User manual

Rainmaker 2 ®

Code No. 99-94-0695 GB

Edition: 07/2024

EC Declaration of Conformity

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In accordance with the EC directive:

- **Machinery Directive 2006/42/EC, annex II, part 1, section A**

Further applicable EC / EU directives:

- Electromagnetic Compatibility (EMC) Directive 2014/30/EU
- Low Voltage Directive 2014/35/EU
- RoHS Directive 2011/65/EU
- Construction Products Regulation no. 305/2011
- Ecodesign Directive 2009/125/EC

CE

The product named below was developed, designed and manufactured in accordance with the above mentioned EC / EU Directives and under the sole responsibility of Big Dutchman.

Description	Rainmaker 2 ®
Serial number and year of construction	According to the customer order no.

The following harmonised standards were applied:

- DIN EN ISO 12100:2011-03 Safety of machinery – General principles for design – Risk assessment and risk reduction
- EN 60204-1:2018 Safety of machinery – Electrical equipment of machines – Part 1: General requirements

Authorised agent for documentation: Manager Documentation
Auf der Lage 2; D-49377 Vechta; Germany

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Vechta, 18.07.2024 Manager Documentation ..... Christian Tobergte
Place, date Authorised agent for documentation

Overview of changes / updates

Name of chapter	Type of change / update	Product information / *Code of the person in charge*	Date of edition	Page
2.8.2 ”Important notes on the use of Tangit adhesive and Tangit cleaner”	Warning added	AMa	12/2022	9
5.6 ”Instructions for the glueing of the drip trough”	Chapter revised	AMa	12/2022	31
7 ”Troubleshooting”	Table added	AMa	12/2022	40
3.3 ”Purpose and structure”	Chapters combined and supplemented	AMa	07/2024	15
3.5 ”Water quality requirements”	New chapter added	AMa	07/2024	18
3.6 ”Wet area”	New chapter added	AMa	07/2024	20
3.7 ”Weight of the cooling system”	New chapter added	AMa	07/2024	20
4.5 ”Bleed off”	Warning, illustration and table added	AMa	07/2024	24
7 ”Troubleshooting”	Table added	AMa	07/2024	40

1 About this manual

Observe the instructions in this manual to ensure correct and safe use of the system.

Keep this manual safe for future use.

All persons assembling, operating, cleaning and servicing this system must be familiar with the contents of this manual.

These persons must always have access to the manual. Keep this manual in the immediate vicinity of the system for this reason.

Observe the comprised safety instructions!

If this manual is damaged or lost, request a new copy from **Big Dutchman**.

This manual is protected by copyright. The information and drawings included in this manual may not be copied without the manufacturer's consent, nor may they be misused or disclosed to third parties.

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If you find mistakes or unclear information in this manual, please do not hesitate to let us know.

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1.1 Structure of the safety instructions

⚠ DANGER!

This indicates risks that will lead to personal injury resulting in death or to serious injuries.

⚠ WARNING!

This indicates risks that could lead to personal injury resulting in death or to serious injuries.

⚠ CAUTION!

This indicates risks or insecure procedures that could lead to moderate or minor injuries.

NOTICE!

This indicates notes preventing property damage and leading to an effective, economic and environmentally-conscious handling of the system.

1.2 Supplier's documentation

The supplier's documentation includes all instructions for components that are supplied by **Big Dutchman** but not manufactured by **Big Dutchman**, for example motors. These instructions are usually supplied with the respective component. If this is not the case or if the language of the corresponding country is not included, please request this documentation from **Big Dutchman** .

It is essential to observe the instructions in the supplier's documentation!

2 Safety

2.1 General safety regulations

Only work with suitable tools and observe the local accident prevention regulations.

⚠ WARNING!

Live parts may be bare when performing different types of tasks. Touching live parts can lead to injuries caused by electric shock and short circuits.

- ► Set the main switch to "Off" before starting any repair or maintenance tasks.
- ► Secure the system against reactivation.
- ► Attach a fixed sign to indicate that maintenance and repair tasks are in process!
- ► Never touch bare electrical components.
- ► Equipment with bare electrical components must not be used by the operating staff.

Check safety and function control devices to ensure safe and accurate operation after carrying out any tasks.

Observe the regulations of local water distribution and power supply companies.

⚠ WARNING!

Defective or disassembled safety devices can lead to serious injuries or to death!

- ► It is strictly forbidden to remove or put out of operation any safety device.
- ► If safety devices are damaged, immediately put the system out of operation. Lock the main switch in zero position and eliminate any damage.
- ► Make sure that all safety devices are properly mounted and function after work on the system has been completed and before putting the system into operation (again).

⚠ WARNING!

- ► Parts lying about on the system and in its vicinity can cause persons to stumble and / or fall and thus risk injuring themselves by contact with system components.
- ► Parts lying about in or on the components can lead to serious damage of the system.
- ► Never deposit objects (e.g. spare parts, replaced parts, tools, cleaning tools etc.) in the accessible areas of the system or in the surrounding areas after having worked on the system!
- ► **Before** putting the system into operation again, assure yourself that all loose or replaced parts have been removed from the system components!

⚠ DANGER!

Persons may be electrocuted or suffer serious electrical injuries if water from leaking hoses, seals and pipes reaches live parts.

- ► Disconnect the main power supply.
- ► Interrupt the main water supply.
- ► Only now may you enter the part of the house where large quantities of water have escaped.

NOTICE!

Leaking hoses, seals and pipes can cause structural damage or destroy electrical systems by short circuits.

- ► Check regularly whether large quantities of water are escaping and eliminate the leaks as soon as possible.

⚠ WARNING!

Children must not access the system. The safety distances for the system are not designed for children. A risk of injury cannot be excluded, even for supervised children.

2.2 Operator's responsibility

The operator is subject to the legal obligations regarding occupational safety and is responsible for the staff's safety. All safety, accident prevention and environmental protection regulations applicable for the area of use of the system must be observed. The following is especially important:

The operator must clearly specify responsibilities for operation, maintenance and cleaning.

The operator must provide the staff with the necessary personal protective equipment.

The operator is responsible for

- using the system in compliance with the designated use;
- ensuring that the system is only operated in an excellent state from the technical point of view and that maintenance intervals are observed;
- ensuring that his staff is trained to use the system;
- ensuring that operation instructions are prepared for the system.

2.3 Staff qualifications

Staff must consist of qualified persons who can be expected to perform their tasks reliably. Persons whose ability to respond is impaired, e.g. by alcohol, drugs or medication, must not work on the system. The operator is responsible for which persons he employs. **Big Dutchman** does not assume any liability for personal injury and property damage caused by insufficiently qualified staff.

2.4 Personal protective equipment

⚠ WARNING!

The following instructions apply to any task carried out on the system.

- ► Wear **close-fitting protective clothing** and **protective footwear**.
- ► Use **protective gloves** where there is a risk of hand injuries and **safety goggles** where there is a risk of eye injuries.
- ► Do not wear **any rings, necklaces, watches, scarves, ties or other items** which could get caught in parts of the system.
- ► Make sure that **long hair is always tied back**. Hair can get caught in driven or rotating working units or parts of the system, resulting in serious injuries.
- ► When working underneath the system **always** wear a **hard hat**!

2.5 Designated use

The **Big Dutchman** system may only be used for the purpose for which it is designated.

Any deviating use is considered non-designated use. The manufacturer shall not be liable for any damage resulting from such non-designated use. The user alone bears the risk. The designated use also includes the exact compliance with operating, maintenance and assembly requirements of the manufacturer.

2.6 Ordering of spare parts

⚠ CAUTION!

For you own safety, use original **Big Dutchman** spare parts only. For third-party products that have not been released or recommended and for modifications (e.g. software, control units), judging whether there is a safety risk in connection with **Big Dutchman** systems is not possible.

NOTICE!

The exact description of the spare parts to be ordered can be found by means of the position number in the spare parts list.

Indicate the following when ordering spare parts:

- the code number and description of the spare part;
- the customer number or order number;
- the current supply, e.g. 230 / 400 V – 3 Ph – 50 / 60 Hz.

2.7 Safety instructions when operating electrical appliances

NOTICE!

Only qualified electricians may install and work on electric parts / assembly groups in accordance with electro-technical regulations (e.g. EN 60204, DIN VDE 0100/0113/0160).

WARNING!

If an electric part is open, dangerous electric tensions are bare. Be aware of the danger and keep staff of other professions away from the danger zone.

NOTICE!

Do not install control devices directly in the house but in the service room to prevent corrosion caused by e.g. ammonia gas.

2.7.1 Protective-equipotential bonding (earthing) of the system

The system must be earthed professionally by the operator or a company commissioned by him at suitable points and according to the valid local guidelines and standards (e.g. IEC 60364-7-705 mod. 2006 / DIN VDE 0100-705: Low-voltage electrical installations – part 7-705: Requirements for special installations or locations – Agricultural and horticultural premises) for protective-equipotential bonding.

2.8 System-specific safety regulations

The system is designed according to the state of technology and meets current safety requirements. Nevertheless, there are residual risks, which can be prevented as follows.

⚠ WARNING!

Danger of drawing-in due to rollers, chains, gear wheels and belts!

- ► Disconnect the system from the power supply before starting any work on the system, because the system may turn on unexpectedly when operated automatically.
- ► Secure the system against reactivation.
- ► Prevent contact with rotating and driven system parts in general!
- ► Assure yourself that all safety devices have been attached correctly.

2.8.1 Safety symbols on the system

i NOTICE!

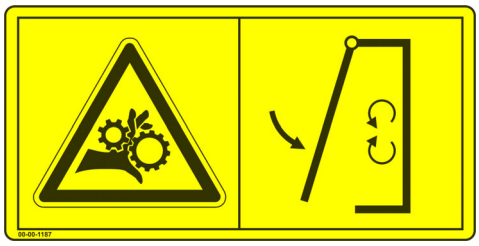
Safety symbols and instructions on the system must always be easily visible and undamaged.

- ► Clean safety symbols in case they are dirty, e.g. due to dust, animal excrement, feed remains, oil or grease.
- ► Immediately replace damaged, lost or illegible safety symbols.
- ► If a safety symbol or instruction is fixed to a part to be replaced, ensure that it will be fixed to the new part as well.

General note!

Read the manual.

Code no. 00-00-1240



Danger of crushing due to rotating machine parts!

Always lock and secure safety devices before putting the system into operation. Only authorised persons may open protection devices, and only when the system is idle.

Code no. 00-00-1187

Danger of drawing-in due to operating auger, chain or rope sheaves!

Never reach or climb into the feed hopper, the feed column, the feed pipes or the feed trough while the motor is running!

Code no. 00-00-1188

2.8.2 Important notes on the use of Tangit adhesive and Tangit cleaner

⚠ WARNING!

Tangit adhesive is flammable! Therefore:

- ► No open fires nor hot air blowers, gas brooders and open light bulbs in the work area!
- ► Do not smoke, weld or grind in the work room!
- ► Solvent vapours are heavier than air. Such vapours may cause unconsciousness and / or form explosive mixtures. Use and dry in well-ventilated areas only. Make sure that the area stays well-ventilated after gluing work is finished!
- ► Remove possible solvent vapour clouds before starting to weld or grind!
- ► Observe the general instructions and the instructions for use of the manufacturer.

⚠ WARNING!

Tangit adhesive and Tangit cleaner are dangerous to the health! When working with Tangit adhesive or Tangit cleaner, always

► Wear gloves!

► Wear eye protection!

► Wear breathing protection!

► Ventilate rooms!

Notes on the glueing of components:

- The adhesive is ready-for-use and must not be diluted. The adhesive must be thin and fluid. If it is viscous and does not flow off of a dipped spatula, then the content is too old and must not be used any more. Do not continue to use already open containers.
- Bevel cut edges and remove any burrs!
- The glue areas must be completely clean, dry and oil-free before coming into contact with the adhesive.
- Apply the adhesive evenly with strong brush strokes.
- Move the parts to be glued into their final position immediately after applying the adhesive and hold on to the parts for a few seconds until the Tangit adhesive has hardened. The entire glueing process must be completed within a period of 4 minutes.
- Do not rotate the parts during bonding, but push them straight together.
- Do not move the parts for a period of 5 minutes after glueing. For temperatures below 15°C this time has to be extended to 15 minutes.

NOTICE!

Handle the adhesive carefully in the area of the ball valves and other movable fittings. Do not use more adhesive than necessary.

The excess adhesive can enter the moving parts (e.g. a ball valve) and stick them together so that their functionality may be impaired!

⚠ CAUTION!

Before starting to use the Tangit cleaner and Tangit PVC-U, read and observe the corresponding technical data sheets! The data sheets provide instructions regarding pretreatment, handling, storing and product safety.

2.8.3 Water supply

⚠ CAUTION!

According to DIN EN 1717, water sources in technical systems for livestock management must be assigned the highest possible hazard because they pose a health hazard for humans due to microbes and viruses or chemical and biological substances. This means that within the scope of DIN EN 1717, a direct connection to the public water distribution network is not permitted under any circumstances.

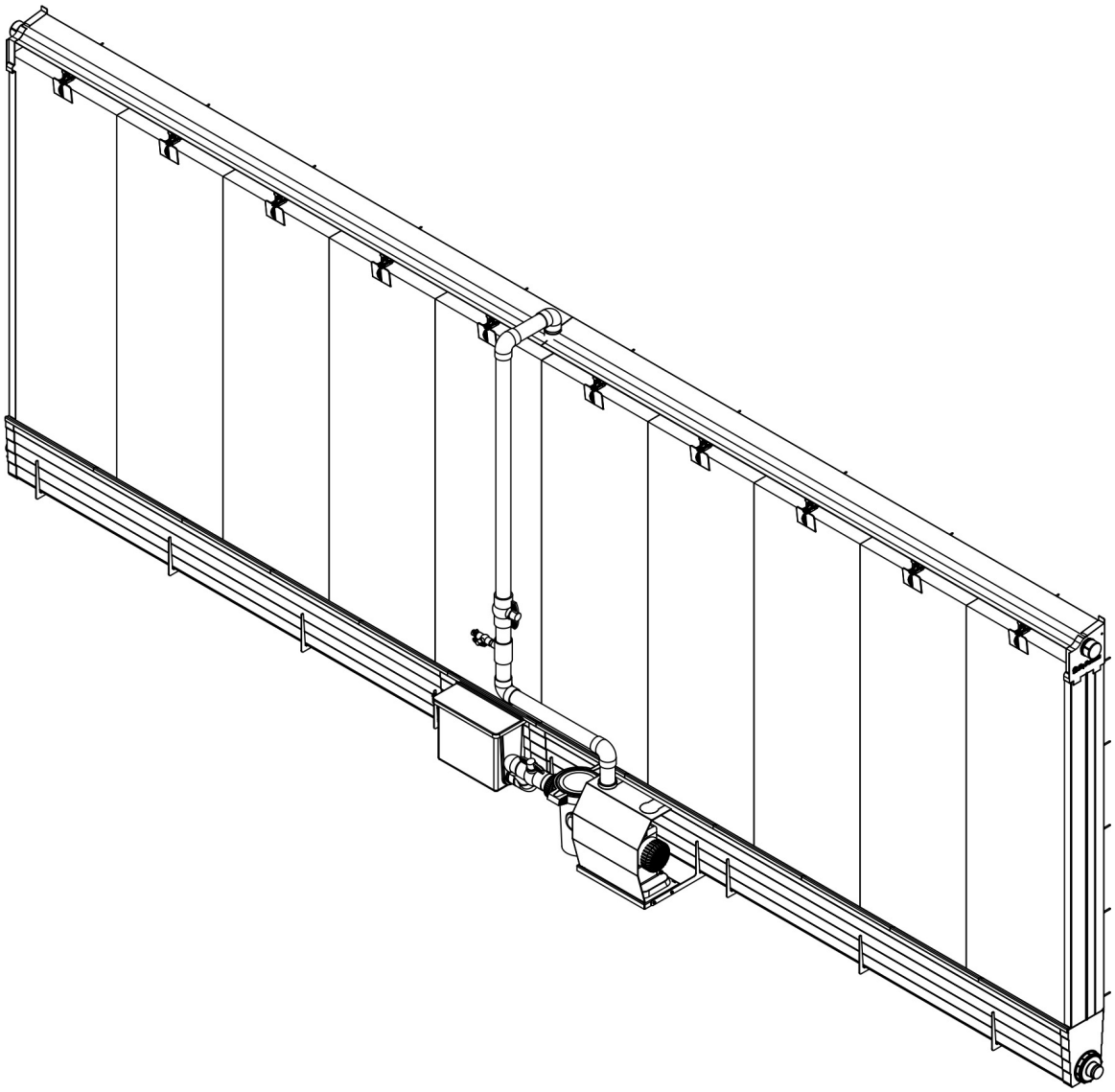
Additionally, all water sources not intended for extraction of water for human use must be equipped with a corresponding sticker or prohibitory sign according to ISO 7010, P005 ("Not drinking water"). The stickers can be purchased from Big Dutchman.

Code no.	Description
00-00-2128	Sticker: Logo – Not drinking water

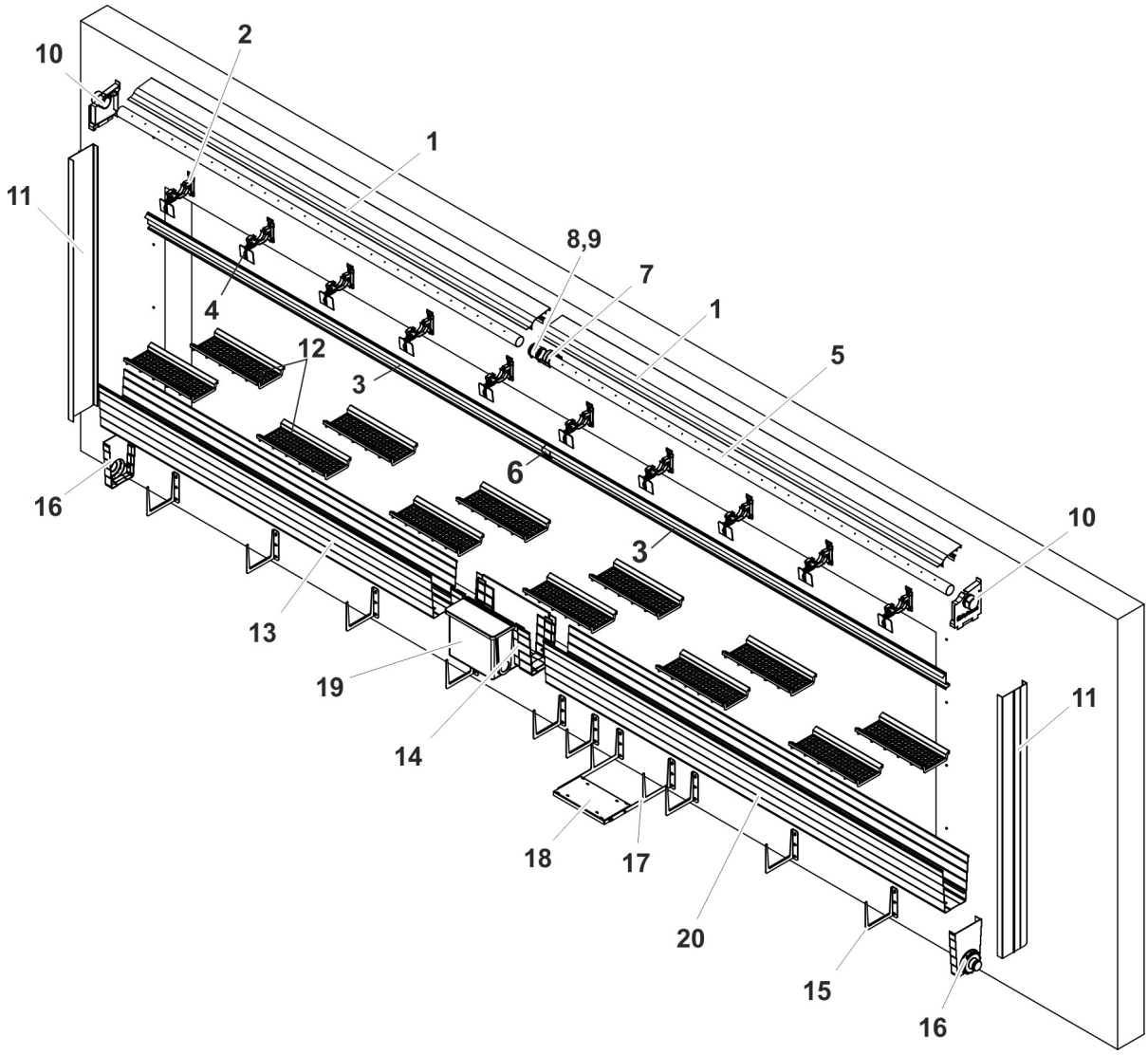
Also comply with the regulations of local water distribution and power supply companies.

3 System description

3.1 Overview



3.2 Individual parts of the frame



Pos.	Code no.	Description
1	83-15-7846	Deflector 3000 PVC for RM2
2	83-15-7843	Bracket PVC for distributing pipe 150/6" for RM2
3	62-00-3705	Guiding profile PVC 3000 for nozzle pipe RM2
4	83-15-7844	Bracket PVC for pad RM2
5	62-00-3704	Distribution pipe 2"x3000 4/100 PVC for RM2
6	60-50-0232	Coupler PVC for guiding rail RM2 & MagixX
7	83-15-8582	Coupler for deflector PVC for RM2
8	60-50-0137	Socket elastic for nozzle pipe RM2
9	83-14-4860	Hose clamp stainless steel W4 9 mm DIN 3017 50-70 mm
10	83-15-9822	End piece for deflector PVC RM2
11	83-15-9823	Side part pad 2500 PVC for RM2
12	62-00-3508	Cover for drip trough 150/500 PVC Rainmaker®
13	62-00-3525	Drip trough 2500 PVC Rainmaker
14	60-05-1112	Coupling for drip trough PVC Rainmaker
15	83-56-3736	Bracket plastic for drip trough Rainmaker
16	62-00-3544	End piece with flushing cap for drip trough PVC RM cpl. mounted
17	83-16-2439	Bracket 3.0 mm stainless steel for pump RM2
18	83-16-2440	Plate 2.0 mm stainless steel for pump RM2
19	62-00-3543	Supply unit RM2 500 mm PVC dia 33.5/61
20	62-00-3505	Drip trough 3000 PVC Rainmaker

3.3 Purpose and structure

Evaporative cooling is a proven and effective means of reducing the air temperature by passing the incoming air across a damp surface (the pads). The outside air absorbs moisture through the intensive contact with the large pad surface and is thus cooled down.

The Rainmaker 2 ® evaporative cooling system consists of several components. The main components are defined based on their joint purpose and include the following parts:

1. Top profile	The top profile (distributing pipe) comprises a PVC pipe (diameter 60.3 mm, 2") with holes, among other parts. The holes are drilled at fixed distances so a large area of the pads is wetted with water from above. When water is pumped through the distributing pipe, it sprays from the holes and thus wets the pads.
2. Pads	Made of cellulose or plastic, with a large specific surface area. When water runs down the pads and air flows through the pads, this air absorbs moisture and thus cools down. Water which reaches the floor of the pads is collected by the drip trough.
3. Supply unit	The supply unit connects the drip trough with the pump. An integrated float valve ensures that fresh water enters the system and keeps the filling level constant.
4. Drip trough	The drip trough holds the water supply for the pump and collects water flowing back from the pads.
5. Pump	The pump transports the returning water upwards to the top profile, together with a certain amount of fresh water.

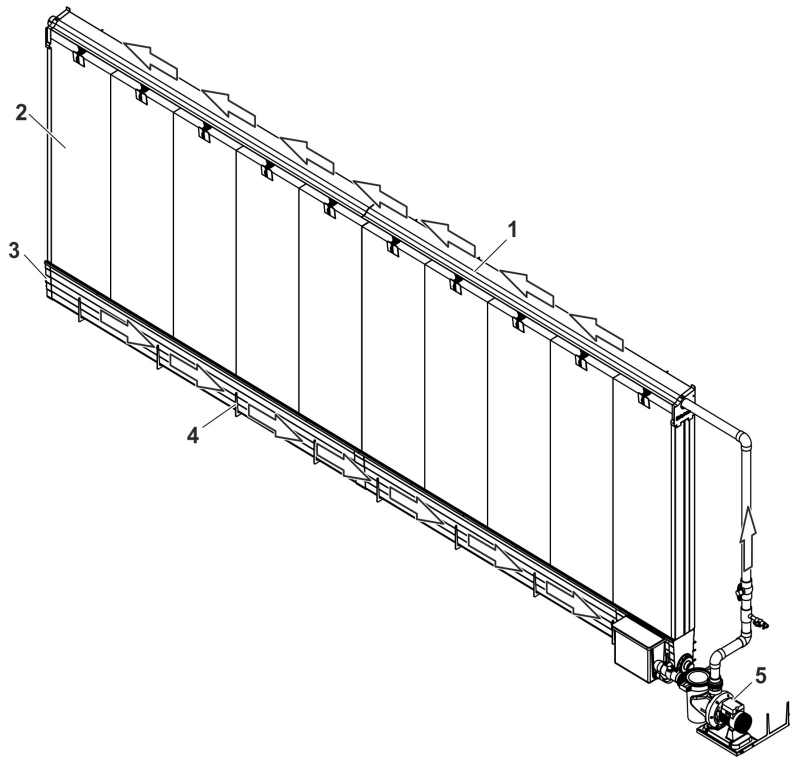
NOTICE!

Discolouration and fading colours of plastic parts are caused by age and cannot be avoided. Direct sunlight accelerates this process.

3.4 Water supply

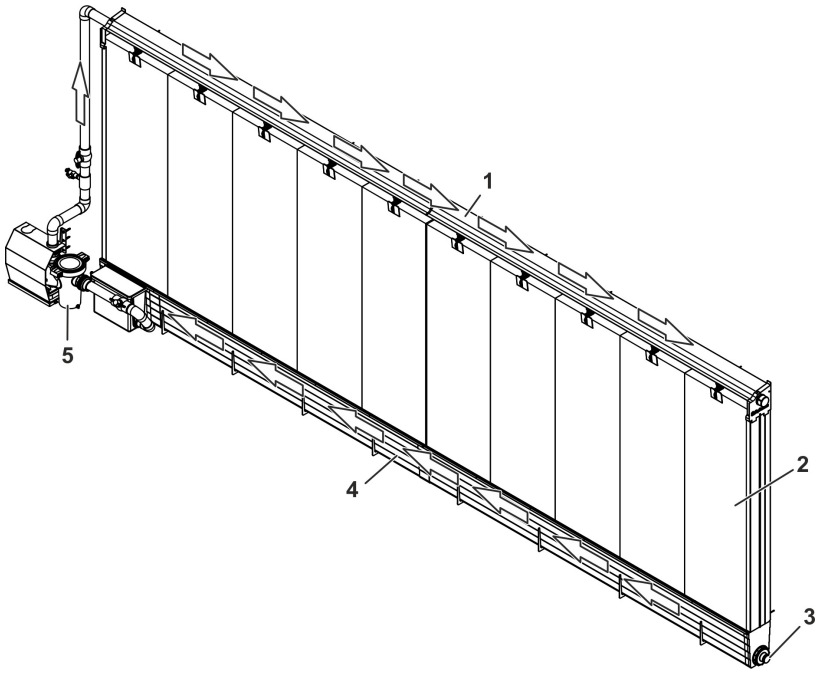
The water supply of the Rainmaker 2 ® system can be installed in three different variants.

Water supply from the right (recommended up to a length of 12,000 mm)



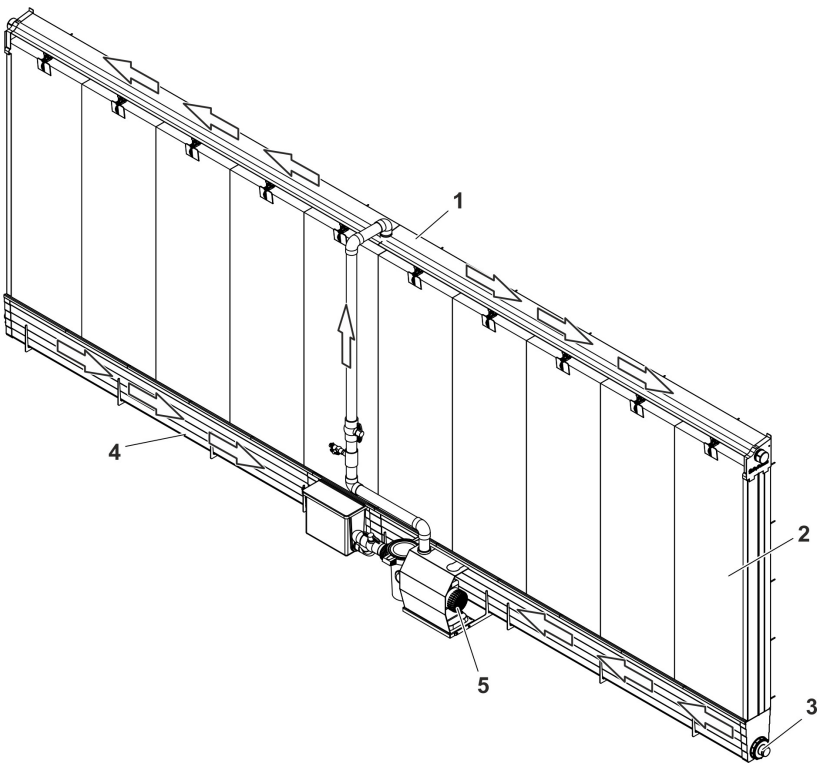
1. Top profile
2. Pads
3. Water intake
4. Drip trough
5. Pump

Water supply from the left (recommended up to a length of 12,000 mm)



1. Top profile
2. Pads
3. Water intake
4. Drip trough
5. Pump

Central water supply (recommended from a length of 12,000 mm)



1. Top profile
2. Pads
3. Water intake
4. Drip trough
5. Pump

3.5 Water quality requirements

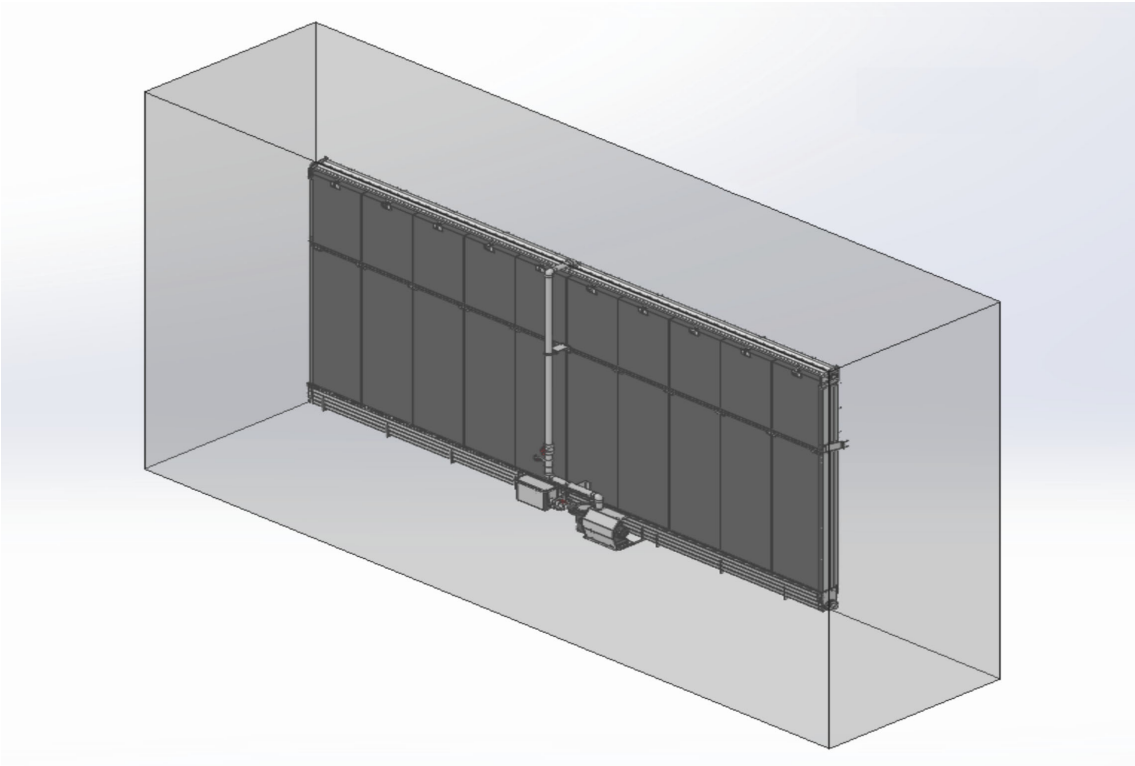
Component	Fresh water	Process water	Reasons
Calcium hardness (as $CaCO_3$)	20 - 150 mg/l	100 - 300 mg/l	High calcium levels cause hard deposits. This occurs when the alkalinity is also high. For example, if the calcium carbonate content is 300 mg/l, the alkalinity must be 100 mg/l to prevent deposits. If the calcium carbonate content is 100 mg/l, the alkalinity can be 300 mg/l without forming deposits. If there are areas on the pads with poor water distribution or if the water supply is switched on and off via time clocks, limescale will form irrespective of the calcium carbonate/alkalinity ratio.
Total alkalinity (as $CaCO_3$)	20 - 150 mg/l	100 - 300 mg/l	High alkalinity is an indicator of a high pH value. Apart from the above-mentioned problems relating to scale formation, this also causes other issues. Calcium carbonate combines with sodium to form sodium carbonate, which is a soft deposit that can be rinsed with water. In areas with poor water distribution or if the water supply is switched on and off via time clocks, a high alkalinity causes a high pH value of the pads. This problem occurs when the pads are almost dry and the concentration of the impurities in the water is very high.
Chloride (as Cl)	< 50 mg/l	< 400 mg/l	High chloride values cause corrosion of metal parts. Chlorides are associated with impurities such as sodium chloride and not with chlorine.
Silicon dioxide, silica (as SiO_2)	< 25 mg/l	< 100 mg/l	Silica is found in sand and rocks. It forms a hard, insoluble deposit on the pads.

Component	Fresh water	Process water	Reasons
Iron (as Fe)	< 0.2 mg/l	< 1.0 mg/l	Iron forms a harmless red layer on the material. Normally, this layer can be rinsed. Iron can cause corrosion on other metal parts.
Conductivity	< 750 µS/cm	< 3000 µS/cm	The conductivity is a measure for the dissolved minerals and impurities in the water. The higher the conductivity, the more minerals and impurities are in the water. It is impossible to recommend an ideal pH value applicable for all systems. Evaluate the least desired component in the water and adjust the pH value and the conductivity to maintain the concentration of this component.
Suspended particles	< 5 mg/l	< 50 mg/l	Suspended particles make the water look turbid. These solids consist of very fine dirt and organic substances. Suspended particles settle on the pads and can clog the openings, make the pads very heavy and form a source of nutrients for algae growth.
pH value	6.0 - 8.5	7.0 - 9.0	Water with a low pH value is acid and makes the paper brittle. A high pH value makes the water alkaline so that the paper is as soft as cotton. A pH value between 7 and 9 ensures a long service life of the pads. If the water absorbs ammonia from the air drawn in via the pads, the pH value can increase to 10.5. *Bleed off* helps to control the pH value.
Chlorine or bromine	0 - 1.5 mg/l	0 mg/l	Chlorine and bromine hardly combat the algae since both substances are very volatile and do not remain in the water. They make the pads soft and reduce their service life.

3.6 Wet area

⚠ CAUTION!

The pad cooling system is operated with water. The entire area of **1 m** around the system is a **wet area** where humidity must be expected. All components installed in this area must be suitable for use in a humid environment!



3.7 Weight of the cooling system

Description	Value	Comment
Total weight Rainmaker 2 incl. pads, water, minerals and safety factor	175 kg/m	-
Total weight Rainmaker 2 incl. pads, water, minerals, **supply unit**, **pump** and safety factor	220 kg/m	This value only applies in the area of the pump and the supply unit.

4 Operation of the system

4.1 Initial operation

NOTICE!

Fill the pump with water before starting the system! If this does not happen, the pump may be destroyed!

The system must be filled with water before initial operation. The water supply to the system must not be interrupted. The water level in the drip trough is regulated via the float valve. It opens if the water level is too low and closes once the required water level has been reached.

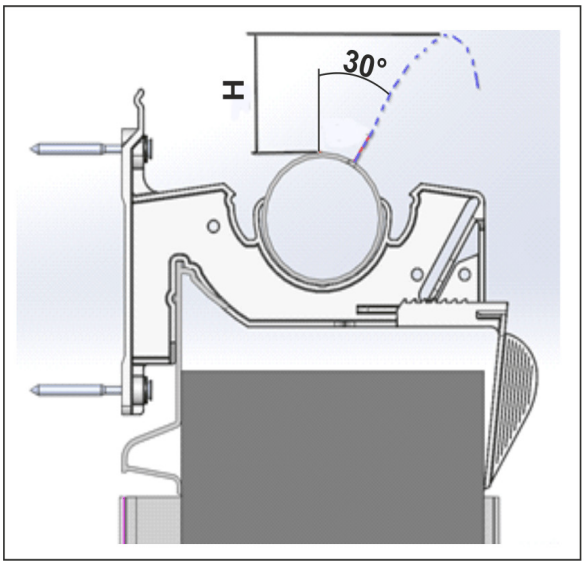
The smooth surface of new pads prevents that the pads get wet quickly. It is therefore important to let the pump run permanently for approx. one day before using the pads for the first time. The pads thus get "used" to the water. This time is also called the "run-in period". Check the pads carefully after the end of the run-in period. Dry streaks indicate that the water is not distributed sufficiently. If you find dry streaks, clean the nozzle line.

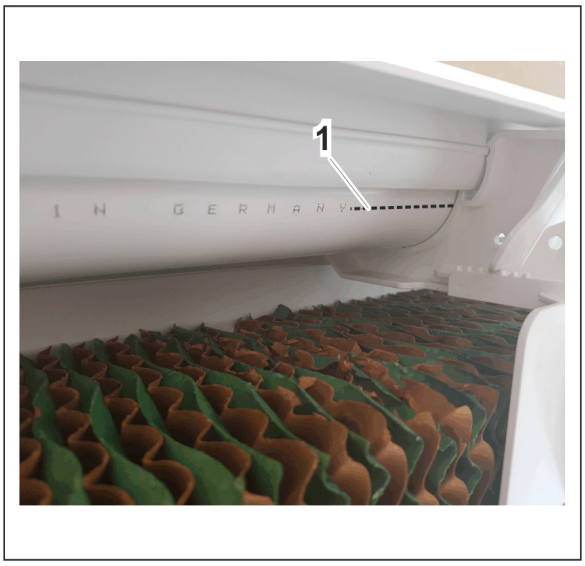
1. Connect the pump.
2. Connect the water supply to the float valve.
3. Adjust the float valve to a height of 20 cm.
4. Fill the drip trough with water until the water reaches the marking at the trough's end pieces.
5. Open the pump's pre-filter and fill the pump with water. Close the filter again afterwards.
6. Open the screw caps at the sides to rinse the system. Bore chips and dirt are flushed from the line and do not reach the pump.
7. Start the pump and rinse for approx. 5 minutes.
8. Close the screw caps after rinsing and check the pump's pre-filter. Clean the filter, if necessary.

4.2 Adjusting the system

The pump's power must be throttled to harmonize with the system length. A ball valve is installed in the pressure line for this purpose. Close the ball valve until the following adjustments have been made to the system:

- Remove the final deflector to be able to see the nozzle pipe.
- Make sure that the pipe has an angle of approx. 30°. There is a marking (1) on the pipe for orientation. Align this marking as depicted in the illustration below.
- Use the ball valve to adjust the water jet at the end of the line in accordance with the illustration below.
- Install the deflector.





H = Water jet height at the end of the system

H = 20 - 25 cm

4.3 Normal operation

Under normal conditions the pump should run continuously, whilst air is being drawn through the pads. Whilst the system is running check for indications of deposits on the surface of the pads caused by impurities in the water.

If deposits occur, increase the water drain (bleed off).

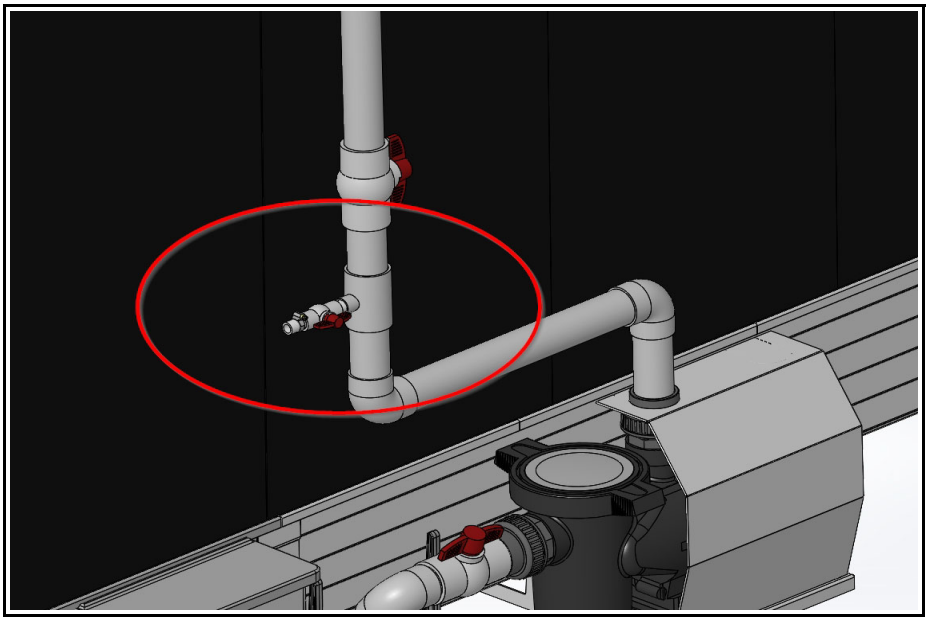
4.4 Limit value on-off cycling

Some users operate the evaporative cooling system in interval mode. This means that the system is switched on and off via a time switch, e.g. at 10 minute intervals. This interval mode reduces the service life of the pads. If the system is started and stopped every 10 minutes, the pads are soaked and dried six times per hour (up to 144 times per day!). Each time the pads dry, the minerals of the water are deposited in the pads and increase the pressure loss. If plastic pads are used, the cleaning interval will thus be shorter.

4.5 Bleed off

NOTICE!

Mount the supplied hose to the bleed off before putting the system into operation.



Water always contains dissolved minerals. When water evaporates, only clean water does so, while the minerals remain in the circulating water. To compensate for the water loss, water is supplied continuously through the float valve. The fresh water also contains dissolved minerals and thus continues to enrich the process water. The mineral concentration increases further. The minerals have a negative effect, especially on the pads. When the pad cooling system switches off, the pads dry out and the minerals settle in the pads. To prevent rapid clogging of the pads due to minerals, keep the concentration as low as possible! For this purpose, a bleed off is installed in the pressure line. The bleed off is a branch through which water is continuously transported away from the system. The amount of concentrated process water is thus reduced, and fresh water dilutes the process water.

The bleed off can be adjusted with a ball valve in the pressure line. The amount of water to be discharged depends on the water quality, size of the pad surface area, type of the pads, the system's cooling capacity as well as the resulting amount of evaporated water. The amount can therefore not be calculated as a general figure.

As a rule of thumb, 10 % of the evaporated water can be discharged via the bleed off. However, since the evaporated amount depends on the temperature, air humidity, type of pad and volume flow, this percentage varies and must be determined iteratively during operation. The following values can be used for orientation to set the bleed off:

System length [m]	Bleed off "bad water" [l/h]*	Bleed off "good water" [l/h]**
1	4.5	12.5
3	14	38
6	27	75
9	41	113
12	54	150
15	68	188
18	81	225
21	95	263
24	108	300
27	122	338
30	135	375
33	149	413
36	162	450

*. In case of clean water with a low mineral concentration.

**. In case of hard water with a high mineral concentration.

4.6 Water distribution

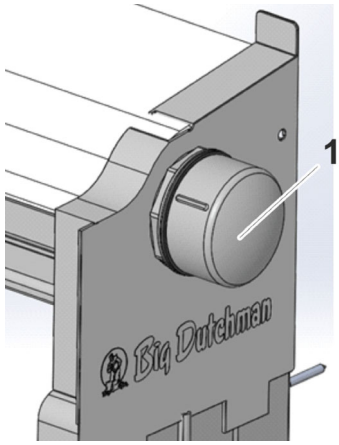
The even distribution of water on the pads is absolutely necessary to extend the service life of the pads. If part of the pads is not sufficiently wet, this part can clog quickly. If you ever see any dry spots or stripes, try to find the cause. Most of the problems in connection with the water distribution can be solved by cleaning the nozzle line. Observe the following procedure when cleaning the Rainmaker 2 ® system.

To achieve the best possible results, the system should be cleaned regularly.

4.7 Winterising Rainmaker 2 ®

Cooling water reaches its highest density at a temperature of approx. 4 °C and then expands again. It is therefore necessary to prepare the Rainmaker 2 ® system before the winter sets in and to protect affected parts.

If temperatures below 4 °C are expected at the system's site, it is absolutely necessary to drain the water of the system as well as of the components. This applies to the pump, float valve and drip trough as well as the entire system piping. Proceed as follows:



1. Close the fresh water supply of the system and open the float valve until no more fresh water is flowing. Disassemble the valve, if necessary, to remove water remaining inside the system.
2. Open the screw caps of the distributing pipe (**1**) on the left and right side. Depending on the design, ball valves might be installed instead of screw caps.
3. Open all ball valves of the system. The water remaining inside the pipes can thus drain.
4. Drain the water from the drip trough. Open the flushing caps of the end caps on the left and right side of the system. Depending on the system's design and year of construction, the end caps may be installed without flushing cap. These systems have an outlet in the drip trough or supply unit. Open it.
5. To empty the pump, open the filter cover as well as the drain plug. Even when the drain plug has been removed, it cannot be guaranteed that all the water drains off. Remove the pump and store it in a building to avoid damage due to remaining water.
6. To be able to put the system back into operation quickly in the summer, we recommend cleaning the system before storing it for the winter.

NOTICE!

To avoid losses, remember to reinstall all removed parts (except for the pump) after all water has been drained!

4.8 Putting the Rainmaker 2 ® system back into operation after the winter

NOTICE!

If the system was not cleaned before storing it for the winter, this must be done now. Otherwise, the pre-filter of the pump clogs and the system cannot function properly!

Rainmaker 2 ® should be put back into operation in time before the temperatures rise. Proceed as follows:

1. Make sure that all screw unions at the distributing pipe, drip trough, end cap and supply unit are closed.
2. Re-attach the pump to the system. Remember to insert the drain plug. The filter of the pump can remain open since the pump must still be filled with water.
3. Fill the drip trough with water and make sure that the float valve works and closes. If necessary, rinse the valve.
4. Fill the pump via the pre-filter and close it tightly with the cover.
5. Switch on the pump and check whether the system works correctly. Adjust the system as described in chapter 4.2 ”Adjusting the system”. Remember to set the bleed off (chapter 4.5 ”Bleed off”) correctly.

5 Maintenance

While using the Rainmaker 2 ® system, you will notice how important preventive maintenance is. Algae growth, deposits (hard incrustations) and dirt accumulation are typical phenomena. To prevent these problems, carry out the tasks described in the following chapters.

NOTICE!

Heavy rains can lead to a flooding of the drip trough so that the pads stand in the water. If this happens over a longer period, the structure of the cellulose pads can become more and more unstable until the pads collapse. To prevent this, drill a hole into the side parts of the drip trough, below the pads.

NOTICE!

The values in the following chapters are recommendations. These values may be higher or lower for your system.

5.1 Changing the water store

Recommendation: In case of high temperature 3 to 4 times per week, otherwise every two weeks.

The entire water store should be replaced at regular intervals. The frequency depends on the water quality and operation time, but usually amounts to every two weeks. The replacement reduces the mineral deposits on the pads and prevents algae growth so that the cleaning intervals can be extended.

5.2 Checking the spray pattern

Recommendation: Weekly

The spray pattern of the pad cooling system is decisive for proper cooling. Foreign objects can clog the drill holes of the distributing pipe and lead to an uneven wetting of the pads. In this case, the pipeline must be rinsed (see chapter 6.2.3 ”Rinsing the pipes”).

5.3 Checking the pre-filter

Recommendation: Weekly

The air brings foreign objects into the system again and again, which then accumulate in the pre-filter of the pump. A soiled filter affects the pump capacity, which leads to the pads not received sufficient water.

5.4 Checking the float valve

Recommendation: Every four weeks

The screen of the float valve protects the valve against impurities and must be checked regularly. Turn the valve counter-clockwise by 90° to open it and clean the screen.

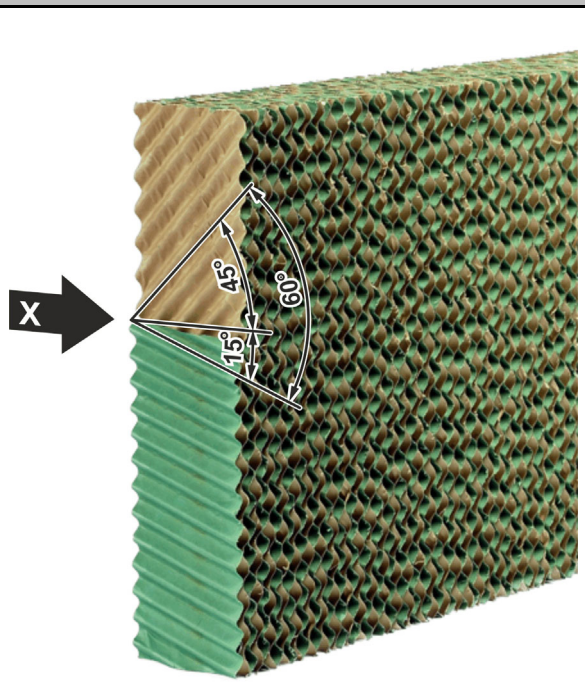
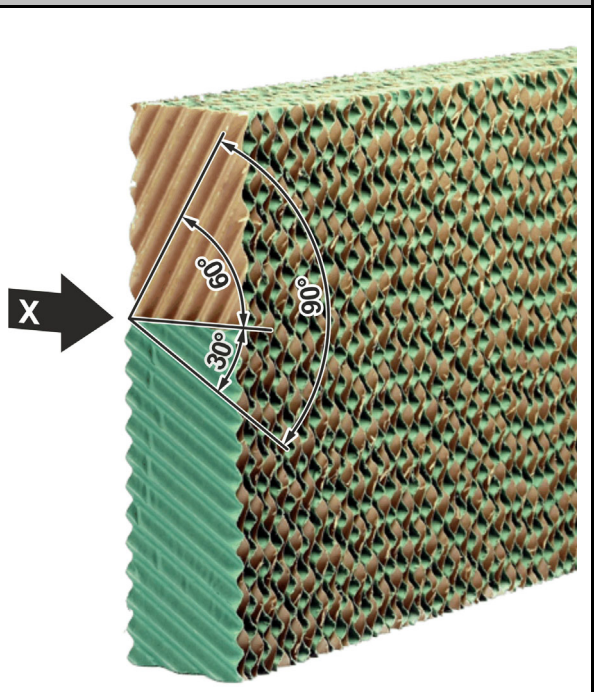
5.5 Replacing the pads

NOTICE!

Refer to the instruction leaflet when installing and replacing pads if the leaflet has been supplied with the pads.

For some pads, the installation direction is pre-defined. Observe this direction! An incorrect installation direction can affect the functionality of Rainmaker 2 ®!

e.g. CELdek pads

CELdek® 7060-15	CELdek® 7090-15
	
X = Air flow	

In case of damage to the drip trough or the top profile, repair any damage using the Tangit adhesive. For larger holes, refer to chapter 5.6 "Instructions for the glueing of the drip trough".

5.6 Instructions for the glueing of the drip trough

The following components are necessary:

Tangit cleaner

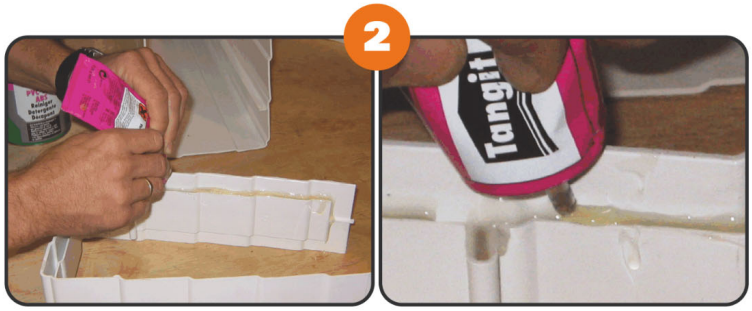
Cloth or blotting paper

Tangit adhesive – tube

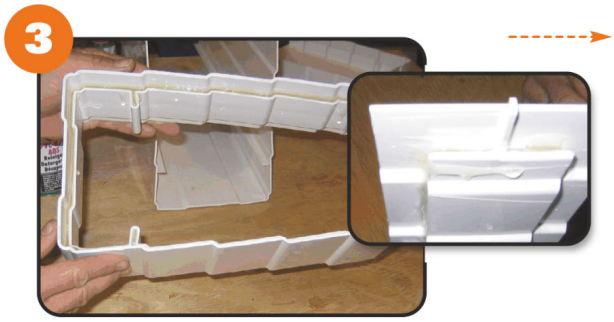
Tangit adhesive – can

Paint brush

1. Clean all glued joints **thoroughly** with Tangit cleaner.

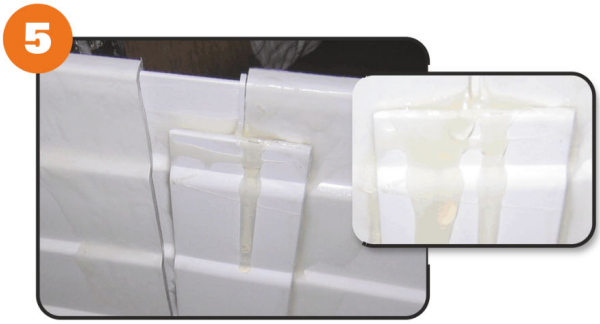


2. Fill the gap in the coupler/end piece **completely** with Tangit adhesive. Use the Tangit adhesive tube withtip.



3. Reverse the coupler and fill the gap on the other side **completely** with Tangit adhesive.

4. Apply the Tangit adhesive **immediately** to the glued joints **on the inside and outside** of the drip trough using the brush. Observe the time for which Tangit adhesive containers may be open (4 minutes at 20 °C).



5. The Tangit adhesive should **ooze out of the gap** when joining the components. If this does not happen, you did not use sufficient adhesive.

6. Bond the drip troughs and the coupler **immediately**. Perform this task with **two persons**.

7. Spread the excess adhesive with the brush.
Done!

6 Cleaning and disinfection

Different cleaning and disinfection measures can guarantee ideal hygiene on a farm.

All measures have the following goals:

1. Reduce or eliminate contamination.
2. Prevent disease.
3. Create ideal conditions for high animal performance.

Since circumstances differ from farm to farm, **Big Dutchman** recommends the following measures to guarantee farm hygiene:

- All vehicles should be disinfected before entering the farm. Install sprinkler hoses and wheel baths for the tyres at a place outside the farm!
- The farm should be fenced in! Only open the gate when required!
- There should be no rodents on the farm! Draw up a plan for elimination and ensure that this plan is observed!
- Eliminate weed on the farm premises!
- No feed should left be open anywhere on the farm! Store feed in a dry place to which the animals have no access!
- The service room of every house should be equipped with hand sanitizer and disinfectant mats!
- All hygiene requirements should be complied with not only during the batch, but also during the entire service period!
- Keep the number of unnecessary visitors to the farm as low as possible. Upon entering the farm / the buildings, all visitors should put on protective clothing and write down their name in the visitors' log!

  The farm should be equipped with a showering facility to change clothes and to prevent the introduction of germs!

6.1 Cleaning instructions

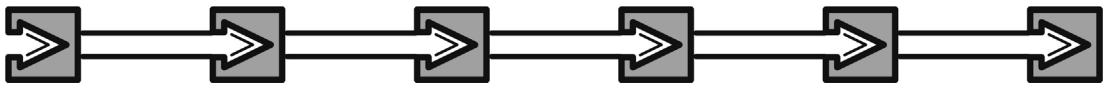
- Shut off the power when cleaning live parts!
- Protect moisture-sensitive parts such as control cabinets and motors from splash water during wet cleaning by covering them!
- Water in combination with dust and feed remains can lead to slippery floors!
- Cleaning agents and disinfectants can cause corrosion! Observe the manufacturer's instructions!

NOTICE!

If you use thermal disinfection, ensure that the temperature does not exceed 60°C.

Temperatures above 60°C can damage the equipment in the house. **Specifically, plastics may deform.**

Rough cleaning, rodent control and insecticide use	Soaking	Cleaning	Washing, immediately followed by drying	Disinfection according to manufacturer's instructions. If prescribed: rinsing	Drying (immediately after completed disinfection)



6.2 Cleaning the Rainmaker 2 ® system

1. Switch off the ventilation system. If this is not possible, run the fans at minimum speed.
2. Switch off the pump and clean the pre-filter.
3. Clean the pads (chapter 6.2.1 ”Cleaning the pads”).
4. Rinse the drip trough thoroughly (chapter 6.2.2 ”Cleaning the drip trough”).
5. Rinse the pipes (chapter 6.2.3 ”Rinsing the pipes”).
6. After rinsing: Switch off the pump. Close the screw caps at the end of the nozzle line. Depending on the design, ball valves might be installed instead of screw caps. Close them.
7. Fill the drip trough with clean water.
8. Return to normal operation.

9. Check the pre-filter of the pump repeatedly after cleaning. Loose dirt can still be rinsed out of the pads.

6.2.1 Cleaning the pads

Mineral deposits and dirt in the pads lead to an increase of the pressure loss. Energy consumption increases and the volume flow is reduced. This makes it necessary to clean the pads regularly. Always clean the pads from both sides!

1. Cellulose pads

   Recommendation: Every 12 weeks

– Dry the pad before cleaning.

– Clean the pad with a soft brush to remove deposits. Brush in the direction of the corrugation. If damages occur at the pad, brush with less pressure. Additionally, the pad can be blown off carefully by means of a compressed air gun to remove loose dirt.

– Hose down the cellulose pad carefully with a water jet. Make sure that the pressure is not too high!

– Continue with point 4 in chapter 6.2 ”Cleaning the Rainmaker 2 ® system”.

2. Plastic pads

   Recommendation: Every 12-16 weeks or from a pressure loss of more than 25 Pa.

   Plastic pads are more robust than cellulose pads and can be cleaned with a high-pressure cleaner. To prevent damage to the pads, observe the following points:

- Operating pressure high-pressure cleaner:	**max. 120 bar**
- Nozzle type:	**fan nozzle**
- Distance between nozzle and pad:	**at least 40 cm**

NOTICE!

If the pad is damage despite these precautions, reduce the operating pressure and increase the distance between nozzle and pad.

– If the pads are slightly soiled, they can be cleaned when mounted. Clean each pad from both sides from top to bottom.
– Remove the pad in case of heavy soiling and clean it on the floor. The pad may be thrown on the floor, without excessive using force, to break up deposited minerals and to make cleaning with a high-pressure cleaner easier.
– Remember to clean the pad from both sides and beat it afterwards to remove loose dirt from the pad.
– Continue with point 4 in chapter 6.2 ”Cleaning the Rainmaker 2 ® system”.

6.2.2 Cleaning the drip trough

Open the screw caps of the side parts before cleaning the drip trough to drain the process water. We recommend a high-pressure cleaner with fan nozzle or a pipe cleaning nozzle for cleaning. The pipe cleaning nozzle has the advantage that the pads must not be removed.

Fan nozzle:

– Remove the pads and the cover of the drip trough.
– Clean the drip trough starting from the pump towards the side(s). Let the dirt drain off the system via the opened side parts.
– Repeat this process until the entire drip trough is clean.
– Continue with point 5 in chapter 6.2 ”Cleaning the Rainmaker 2 ® system”.

Pipe cleaning nozzle:

– Open the screw caps of the side parts.
– Switch on the high-pressure cleaner and insert the nozzle at least up to the centre of the system. The nozzle moves forward nearly automatically due to the special jet arrangement.
– Now pull the nozzle slowly toward you until you have reached the opening.

– Repeat this process until the drip trough is clean.
– Also repeat this process for the other side of the system until the entire system is clean.
– Continue with point 5 in chapter 6.2 ”Cleaning the Rainmaker 2 ® system”.

6.2.3 Rinsing the pipes

– Fill the drip trough with clean water.
– Open the screw cap at the end of the nozzle line (in case of lateral supply) or both screw caps (in case of central supply). Depending on the design, ball valves might be installed instead of screw caps. Open them.
– Start the pump.
– Rinse for some minutes.
– Continue with point 6 in chapter 6.2 ”Cleaning the Rainmaker 2 ® system”.

If the distributing pipe is heavily soiled, we recommend cleaning it with a pipe nozzle. Proceed as follows:

– Open the screw caps at the end of the nozzle line. Depending on the design, ball valves might be installed instead of screw caps. Open them.
– Switch on the high-pressure cleaner and insert the nozzle at least up to the centre of the system. The nozzle moves forward nearly automatically due to the special jet arrangement.
– Now pull the nozzle slowly toward you until you have reached the opening.
– Repeat this process until the drip trough is clean.
– Also repeat this process for the other side of the system until the entire system is clean.
– Continue with point 6 in chapter 6.2 ”Cleaning the Rainmaker 2 ® system”.

6.3 Algae treatment

To prevent or reduce algae growth, the pads should be protected from direct sunlight. To stop the growth of algae and biological organisms, the pads must additionally dry every 24 hours.

If these measures do not have any effect, it may be necessary to add a water purification mixture. Let your local agricultural agent advise you regarding a recommended chemical agent for water purification.

NOTICE!

Chemicals can damage the components of the pad cooling system!

► Before use, make sure that the chemicals do not damage the material. In particular, check the resistance of the pads and the pump.

6.4 Information regarding silicon dioxide for mite control

We would like to explain this topic briefly in order to avoid damage to the drive units caused by the incorrect application of silicon dioxide in the future.

In poultry houses, amorphous silicon dioxide is used as a biocide to eliminate harmful insects, such as red mites. It is also distributed under the trade name M-Ex Profi 80.

How it works: Silicon dioxide destroys the wax layer which surrounds the mites. The mites then dry out. The white powder is dissolved in water at a ratio of 1:6 to create a suspension that can easily be sprayed onto surfaces and equipment in the house using standard spraying technology.

The agent is easy to use, very effective and relatively inexpensive. Practical use has shown that the rough surface of the applied suspension causes extreme wear and tear on moving parts made of plastic or metal, however. Lubricants such as oils and greases are destroyed by silicon dioxide.

6.5 Prevention of legionella

To prevent the spreading of germs and bacteria such as legionella, the water should be replaced at regular intervals and the system should be dried completely for a certain period. The frequency depends on the water quality and climatic conditions.

7 Troubleshooting

Increased pressure loss of the system	Pads soiled (mineral deposits/ algae/dirt)	Clean the pads (chapter 6.2.1 ”Cleaning the pads”).
		Shorten the cleaning intervals.
		Replace the water in the drip trough more often.

Too many minerals deposit in the pads in a short time.	Too little water is drained via the "“bleed off".	Check whether the bleed off is adjusted correctly. Increase the bleed-off amount, if necessary (chapter 4.5 ”Bleed off”).
	Too many on/off cycles	Reduce the number of on/off cycles
	Hard water (high mineral content)	Replace the water store more often and clean the drip trough (chapter 5 ”Maintenance”).

Algae growth in the pad cooling system	Direct sunlight	Protect the system against direct sunlight Ensure a sufficient distance to the pad to prevent influencing the air flow.
	The pad is kept moist for too long	Let the pad dry once per day (for example during the night).
		Let the pad dry and clean it afterwards (chapter 6.2.1 ”Cleaning the pads”).
	Phosphate and nitrate in the water	Avoid the use of chemicals, disinfectants and cleaners. They often contain phosphate and nitrate, which promotes algae growth.
		Replace the water store more often and clean the drip trough to keep the nutrient concentration low (chapter 5 ”Maintenance”).

Dry spots occur on the pads	Holes in the top profile clogged	Check whether water sprays through all holes of the top profile. Clean clogged holes or the entire top profile, if necessary.
	Water pressure too low	Check the set water pressure (chapter 4.2 ”Adjusting the system”) and adjust it at the ball valve, if necessary.
		Check the pre-filter of the pump and clean it.

Too little water in the drip trough	Float valve does not work	Check whether the float valve functions and clean it
		Replace the valve.
	Water pressure too low	Check the set water pressure (chapter 4.2 ”Adjusting the system”) and adjust it at the ball valve, if necessary.

Water drips from the pads	Pads installed incorrectly	Check whether the pads have been installed in the right direction. If necessary, turn the pad around (chapter 5.5 ”Replacing the pads”).
		Check whether the pads are vertically aligned.
	Pads are too short and not sufficiently hold in the guiding profile	If possible, lay something underneath the pads to lift them.
		Replace the pads by a higher version or lower the upper profile.
	Air speed too high	Clean the pads (chapter 6.2.1 ”Cleaning the pads”).
	Water pressure too high, too much water on the pads	Check the set water pressure (chapter 4.2 ”Adjusting the system”) and adjust it at the ball valve, if necessary.
	Distributing pipe not correctly installed	Check whether the lettering "Made in Germany" is visible and correctly aligned (chapter 4.2 ”Adjusting the system”). Adjust it, if necessary.
	Guiding profile incorrectly installed	Check whether the guiding profile is clicked in the pipe clip and connected with the couplers.
		Check whether the profile is pressed against the wall and does not hang freely.
	Deflector incorrectly installed	Check whether the deflector is clicked in the pipe clips and connected with the couplers.

Drip trough or top profile tear in winter	System was not winterized	Check whether the water was drained and the entire system has been winterized (chapter 4.7 ”Winterising Rainmaker 2 ®”).
		Close any leaks (chapter 5.6 ”Instructions for the glueing of the drip trough”).

The pump does not work	No voltage at the pump	Check the power supply and contact an electrician, if necessary.
	Electrical and mechanical defect at the pump	To order spare parts, contact your distributor.
		Install (if not yet done) a guard cap over the pump which protects it from sunlight and weather.

During operation, air bubbles form in the pump's filter chamber.	Leaks in the pump's suction line.	Check the screwing and the glued joints of the suction line. Repair it.

Light spots between the pads	Pads not installed correctly in the system	Correct the position of the pads and fix them correctly with the pad retainers.

Leaking pipe	Adhesive fittings poorly glued	Close any leaks (chapter 5.6 ”Instructions for the glueing of the drip trough”).
	Pipe torn	

The cooling effect is not sufficient	The water distribution on the pads is insufficient	Check the set water pressure (chapter 4.2 ”Adjusting the system”) and adjust it at the ball valve, if necessary. Please note that too much water causes water leakage!

The ball valve cannot be moved	The ball is sticking/is fixed	Loosen the ball by turning the valve carefully back and forth.
		Replace the ball balve.

8 Spare parts

8.1 Elements for water supply

NOTICE!

Connect the water supply to the float valve with a hose.

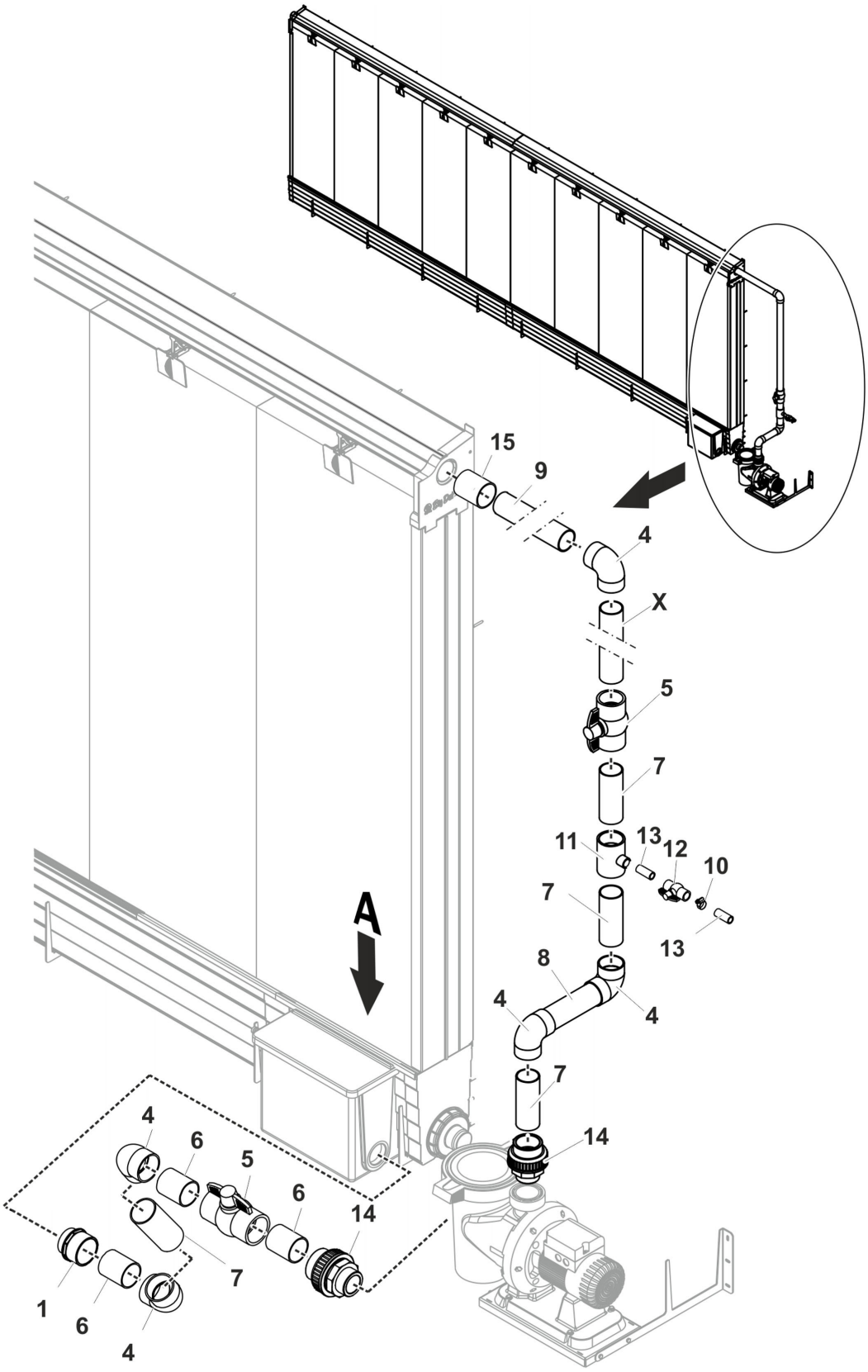
8.1.1 Technical data for the centrifugal pump

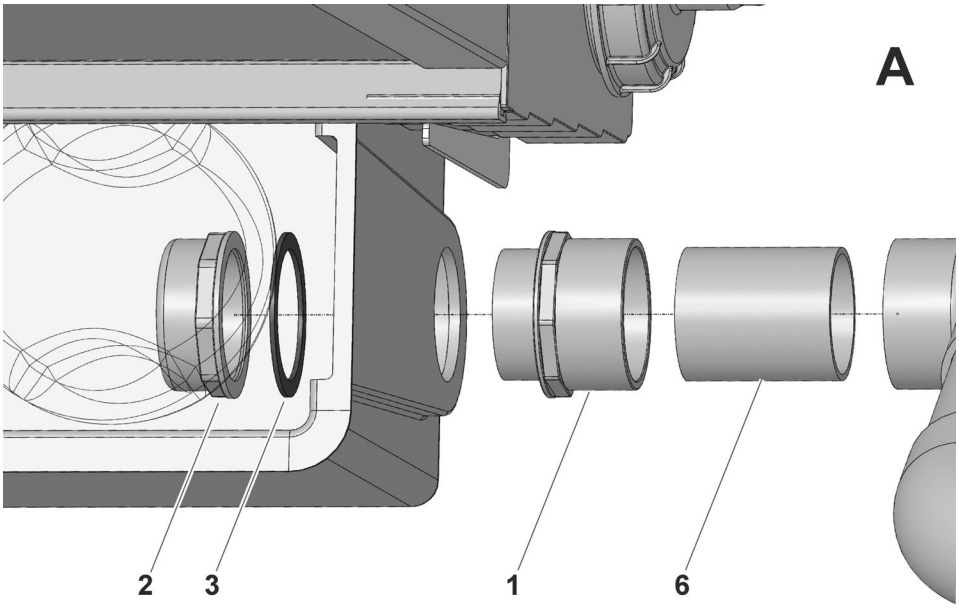
- Max. ambient temperature 50 °C
- Max. water temperature 60 °C
- Protection class IP 55

NOTICE!

To increase the pump's service life, always attach the pump cover to protect the pump from the weather (e.g. rain, hail and direct sunlight).

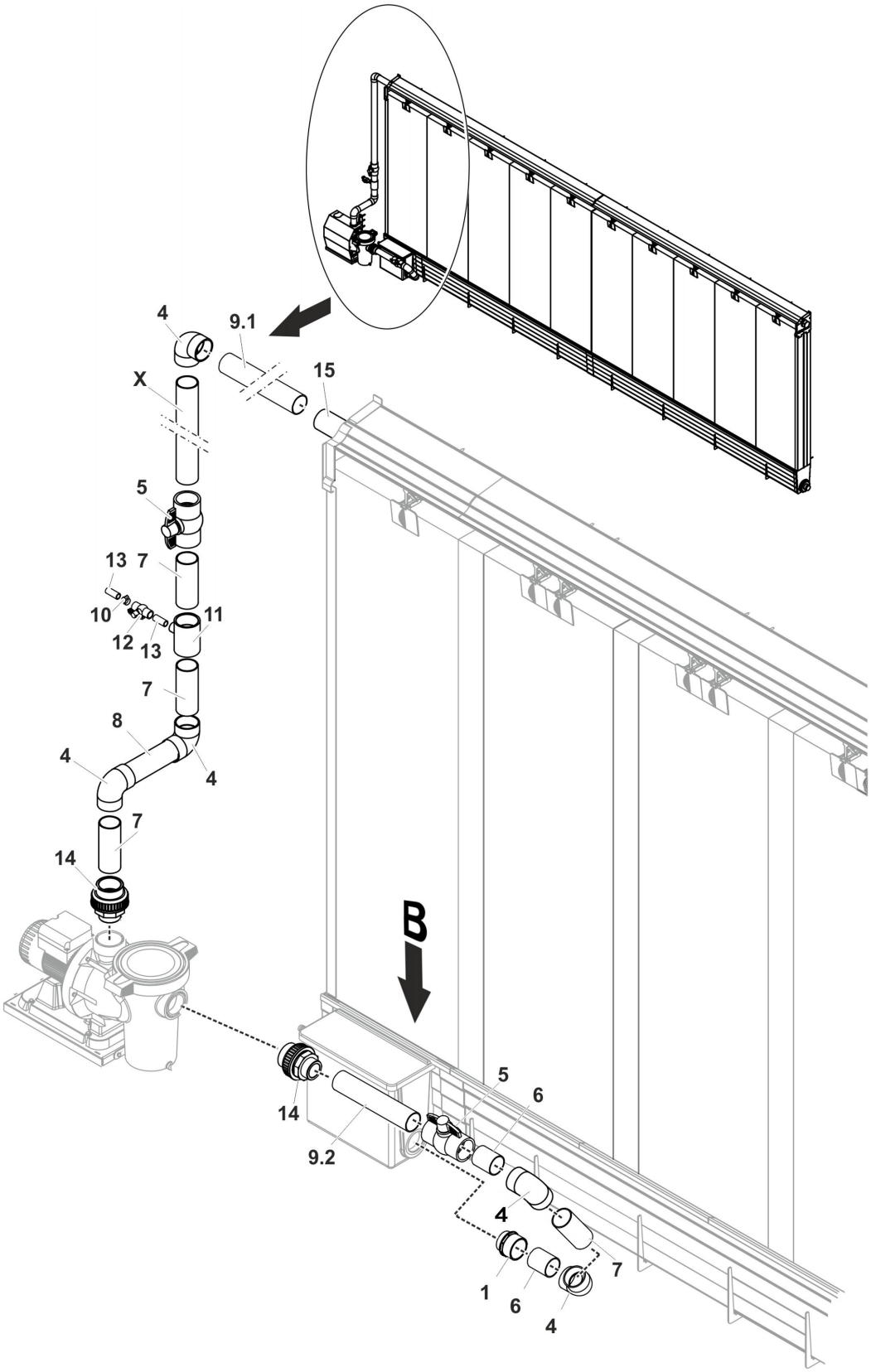
8.2 Supply from the right

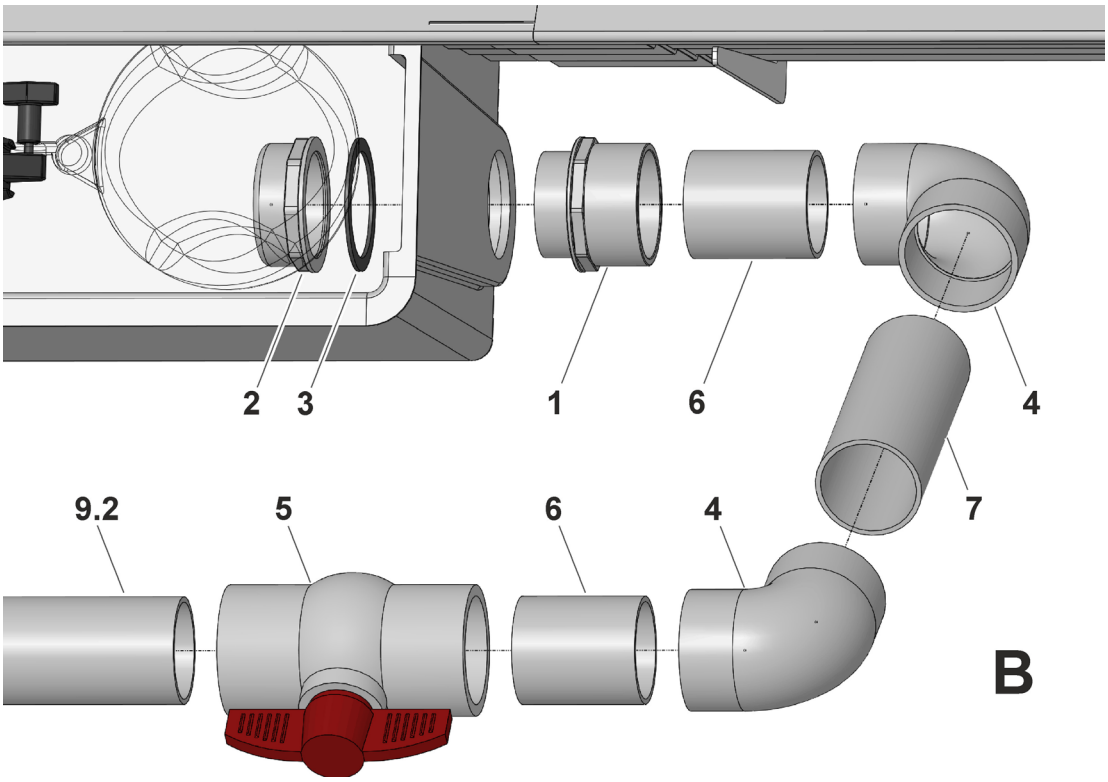




Pos.	Code no.	Description
1	83-16-5727	Adapter nipple 2" x 2" m PVC white for Rainmaker
2	83-17-8951	Nut 2" fm PVC white for adapter nipple 2" x 2" m PVC white
3	83-16-5734	Flat gasket 2" for adapter nipple 2" x 2" m PVC white
4	83-17-4850	Elbow 90° PVC white 2" 2 x stick-on-sleeve
5	83-16-4790	Ball valve 2" PVC white 2 x stick-on sleeve
6	99-40-3872	Pipe 2" x 70 PVC white
7	99-40-3873	Pipe 2" 150 PVC white
8	99-40-3878	Pipe 2" 230 PVC white
9	99-40-3879	Pipe 2" x 590 PVC white
10	30-00-3709	Hose clamp stainless steel W2 9 mm DIN 3017 20-32mm
11	83-16-2313	T-piece PVC 2" x 1/2" x 2" white 2 x stick-on sleeve
12	83-16-4791	Ball valve 1/2" PVC white 2 x stick-on sleeve
13	99-40-3882	Pipe 1/2” x 45 PVC white
14	83-16-2326	Screw union 2" fm x 2" m NP16
15	60-50-0137	Socket elastic for nozzle pipe RM2
X		Cut to fit

8.3 Supply from the left





Pos.	Code no.	Description
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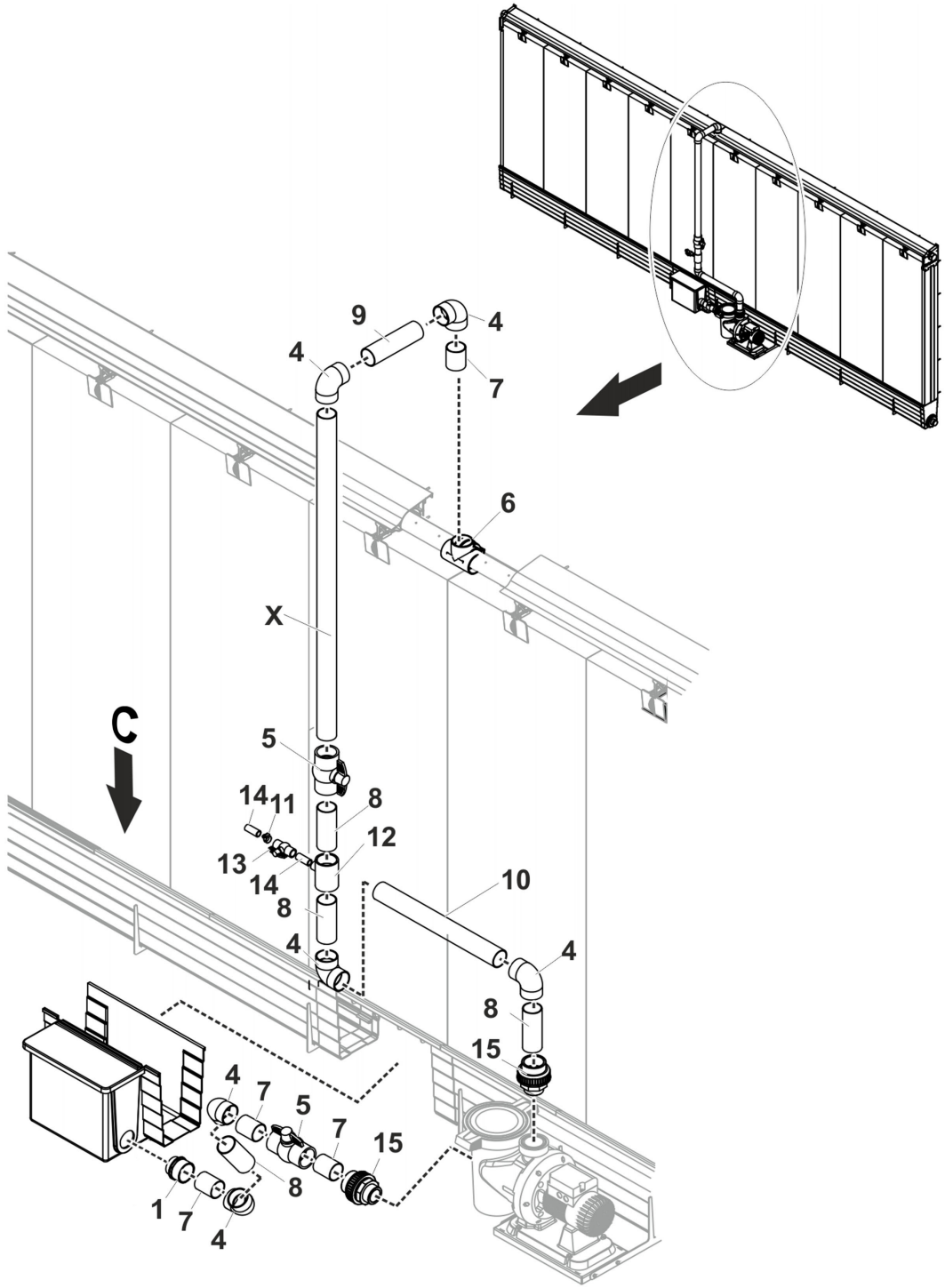
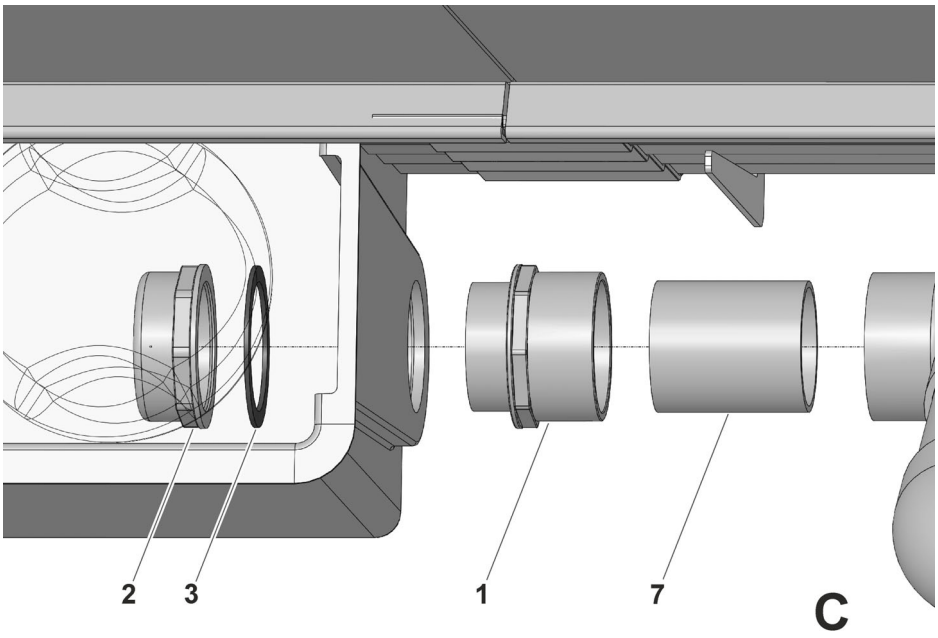
2	83-17-8951	Nut 2" fm PVC white for adapter nipple 2" x 2" m PVC white
3	83-16-5734	Flat gasket 2" for adapter nipple 2" x 2" m PVC white
4	83-17-4850	Elbow 90° PVC white 2" 2 x stick-on-sleeve
5	83-16-4790	Ball valve 2" PVC white 2 x stick-on sleeve
6	99-40-3872	Pipe 2" x 70 PVC white
7	99-40-3873	Pipe 2" 150 PVC white
8	99-40-3878	Pipe 2" 230 PVC white
9.1	99-40-3879	Pipe 2" x 590 PVC white cut to 200 mm
9.2	99-40-3879	Pipe 2" x 590 PVC white cut to 300 mm
10	30-00-3709	Hose clamp stainless steel W2 9 mm DIN 3017 20-32mm
11	83-16-2313	T-piece PVC 2" x 1/2" x 2" white 2 x stick-on sleeve
12	83-16-4791	Ball valve 1/2" PVC white 2 x stick-on sleeve
13	99-40-3882	Pipe 1/2” x 45 PVC white
14	83-16-2326	Screw union 2" fm x 2" m NP16
15	60-50-0137	Socket elastic for nozzle pipe RM2
X		Cut to fit

8.4 Central supply

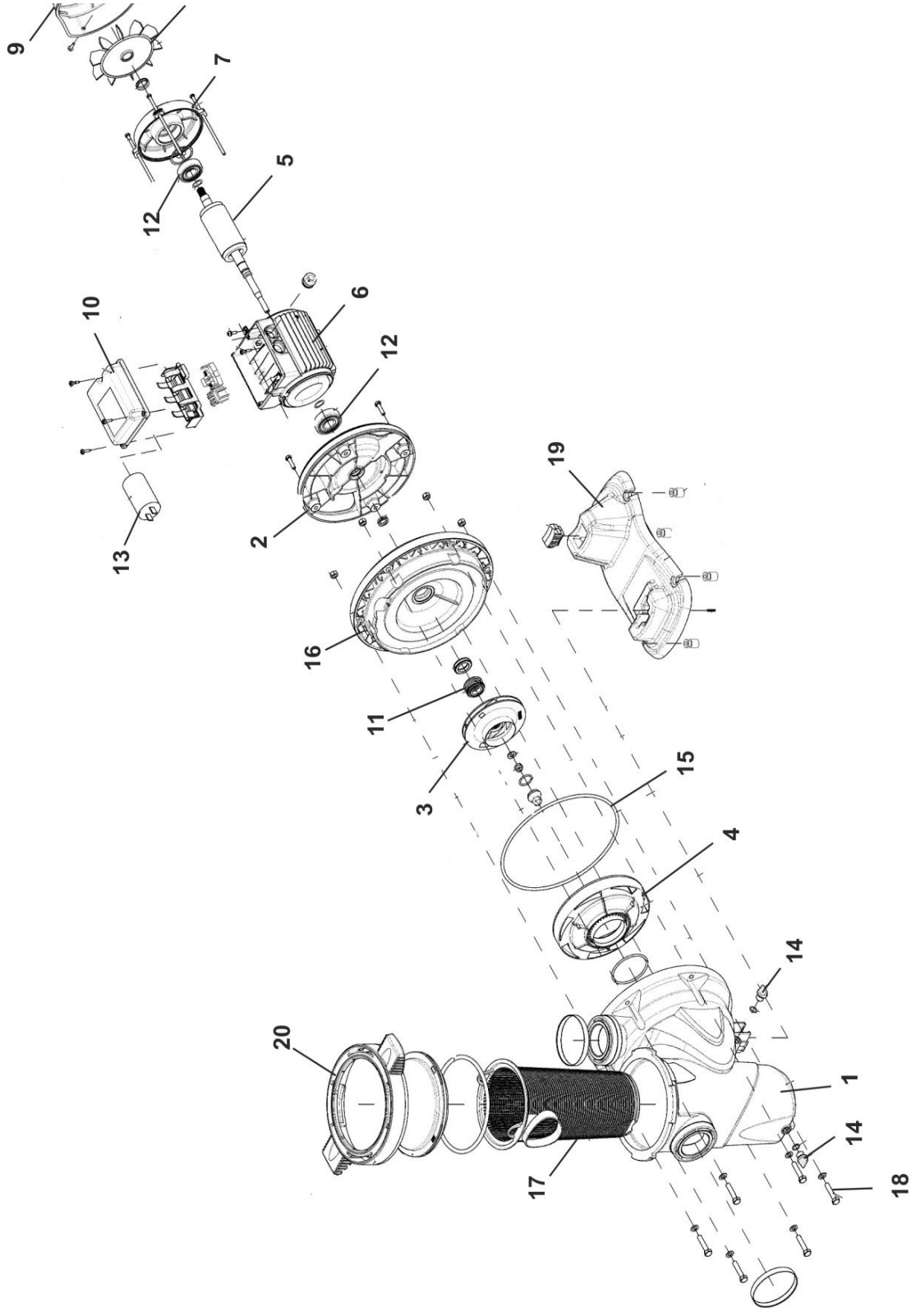
Water is supplied into the distributing pipe through a T-piece. Use a saw to cut out a piece of the deflector for the T-piece. The distributing pipes must be glued to the T-piece.





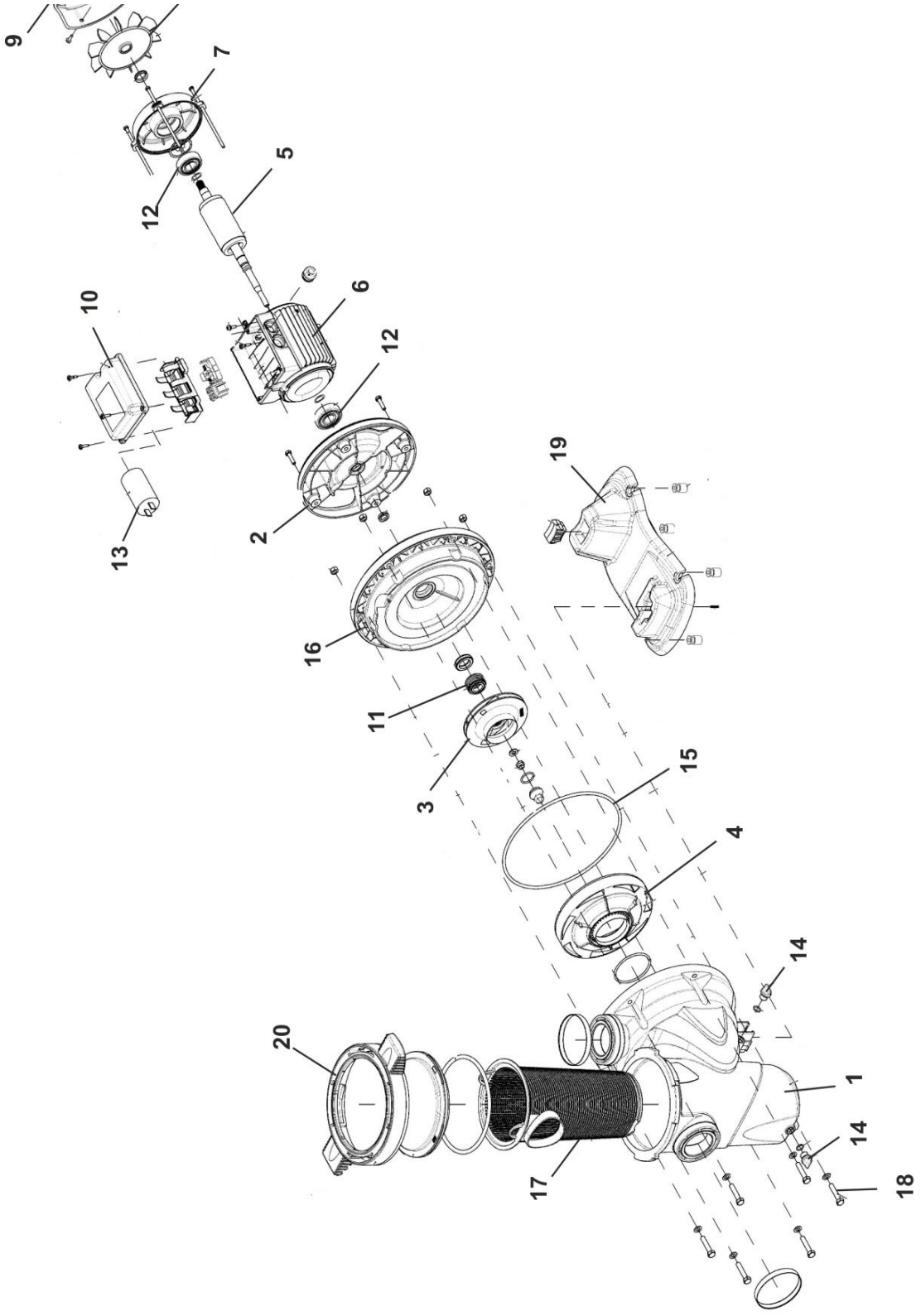
Pos.	Code no.	Description
1	83-16-5727	Adapter nipple 2" x 2" m PVC white for Rainmaker
2	83-17-8951	Nut 2" fm PVC white for adapter nipple 2" x 2" m PVC white
3	83-16-5734	Flat gasket 2" for adapter nipple 2" x 2" m PVC white
4	83-17-4850	Elbow 90° PVC white 2" 2 x stick-on-sleeve
5	83-16-4790	Ball valve 2" PVC white 2 x stick-on sleeve
6	62-00-3702	T-piece PVC 2" x 2" x 2" white 2 x stick-on sleeve
7	99-40-3872	Pipe 2" x 70 PVC white
8	99-40-3873	Pipe 2" 150 PVC white
9	99-40-3878	Pipe 2" 230 PVC white
10	99-40-3879	Pipe 2" x 590 PVC white cut to 200 mm
11	30-00-3709	Hose clamp stainless steel W2 9 mm DIN 3017 20-32mm
12	83-16-2313	T-piece PVC 2" x 1/2" x 2" white 2 x stick-on sleeve
13	83-16-4791	Ball valve 1/2" PVC white 2 x stick-on sleeve
14	99-40-3882	Pipe 1/2"x 45 PVC white
15	83-16-2326	Screw union 2" fm x 2" m NP16
X		Cut to fit

8.5 Centrifugal pump Euroswim 50M 50 Hz 4.2 A



Pos.	Code no.	Description
1	81-35-0667	Pump body Euroswim R0010334
2	on request	Support
3	81-36-6577	Impeller Euroswim 50 (no. 4) R00010339
4	81-36-8098	Diffusor Euroswin-Europro
5	on request	Shaft (Pos 7) Euroswim 100
6	81-37-1319	Pad cooling pump motor Euroswin 100 M 230 V, 50 Hz
7	on request	Motor cover
8	on request	Fan
9	on request	Fan guard cap
10	81-36-8810	SP − TERMINAL BLOCK, Pos. 14+53+324+319+61+72
11	81-34-8697	Gasket kit no. 16 (radial seal ring and case O-ring) for 62-00-3615, supply article no. R00010355
12	on request	Rear bearing 6202-2RSH
13	81-36-8854	Capacitor 16 µF for centrifugal pump Euroswim 50
14	81-37-8621	Plug Euroswim (no. / 25/26) R00010339
15	81-34-3148	O-ring NBR
16	on request	Flange
17	81-33-1808	Filter for centrifugal pump Euroswim 50M/100M
18	on request	Screw set
19	81-35-7770	Base (centrifugal pump Euroswim 62-00-3610)
20	81-36-9789	Filter cover for centrifugal pump Euroswim 50M 220-230 V 50 Hz

8.6 Centrifugal pump Euroswim 100M 50 Hz 6.3 A



Pos.	Code no.	Description
1	81-35-0667	Pump body Euroswim R0010334
2	on request	Support
3	81-36-6577	Impeller Euroswim 50 (no. 4) R00010339
4	81-36-8098	Diffusor Euroswin-Europro
5	on request	Shaft (Pos 7) Euroswim 100
6	81-37-1319	Pad cooling pump motor Euroswin 50M/100M 230 V, 50 Hz
7	on request	Motor cover
8	81-35-7764	Fan (centrifugal pump Euroswim 62-00-3610)
9	81-35-7768	Fan guard cap (centrifugal pump Euroswim 62-00-3610)
10	81-36-8810	SP − TERMINAL BLOCK, Pos. 14+53+324+319+61+72
11	81-34-8697	Gasket kit no. 16 (radial seal ring and case O-ring) for 62-00-3615, supply article no. R00010355
12	on request	Rear bearing 6302-2RSH
13	62-00-3613	Capacitor 25 µF / 230 V for centrifugal pump Euroswim 100M
	62-00-3616	Capacitor 80 µF / 230 V for centrifugal pump Euroswim 100M 60 Hz
14	81-37-8621	Plug Euroswim (no. / 25/26) R00010339
15	81-34-3148	O-ring NBR
16	on request	Flange
17	81-33-1808	Filter for centrifugal pump Euroswim 50M/100M
18	on request	Screw set
19	81-35-7770	Base (centrifugal pump Euroswim 62-00-3610)
20	81-36-9789	Filter cover for centrifugal pump Euroswim 50M 220-230 V 50 Hz

9 Dismantling and disposal

NOTICE!

When disposing of the system, commission experts only.

The operator is responsible for disposing of the system at the end of its service life. Observe the applicable statutory provisions when disposing of the system.

NOTICE!

Incorrect disposal can lead to environmental damage.

► The system and individual parts must be disposed of properly!

► If necessary, commission a specialised company with the disposal.

NOTICE!

Observe system-specific safety instructions during dismantling.

10 Checklist for initial operation / return to operation Rainmaker 2 ®

NOTICE!

This checklist can also be found as annex at the end of the manual. Make sure to cut this page along the line from the manual and keep it safe as ***blank*** master copy!

To prevent damage to the system, observe the following points before first operating the system and when putting it back into operation (e.g. after the winter months). Put the system into operation only when all points have been met.

Before first putting the system into operation

- ☐ Is the power supply connected correctly?
- ☐ Is the water supply connected to the float valve and is the water pressure sufficient?
- ☐ Is the drip trough filled up to the marking?
- ☐ Is the pre-filter of the pump filled and the cover closed?
- ☐ Is the distributing pipe aligned correctly?
- ☐ Are all ball valves open?
- ☐ Are the pads aligned correctly?

Adjustment of the system

- ☐ Is the system adjusted correctly? (The water jet at the end of the system should be approx. 20 to 25 cm.)
- ☐ Is the bleed off adjusted correctly? (10 % of the amount of water provided by the water supply)

11 Annex

Checklist for initial operation / return to operation Rainmaker 2 (template for copying)

Checklist for initial operation / return to operation Rainmaker 2

To prevent damage to the system, observe the following points before first operating the system and when putting it back into operation (e.g. after the winter months). Put the system into operation only when all points have been met.

Before first putting the system into operation

- ☐ Is the power supply connected correctly?
- ☐ Is the water supply connected to the float valve and is the water pressure sufficient?
- ☐ Is the drip trough filled up to the marking?
- ☐ Is the pre-filter of the pump filled and the cover closed?
- ☐ Is the distributing pipe aligned correctly?
- ☐ Are all ball valves open?
- ☐ Are the pads aligned correctly?

Adjustment of the system

- ☐ Is the system adjusted correctly? (The water jet at the end of the system should be approx. 20 to 25 cm.)
- ☐ Is the bleed off adjusted correctly? (10 % of the amount of water provided by the water supply)