

User manual

Rainmaker®

Code No. 99-97-0362

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These instructions are a translation of the original instructions!

EC Declaration of conformity



Big Dutchman

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In accordance with EC Directives:

- **Machines 2006/42/EG, Annex II / Part 1 / Chapter A**

Further applicable EC directives:

- Electromagnetic compatibility 2004/108/EC
- Low voltage 2006/95/EC



The product mentioned below was developed, constructed and produced in accordance with the above mentioned EC Directives and under sole responsibility of Big Dutchman.

Description:	System for evaporative cooling in livestock facilities
Type:	Rainmaker
System no. and year of construction:	see customer order no.

The following harmonised standards apply:

- EN ISO 12100:2010 Safety of machinery - General principles for design - Risk assessment and risk reduction (ISO 12100:2010)
- EN 60204-1:2006/AC:2010: Safety of machinery - Electrical equipment of machines Part 1: General requirements

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16.01.2010

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Place

Date

Signer and information regarding signer

Signature

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1 Basic instructions



Please take care of this manual and always keep it in the same place close to the installation for quick reference. All persons working with the system, assembling, cleaning and servicing have to be familiar with the contents of these instructions.

Please observe the contained safety instructions!

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

1.1 Basics

The **Big Dutchman** installation has been constructed according to the current state of the art and all acknowledged regulations regarding technical safety. The installation is reliable. Upon operation, however, dangers to life and limb of the user or third persons or impairments of the system or other material property are still possible.

The system may only be mounted, attended, repaired and used:

- for due use
- in an excellent state from the safety and technical point of view
- by persons who are familiar with the safety regulations

In the event of special problems which are not described in detail in this manual, we recommend to contact us for your own safety.

1.2 Designated use

The **Big Dutchman** Rainmaker® serves to reduce the air temperature through evaporative cooling, by means of passing the incoming air across a damp surface (the pads).

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

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

1.3 Avoidance of foreseeable misuse

The following uses of the **Big Dutchman** Rainmaker® are not permitted in principle and are considered misuse:

- The use outdoor, especially in areas that are susceptible to frost.
- The use of the system where the temperature inside the house is below 0°C.
- Utilising the system with aggressive and/or corrosive materials in quantities that do not constitute good professional practise.




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

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

1.4 Explaining the symbols


1.4.1 Safety symbols in this manual

Upon reading this **manual** you will come across the following symbols


	<p>WARNING</p> <p>This symbol indicates risks possibly leading to personal injury resulting in death or to severe injuries.</p>
	<p>CAUTION</p> <p>This symbol indicates risks or insecure procedures possibly leading to injuries or material damage.</p>
	<p>NOTE</p> <p>This symbol indicates notes leading to an effective, economic and environmentally-conscious handling of the installation.</p>

1.4.2 Safety symbols in the manual and on the installation

These safety symbols illustrate remaining dangers when handling the system. They are supplements to the above-mentioned symbols:





	<p>Warning against dangerous electrical voltage</p>
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	<p>Warning against the cold</p>
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	<p>Warning against slippery surface</p>
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1.4.3 Safety symbols and notes on your installation

Depending on the type of installation you will find the following safety symbols. They indicate technically remaining dangers when handling the system and give information on how to avoid these dangers.

	<p>GENERAL DANGER!</p> <p>Installation automatically starts working. Before starting repair, maintenance or cleaning work, put main switch to "OFF".</p>
	<p>Danger of bruising due to rotating machine parts!</p> <p>Close protective devices each time before taking the system into operation. Opening protective devices is only allowed when the system is in a standstill and by authorised persons.</p>
	<p>RISK OF INJURY due to operating auger, chain or cable discs!</p> <p>Never reach into or climb into a feed container or trough while the motor is running.</p>
	<p>DANGER OF SKIN CORROSION due to purifying agents!</p> <p>Always wear protective clothing when repairing, maintaining and cleaning the installation. Always observe the manufacturer's instructions when using acids!</p>

Observe the instructions attached to the installation, such as the arrow on the motor indicating the direction of rotation.

The signs and safety instructions always have to be visible and must not be damaged. If they are soiled by dust, manure, feed remains, oil or grease, clean them by means of a water-detergent mixture.

	<p>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.</p>
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1.5 Ordering spare parts



Operational safety is the prime necessity!

For your own safety only use original **Big Dutchman** spare parts. For foreign products that have not been released or recommended or for modifications carried out (e.g. software, control units) we cannot judge whether there is a safety risk in connection with the **Big Dutchman** systems.

Indicate the following for ordering spare parts:

- Code no. and description of the spare part or
- Invoice no. of original invoice
- Current supply, e.g. 230/380 V 50/60 Hz

1.6 Obligations

Closely adhere to the instructions in this manual.

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

These mounting and operating instructions, particularly the safety instructions, have to be observed by everyone working with this system. Moreover, the regulations and instructions for the prevention of accidents valid at the respective place of use have to be observed.

The manufacturer is not responsible for any damages to the machine resulting from changes done by the user.

1.7 Warranty and liability

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

- non-designated use of the installation
- inappropriate mounting and operating of the system
- operating the system with defective safety equipment or not duly fixed or not functioning safety and protective devices,
- non-observance of the instructions in this manual regarding transport, stock keeping, mounting, maintenance, operating and upgrading of the system
- unauthorised modifications on the system
- inappropriate repairs
- in the event of disasters caused by foreign matters or force majeure.

1.8 Disorders due to power failure

We recommend the installation of warning systems for a better monitoring of your production units and the installation of an emergency power-generating set for adequate supply with power in case of power failure. With this, you protect the animals and thus your own economical health. For further information please contact your property insurance.

1.9 First aid

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

If you need help, describe the accident as follows:

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

1.10 Pollution abatement regulations

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

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

1.11 Waste disposal

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

1.12 Notes for use

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

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

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

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

1.13 Copyright

This manual is subject to copyright. The information and drawings included in this manual shall not be copied without the manufacturer's consent, nor shall they be used for anything other than the designated use. Neither shall they be disclosed to third parties.

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

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2 Safety instructions

These mounting and operating instructions, particularly the safety regulations, have to be observed by all persons working on this system. Moreover the regulations for accident prevention valid for this place have to be observed!

2.1 General safety instructions




All established safety precautions and other generally accepted safety regulations and medical references have to be observed. Please check safety and function control devices to ensure safe and accurate operation:



- before putting into operation
- at adequate time intervals
- after modifications or repairs.

Check the proper functioning of the system after any kind of repair works. You may only take the device into operation when all protective systems have been put into place again. Follow the directions of the electric and water supply company.

2.2 Safety instructions when operating electrical appliances

You have to ensure that the system with the electrical appliances is operated and maintained according to the electro-technical regulations.

	Installation and work on electric components/structural groups may only be carried out by qualified personnel according to electro-technical regulations (e.g. EN 60204, DIN VDE 0100/0113/0160).
	Dangerous electric tensions are bare in case of open control equipment. Be aware of the danger and keep workers of other professions away from the danger zone!
	Do not install control devices directly in the house, but in the service room to prevent corrosion caused by ammonia gas.

	Warning
	Never repair or bypass the fuses!
	Damaged fuses have to be replaced with new fuses!

Immediately switch off the installation in the event of malfunctions of the power supply units. Use a bipolar voltage probe to make sure that the electrical equipment is not alive.

Check the electrical wiring and cables for recognisable damage before putting the device into operation. Replace damaged wiring and cables before taking the device into operation.

Only use the fuses indicated in the circuit diagram. Immediately replace damaged fuses. Never repair or bypass the fuses!

Never cover the electrical motor. This can cause high temperatures resulting in fire and a break-down of the equipment.

The control box as well as the terminal and connector boxes of the installation must always be kept shut.

Let damaged or broken plugs be replaced by an electrician.

Do not pull the plug from the socket at the flexible cable.

For the respective connections please see the enclosed connecting plan of the system parts delivered.

2.3 System safety instructions

2.3.1 Danger zone



Never reach into the running installation. Before reaching into the installation, turn the system off and secure it against unintentional actuation.

Assure yourself beforehand that the main switch is in the OFF position and can not be put in the ON position without your knowledge.

The different areas of the **Big Dutchman** installations are characterised by different types of construction.

There are several system parts that run out, rotate or slide that can increase the risk of an accident when you are unaware of the type of construction.

There are hazard areas where a risk of injury exists

- due to rotating parts
- due to electrical current in case of non-reliable or defective switching-off of overload current.

2.3.2 Entire system

- Parts lying about on the system or around it can cause you to stumble or fall so that you can get injured by the constructional parts of the system.
- Ignorance of the constructional structure of the system can lead to injuries.
- Parts lying about in / on the components (e.g. in the feed trough, on the egg belt, in the nests etc.) can severely damage the system.



After repair or maintenance work, never place any objects (e.g. spare parts, replaced parts, tools, cleaning implements etc.) in the accessible areas of the system or around it!

Make sure that all loose or replaced parts have been removed from the system components **before** the system is taken into operation again!


Make yourself familiar with the construction of the system in sufficient light! If this is not possible at site, get all available information on the remaining dangers in connection with this system!

When working **under** the installation, always wear a safety helmet!

2.3.3 Individual components


2.3.3.1 Water supply


- Leaky hoses, seals or nipple drinkers can cause water damage in the house and destroy the installation and electrical systems.
- Danger of electric shock
- Danger of short circuits

	<p>First disconnect main power supply and then enter the house compartment!</p> <p>If you have to carry out maintenance, cleaning or repair work get the information beforehand, where the main electric switch is located.</p> <p>Put main switch to "Off" and indicate maintenance or repair work by a sign fixed to the main switch!</p> <p>Immediately disconnect main water supply!</p>
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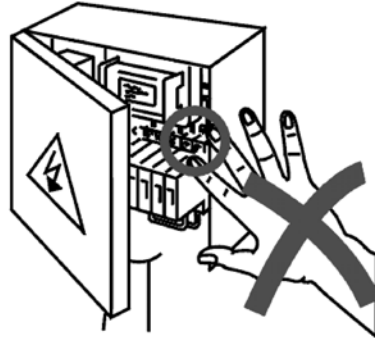
2.3.3.2 Ventilation system

- Rotating fans can lead to severe injuries.
- Fans can start due to their automatic control units.

	<p>Never reach through the protective grills or blade flaps into a fan, even if it is not in operation!</p>
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	<p>Before carrying out repair or maintenance work, disconnect power supply and indicate this by a sign fixed to the main switch!</p>
---	--

2.3.3.3 Electrical components

**High electric tension!**

If touching live parts, severe injuries due to electric shocks are possible!

During repair or maintenance work, live elements can be bare!


Never touch bare electrical components. Staff members must not use machines with bare electrical components.

2.4 Personal safety instructions




These safety instructions are intended to make you familiar with all information regarding the system that are important for your safety and that of the system.

Maintenance may only be carried out by specially trained and briefed users.

Keep with the safety instructions in this manual.

	<p>Missing knowledge on the structural design of the installation can lead to injuries.</p> <p>Make yourself familiar with the design and construction of the installation. Inform yourself and your colleagues about the remaining dangers in connection with this installation!</p>
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2.4.1 Clothing for personal safety

	<p>Wear close-fitting clothes when carrying out mounting, maintenance and cleaning work at the installation.</p>
	<p>Do not wear rings, necklaces, watches or other items which could get caught at parts of the installation.</p>
	<p>Never work with long hair that is not tied together. Your hair could get caught in moving devices or system parts and thus cause serious injuries.</p> <p>During all mounting, maintenance and cleaning work at the installation, wear protective clothes and shoes as well as safety glasses and gloves if required.</p>

2.4.1.1 Clothing and footwear

- Wide, fluttering clothes increase the risk of an accident.
- Wide pieces of clothing, ties, scarves etc. can get caught in the moving or rotating system parts.
- High heels are a safety risk.
- If you stumble, you can knock against sharp-edged, moving or rotating system parts and get severely injured.



Secure wide, fluttering clothes or take them off!

When working at or on the system, only wear slip-free footwear and safety shoes when replacing heavy system parts!

2.4.1.2 Jewellery

- Loose or large jewellery increases the risk of an accident.
- The large or loose parts of jewellery can get caught in components of the installation.



Take off all jewellery, particularly necklaces, bracelets and rings!

2.4.1.3 Hair

- Long hair increases the risk of an accident.
- Long hair can get caught in moving or rotating system parts.



Secure long hair by tying it back or wearing a bandanna or cap!



2.4.2 Assembly and maintenance

Assembly of the installation can be carried out by the farmer himself or by an authorized person. We assume that the operator or authorized person either have some sort of technical training or have the necessary knowledge or practical experience that are a main condition for a proper assembly of the installation.

Repairs must only be carried out by persons who can guarantee for a proper execution on the basis of their training or their practical knowledge and experiences. Only the owner or the operator have the power of such a decision.

Every electrical work must only be carried out by qualified electricians according to the respectively valid electrical regulations such as DIN, VDE, safety regulations and the prescriptions of the local electric power supply companies or the regulations valid in the country.

Only work with appropriate tools; in case of possible danger to hands, use protective gloves, and safety glasses in case of danger to the eyes.

	Always switch off the installation, disconnect the power supply and make sure that the installation cannot be switched on again before carrying out any repair, maintenance and cleaning work or before removing any malfunction.
	Secure the installation by putting a fixed sign at the main switch "Do not activate!" and if required add the note that maintenance work is carried out.

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

2.4.3 Employing external personnel

Mounting, maintenance and repair work is frequently carried out by non-operating personnel not familiar with the special circumstances and the inherent dangers.



As supervisor, you are responsible for the safety of external personnel!

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

2.5 Safety contrivances



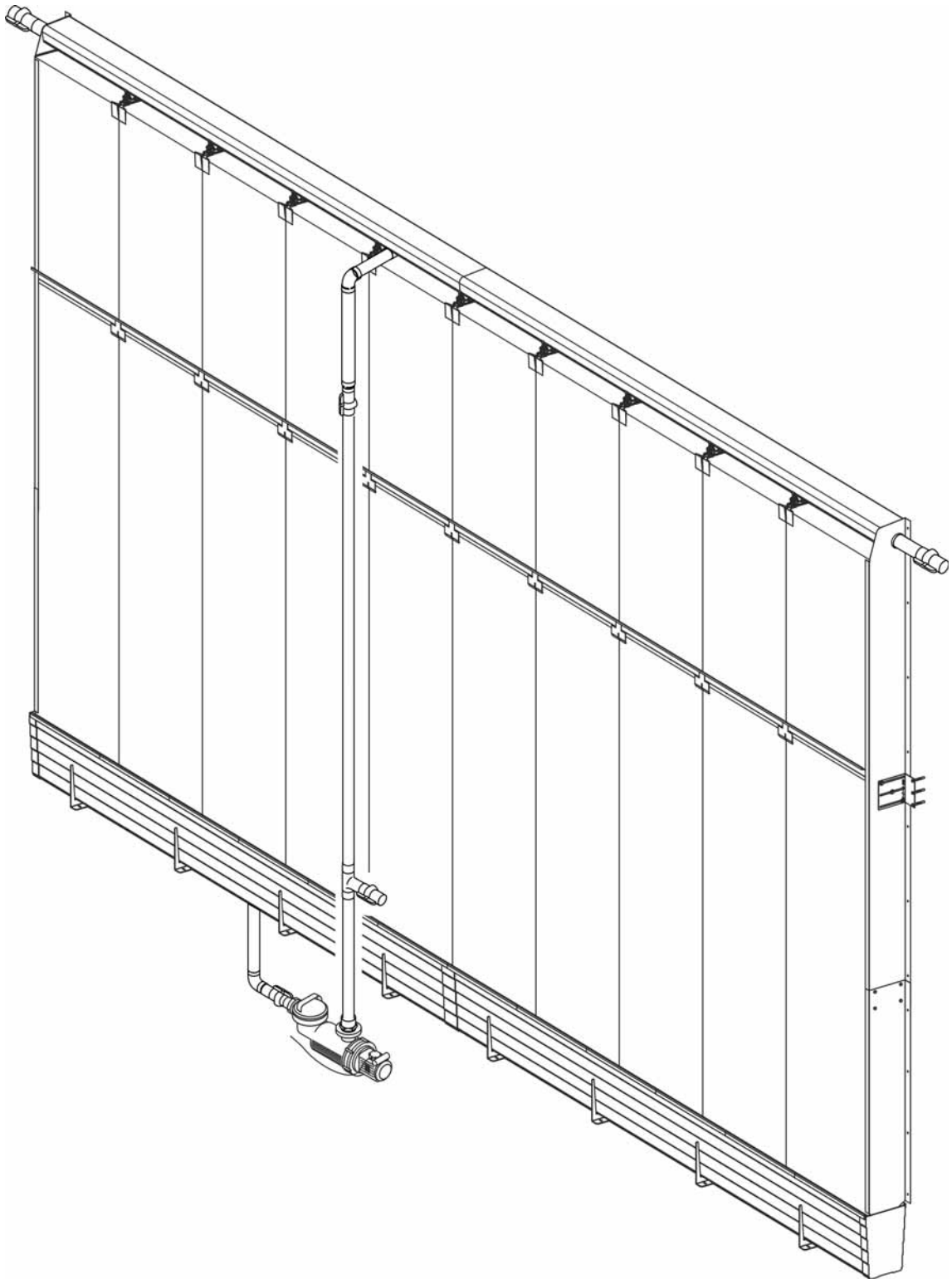
It is strictly forbidden to remove or put out of operation any safety contrivances. This leads to risk of injury and danger of life! Should the safety devices be damaged, the system has to be put out of operation immediately. The main switch has to be locked in zero position.

2.6 Dangers resulting from non-compliance with the safety instructions

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

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

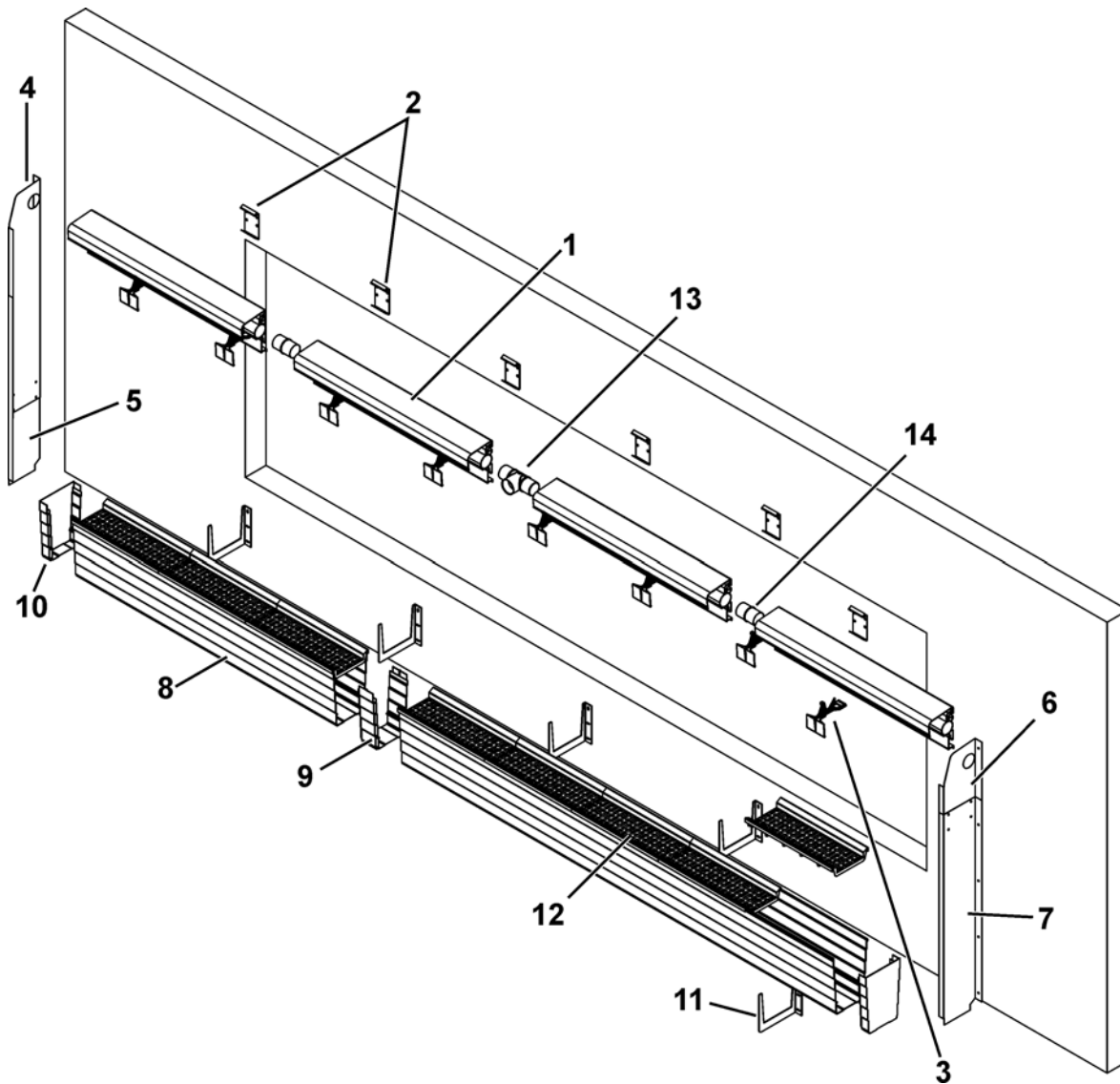
3.1.2 For a pad system with a height of over 2000mm



Only for pads with a depth of 150mm.

3.2 Individual parts of the frame

3.2.1 For pads with a height of up to 2000mm

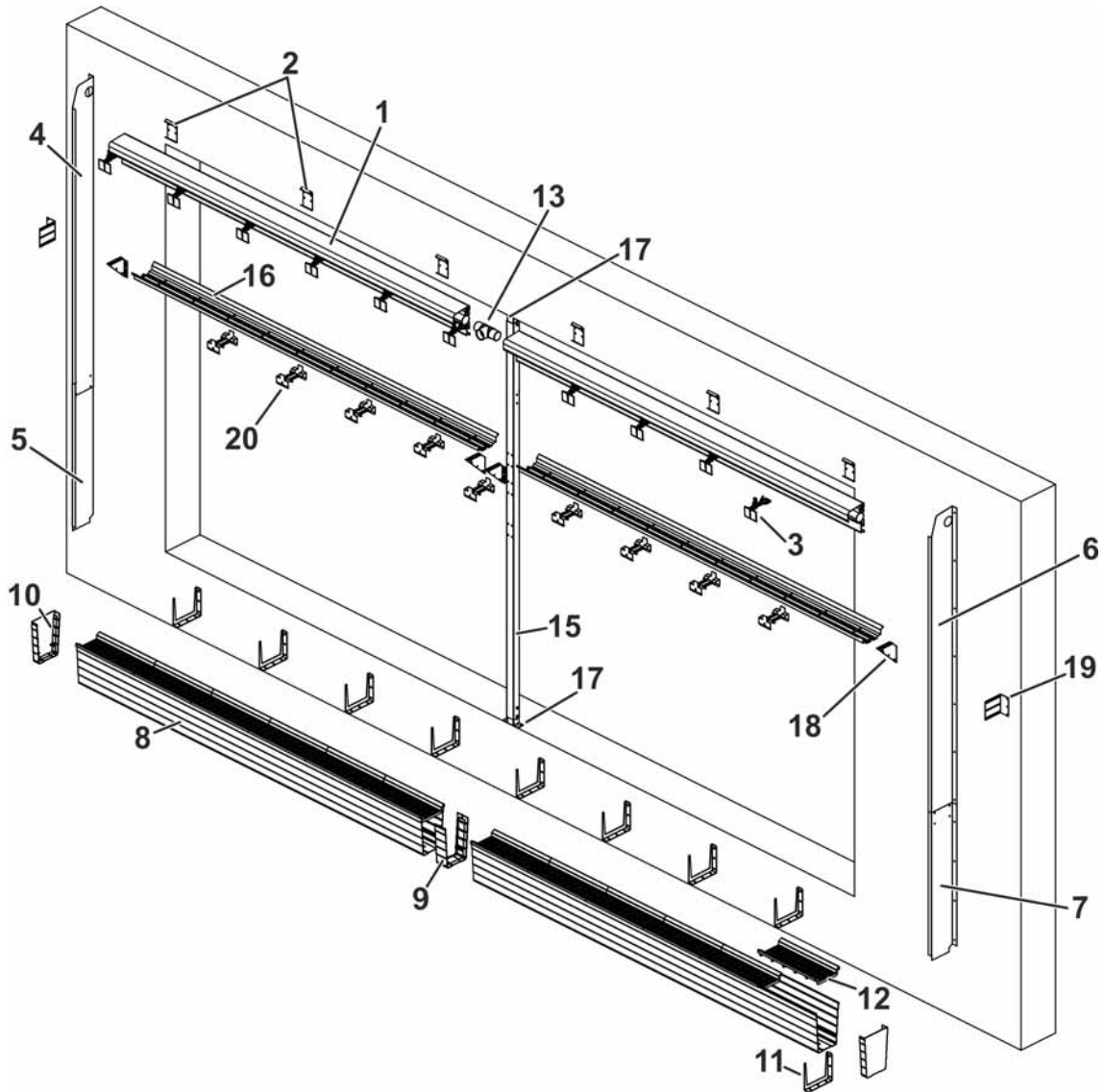


Pos.	Code no.	Description
1	62-00-3500	Top profile 100/150x3000 PVC
2	60-05-1107	Bracket, 2.0mm for top profile
3a	60-05-1108	PVC bracket for pad 150/6"
3b	62-00-3514	PVC bracket for pad 100/4
4a	60-05-1140	Side panel, upper left, stainless steel RM150
4b	62-00-3520	Side panel, upper left, stainless steel RM100
5a	60-05-1141	Side panel, lower left, stainless steel RM150
5b	62-00-3521	Side panel, lower left, stainless steel RM100
6a	60-05-1142	Side panel, upper right, stainless steel RM150
6b	62-00-3518	Side panel, upper right, stainless steel RM100
7a	60-05-1143	Side panel, lower right, stainless steel RM150
7b	62-00-3519	Side panel, lower right, stainless steel RM100
8	62-00-3505	Water channel 3000 PVC
9	60-05-1112	Coupling for water channel PVC
10	60-05-1116	End cover for water channel PVC
11	83-02-9984	Bracket, 3.00mm stainless steel for water channel
12a	62-00-3508	Cover for water channel 150/500 PVC Rainmaker®
12b	62-00-3507	Cover for water channel 100/500 PVC Rainmaker®
13	60-05-1162	T-piece for top profile PVC
14	62-00-3503	Coupling for top profile PVC

3.2.2 For a pad system with a height of over 2000mm



Only for pads with a depth of 150mm.



Pos.	Code no.	Description
1	62-00-3500	Top profile 100/150x3000 PVC
2	60-05-1107	Bracket, 2.0mm for top profile
3	60-05-1108	PVC bracket for pad 150/6"
4	62-00-3528	Side panel, upper left, long stainless steel Rainmaker®
5	60-05-1141	Side panel, lower left, stainless steel RM150
6	62-00-3527	Side panel, upper right, long stainless steel Rainmaker®
7	60-05-1143	Side panel, lower right, stainless steel RM150
8	62-00-3505	Water channel 3000 PVC
9	60-05-1112	Coupling for water channel PVC
10	60-05-1116	End cover for water channel PVC
11	83-02-9984	Bracket, 3.00mm stainless steel for water channel
12	62-00-3508	Cover for water channel 150/500 PVC Rainmaker®
13	60-05-1162	T-piece for top profile PVC
14	62-00-3503	Coupling for top profile PVC
15	83-07-1760	U-profile stainless steel for Rainmaker® intermediate frame
16	83-07-1746	Intermediate channel Rainmaker®/MagixX
17	83-07-1759	Foot, stainless steel for Rainmaker® intermediate frame
18	83-07-1745	Gusset plate, stainless steel for Rainmaker®/MagixX intermediate frame
19	83-07-7944	Reinforcement angle, stainless steel for Rainmaker® intermediate frame
20	83-07-5807	Pad holder, stainless steel for Rainmaker® intermediate frame

3.3 Purpose of Evaporative Cooling

The 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.

3.4 Description of System

The Rainmaker® evaporative cooling system can be sub-divided into individual groups. The main groups are defined in accordance with their collective purpose and are listed below: Top profile (distribution tube), pads, water supply, water channel and pump.

- 1. Top profile** The top profile (distribution tube) is comprised of a perforated PVC tube (Ø 60mm) amongst other things. These holes are drilled at defined intervals in order to sprinkle the whole surface of the pads with water from above. When the water is pumped through the distribution tube it sprays out of the holes onto the deflector and then trickles down onto the pads.

- 2. Pads** Manufactured from cellulose or plastic with a large specific surface. When water runs down onto the pads and air flows through the pads the air absorbs the humidity and is thus cooled. Water that reaches the base of the pads is collected in the water channel.

- 3. Water supply** The water supply introduces fresh water into the system.

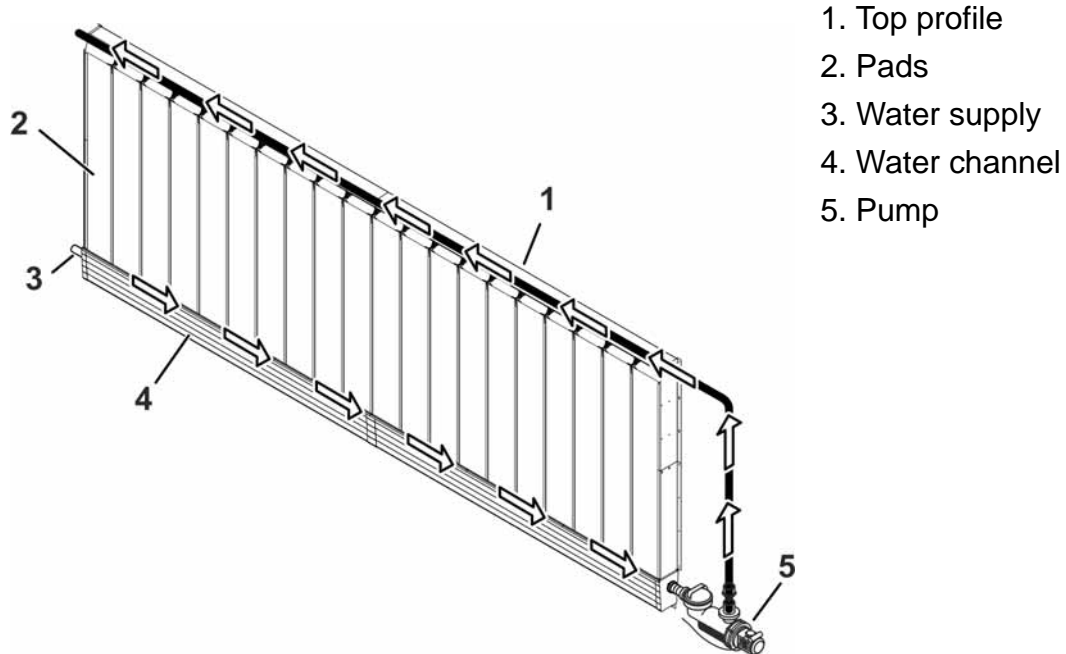
- 4. Water channel** The water channel contains the water supply for the pump and collects the water that runs back out of the pads.

- 5. Pump** The pump feeds the returned water along with a proportion of fresh water back up to the top profile.

3.5 Water Supply from End / Center

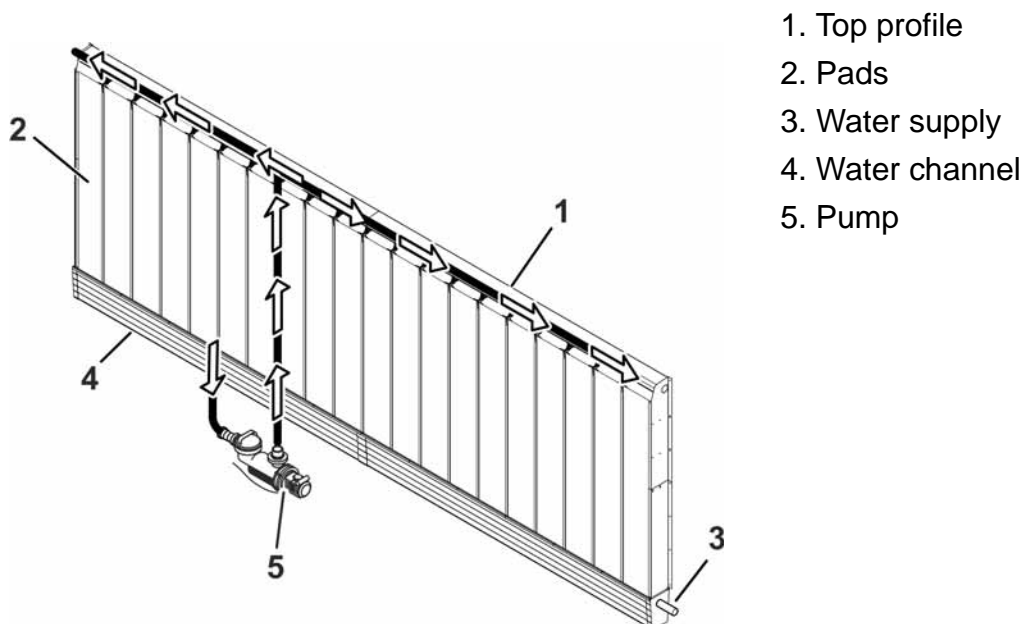
The water supply of the Rainmaker® system can be installed in 2 different variations.

Side water feed (recommended up to 12,000mm length)



- 1. Top profile
- 2. Pads
- 3. Water supply
- 4. Water channel
- 5. Pump

Central water feed (recommended from 12,000mm length)



- 1. Top profile
- 2. Pads
- 3. Water supply
- 4. Water channel
- 5. Pump

3.6 Major Components and Diagram Profile

3.6.1 For pads with a height of up to 2000mm

(Water supply from end or center)

D= Overall height of the pads:

1200mm

1500mm

1800mm

2000mm

A = Wall aperture

$A \leq D - 115\text{mm}$

B= Top profile (215mm)

C= Wall

E= Substructure, wood or steel (if required)

F= Bracket for water channel

G= Water channel (295mm)

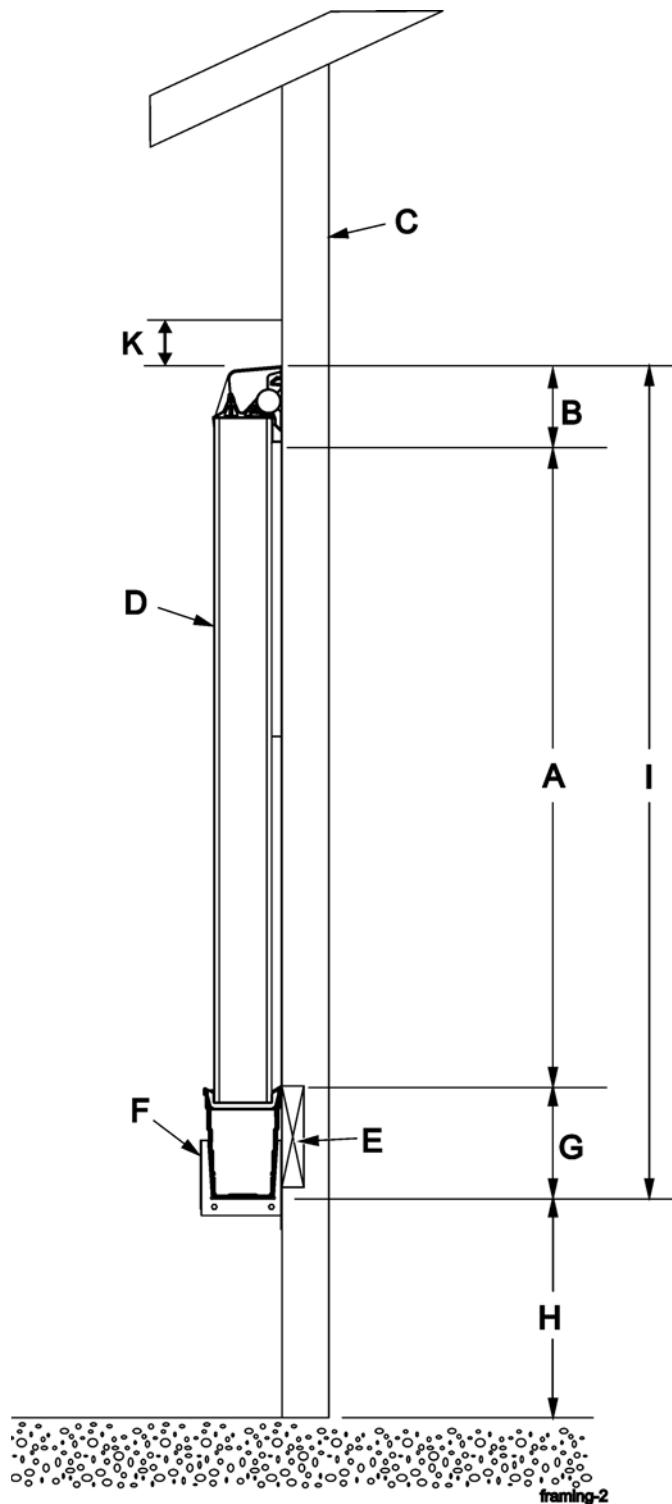
H= min. 250mm

Clearance below the water channel for centrifugal pump.

I= Overall height of piping system

$D + 395\text{mm}$

K= Free space for opening the deflector, min. 120mm



3.6.2 For a pad system with a height of over 2000mm

D= Overall height of the pads:

2500mm (1500mm + 1000mm)

2800mm (1800mm + 1000mm)

3000mm (2000mm + 1000mm)

A = Wall aperture

$A \leq D - 100\text{mm}$

! When an intermediate frame is being used this must be precisely observed to within **20mm!**

B= Top profile (215mm)

C= Wall

E= Substructure, wood or steel (if required)

F= Bracket for water channel

G= Water channel (295mm)

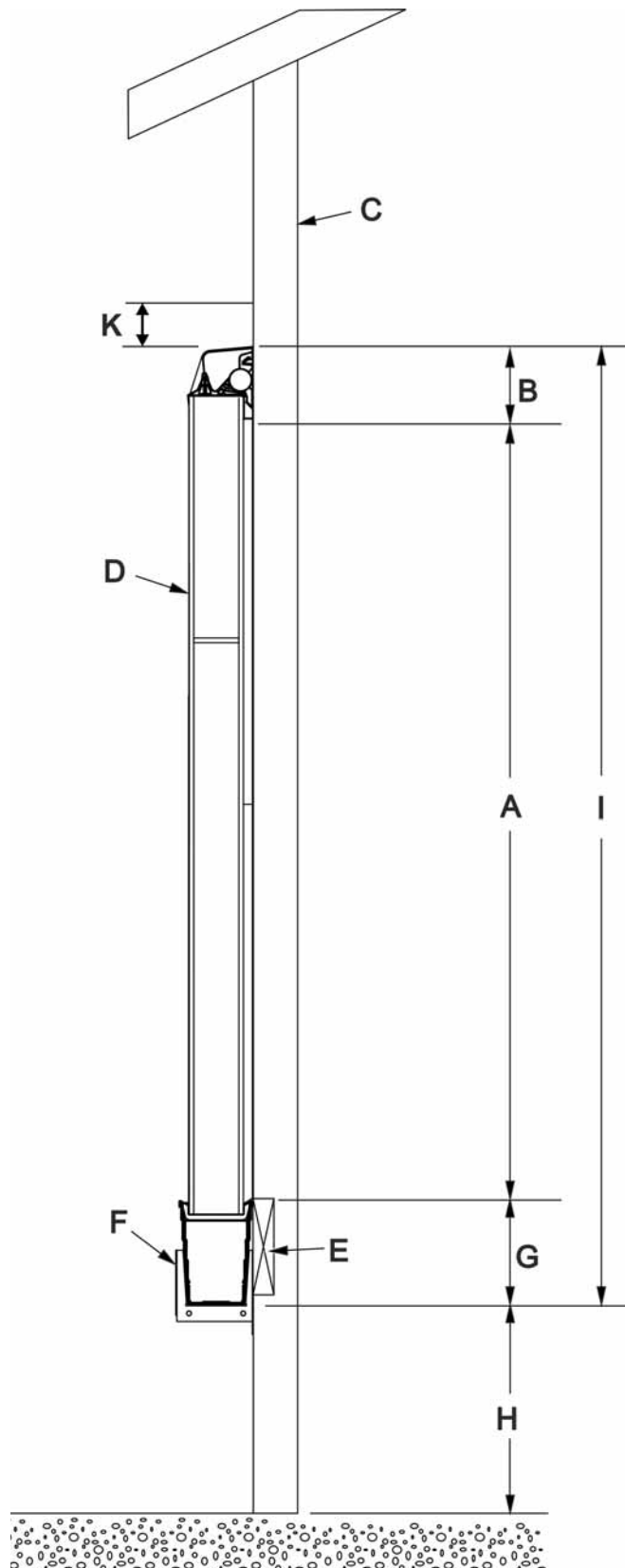
H= min. 250mm

Clearance below the water channel for centrifugal pump.

I= Overall height of piping system

D + 415mm

K= Free space for opening the deflector, min. 120mm



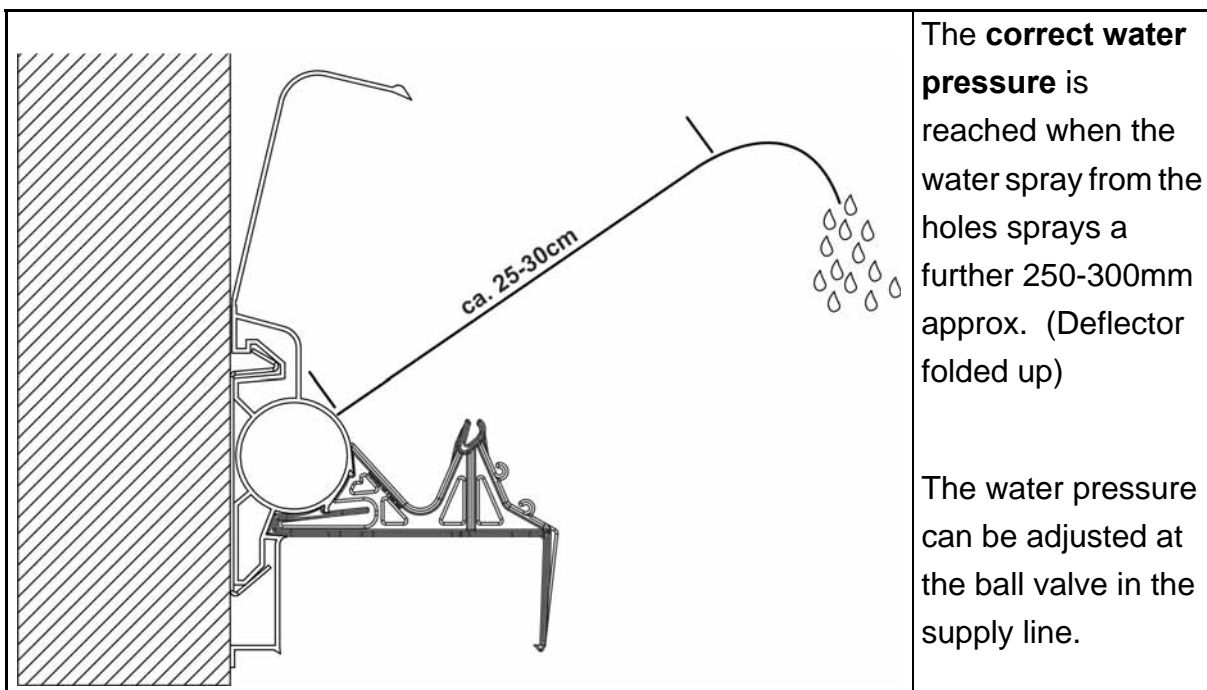
4 Operation

4.1 Initial Start-up

The system must be filled with water before commissioning. The water supply to the system must not be interrupted. The water level in the water channel 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.

When the pads are new, their slick surfaces will prevent the fast soaking that will happen with older pads. For this reason, when the pads are used for the first time, it is important to allow the pump to run for one or two days continuously. This will "soak-in" the pads, and allow faster start-up later. These one or two days are called the "break-in" period. At the end of the "break-in" period, inspect pads carefully, any dry streaks will indicate an inconsistent water distribution. If you find these dry streaks, you will need to clean the spray line. To clean the spray line, follow the procedure outlined on the next page.

4.1.1 Correct water pressure of the system



4.2 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 deposition is occurring then the water drain (bleed off) should be increased.

4.3 Limit on-off cycling

Many users have initially seen greater cooling effects from evaporative cooling systems when they run the system on a ten minute timer. Although this cooling may have a great short term effect, the pad life is greatly shortened. For this reason, you must choose for yourself which is more important. When the system is started and stopped every ten minutes, the pads are wetted and dried out six times per hour (Up to 144 times per day!). Each time the pads dry, the minerals in the water remain on the pad, and limit the cooling effectiveness.

4.4 Why drain (bleed-off) water from the system

Water always contains dissolved minerals. When the pad-cooling system is operating, the water evaporates and the mineral content in the recirculated water increases. To accommodate the water loss fresh water is automatically introduced into the system by the float valve. To prevent too high of a mineral content and sediments on the pads you have to drain some of the recirculating water. The constant water drainage is called bleed off. The amount of water being drained depends on the amount of evaporated water and the mineral content of the water. As rule of thumb you can say that 10% of the water flow at good to moderate water quality.

If the water has a very high mineral content the bleed off rate should be the same as the evaporation rate.

4.5 Water distribution

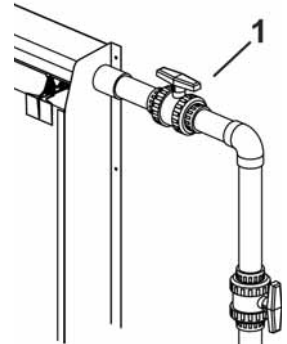
Maintaining even water distribution to the pads is the most important way of extending pad life. If an area of a pad does not receive enough water, it will clog or soften. If at any time you see dry spots or streaks, investigate to see why. Most problems associated with water distribution may be fixed with a good cleaning of the spray line. Follow procedures outlined below for cleaning the Rainmaker® System.

For best results clean the system on a regular basis.

4.6 Winterize your Rainmaker®

In order to make the Rainmaker® winter-proof, the parts endangered by frost should be protected. Proceed as follows for this:

1. Switch the pump off.
2. Remove the screen covering on the pump. With temperatures below 0°C remove the pump altogether.
3. Loosen the screw connection at the upper ball valve (item 1).
4. Remove the drain plug from the screen basket (pump).
5. Empty the water channel.



To put the Rainmaker® back into operation you must make it operationally capable once again.

1. Put the drain plug back into the screen basket (pump).
2. Tighten the screw connection at the upper ball valve again.
3. Reconnect the pump if necessary and fit the screen covering onto the pump once again.
4. Fill the system with water and ensure that the water supply at the float valve is not going to be interrupted.
5. Switch on the pump.


5 Maintenance

5.1 Extending pad life

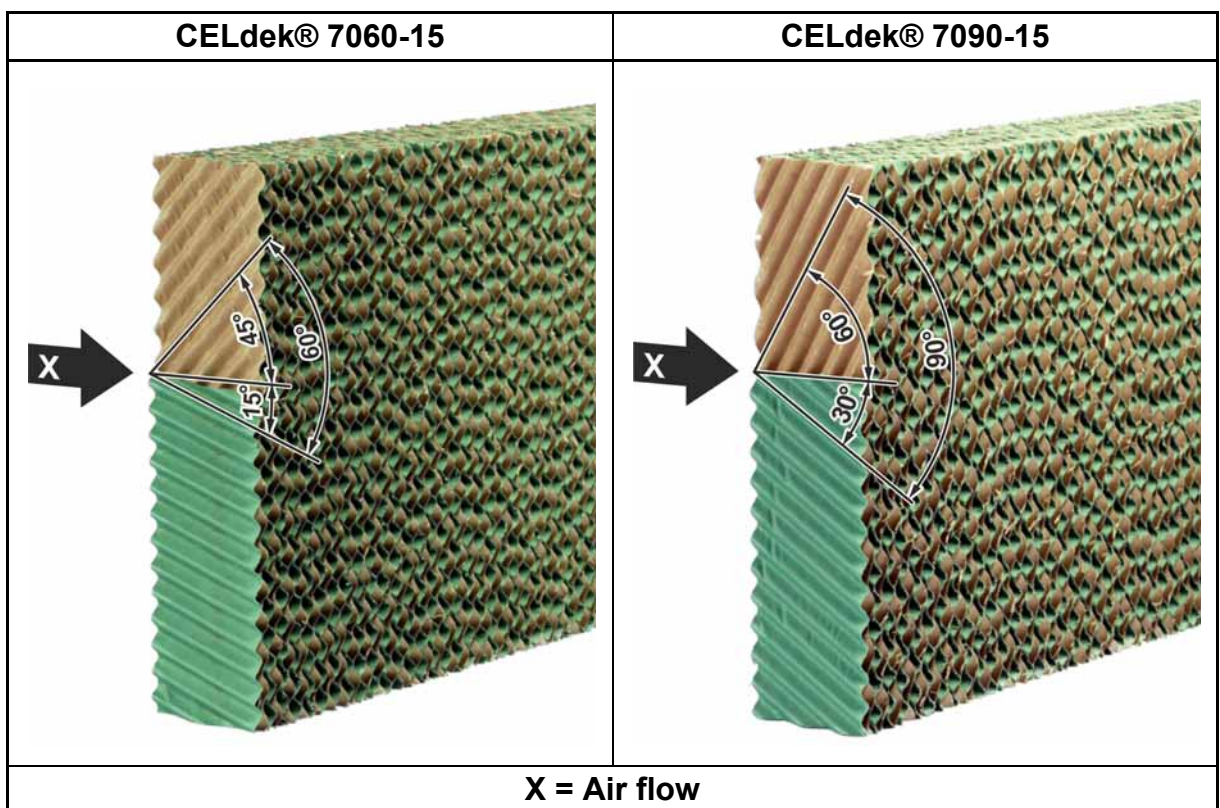
If you use the Rainmaker® System you will notice the need for good preventative maintenance. Algae growth, scale (hard crusty deposits) and dirt accumulation are typical problems associated with poor maintenance. Maintaining the Rainmaker® is very simple. It takes a small amount of time and effort.

5.2 Replacing the pads

5.2.1 Notes for the replacement of cooling pads

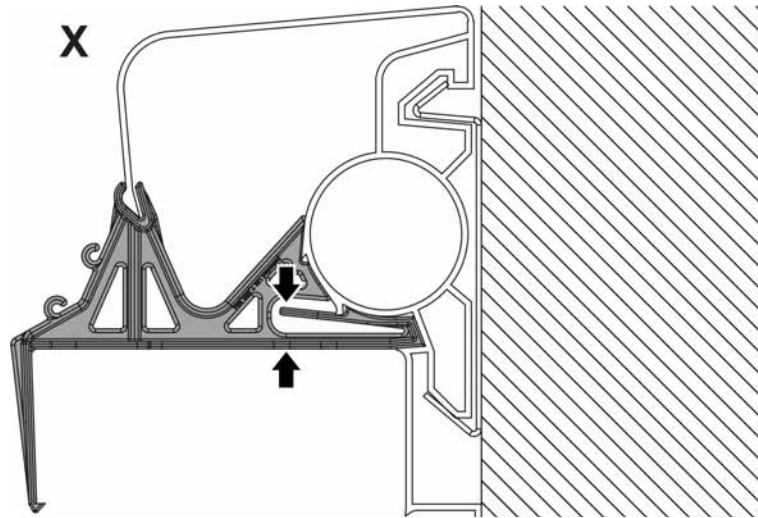
	<p>When installing and replacing the pads observe the enclosed slip, if there is one.</p> <p>With some pads an installation direction is stipulated. This must be observed in order to avoid impairing the function of the Rainmaker®!</p>
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e.g. Pads from Munters:



5.2.1.1 Pad holder for pads with a height of up to 2000mm

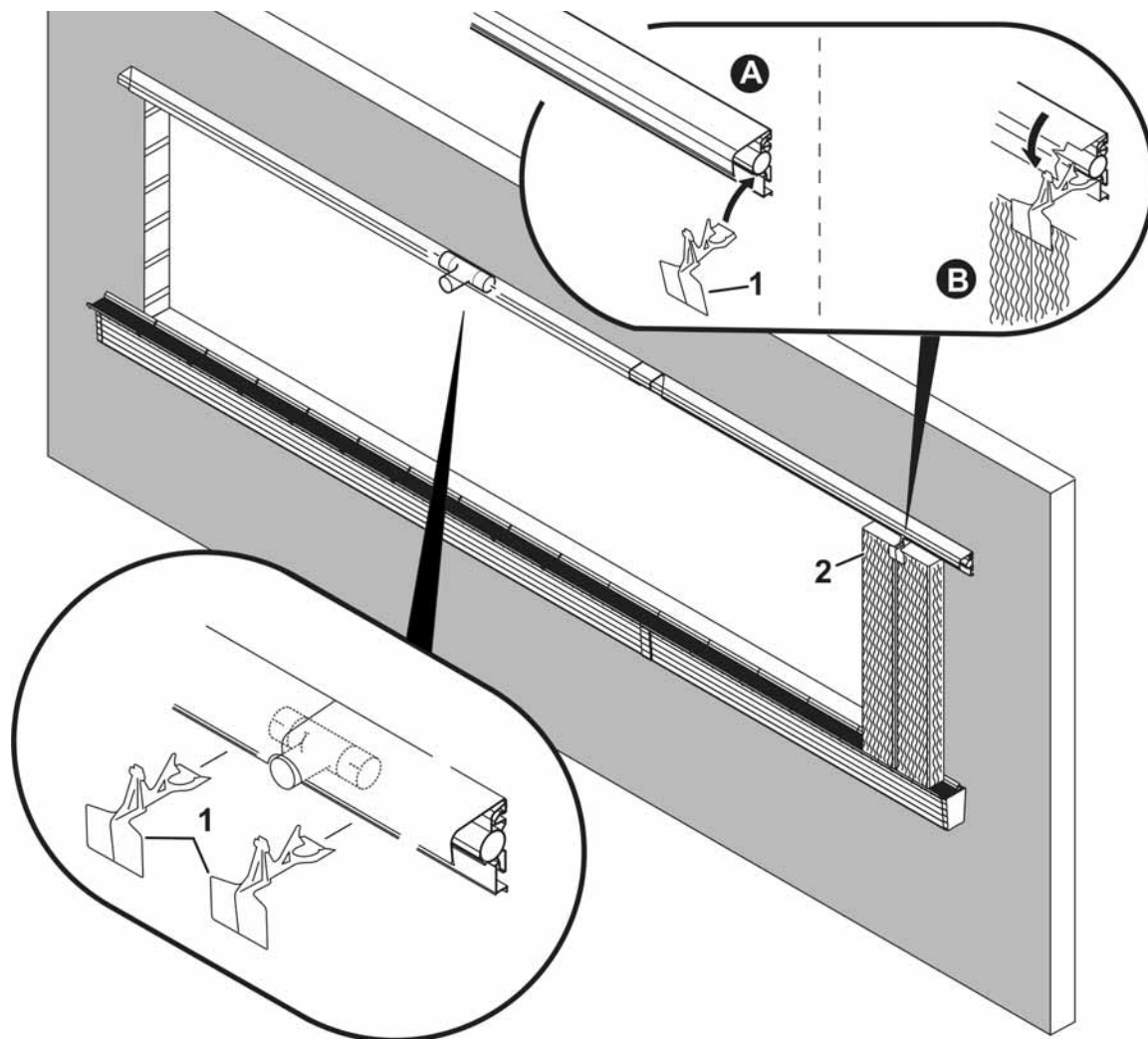
Let the pad holder snap into the guide rail provided. Then let the deflector snap into the pad holder (=> Detail X).




A= Top-profile

B= Position pad retainers always between two pads.

Pos.	Code no.	Description
1a	60-05-1108	Retainer PVC for Pad 150/6"
1b	62-00-3514	Retainer PVC for Pad 100/6"
2		Pad

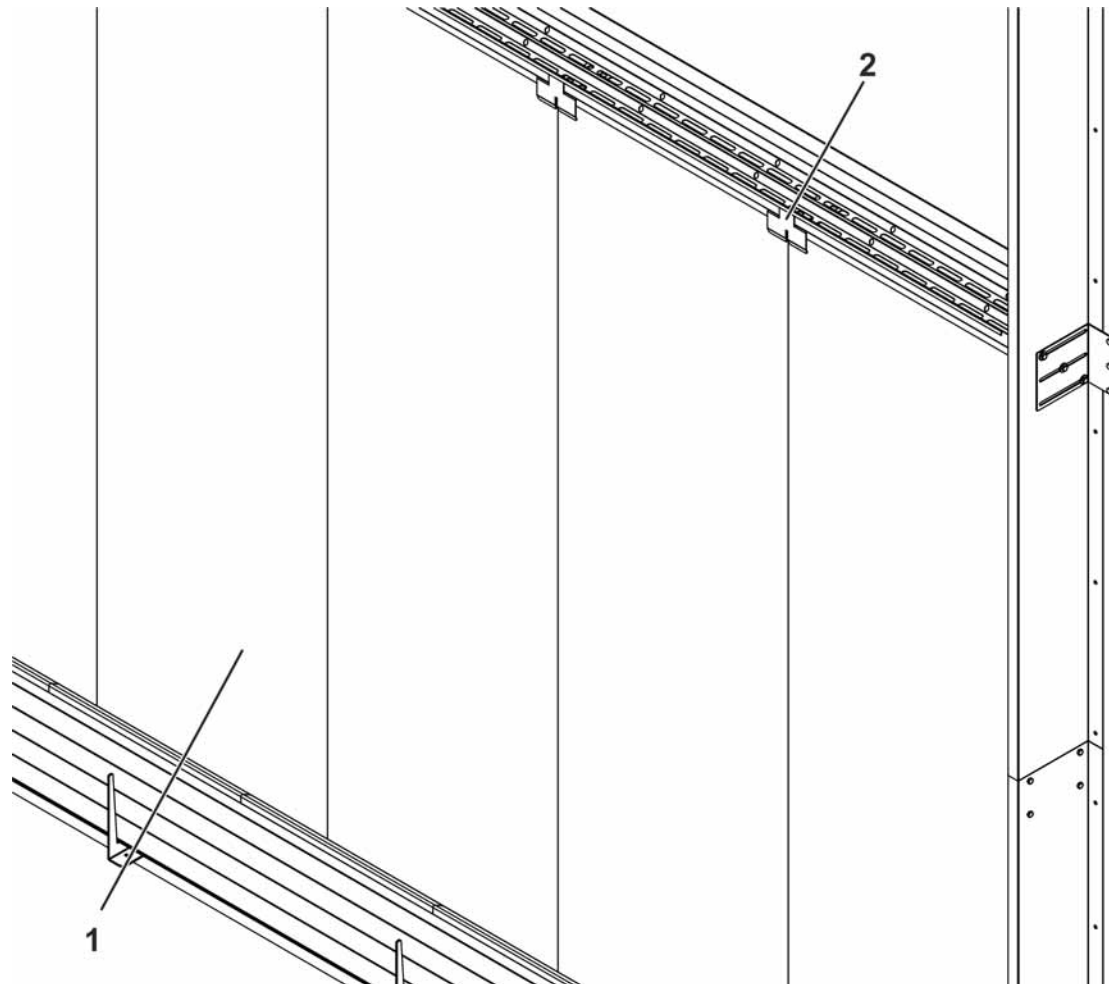


 **Note: For center feed systems**
For center feed, place a Pad Retainer at each side of the T-piece.



5.2.1.2 Pad holder for a pad system over 2000 mm height

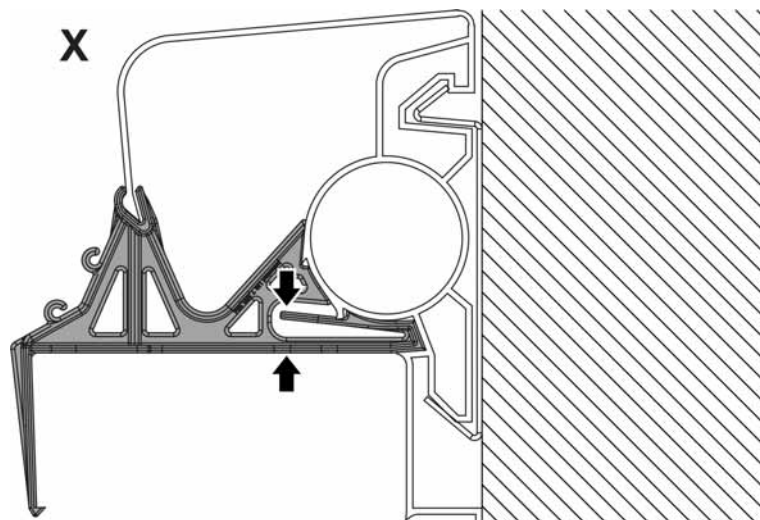
1. Place the lower pads on the cover for the water channel. Between two pads, slide a pad holder (stainless steel) between pad and intermediate channel. Position the pad holder (stainless steel) precisely in the middle between the pads so that these can be held in the correct position.



Pos.	Code no.	Description
1		Lower pad
2	83-07-5807	Pad holder, stainless steel for Rainmaker intermediate frame

2. After placing all of the lower pads loosen all of the fastening screws on the bottom feet of all of the posts. The intermediate channel settles onto the lower pads and the air gap is closed.
3. If the intermediate channel is at the correct height, all of the screws on the upper and lower feet can be firmly tightened.

4. Place the upper pads on the intermediate channel. Install a pad holder (PVC) between two pads. Let the pad holder snap into the guide rail provided. Then let the deflector snap into the pad holder. (=> Detail X) .



Pos.	Code no.	Description
	60-05-1108	PVC bracket for pad 150/6"



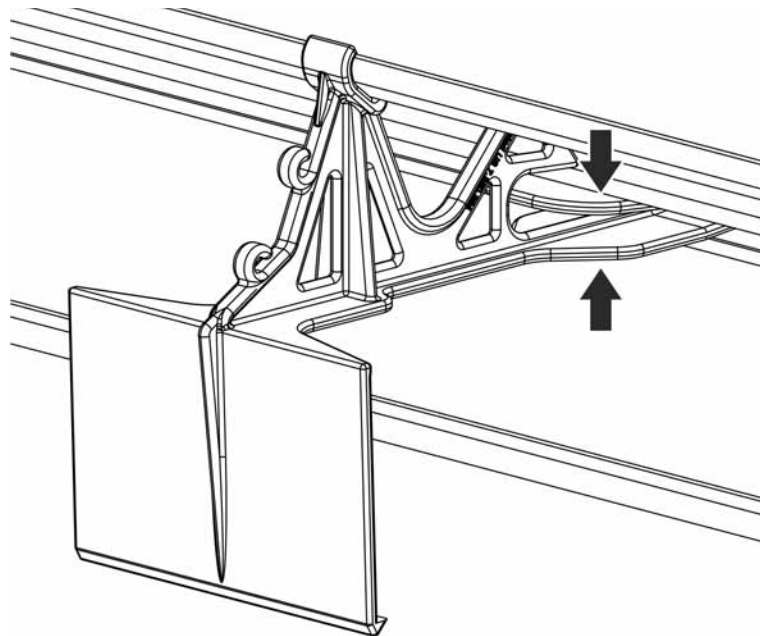
Note: For center feed systems

For center feed, place a Pad Retainer at each side of the T-piece.



5.2.2 Pads up to 2000mm and upper pads with an overall pad height over 2000mm

The pad holder (PVC) can be removed by pressing together the rear part of the holder and loosening the holder. The pads can then be removed.



5.2.3 Lower pads with an overall pad height over 2000mm

Remove the upper pads, as described in chapter 5.2.2 "Pads up to 2000mm and upper pads with an overall pad height over 2000mm".

Loosen the M8x16 screws on the gusset plates fastened to the posts. The intermediate channel can be lifted up and the lower pads removed and/or replaced. Then lower the intermediate channel again and fasten the screws.

5.3 Repairing a defective driptrough or a defective top profile



If there are defects on the driptrough or at the top profile, these should be repaired with Tangit glue. In case of larger leaks, please observe chapter 5.3.1 or 5.3.2.

5.3.1 Instructions for the glueing of the water reservoir

Rainmaker

- D** **Hinweise zum Verkleben der Wasserrinne mit Kupplung/Enddeckel**
- GB** **Instructions on how to glue the water reservoir to the coupler/end cap**
- E** **Instrucciones para pegar el depósito de agua con pieza de unión/cubierta final**
- RUS** **Инструкция по склеиванию водосточного желоба с муфтой/крышкой**

Sie benötigen/You need/Se necesita/Вам понадобятся:



- Tangitreiniger
- Tangit cleaner
- Limpiador Tangit
- Очиститель Tangit



- Lappen oder Fließpapier
- Cloth or blotting paper
- Тряпа о papel secante
- Тряпка или фильтр. бумага



- Tangitklebstoff-Tube
- Tube of Tangit glue
- Tubo de pegamento Tangit
- Клей Tangit в тубике



- Tangitklebstoff-Dose
- Tin of Tangit glue
- Lata de pegamento Tangit
- Клей Tangit в банке



- Pinsel
- Brush
- Pincel
- Кисть



- Alle Klebestellen mit Tangitreiniger **gründlich** reinigen/abwischen.
- **Thoroughly** clean all glue surfaces with Tangit cleaner.
- Limpiar **en profundidad** todas las superficies de pegado con el limpiador Tangit
- **Основательно** почистите/протрите склеиваемые места очистителем Tangit.



- Den Spalt in der Kupplung/Enddeckel **komplett** mit Tangitklebstoff füllen. Dafür die Klebetube mit der Spitze verwenden.
- **Completely** fill the opening of the coupler/end cap with Tangit glue. Use the pointed tube of Tangit glue.



- Rellenar **completamente** la hendidura de la pieza de unión/cubierta final con el pegamento Tangit. Se aplica con precisión utilizando el extremo del tubo.
- **Полностью** заполните зазор муфты/крышки клеем Tangit. Используйте для этого клей из тубика.



- Die Kupplung umdrehen und auch den Spalt an der anderen Seite **komplett** mit Tangit ausfüllen.
- Turn the coupler around and **completely** fill the gap on the other side as well with Tangit.
- Girar la pieza de unión y rellenar también **completamente** la hendidura por el otro lado con Tangit.
- Поверните муфту и **полностью** заполните клеем зазор с другой стороны.



- Danach **sofort** mit dem Pinsel die Klebestellen an der Wasser-
rinne **innen und außen** mit Tangitklebstoff bestreichen. Bitte die
offene Zeit von Tangit (4 Min. bei 20°C) beachten.
- Then **immediately** apply Tangit glue at the glue surfaces of the
water reservoir on **the inside and on the outside** using the brush.
Observe the open time of the Tangit glue (4 minutes at 20°C).
- **Inmediatamente** después, aplicar el pegamento con el pincel
sobre el depósito de agua, **interior y exteriormente**. Tener en
cuenta el tiempo máximo con recipiente abierto (4 min. a 20°C).
- После этого **сразу же** смажьте кистью с клеем Tangit
склеиваемые места желоба с **внешней и внутренней**
сторонами. Соблюдайте время открытой выдержки клея
(4 мин. при 20°C).



- Der Tangitklebstoff sollte beim Zusammenfügen **aus dem Spalt quellen**. Falls nicht, haben Sie zu wenig Klebstoff verwendet!
- When the two parts are glued together, the Tangit glue **should ooze out of the opening**. If this is not the case, you did not use enough glue!
- El pegamento Tangit **debe rebosar por la fisura** cuando se unen las piezas. Si esto no ocurre, es que no se ha empleado suficiente pegamento.
- При соединении желоба с муфтой клей должен **вытекать из зазора**. В противном случае Вы использовали слишком мало клея!



- Anschließend die Wasserrinnen und die Kupplung sofort zusammen-
fügen. Hierbei sollte **zu zweit** gearbeitet werden.
- Then immediately join the water reservoir and the couplers together.
This task should be carried out by **two persons**.
- A continuación acoplar el depósito de agua y la pieza de unión.
Para esta acción se necesitan dos personas.
- Затем сразу же соедините желоб с муфтой. Для этого Вам
понадобится **помощник**.



- Überschüssigen Klebstoff mit dem Pinsel **verstreichen** – fertig!
- **Spread** excessive glue with the brush – **done!**
- **Extender** el pegamento sobrante con el pincel. ¡Ya está listo!
- **Размажьте** кистью вытекший клей – и дело сделано!



Big Dutchman.

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5.3.2 Instructions for the glueing of the top profile

Rainmaker

- D** Hinweise zum Verkleben des Top-Profiles mit Kupplung/T-Stück
- GB** Instructions on how to glue the top profile to the coupler/T-piece
- E** Instrucciones para pegar los perfiles superiores con pieza de unión/pieza en T
- RUS** Инструкция по склеиванию верхнего профиля с муфтой/тройником

Sie benötigen/You need/Se necesita/Вам понадобятся:



- Tangitreiniger
- Tangit cleaner
- Limpiador Tangit
- Очиститель Tangit



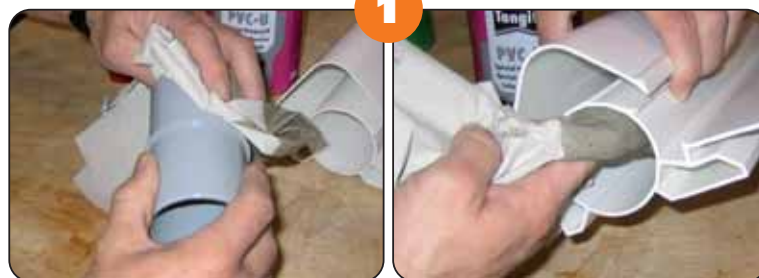
- Lappen oder Fließpapier
- Cloth or blotting paper
- Трапо о papel secante
- Тряпка или фильтр. бумага



- Tangitklebstoff
- Tube of Tangit glue
- Pegamento Tangit
- Клей Tangit



- Pinsel
- Brush
- Pincel
- Кисть



- Alle Klebestellen mit Tangitreiniger **gründlich** reinigen/abwischen.
- **Thoroughly** clean all glue surfaces with Tangit cleaner.
- Limpiar **en profundidad** todas las superficies de pegado con el limpiador Tangit
- **Основательно** почистите/протрите склеиваемые места очистителем Tangit.



- Alle Klebestellen des Top-Profiles mit dem Pinsel **gründlich** mit Tangitklebstoff einstreichen.
- Use the brush to apply Tangit glue to all glue surfaces of the top profile.
- Aplicar **exhaustivamente** el pegamento con el pincel en todas las superficies de pegado de los perfiles superiores.
- **Основательно** смажьте все склеиваемые места верхнего профиля кистью с клеем Tangit.



- Alle Klebestellen der Kupplung mit dem Pinsel **gründlich** mit Tangitklebstoff einstreichen.
- Use the brush to apply Tangit glue to all glue surfaces of the coupler.
- Aplicar **exhaustivamente** el pegamento con el pincel en todas las superficies de pegado de las piezas de unión.
- **Основательно** смажьте все склеиваемые места муфты кистью с клеем Tangit.



- Kupplung und Top-Profil **sofort** zusammenfügen. Bitte die offene Zeit von Tangit (4 Min. bei 20°C) beachten.
- Join coupler and top profile **immediately** together. Observe the open time of the Tangit glue (4 minutes at 20°C).
- **Inmediatamente** después, acoplar la pieza de unión al perfil superior. Tener en cuenta el tiempo máximo con recipiente abierto (4 min. a 20°C).
- **Сразу же** соедините муфту с верхним профилем. Соблюдайте время открытой выдержки клея (4 мин. при 20°C).



- Der Tangitklebstoff sollte beim Zusammenfügen **aus dem Spalt quellen**. Falls nicht, haben Sie zu wenig Klebstoff verwendet!
- The Tangit glue should **ooze out of the joint** when the two parts are joined together. If this is not the case, you did not use enough glue!
- El pegamento Tangit **debe rebosar por la fisura** cuando se unen las piezas. Si esto no ocurre, es que no se ha empleado suficiente pegamento.
- При соединении желоба с муфтой клей должен **вытекать из зазора**. В противном случае Вы использовали слишком мало клея!



- Überschüssigen Klebstoff mit dem Pinsel **verstreichen** – fertig!
- Spread excessive glue with the brush – **done!**
- Extender el pegamento sobrante con el pincel. ¡Ya está listo!
- Размажьте кистью вытекший клей – и дело сделано!



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5.4 Cleaning

5.4.1 Cleaning your Rainmaker® System

1. Shut off pump and clean strainer.
2. If possible, turn off fans. (If this is not possible, run fans at minimum levels).
3. Gently hose off pads. Clean algae from pads and pipes.
4. Flush reservoir.
5. Flush spray line:
 - (A) Open ball valve at end of spray line (when end feed is used) or open both ball valves (when center feed is used).
 - (B) Turn on pump.
 - (C) Clean for several minutes.
6. Using a long stick clean the spray line with a brush or attach the brush to a rope and pull it through the spray line. Brush off the dirt on the spray line.
7. After flushing spray line: Turn off pump. Close Ball Valve at the end of spray line.
8. Refill reservoir to full level.
9. Resume normal operation.

5.4.2 Algae treatment

If algae develops on pipes, it may be necessary to add a water treatment compound to control algae growth. Consult your local agricultural distributor for a recommended water treatment chemical.

5.4.3 Cleaning the pads

- Clean the dry cellulose pad by means of a soft brush in order to remove deposits. Brush in the direction of the ribbing. If damages occur at the pad, the brushing should be carried out with less pressure.



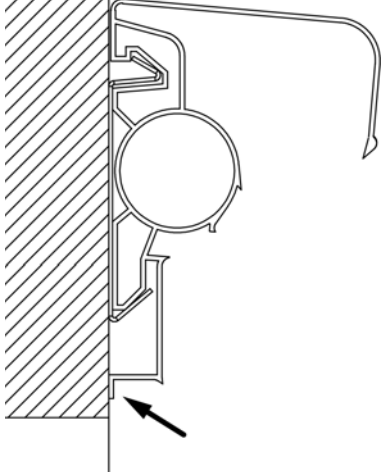
- Wash the cellulose pad with a water jet with low pressure.



6 Fault Clearance

Malfunction	Cause	Remedy
A lot of minerals/algae deposit in the pad within a short time	Too little water is drained via the "bleed-off"	Check if water is permanently drained over the "bleed off" and increase the amount of drain water, if necessary (=> 4.4 "Why drain (bleed-off) water from the system").
	Too many on/off-cycles	Reduce the number of on-/off-cycles
	The pad is kept damp too long time	Let the pad dry once a day (for example at night)
		Clean the dry cellulose pad (=> 5.4.3 "Cleaning the pads").
		Carry out a regular complete cleaning of the water basin (approx. every 4 weeks, depending on the water quality and operating time).
Dry spots are formed on the pads	Holes in the top profile clogged	Check if water sprays out of all holes of the top profile. Clean clogged holes or the entire top profile, if necessary.
	Water pressure adjusted too low	Control the adjusted water pressure (=> 4.1.1 "Correct water pressure of the system") and adjust this at the ball valve, if necessary.

Malfunction	Cause	Remedy
Too little amount of water in the driptrough	Float valve does not function	Check the operability of the float and replace it, if necessary.
	Water pressure adjusted too low	Check the adjusted water pressure (=> 4.1.1 "Correct water pressure of the system") and adjust this at the ball valve, if necessary.
Water drips out of the pads	Pads not installed correctly	Check whether the pads are installed in the correct way and turn them round, if necessary (=> 5.2 "Replacing the pads")
	Water pressure adjusted too high	Check the adjusted water pressure (=> 4.1.1 "Correct water pressure of the system") and adjust this at the ball valve, if necessary.

Malfunction	Cause	Remedy
<p>Water drips from the lower lip of the top profile on the side facing the house</p>	<p>Lower lip of the top profile does not lie on the wall</p> 	<p>Check whether the lower lip of the top profile lies on the wall; use distance plates or similar, if necessary, in order to press the lip of the top profile closer to the pad.</p>
<p>Drip trough or top profile break down in winter</p>	<p>System was not winterized</p>	<p>Check whether water was drained and the entire system has been winterized (=> 4.6 "Winterize your Rainmaker®").</p> <p>Repair the broken spots, if necessary (=> 5.3 "Repairing a defective drip trough or a defective top profile")</p>

Malfunction	Cause	Remedy
The pump does not function	No voltage at the pump	Contact an electrician.
	Electrical or mechanical defect at the pump	Contact your supplier concerning the delivery of spare parts.
		Install a protective cap on the pump (if not yet done) which resists solar radiation and weather influences.

7 Spare parts

7.1 Elements for water supply



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

7.1.1 Technical data for the centrifugal pump

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



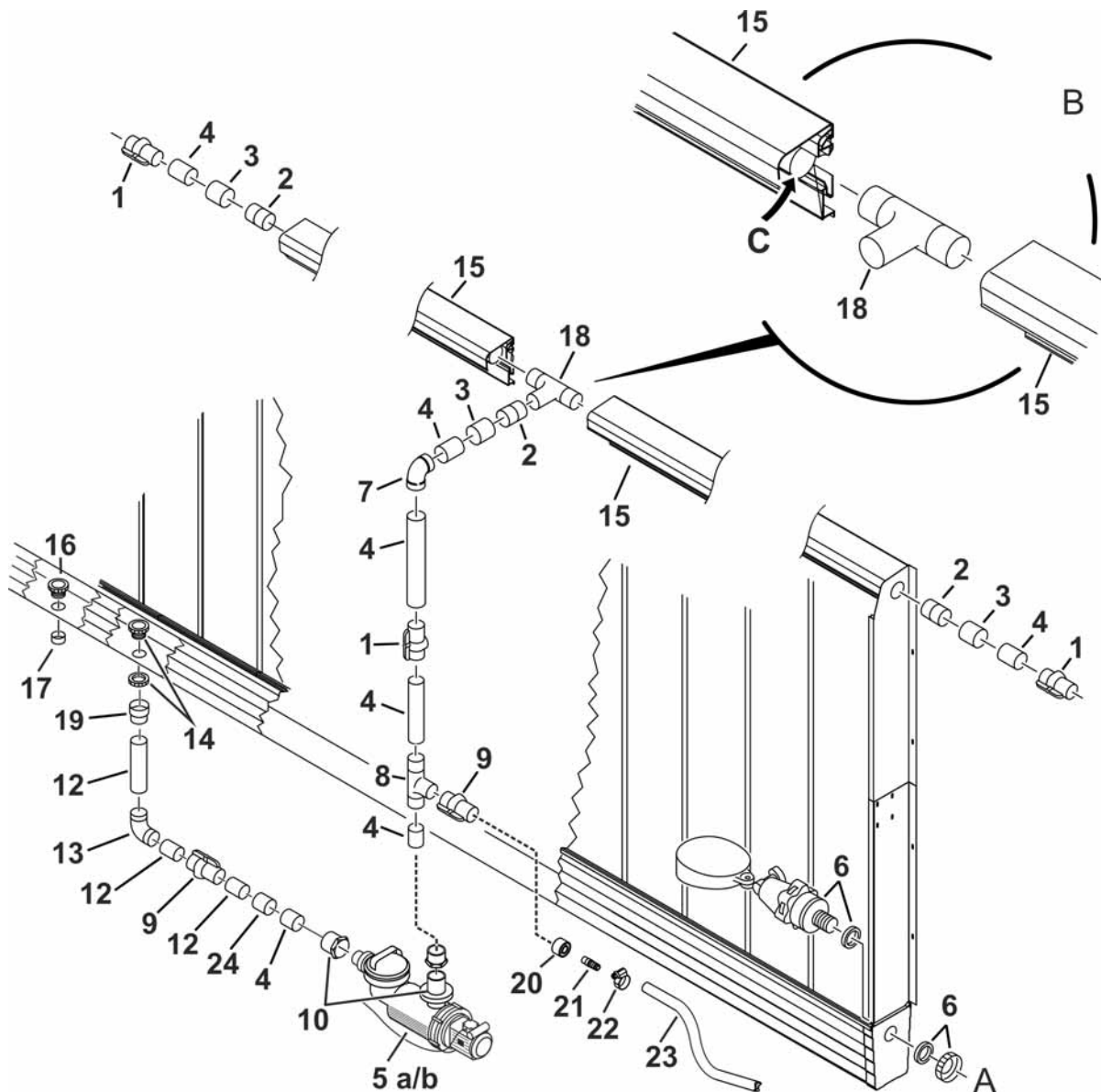
In order to increase the service life of the pump, it is recommended that a cover is fitted to the pump on-site. This protects the pump from weather influences (e.g. rain, hail and direct solar radiation).

7.1.2 Plumbing (center feed)

A= Fresh water supply

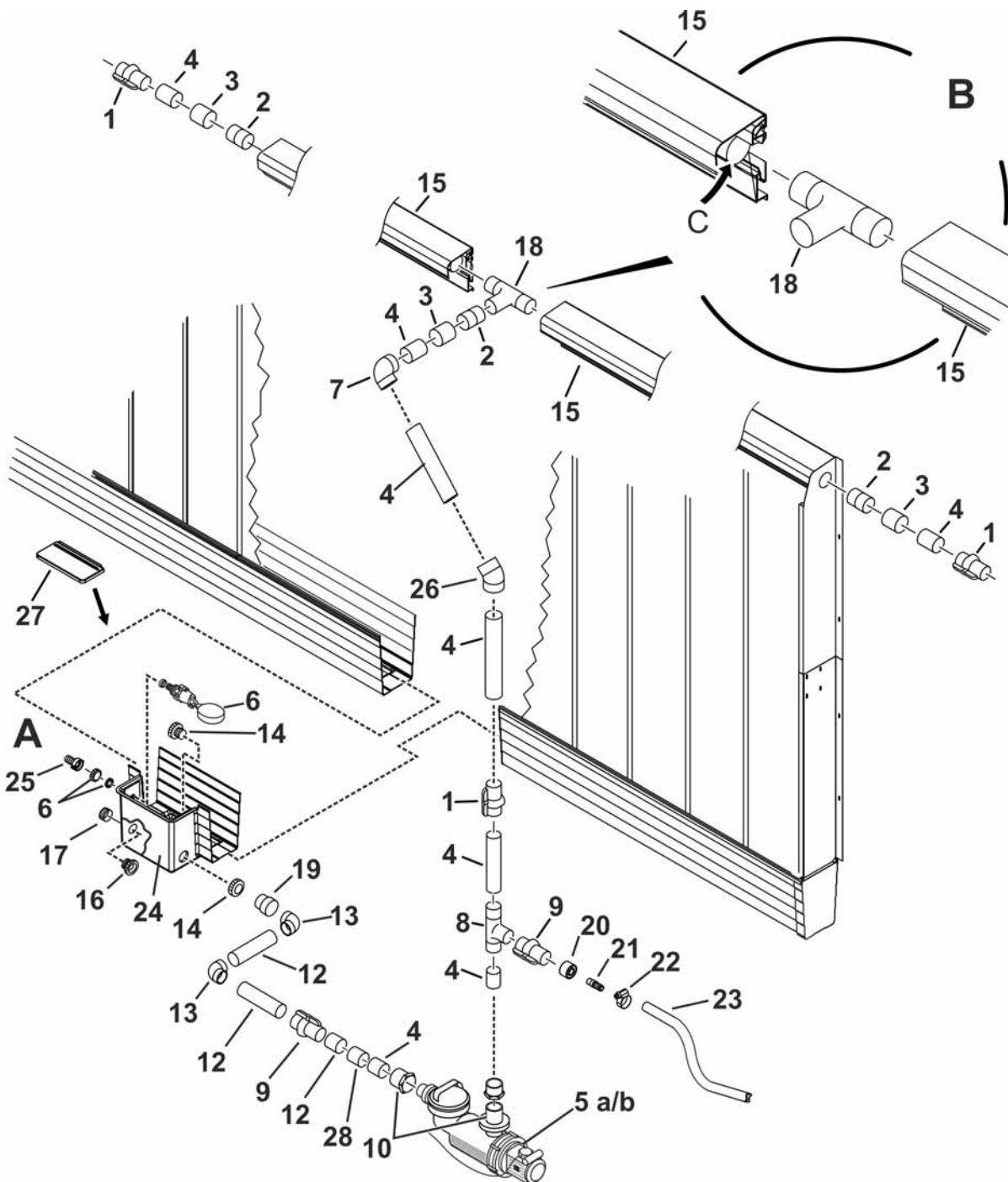
Pos.	Code no.	Description
1	99-40-3987	Ball valve 63mm PVC
2	62-00-3503	Coupling for top profile
3	99-40-4043	Transition sleeve 63mmx2"
4	20-50-1066	Pipe 63mmx3.00 PVC
5 a	62-00-3605	Euroswim centrifugal pump 50M 220-230V 50Hz up to 12m pad length
5 b	62-00-3610	Euroswim centrifugal pump 100M 220-230V 50Hz up to 30m pad length
6	60-05-1121	Float valve
7	20-50-1052	Bracket 63-90deg PVC
8	99-40-3799	T-piece 63x50Ax63 PVC
9	99-40-3986	Ball valve 50mm PVC
10	99-40-4064	Coupling 63 l x 2" A ND16
12	99-40-3730	Pipe 50x2.50 PVC
13	99-40-3739	Bracket 50 - 90 deg.
14	99-40-4042	Bushing 1 3/4"A x 40/50 PVC

Pos.	Code no.	Description
15	62-00-3500	Top profile 100/150
16	99-40-4093	Bushing 1 1/4" A x 32 PVC with clamping nut
17	99-40-4094	Cap 1 1/4" PVC
18	60-05-1162	T-piece for top profile
19	99-40-3733	Sleeve 50mm PVC
20	99-40-3737	Reducer, short 50A x 20I PVC
21	99-40-3829	Hose fitting 22x20 PVC
22	30-00-3709	Hose clamp 3/4" 20-32 </td
23	30-00-3051	High pressure hose - 3/4" yellow
24	99-40-3748	Reduction sleeve 63 x 50 PVC



7.1.3 Plumbing with supply unit (center feed)

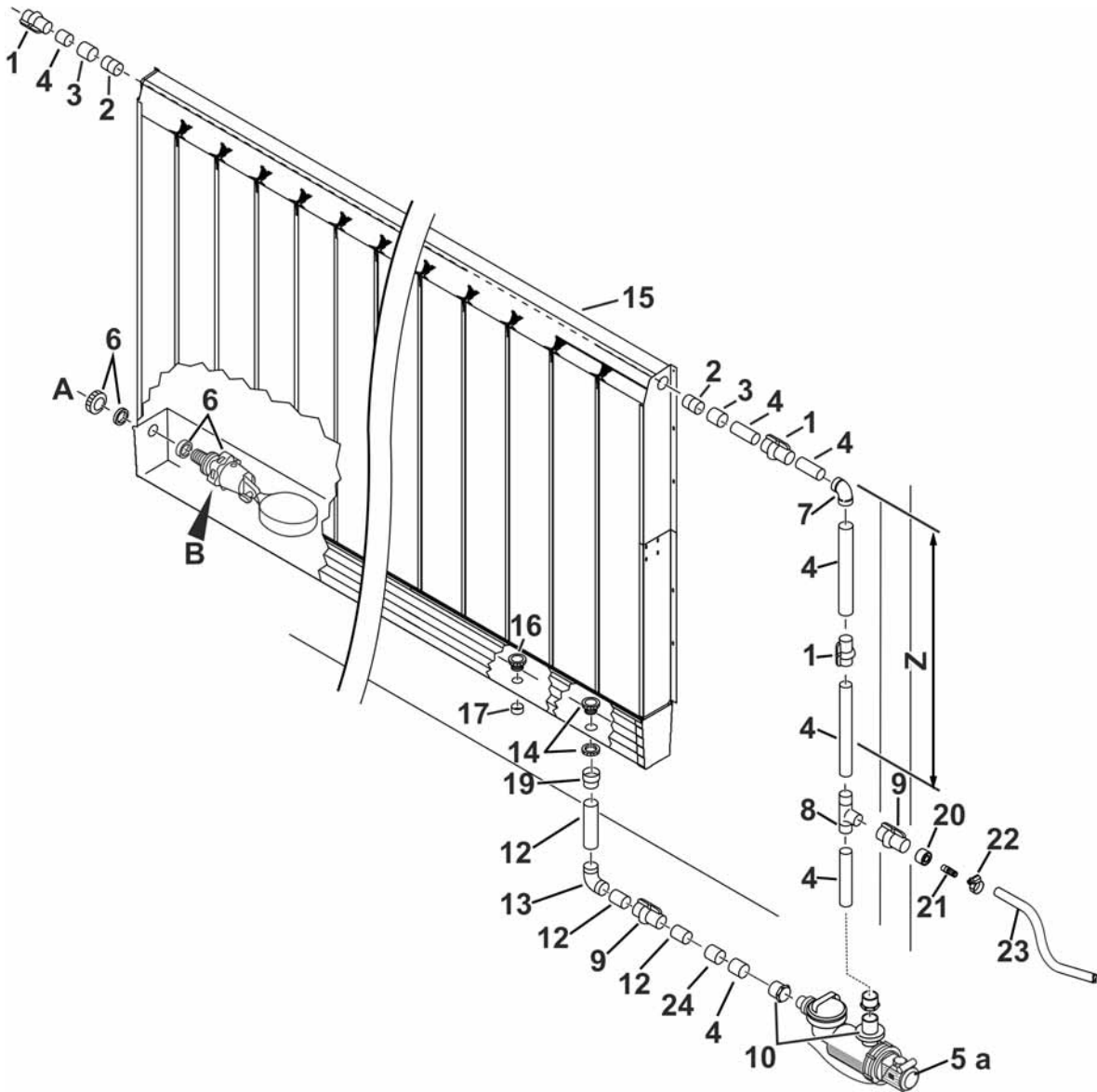
A= Fresh water supply



Pos.	Code no.	Description
1	99-40-3987	Ball valve 63mm PVC
2	62-00-3503	Coupling for top profile
3	99-40-4043	Transition sleeve 63mmx2"
4	20-50-1066	Pipe 63mmx3.00 PVC
5 a	62-00-3605	Euroswim centrifugal pump 50M 220-230V 50Hz up to 12m pad length
5 b	62-00-3610	Euroswim centrifugal pump 100M 220-230V 50Hz up to 30m pad length
6	60-05-1121	Float valve
7	20-50-1052	Bracket 63-90deg PVC
8	99-40-3799	T-piece 63x50Ax63 PVC
9	99-40-3986	Ball valve 50mm PVC
10	99-40-4064	Coupling 63 l x 2" A ND16
12	99-40-3730	Pipe 50x2.50 PVC
13	99-40-3739	Bracket 50 - 90 deg.
14	99-40-4042	Bushing 1 3/4"A x 40/50 PVC
15	62-00-3500	Top profile 100/150
16	99-40-4093	Bushing 1 1/4"A x 32 PVC with clamping nut
17	99-40-4094	Cap 1 1/4 PVC
18	60-05-1162	T-piece for top profile
19	99-40-3733	Sleeve 50mm PVC
20	99-40-3737	Reducer, short 50A x 20I PVC
21	99-40-3829	Hose fitting 22x20 PVC
22	30-00-3709	Hose clamp 3/4" 20-32
23	30-00-3051	High pressure hose - 3/4" yellow
24	62-00-3526	Supply unit RM 500mm PVC
25	30-00-3070	Hose fitting, orange 3/4"IG compl. with nut and seal.
26	20-50-3714	Bracket 63 - 45 deg. PVC ND16
27		Cover for supply unit
28	99-40-3748	Reduction sleeve 63 x 50 PVC

7.1.4 Plumbing (lateral feed)

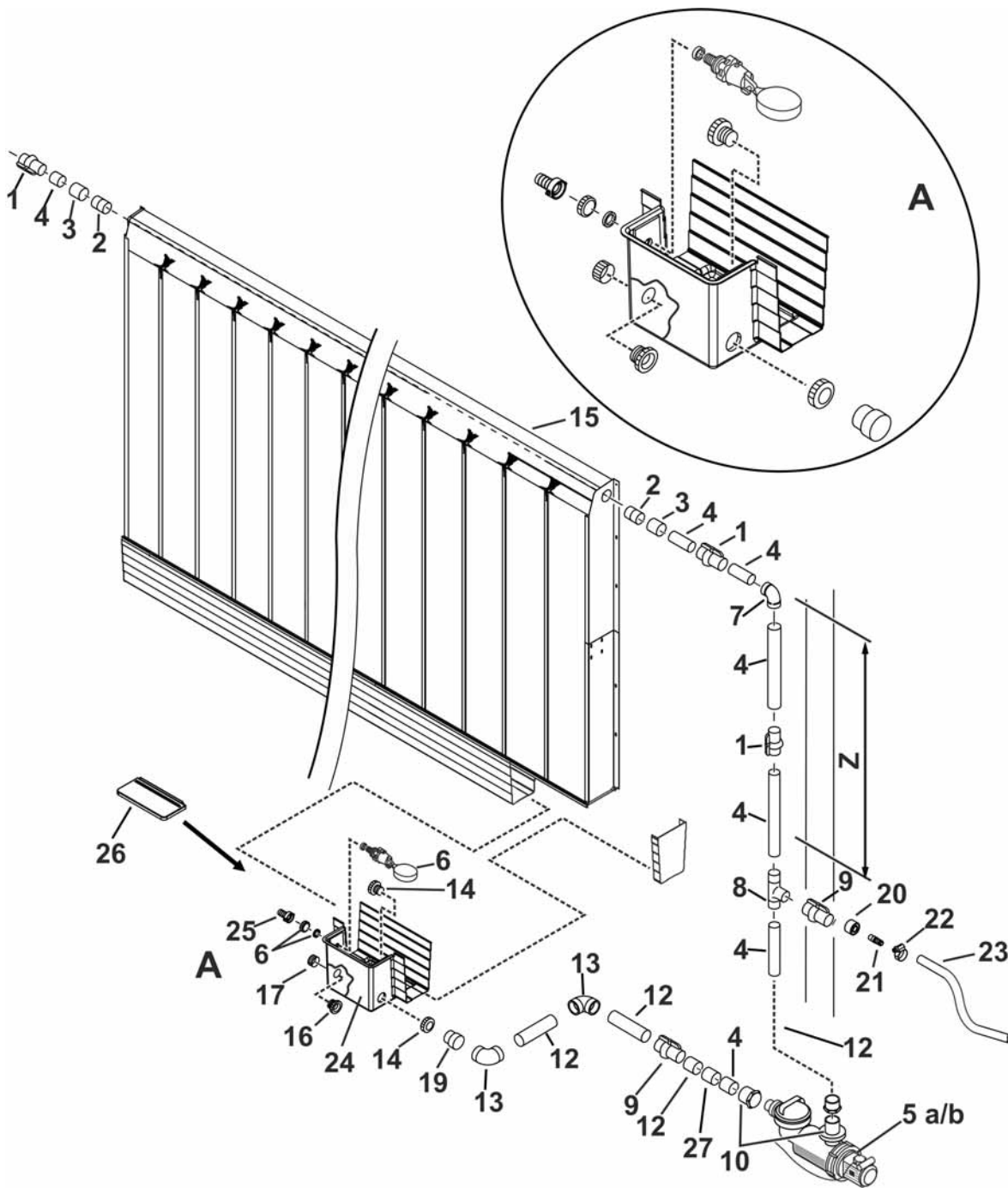
A= Fresh water supply



Pos.	Code no.	Description
1	99-40-3987	Ball valve 63mm PVC
2	62-00-3503	Coupling for top profile
3	99-40-4043	Transition sleeve 63mmx2"
4	20-50-1066	Pipe 63mmx3.00 PVC
5 a	62-00-3605	Euroswim centrifugal pump 50M 220-230V 50Hz up to 12m pad length
5 b	62-00-3610	Euroswim centrifugal pump 100M 220-230V 50Hz up to 30m pad length
6	60-05-1121	Float valve
7	20-50-1052	Bracket 63-90deg PVC
8	99-40-3799	T-piece 63x50Ax63 PVC
9	99-40-3986	Ball valve 50mm PVC
10	99-40-4064	Coupling 63 I x 2" A ND16
12	99-40-3730	Pipe 50x2.50 PVC
13	99-40-3739	Bracket 50 - 90 deg.
14	99-40-4042	Bushing 1 3/4"A x 40/50 PVC
15	62-00-3500	Top profile 100/150
16	99-40-4093	Bushing 1 1/4"A x 32 PVC with clamping nut
17	99-40-4094	Cap 1 1/4 PVC
19	99-40-3733	Sleeve 50mm PVC
20	99-40-3737	Reducer, short 50A x 20I PVC
21	99-40-3829	Hose fitting 22x20 PVC
22	30-00-3709	Hose clamp 3/4" 20-32
23	30-00-3051	High pressure hose - 3/4" yellow
24	99-40-3748	Reduction sleeve 63 x 50 PVC

7.1.5 Plumbing with supply unit (lateral feed)

A= Fresh water supply



Pos.	Code no.	Description
1	99-40-3987	Ball valve 63mm PVC
2	62-00-3503	Coupling for top profile
3	99-40-4043	Transition sleeve 63mmx2"
4	20-50-1066	Pipe 63mmx3.00 PVC
5 a	62-00-3605	Euroswim centrifugal pump 50M 220-230V 50Hz up to 12m pad length
5 b	62-00-3610	Euroswim centrifugal pump 100M 220-230V 50Hz up to 30m pad length
6	60-05-1121	Float valve
7	20-50-1052	Bracket 63-90deg PVC
8	99-40-3799	T-piece 63x50Ax63 PVC
9	99-40-3986	Ball valve 50mm PVC
10	99-40-4064	Coupling 63 I x 2" A ND16
12	99-40-3730	Pipe 50x2.50 PVC
13	99-40-3739	Bracket 50 - 90 deg.
14	99-40-4042	Bushing 1 3/4"A x 40/50 PVC
15	62-00-3500	Top profile 100/150
16	99-40-4093	Bushing 1 1/4"A x 32 PVC with clamping nut
17	99-40-4094	Cap 1 1/4 PVC
19	99-40-3733	Sleeve 50mm PVC
20	99-40-3737	Reducer, short 50A x 20I PVC
21	99-40-3829	Hose fitting 22x20 PVC
22	30-00-3709	Hose clamp 3/4" 20-32
23	30-00-3051	High pressure hose - 3/4" yellow
24	62-00-3526	Supply unit RM 500mm PVC
25	30-00-3070	Hose fitting, orange 3/4"IG compl. with nut and seal.
26		Cover for supply unit
27	99-40-3748	Reduction sleeve 63 x 50 PVC