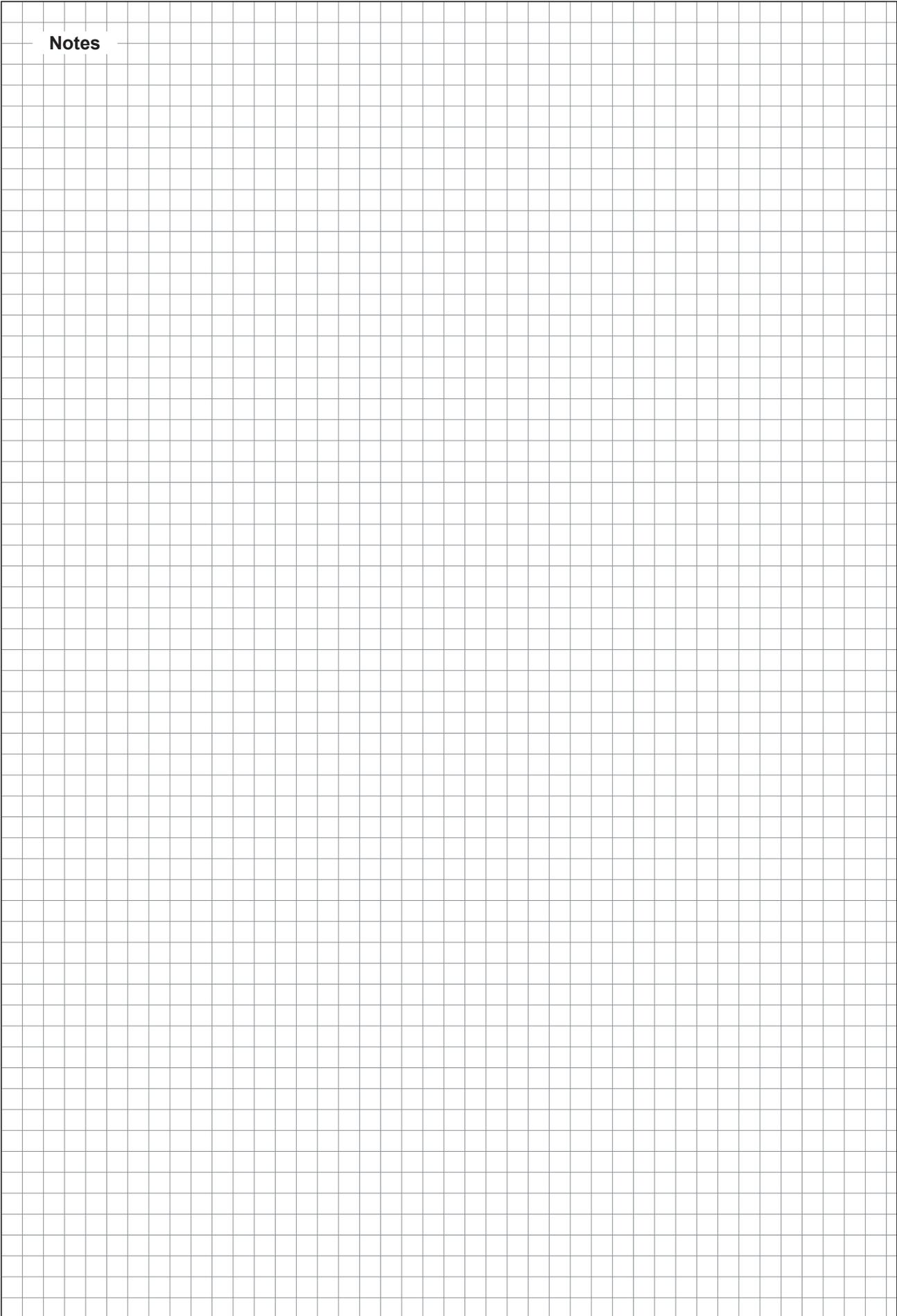
9.2 Unit dimensions



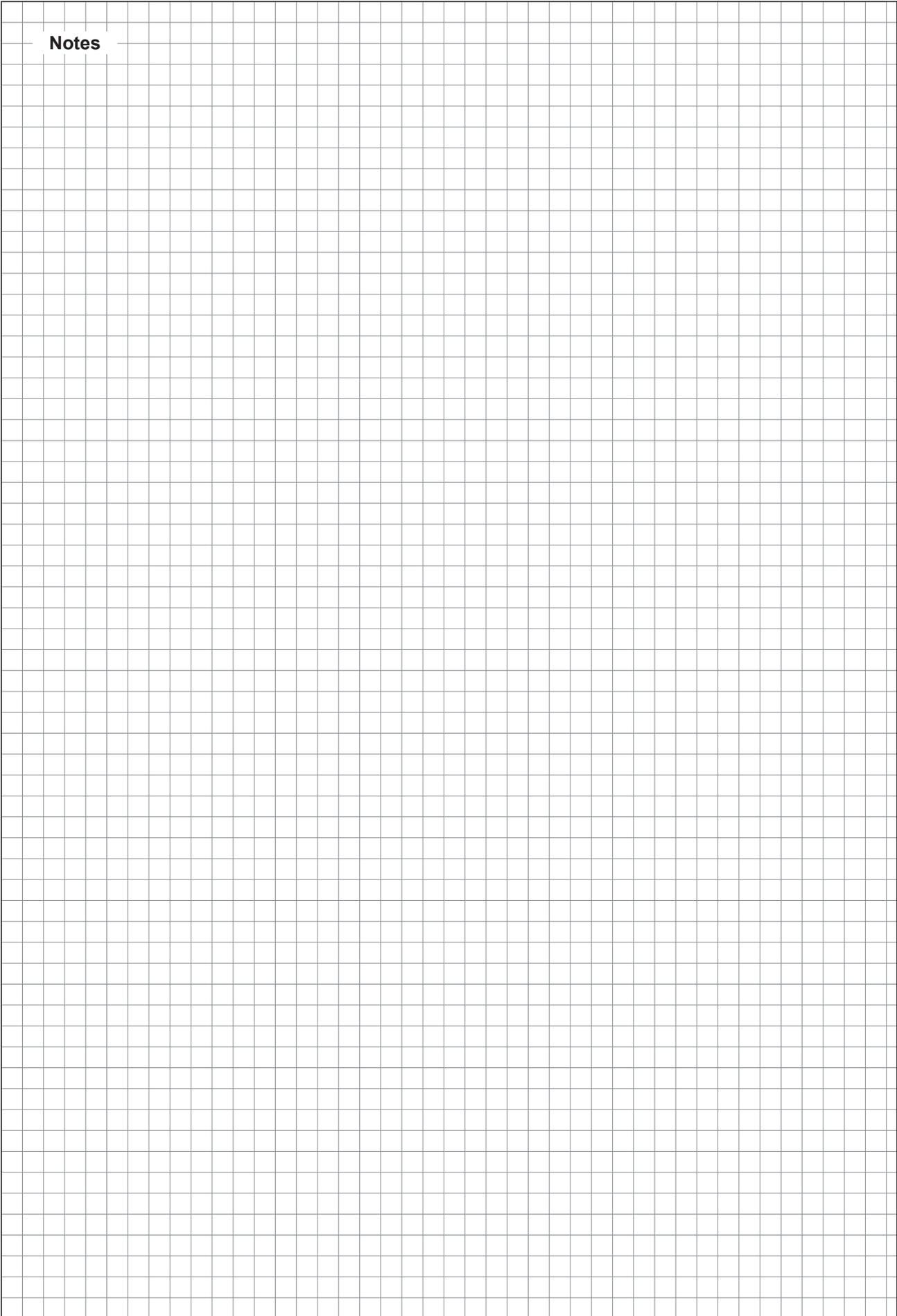
Dimensions in mm



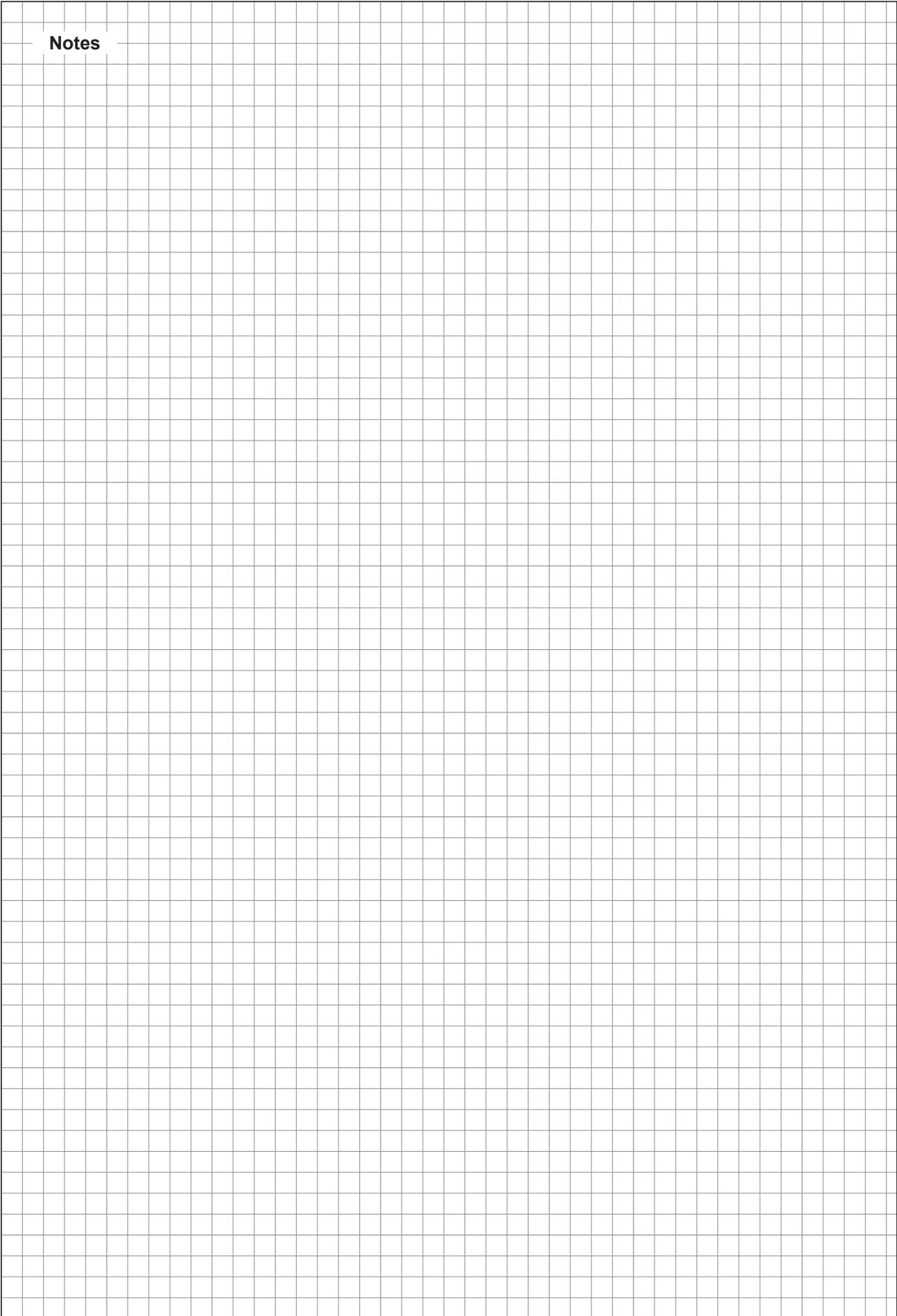
Notes



Notes



Notes





CONSULTING, SALES AND SERVICE:



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