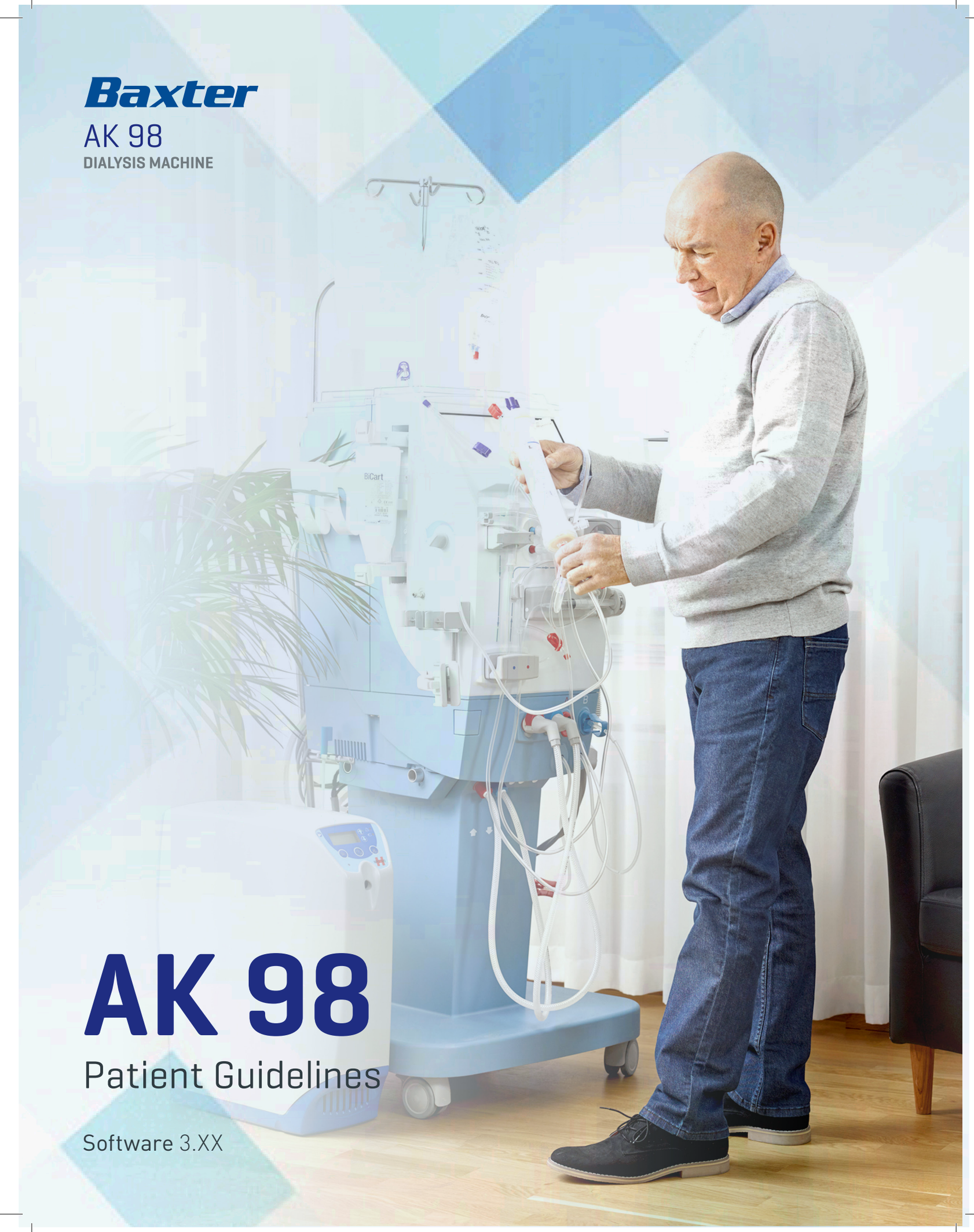
Baxter

AK 98

DIALYSIS MACHINE



AK 98

Patient Guidelines

Software 3.XX

Important notice:

The contents of this training material are based on the **AK 98** Dialysis machine Operator's Manual for software 3.xx (HC128100001 Rev 2019-02-28 Program version 3.xx). Reviewing these materials does not replace the training given to you by your healthcare provider, nor does it replace your responsibility to read and understand the full text of the Operator's Manual prior to operating the machine. If there are deviations between the actions described here, and the instructions contained in the Operator's Manual, then the information from the Operator's Manual takes precedence.

CAUTION

Mobile or cordless telephones and/or other equipment such as a laptop, connected to a wireless network, may be used, but should not be placed on top of the **AK 98** dialysis machine.

CAUTION

CAUTION

Do not move the dialysis machine during a treatment. If you need to move the dialysis machine to reach the side only do small adjustments and make sure not to overbalance or collide the dialysis machine as this could damage the equipment.

CAUTION

NOTE

The main switch on the back (I/0) should always be switched on (I) even when the machine is not in use. This is to ensure that the batteries remain charged.

NOTE

Contents

Patient:

Nurse:

Nurse phone:

Hospital phone:

Emergency:

Dialysis prescription

Your desired prescription is:

Time ..... hours

Sodium ..... mmol/l

Bicarbonate ..... mmol/l

Dialysis fluid temperature ..... °C

Dialysis fluid flow ..... ml/min

Dialysis fluid

Name of A-concentrate .....

Treatment

Blood flow ..... ml/min

Venous pressure not higher than ..... mmHg

Arterial pressure not lower than ..... mmHg

Dry weight ..... kg

Rinse back volume ..... ml

Drinks ..... ml

Heparin bolus dose ..... ml of ..... IU heparin

Heparin infusion rate ..... ml/hours

Heparin stop time ..... min

Low molecular weight heparin ..... ml

1 Introduction

This Patient Guidelines booklet is intended for patients and has been developed as a tool to assist you in your preparations for home hemodialysis.

CAUTION

Patients connected to the **AK 98** dialysis machine should be monitored by competent personnel since life threatening situations can arise that may not activate alarms. The operator should pay attention to all appropriate alarms and follow the instructions, warnings, cautions, and notes given in the Operator's Manual. It is imperative that the machine has passed the functional check before connecting a patient.

CAUTION

WARNING

Treatment in a home healthcare environment shall only be allowed if the operator has received proper training to enable her / him to prepare the machine, perform and end the treatment in a safe way, and disinfect and clean the machine between treatments. Training shall be based on a profile assuming maximum of eight years of operator's education. The physician is responsible to ensure that the competence of the operator is checked on regular basis. Records of the training and competence checks shall be archived by the responsible physician.

WARNING

2 The hemodialysis system

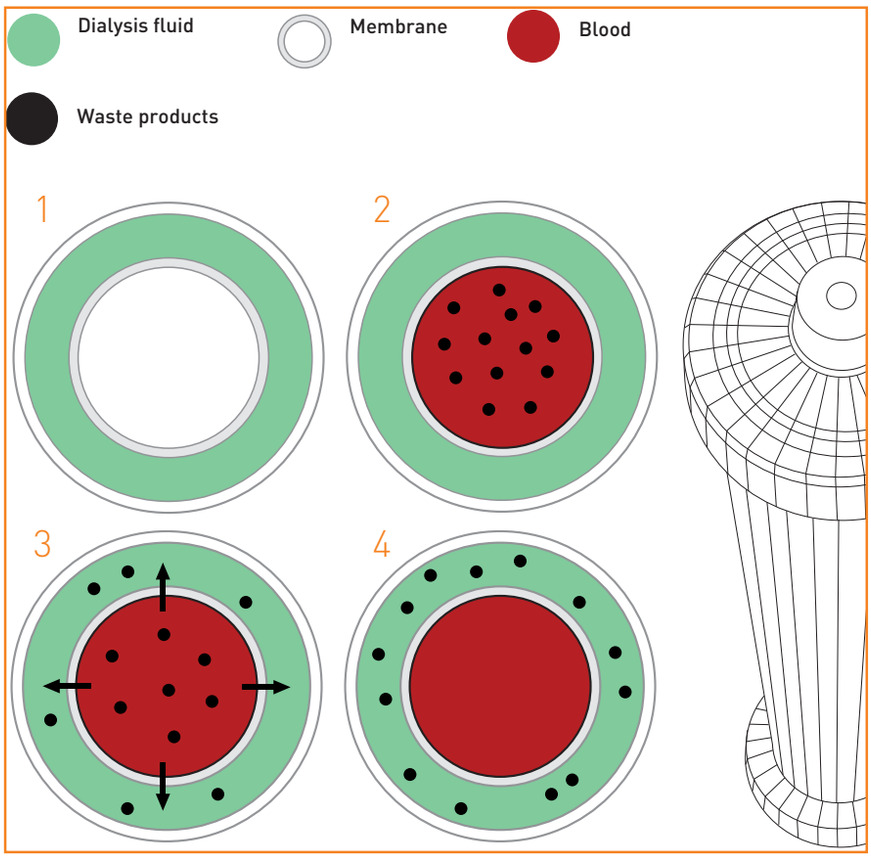
2.1 How hemodialysis works

In hemodialysis the cleaning of the blood takes place outside the body in an "artificial kidney", also called a dialyzer. Blood is pumped via plastic lines to the dialyzer and back again, a process monitored and controlled by a dialysis machine.

During the treatment blood flows on one side of a membrane within the dialyzer. The dialysis machine mixes a fluid known as dialysis fluid and passes it through the dialyzer on the other side of the membrane.

Waste products and excess fluid pass across the membrane from the blood into the dialysis fluid. The cleaned blood is returned to the body and the waste products and fluid are removed from the system.

As the dialysis fluid is free from waste products, a concentration difference is created across the membrane. This makes the waste products move by diffusion from the blood, through the membrane and into the dialysis fluid. When the treatment starts, besides waste products, the patient's blood also contains excess fluid. To remove the fluid a pressure gradient is applied across the membrane in the dialyzer. This forces water to leave the blood, and enter the dialysis fluid by the process of ultrafiltration. The amount of fluid ultrafiltered during the entire treatment session should correspond to the excess volume.

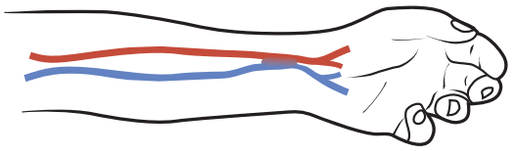


2.2 Blood access

This is a means by which blood can be taken out and returned to the body.

AV-fistula

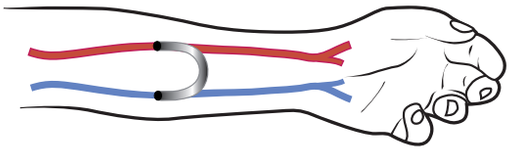
This is the most common type of access. The artery (red) has been connected to a superficial vein (blue), and after a maturation period the vein has become arterialized with thicker walls and larger diameter.



Other types include a graft and a permanent catheter.

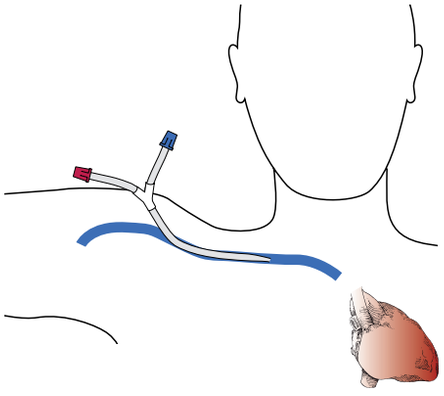
Graft

The connection between artery and vein is made through a tube made either of an artificial material, or from part of one of your own blood vessels.



Catheter

Usually inserted into a vein in the neck or shoulder.



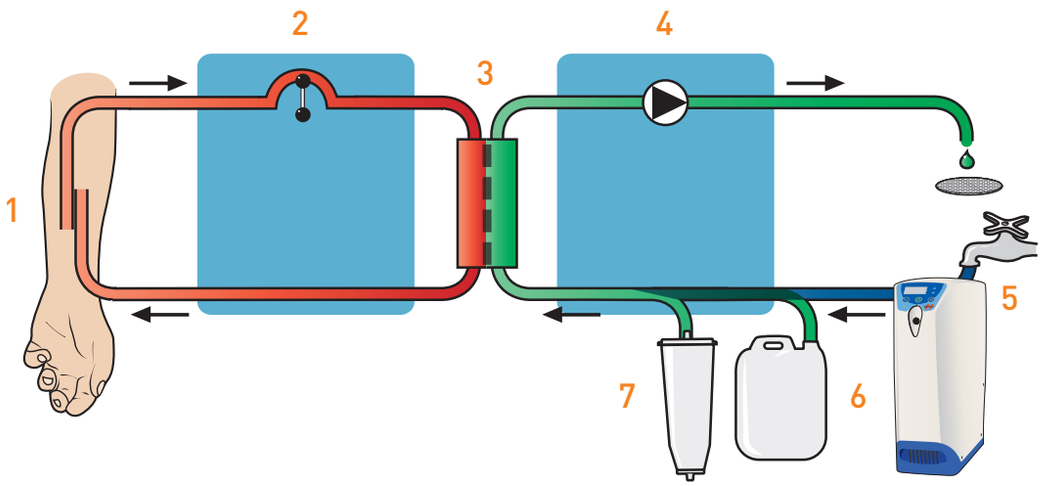
Care of the access will vary depending on which type of access you have and how your hospital would like you to look after your access.

Before commencing dialysis it is important to know how to look after your access. Your hospital will provide you with this information.

2.3 Different components of the hemodialysis system

A dialysis machine is needed to perform hemodialysis.

If the dialyzer is the kidney, the machine could be said to correspond to the rest of the body, providing the kidney with blood and controlling the whole process.



1. **The access:**
   the means by which blood is removed and returned to the body.
2. **The blood monitor:**
   pumps blood through a disposable circuit at a continuous, controlled speed from the access, through the dialyzer and back to the access.
3. **The dialyzer:**
   is connected within the disposable circuit. This is where waste products and excess fluid are removed from the blood.
4. **The fluid circuit:**
   prepares and pumps the dialysis fluid through the dialyzer and out to drain.
5. **The reverse osmosis unit:**
   provides a continuous flow of clean water to the dialysis machine during treatment and disinfection.
6. **A-concentrate:**
   contains electrolytes, including sodium, potassium, calcium, magnesium chloride and acetic acid.
7. **B-concentrate:**
   contains the buffer bicarbonate and sodium.

2.3.1 The blood monitor

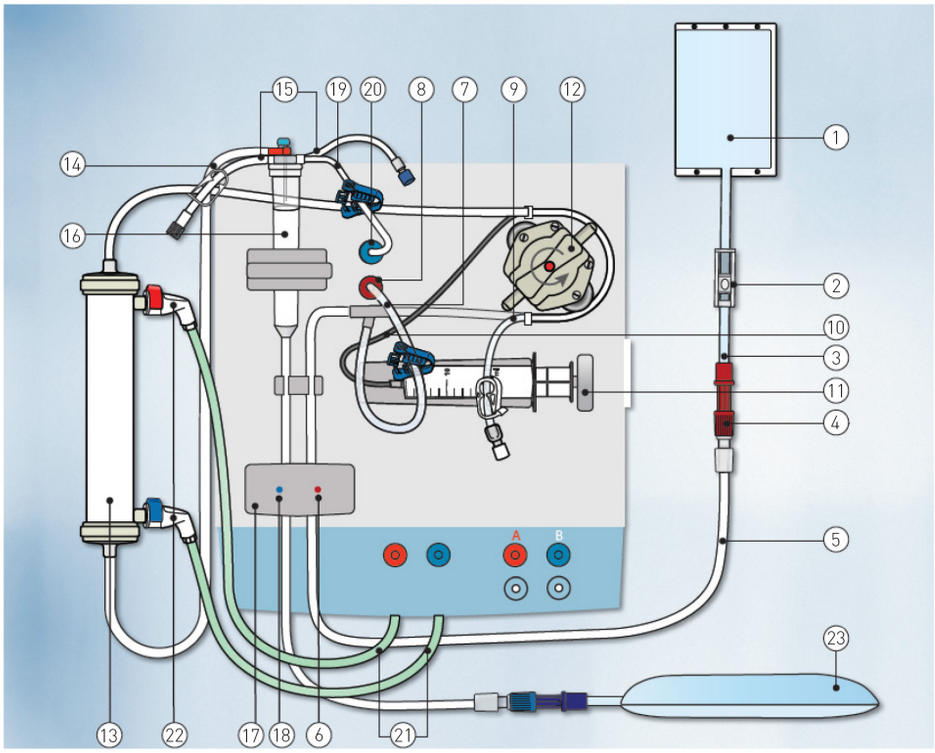
The blood monitor controls and supervises the entire blood circuit.

The purpose of the blood monitor is to pass blood from the access through the arterial blood line to the dialyzer, after which it is returned to you via the venous blood line. This is done at a continuous flow and controlled speed.

The blood pump is placed before the dialyzer.

Safety features built into the system monitor the pressure of the blood flow coming out of and being returned to the access.

An air detector is incorporated into the blood circuit in order to prevent possible air being returned to the access.



1. Saline bag
2. Roller clamp or clamp on infusion line
3. Infusion line
4. Connector
5. Arterial blood line
6. Arterial blood line clamp
7. Arterial pressure transducer line
8. Arterial pressure transducer connector
9. Arterial infusion line
10. Heparin line
11. Syringe pump piston
12. Blood pump
13. Dialyzer
14. Venous blood line
15. Venous infusion lines
16. Venous drip chamber
17. Venous blood line clamp
18. Priming detector
19. Venous pressure transducer line
20. Venous pressure transducer connector
21. Dialysis fluid tubes
22. Dialysis fluid tube connectors
23. Waste bag

2.3.2 The dialyzer

This is a small plastic cylinder which fits into the disposable circuit.

A dialyzer contains many fibres of membrane.

This membrane is a thin film containing thousands of microscopic holes (pores).

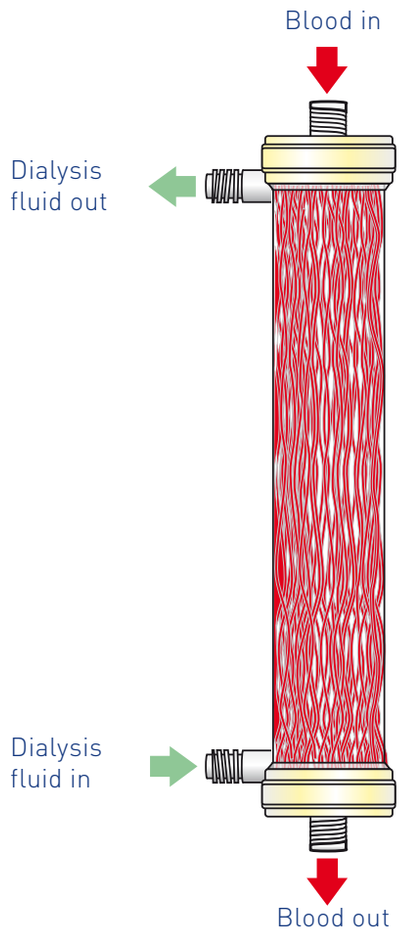
The pores allow water and waste products to pass through them but keep the blood cells and proteins within the blood.

Fluid is removed from the blood by ultrafiltration driven by a pressure gradient, TMP (transmembrane pressure), across the membrane.

Dialysis fluid passes continuously through the dialyzer on the other side of the membrane.

All dialyzers have four external ports, two that allow blood to enter and exit the dialyzer and two that allow dialysis fluid to enter and exit the dialyzer.

The dialysis fluid flows through the dialyzer in the opposite direction to the blood.



2.3.3 The fluid monitor

The purpose of the fluid monitor is to prepare dialysis fluid and continuously pass it through the dialyzer and out to drain.

Water is taken into the machine and mixed with 2 concentrates which contain various salts.

The fluid is monitored to ensure the concentration of salts is correct. It is then warmed to body temperature and passed via the dialysis fluid tubes to the dialyzer.

The amount of fluid removed in the dialyzer is measured and controlled and the waste fluid is passed to the drain.

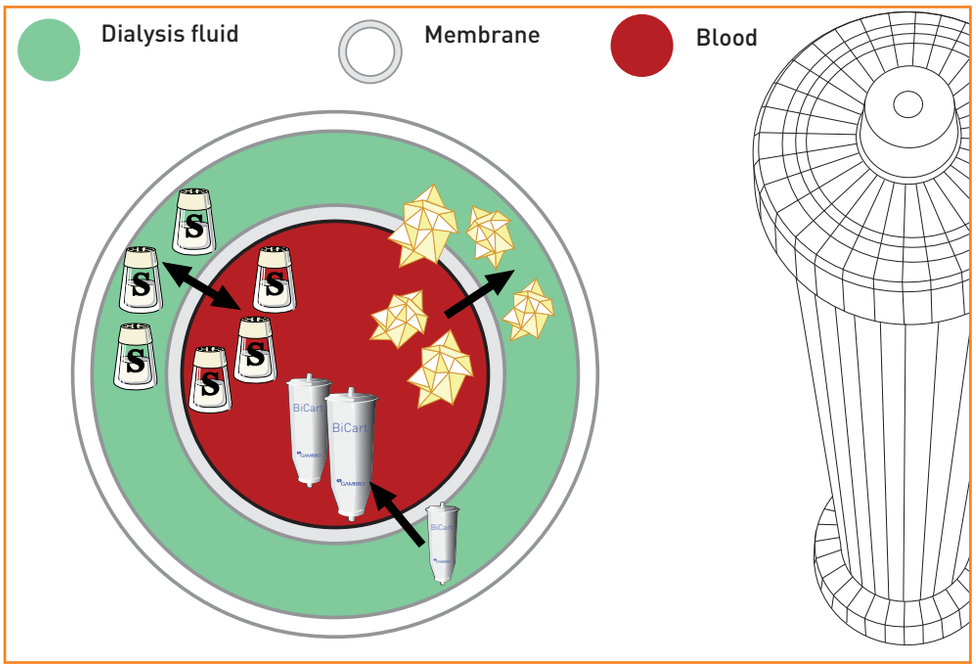
The functions of the fluid unit are:

1. To produce dialysis fluid in the correct concentration and at the right temperature
2. To pass the fluid through the dialyzer at a continuous controlled flow
3. To monitor and control fluid removal
4. To monitor the dialysis fluid for problems

Dialysis fluid

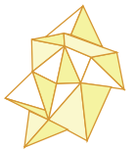
As well as removing waste products and fluid from the blood, the dialysis fluid corrects the imbalance of various salts within the body.

This is achieved by adding these salts to the dialysis fluid. The fluid monitor mixes water with concentrates taken from one or two canisters or cartridges. By varying the concentration of salts in the concentrate, the imbalance can be corrected (A and B concentrates).



Some solutes will move from the blood into the dialysis fluid whilst others will move in the opposite direction.

This salt has the same concentration in the blood as in the dialysis fluid. Its concentration stays the same in the blood.



This salt has a higher concentration in the blood than in the dialysis fluid so it moves from the blood into the fluid.

This salt has a higher concentration in the dialysis fluid than the blood so it moves from the fluid into the blood.

2.3.4 The water supply

The water used for home dialysis must be of a high quality. Since the water is used to prepare dialysis fluid.

A hemodialysis patient is exposed to several hundred liters of dialysis fluid per week, which is separated from the blood only by a thin membrane.

The mains water is therefore purified before it is used by the dialysis machine in a reverse osmosis (RO) unit. This device uses a semipermeable membrane that allows the passage of water but removes most other contaminants.

Pretreatment of the water may be required before it enters the RO unit.

- A water softener to remove hardness
- A carbon filter to remove chlorine and chloramines
- A sediment filter to remove particulate matter

The water should be analyzed on a regular basis, both from a chemical and microbiological standpoint, to ensure that it complies with relevant standards for water dialysis.

2.4 Efficiency of hemodialysis

How do we know that the prescription and the treatment are adequate?

To accomplish a satisfactory dialysis treatment, two things have to be achieved:

1. Adequate removal of excess fluid
2. Adequate removal of unwanted solutes i.e. waste products

Removal of excess fluid

Before starting your dialysis treatment, you must weigh yourself.

The fluid volume to be removed, **the UF volume**, is calculated from the weight gain since the last treatment, to which is added the volume of the drinks to be consumed during the session as well as any infusions.

The target weight is called **dry weight**. This is the weight you would have if you had normal fluid regulation.

When the UF volume is set, the machine can calculate the required **UF rate** by considering the **treatment time**, normally between 4 and 5 hours for conventional HD, up to 4 hours for short daily HD and more than 6 hours for nocturnal HD.

NOTE

Your maximum UF rate is _____liters/hour

NOTE

Solute removal

To achieve an efficient solute removal, the **blood flow rate**, Q_B, should be kept high.

One common waste is urea, which results from the breakdown of protein.

The simplest way to follow the urea removal is to analyze and compare the blood urea concentrations before (pre) and after (post) dialysis.

The results of the pre and post blood tests can be entered into one of two main calculations to ensure that you are getting the correct dose of HD.

These calculations are

- Urea reduction ratio (URR)
- Urea kinetic modeling (Kt/V)

The URR measures the level of urea in the blood before and after a treatment. The difference between the two levels is shown as a percent.

The Kt/V is calculated by multiplying the amount of waste removed by the treatment time. The result is divided by the estimated volume of water in the body.

- The K stands for clearance of urea
- The t stands for treatment time
- The V stands for the volume of the body water

NOTE

The **AK 98** dialysis machine has a feature integrated that can give you information on the efficiency of your treatment. The **Diascan** monitoring system can be used for clearance measurement (K) and (Kt/V).

NOTE

At present a minimum of _____ Kt/V for an adequate hemodialysis session is recommended.

When you receive adequate dialysis, you will feel better and you will have more energy.

If the result falls below these levels, your doctor can make some changes, e.g. increase the treatment time (t) or use a bigger dialyzer with more clearance (K).

NOTE

Clearance describes the cleansing capacity of a dialyzer.

NOTE

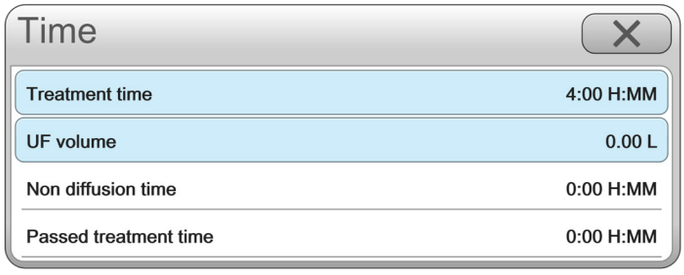
** Daugirdas, John. Chronic Hemodialysis Prescription: A urea kinetic approach. *Handbook of Dialysis*, 4th edition, 2007, Chapter 9, page 146-151.

Several factors ensure the efficiency of a dialysis treatment.
Those parameters can also be checked on the **AK 98** dialysis machine.

1. The non-diffusion time:

This is the time during the treatment when no dialysis has occurred and when the dialysis fluid is bypassed. This may be due to:

- A conductivity alarm
- A stopped blood pump

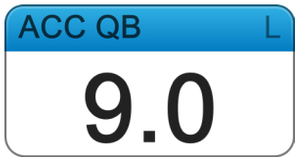


NOTE

If non-diffusion time is regularly greater than _____ minutes then the dialysis received is not that prescribed.

NOTE

2. The accumulated blood volume (ACC QB):



- The accumulated volume = blood flow (ml/minute) x time (minutes) To achieve an efficient solute removal the blood flow rate, QB, should be kept as high as possible. The length of the treatment is a compromise between practical and social considerations and the physiological limits for the removal rate of fluid and solutes
- A stopped blood pump or reduced blood flow will also reduce the accumulated volume

NOTE

If the accumulated volume is regularly lower than _____liters, or the non-diffusion time is regularly in excess of ___minutes, inform your dialysis unit.

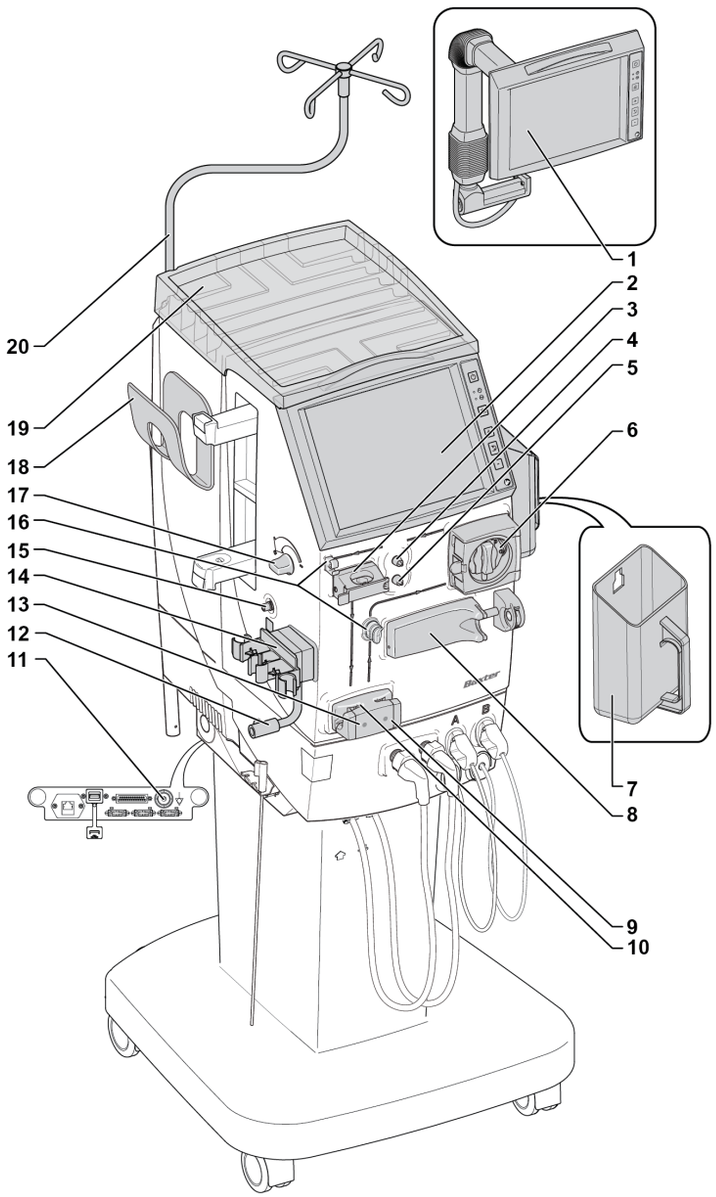
NOTE

3 The **AK 98** dialysis machine and its accessories

Ref: Operator's manual for the **AK 98** dialysis machine, Chapter 2 Machine description

3.1 The **AK 98** dialysis machine

1. Remote operator's panel (option)
2. Operator's panel
3. Air detector
4. Venous pressure transducer connector
5. Arterial pressure transducer connector
6. Blood pump
7. Prime bucket (option)
8. Heparin pump
9. Priming detector
10. Arterial blood line clamp
11. Venous blood line clamp
12. Potential equalisation connection
13. Arm for dialyzer holder
14. Expansion chamber holder
15. Blood pressure monitor (BPM) connector (option)
16. Blood line guides
17. Level adjustment knob
18. BPM cuff holder (option)
19. Top tray
20. Infusion stand

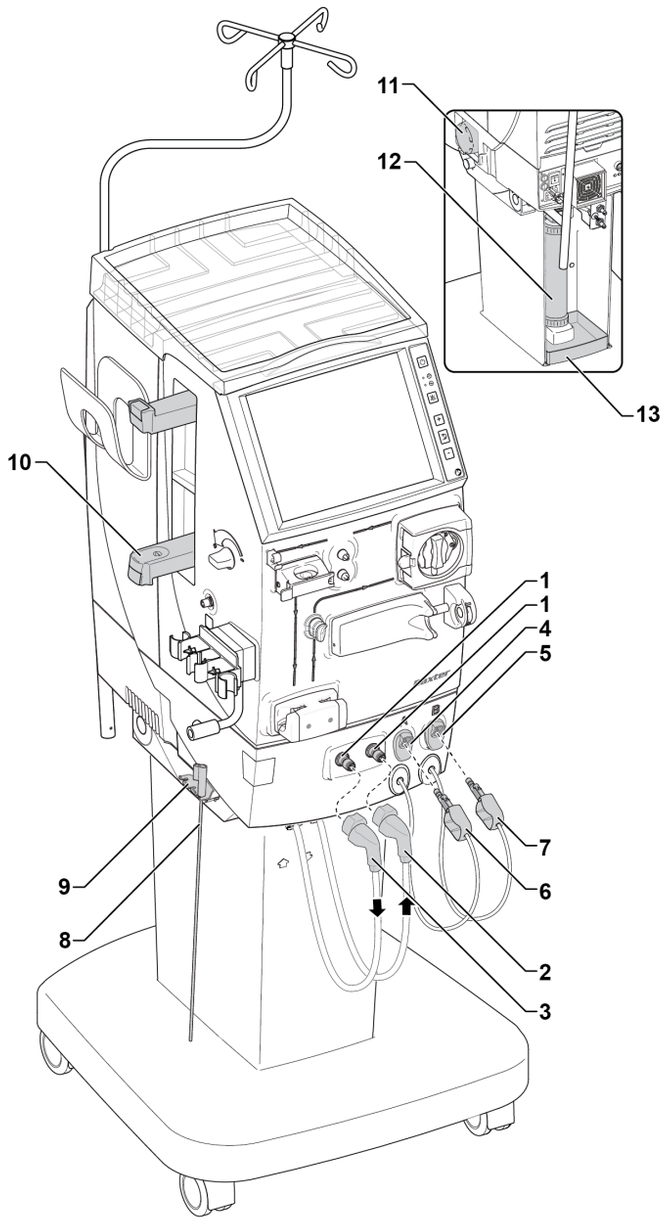


3.1.1 Blood unit

1. **Remote operator's panel (option)**
   The operator´s panel can be mounted in an external housing. The remote panel is easy to adjust in different positions. The controls on the remote panel are the same as when the operator's panel is mounted in the machine cabinet.
2. **Operator's panel**
   The operator´s panel can be mounted in the machine cabinet.
3. **Air detector**
   The air detector will detect air or foam in the venous drip chamber and prevent air from being infused to the patient.
4. **Venous pressure transducer connector**
   The pressure in the venous drip chamber is measured when the venous pressure transducer of the venous blood line is attached properly to this connector.
   Measures the resistance of the blood returning to the access.
5. **Arterial pressure connector**
   The pressure in the arterial blood line, just before the blood pump, is measured when the arterial pressure transducer of the arterial blood line is attached properly to this connector. The arterial pressure is the pressure of the blood coming out of the arterial access.
6. **Blood pump**
   The blood pump will stop if the pump cover is opened. During a power failure you can turn the pump rotor manually (anticlockwise) by the handle to circulate the blood.
7. **Prime bucket (option)**
   The prime bucket is a container to collect the priming solution.
8. **Heparin pump**
   The heparin pump holds a syringe containing heparin solution. The pump
   distributes heparin in the blood line to prevent the blood from clotting.
9. **Priming detector**
   The priming detector detects if there is blood or not in the venous blood line. When blood has been detected, treatment alarms are activated.
10. **Arterial blood line clamp**
    The clamp closes the arterial line in certain alarm situations.
11. **Venous blood line clamp**
    The clamp closes the venous blood line in certain alarm situations.
12. **Potential equalisation connection**
    For patients with a central venous catheter this connector is used to connect to an equalisation conductor.
13. **Arm for dialyzer holder**
    You can swing the arm to change the position of the dialyzer. The holder can be rotated through 360°.
    CAUTION! Take care not to wrap the blood lines around the dialyzer holder when rotating it. This could cause kinking of the blood lines, and lead to hemolysis.
14. **Expansion chamber holder**
    The holder is used when an arterial expansion chamber is present in the blood line or when performing single needle treatment.
15. **Blood Pressure Monitor (BPM) connector (option)**
    The blood pressure cuff and hose connects directly to the BPM connector.
16. **Blood line guides**
    The blood lines should always be placed in the guides during treatment for safety reasons.
17. **Level adjustment knob**
    The level in the venous drip chamber is adjusted by turning this knob (counterclockwise to raise the level, clockwise to lower it).
18. **Blood Pressure Moniotor (BPM) cuff holder (option)**
    The blood pressure cuff and hose not in use are kept in this holder.
19. **Top tray**
    To protect the machine against spillage, the top tray must always be correctly placed on top of the machine.
20. **Infusion stand**
    The infusion stand is used for fluid bags. Maximum permitted load is 3 kg. The infusion stand can be turned between a position over the tray and to the left of the dialysis machine. A mechanical stop limits the movement.

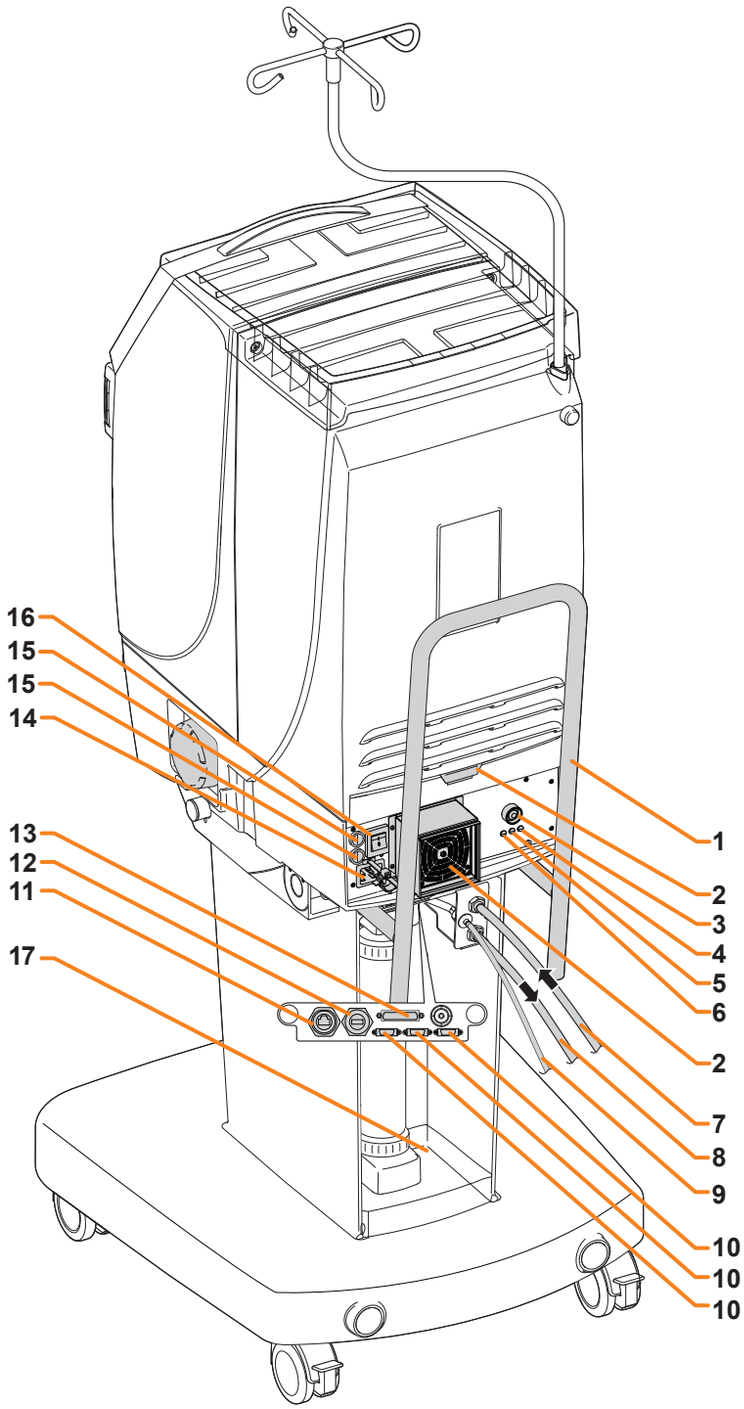
3.1.2 Fluid unit

1. **Standby ports for the dialysis fluid tubes**
   The standby ports hold the dialysis fluid tubes during the functional check, the disinfection program, and the rinse program.
2. **Dialysis fluid tube from machine to dialyzer (blue)**
   The blue connection is from the machine to the dialyzer. The newly prepared, fresh dialysis fluid, flows from the machine to the dialyzer via this tube.
3. **Dialysis fluid tube from dialyzer to machine (red)**
   The red connection is from the dialyzer to the machine. The used dialysis fluid flows from the dialyzer to the machine via this tube.
4. **Standby port for red concentrate**
   This port holds the red concentrate connector when it is not used in treatment.
5. **Standby port for blue concentrate connector**
   This port holds the blue concentrate connector when it is not used in treatment.
6. **Concentrate connector, red**
   The red connector can be attached to a white pick-up tube and placed in a container with acidic concentrate. or connected directly to the **SoftPac** concentrate.
7. **Concentrate connector, blue**
   The blue connector can be attached to a blue pick-up tube and placed in a container with liquid bicarbonate.
8. **Pick-up tube**
   A pick-up tube is placed in a container with a dialysis fluid concentrate or a disinfectant solution.
9. **Pick-up tube holder**
   The pick-up tubes not in use are kept in this holder.
10. **BiCart cartridge holder**
    This holder is for the **BiCart** cartridge. The holder is also used for the **CleanCart** cartridges (cleaning or decalcification).
11. **Blood leak detector**
    The blood leak detector checks for blood in the dialysis fluid.
12. **Ultrafilter**
    The base of the dialysis machine cabinet contains the ultrafilter. The purpose of the ultrafilter is to further clean the dialysis fluid from possible contamination by bacteria and endotoxins.
13. **Fluid leakage detector tray**



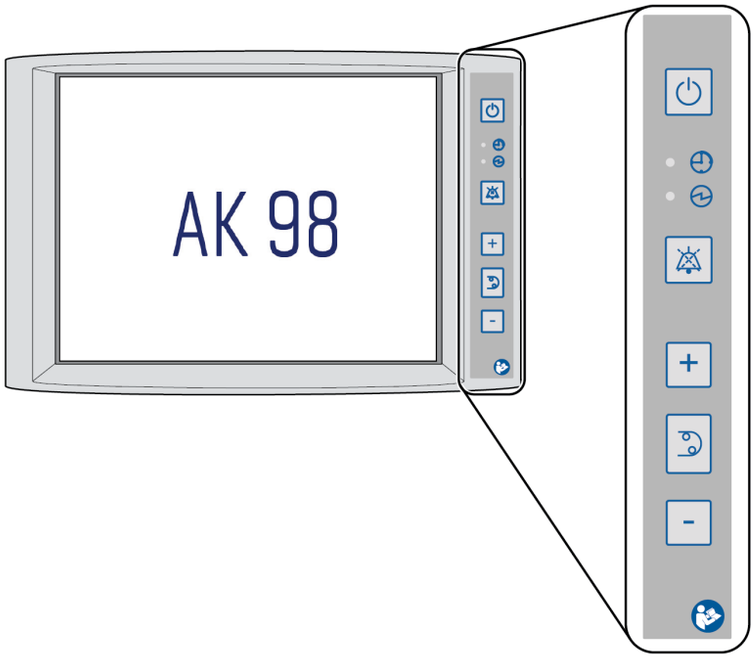
3.1.3 Rear of the machine

1. **Transportation handle**
2. **Air filters**
3. **Halt button**
   When this button is pressed, the power supply to the machine is interrupted. As soon as the button is released the power returns and the machine performs a recovery.
4. **Battery charge indicator**
5. **Battery connect indicator**
6. **Over temperature protection indicator**
7. **Inlet water tube**
8. **Outlet tube (drain)**
9. **Disinfectant inlet tube**
10. **Remote panel contacts**
11. **Ethernet port**
12. **USB port**
13. **External communication port**
14. **Mains connection**
15. **Fuses**
16. **Main switch**
17. **Fluid leakage detector tray**
    If an internal leakage occurs in the dialysis machine the fluid will be collected in the fluid leakage detector tray. The detected volume could be an excessive UF volume. An alarm will be displayed if the fluid level reaches the level of the detector.



3.1.4 The operator's panel

Ref: Operator's manual for the **AK 98** dialysis machine, Chapter 3 Handling the dialysis machine



On/Off button

Press to turn the dialysis machine on or off.

Schedule indicator

When this indicator is lit blue, a program (Auto Rinse or Auto heat/ chemical) is scheduled to run with automatic start.

Main switch indicator

When this indicator is lit green, the dialysis machine is connected to mains power supply and the main switch (at the rear of the machine cabinet) is on.

Mute button

Press the Mute button to mute the alarm or attention sound. Press and hold the Mute button to turn the alarm or attention sound on again.

Blood pump up button

Increase blood pump speed.

Blood pump button

Press the Blood pump button to start or stop the blood pump.

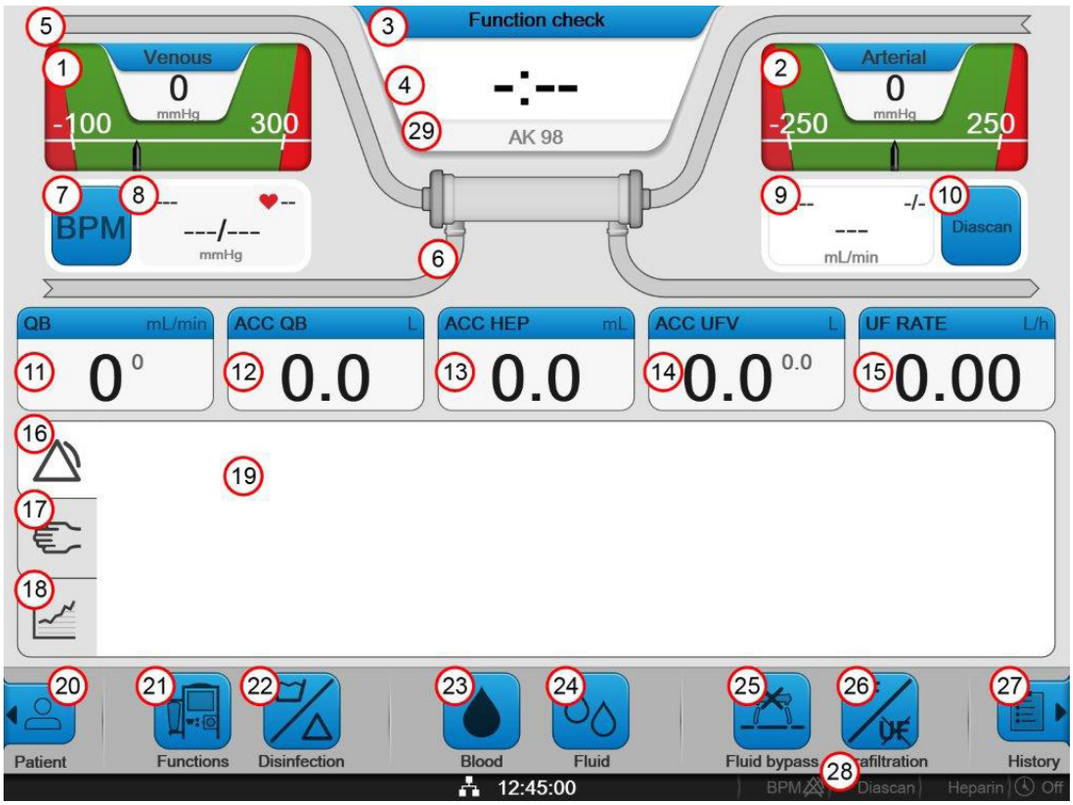
Blood pump down button

Decrease blood pump speed.

3.1.5 The screen

Screen overview

The touch screen contains menus and buttons for preparing, running, finishing and maintaining the dialysis machine.



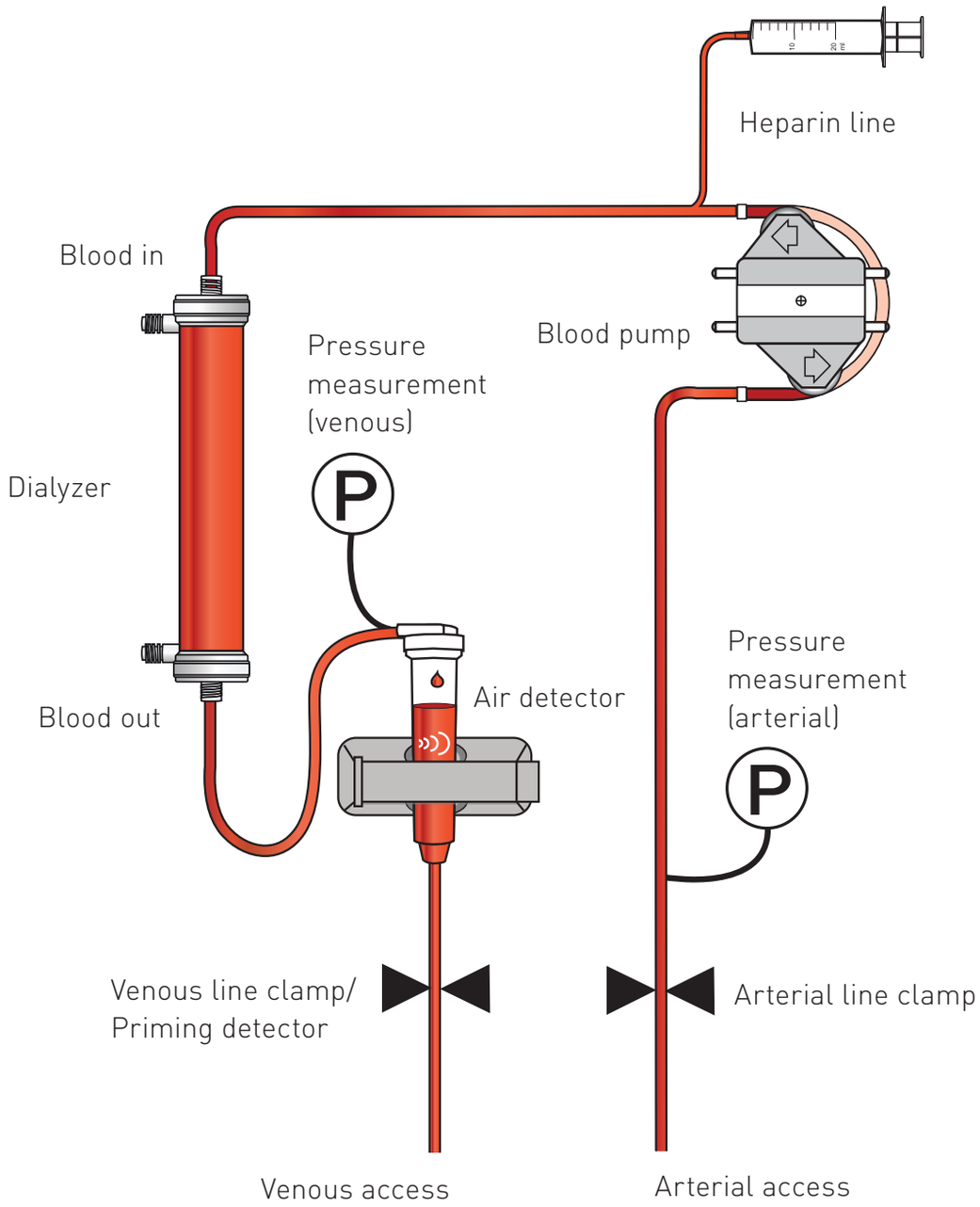
1. Venous pressure control
2. Arterial pressure control
3. Machine state indicator
4. Time indicator
5. Blood path
6. Fluid path
7. Blood pressure monitor (BPM) button
8. Blood pressure monitor (BPM) read out field
9. Diascan read out field
10. Diascan button
11. Treatment overview field
12. Treatment overview field
13. Treatment overview field
14. Treatment overview field
15. Treatment overview field
16. Alarm tab
17. Information tab
18. Treatment graph tab
19. Information field
20. Patient page
21. Functions button
22. Disinfection button
23. Blood button
24. Fluid button
25. Fluid bypass button
26. Ultrafiltration (UF) button
27. Treatment history page
28. Status bar
29. Monitor identifier (Nickname)

3.2 The blood circuit

Ref: Operator's manual for the **AK 98** dialysis machine, Chapter 4 Hemodialysis—double needle treatment

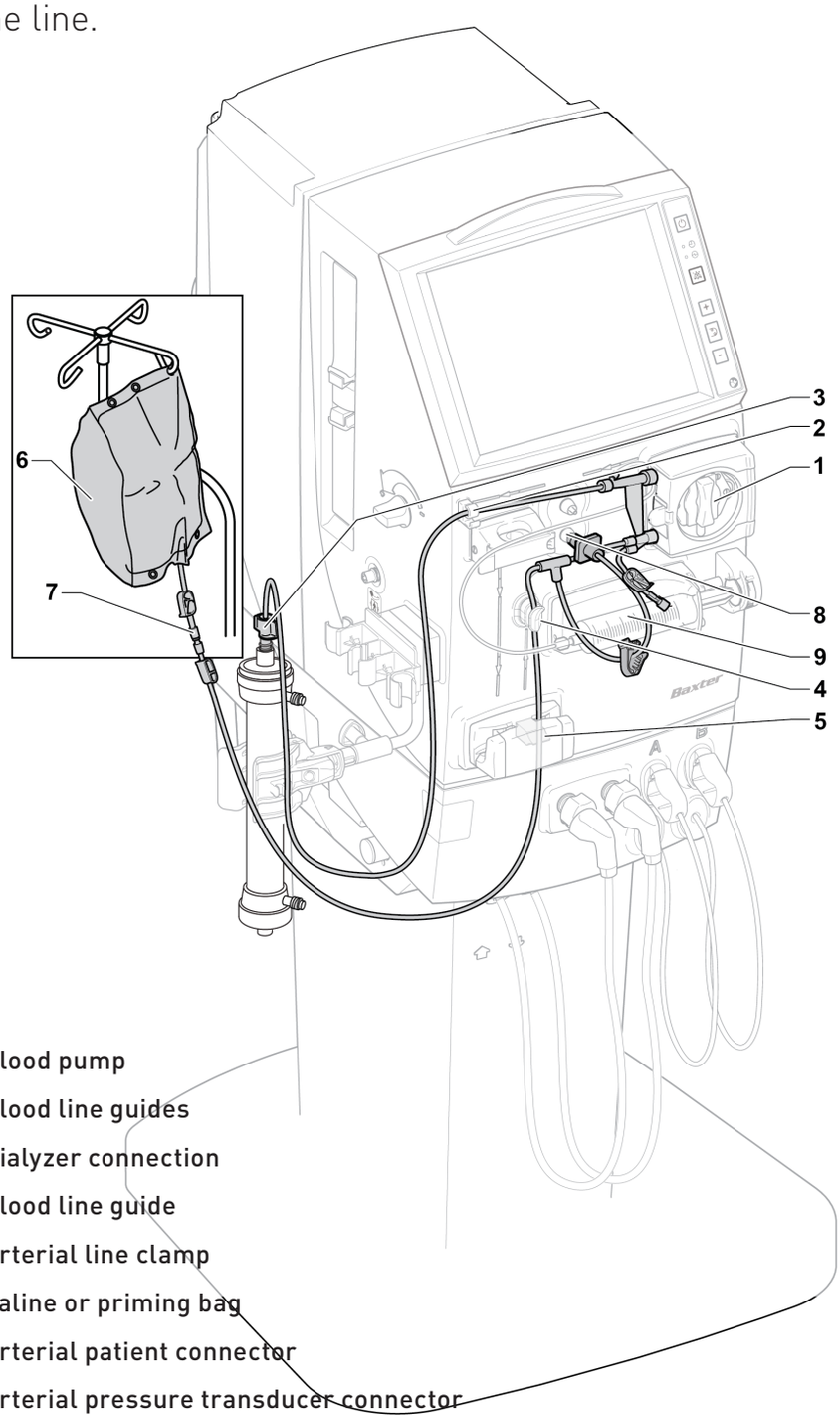
The blood circuit (extracorporeal circuit) is made up of two disposable lines and a disposable dialyzer.

Its function is to circulate blood from the arterial access through the dialyzer and back via the venous access.



3.2.1 Arterial blood line

The arterial line can be identified by the red connectors on each end of the line.

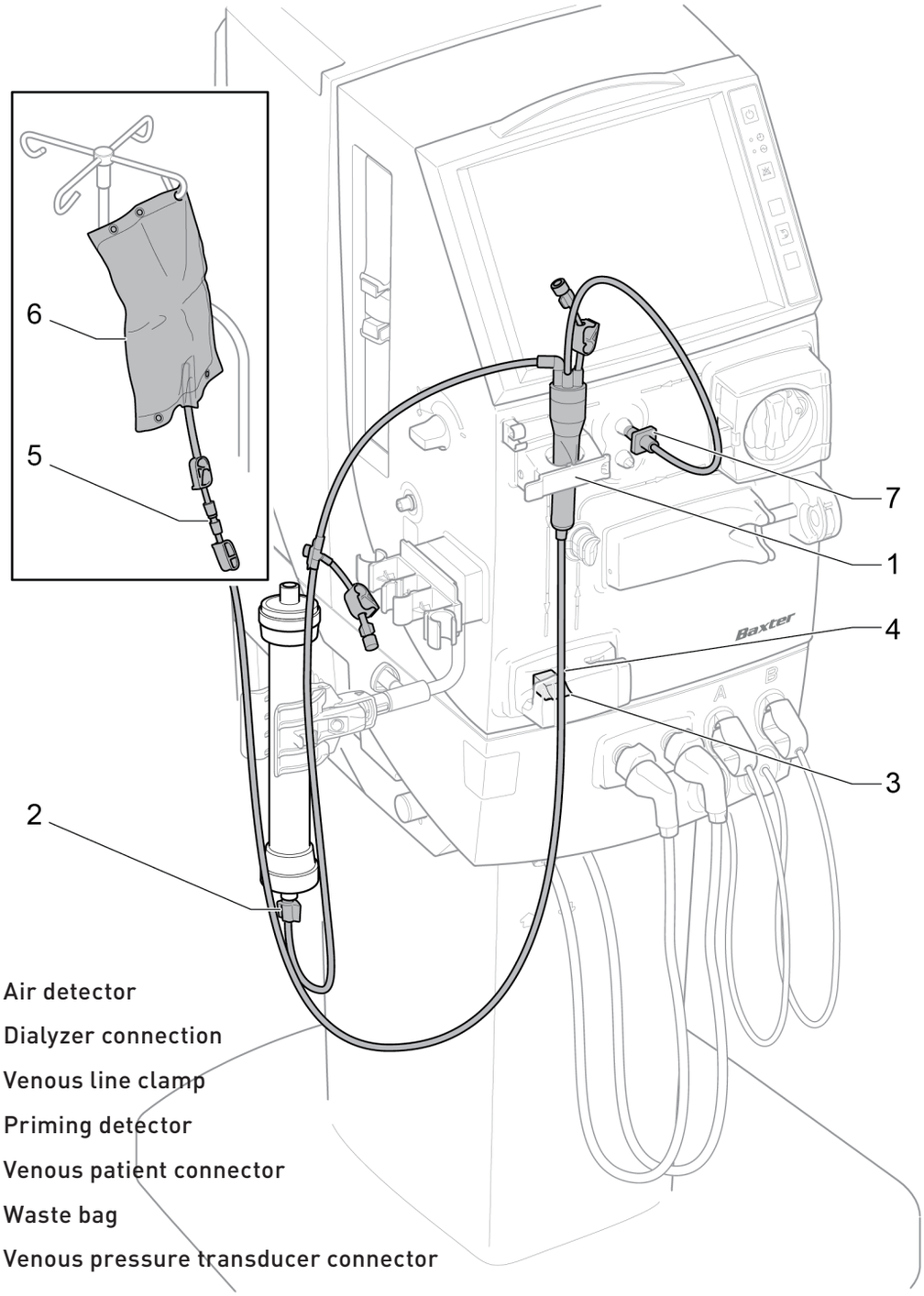


1. Blood pump
2. Blood line guides
3. Dialyzer connection
4. Blood line guide
5. Arterial line clamp
6. Saline or priming bag
7. Arterial patient connector
8. Arterial pressure transducer connector
9. Heparin pump

The function of the arterial line is to take blood out of the body. This is done by means of the blood pump. The speed is controlled by the setting keys placed above and below the blood pump button and the pressure is measured by the arterial pressure measurement.

3.2.2 Venous blood line

The venous line can be identified by the blue connectors on each end of the line.

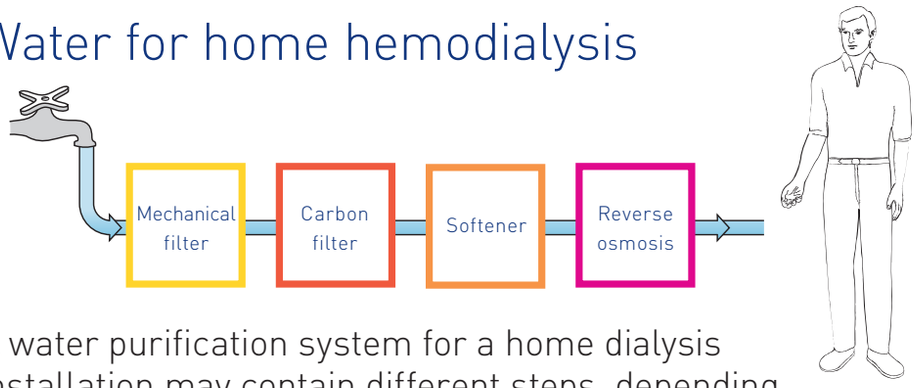


1. Air detector
2. Dialyzer connection
3. Venous line clamp
4. Priming detector
5. Venous patient connector
6. Waste bag
7. Venous pressure transducer connector

The function of the venous line is to return blood to the body. The air detector ensures no air is pumped back into the access. The pressure is measured by the venous pressure measurement.

4 The water purification system

4.1 Water for home hemodialysis



A water purification system for a home dialysis installation may contain different steps, depending on local circumstances:

- A mechanical filter to remove particles may sometimes be installed as a first stage if the water contains a lot of particulate matter
- A carbon filter to remove chlorine and chloramines present in the feed water
- A softener to remove hardness
- A reverse osmosis unit such as the Gambro **WRO 300 H** water purification unit removes dissolved salts and microbiological contaminants

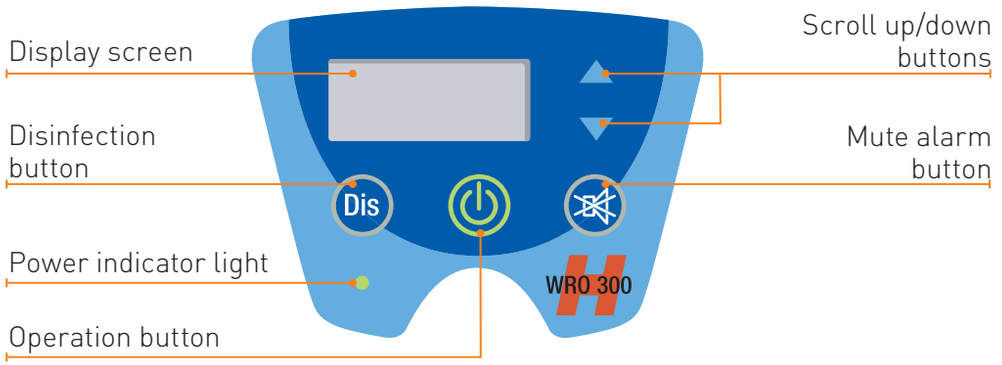
NOTE

The following information relates to Gambro's reverse osmosis unit **WRO 300 H**. If another reverse osmosis unit is to be used instead, follow the instructions for use for that specific unit.

NOTE

4.2 The **WRO 300 H** water purification unit — operator's panel

Ref: Operator's manual for the **WRO 300 H** water purification unit HCEN12104/HCEN12481



NOTE

The WRO unit you are using may look slightly different than the one pictured in this document. Please refer to your clinic nurse for any questions regarding the version of the unit you are using.

NOTE

4.2.1 Description of the buttons

Buttons	Description
	Is lit when the WRO is in operation (RUN)
	Is lit when a heat program is in progress The button is also used when initiating warm citric acid cleaning For more information please consult the operator´s manual for the **WRO 300 H** unit (HCEN12104/HCEN12481).
	Press to acknowledge and silence alarms and notifications
	Used to scroll and view data in the display
	Displays status and alarm information
 	Indicates a low priority alarm. Indicates an information signal.

4.3 The **WRO 300 H** unit—system procedure

4.3.1 Remote operation

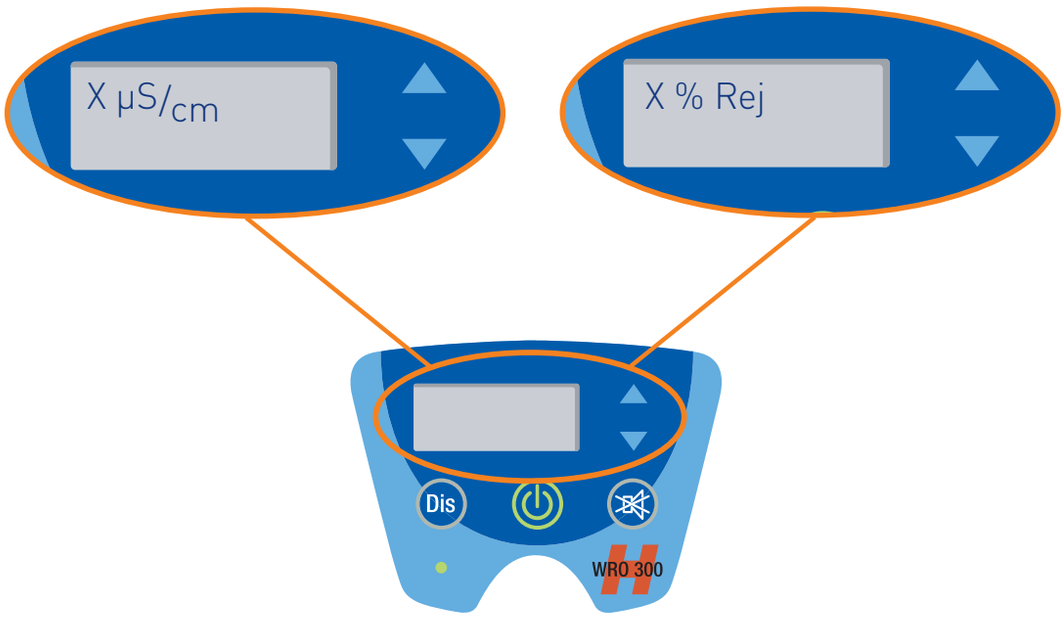
The **WRO 300 H** water purification unit operates automatically together with the **AK 98** dialysis machine.

When the ON/OFF switch on the **AK 98** dialysis machine is pressed, the **WRO 300 H** water purification unit will automatically enter the run mode.

The integrated heat program will not only disinfect the **AK 98** dialysis machine and **WRO 300 H** water purification unit but will also expose all parts of the hydraulic flow path to hot water, between the **AK 98** dialysis machine and the **WRO 300 H unit**.

4.3.2 Conductivity & percent rejection monitoring

To look at the conductivity or percent rejection press the up or down arrow button until conductivity (X µS/cm) or percent rejection (% Rej) is displayed.



Quality indication alarms are set by three limits:

- Notification
- Alarm
- Stop

4.4 Alarms and troubleshooting

In alarm situations the buzzer will sound and the MUTE button will flash. A three digit number and a text message will also appear in the display.

Press MUTE to silence the buzzer. Note down the three digit number and have it available if technical assistance is required.

NOTE

Take note of the alarm notification and code number (the three digit number).

NOTE

Ref: For more information please consult the operator´s manual for the **WRO 300 H** unit (HCEN12104/HCEN12481).

5 Hand cleaning

5.1 Hand washing

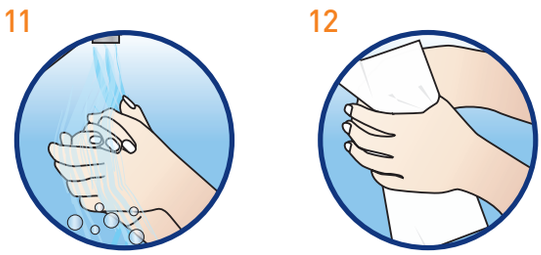
Remove watch and jewelry and roll up sleeves

Wet hands

Apply soap from liquid dispenser

Work up a lather

Perform steps 4–10 for 20 seconds on each hand



Rinse hands thoroughly

Dry hands thoroughly using a good quality disposable paper towel

5.2 Hand disinfection with alcohol gel

1. Dispense two applications of alcohol gel/rub (3-5 ml) onto the palm of your hand.

2. Rub palm against palm 5 times.

3. Rub right palm over the back of your left hand 5 times.
   Rub left palm over the back of your right hand 5 times.

4. Rub both hands together, palm against palm, fingers interlaced 5 times.

5. Rub the back of the fingers, interlocked, against the opposite palm 5 times.

6. Use the left hand to clasp the right thumb and rub hands together 5 times.
   Use the right hand to clasp the left thumb and rub hands together 5 times.

7. Rub the fingers of your right hand against your left palm 5 times. Rub the fingers of your left hand against your right palm 5 times.
   Be sure that your hands are completely wet—let air dry.

6 Your Treatment with the **AK 98** dialysis machine

Ref: Operator's manual for the **AK 98** dialysis machine, Chapter 4 Hemodialysis—double needle treatment

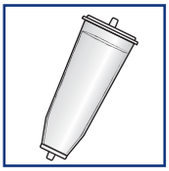
6.1 Preparing for your treatment

6.1.1 Water supply

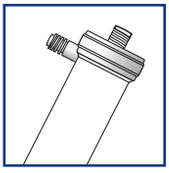
Ensure the **WRO 300 H** water purification unit is still in standby position.

6.1.2 Equipment required for lining and priming the machine

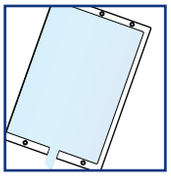
1. A-concentrate canister_____



2. **BiCart**_____ cartridge

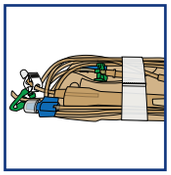


3. Dialyzer_____



4. Saline_____liters

5. Infusion line_____



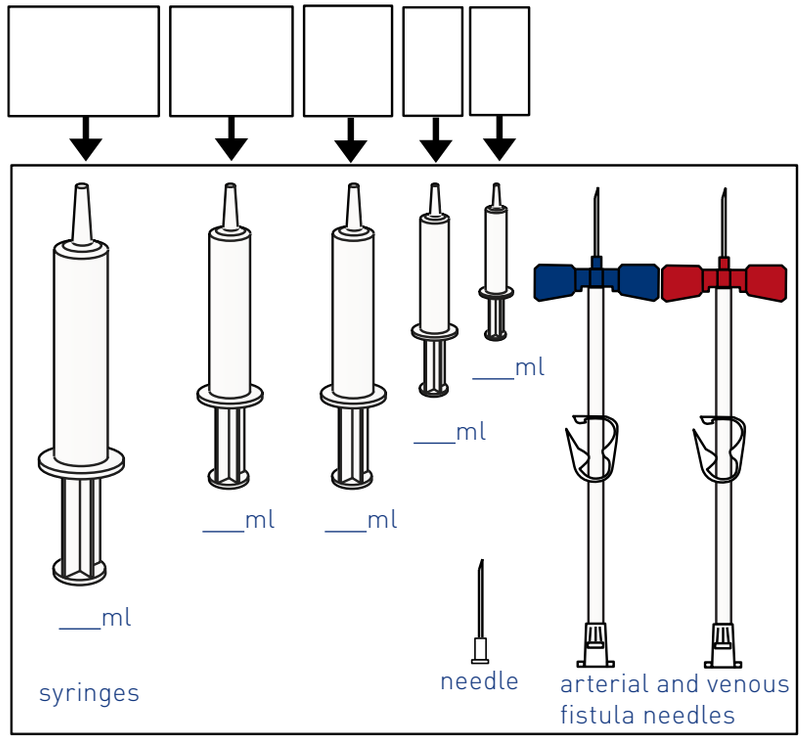
6. Blood lines: arterial and venous _____

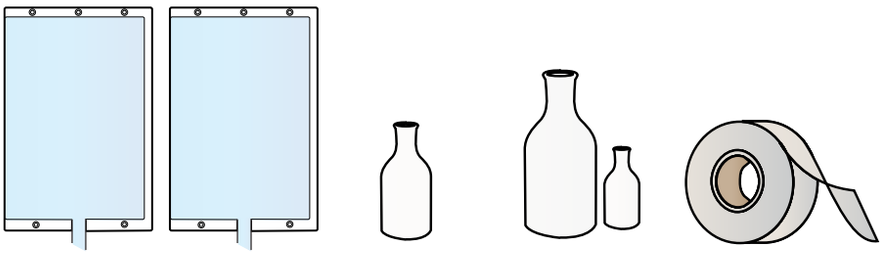
NOTE

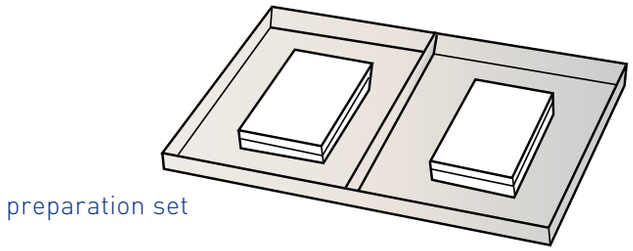
Your blood lines may differ from the ones illustrated in this Patient Guidelines book. Please refer to your clinic for the proper blood lines to use during your treatment

NOTE

6.1.3 Equipment required for heparin and access







In your preparation you will need:

Heparin _____

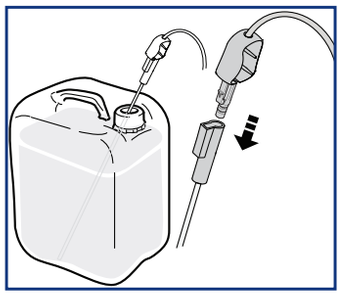
Add _____ml saline for a total of _____ml in syringe.

Add _____ml of heparin to priming bag of saline.

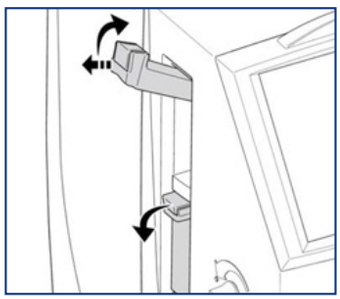
Draw _____ ml of heparin (concentration _____) in to heparin pump syringe

6.2 Set up the dialysis machine

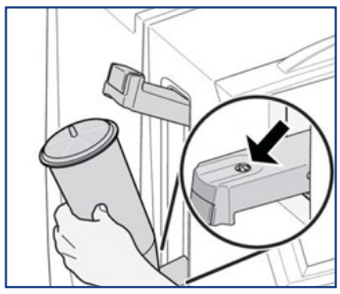
1. Turn the **AK 98** dialysis machine on. The **WRO 300 H** will power on shortly after. Wait about one minute and a half.
2. Remove the red concentrate connector from the stand-by port.



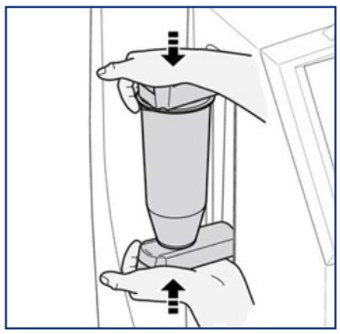
3. Attach a pick-up tube to the red concentrate connector. Place the pick-up tube in the A-concentrate container. If using **SoftPac** concentrates, connect the red concentrate connector directly to the **SoftPac** concentrate bag, once connected break the frangible pin inside the bag.



4. Release the latches by pressing the release buttons. Open the **BiCart** cartridge holder. Fold the upper latch out and up, pull out at the same time. Fold the lower latch out and down.

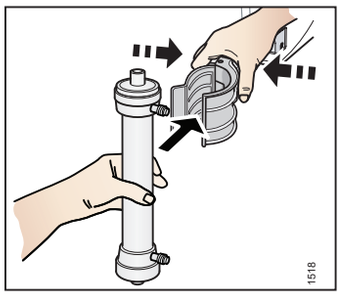


5. Remove the caps from the **BiCart** cartridge and attach it bottom down.

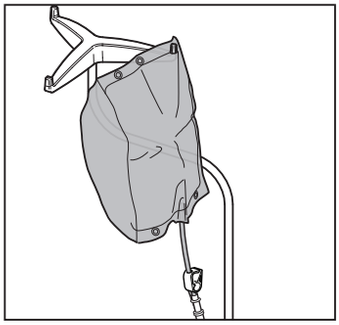


6. Close down the upper latch to secure the cartridge. Hold with one hand underneath the lower latch.

7. Select the concentrate combination to be used from the preset options on the screen and check that the displayed concentrate corresponds with the connected concentrates and your prescription.



8. Attach the dialyzer in the holder. If necessary, squeeze the spring-clip to place the dialyzer in the holder.

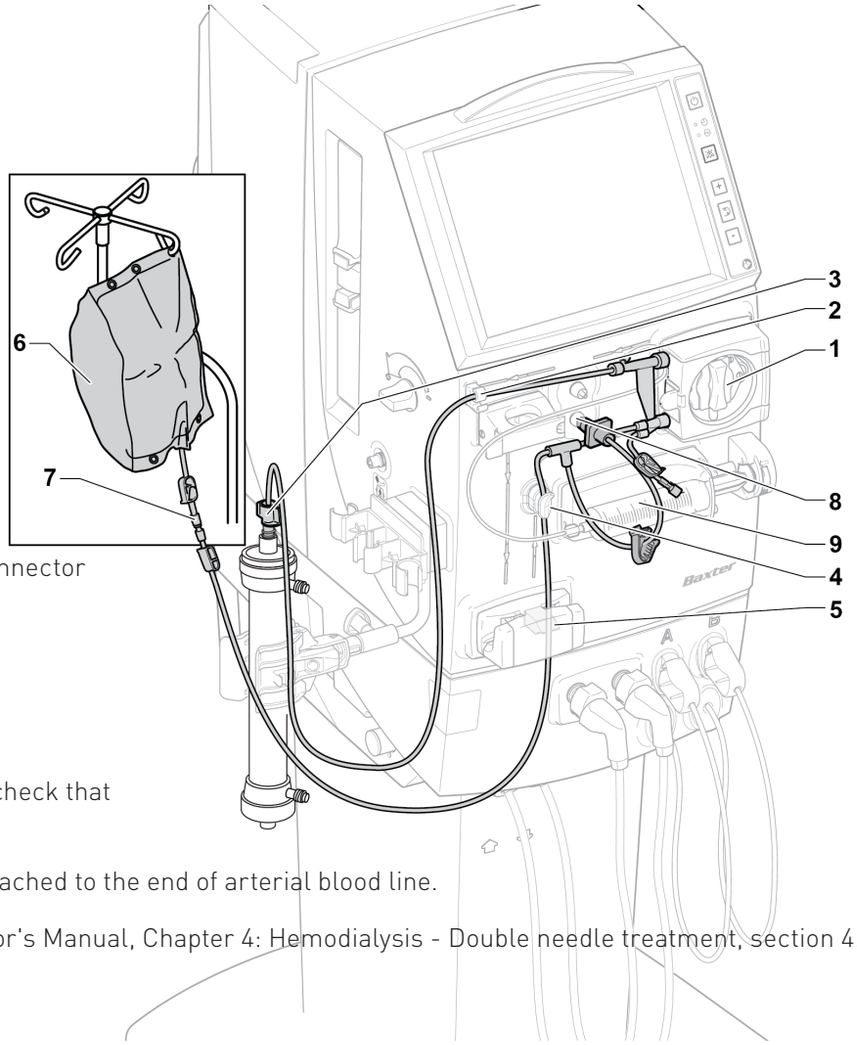


9. Hang the saline or priming solution bag on the infusion stand.

6.3 Lining the machine—arterial line

The arterial blood line set

1. Blood pump
2. Blood line guides
3. Dialyzer connection
4. Blood line guide
5. Arterial line clamp
6. Saline or priming bag
7. Arterial patient connector
8. Arterial pressure transducer connector
9. Heparin pump

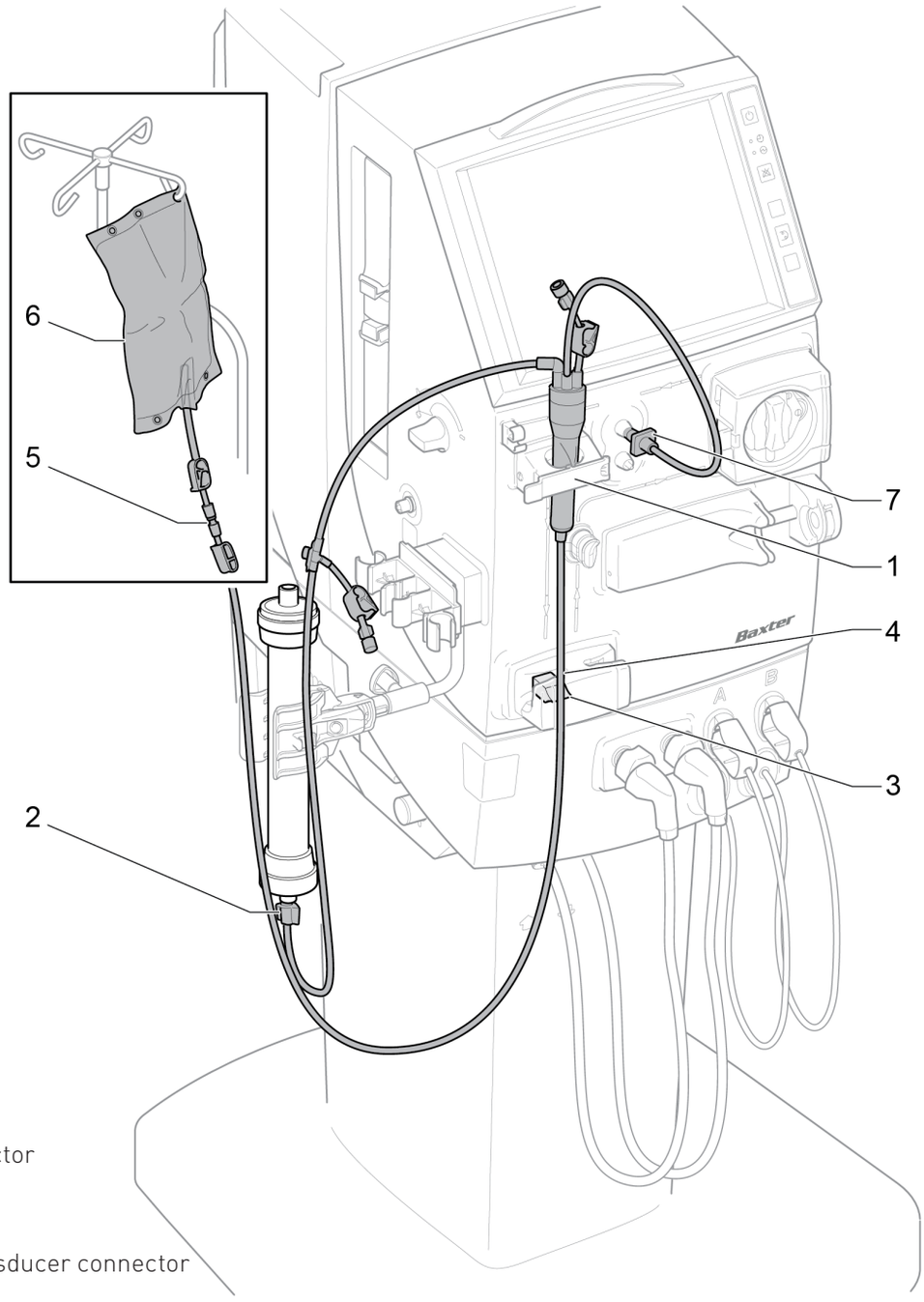


When the dialysis machine is lined, check that the appropriate clamps are closed.

Check that saline bag is securely attached to the end of arterial blood line.

For detailed information see Operator's Manual, Chapter 4: Hemodialysis - Double needle treatment, section 4.2.4

6.4 Lining the machine—venous line



The venous blood line set

1. Air detector
2. Dialyzer connection
3. Venous line clamp
4. Priming detector
5. Venous patient connector
6. Waste bag
7. Venous pressure transducer connector

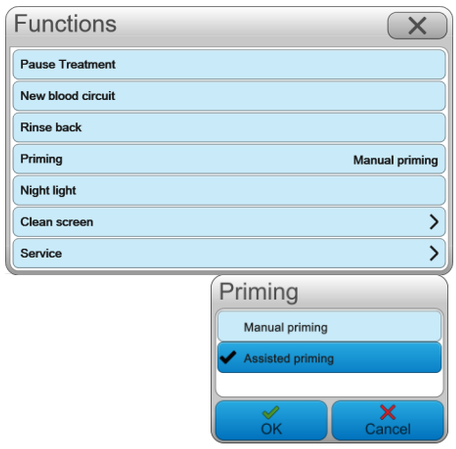
When the dialysis machine is lined, check that the appropriate clamps are closed.

Check that the waste bag is securely attached to the end of the venous blood line.

For detailed information see Operator's Manual, Chapter 4: Hemodialysis - Double needle treatment, section 4.2.5

6.5 Priming the dialysis circuit

6.5.1 Assisted priming procedure



1. Press the **Functions** button.
2. Press **Priming**.
3. Select **Assisted priming**.
4. Ensure the dialyzer is positioned with the arterial blood line connection at the bottom and the venous at the top.
5. Follow the instructions on the screen.
6. When the assisted priming procedure is complete it is possible to perform extra priming or recirculation. See section 4.2.8 "Priming options" in the Operator's manual.

CAUTION

Check carefully that the venous blood line is correctly placed in the priming detector to make sure that the supervision of alarms is activated.

CAUTION

WARNING

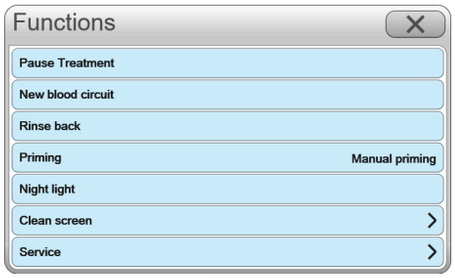
To ensure proper function of the machine check that both the blood lines and fluid tubes are properly attached to the dialyzer.

WARNING

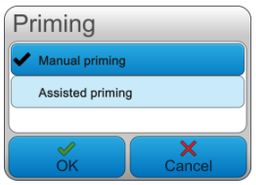
7. When the level in the venous drip chamber is OK, activate the air detector.
8. Press **Confirm**.
9. Press **Connect patient**.

6.5.2 Manual priming procedure

1. Press the **Functions** button.



2. Press **Priming**.

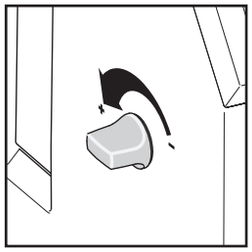


3. Select **Manual priming**

4. Ensure the dialyzer is positioned with the arterial blood line connection at the bottom and the venous at the top.

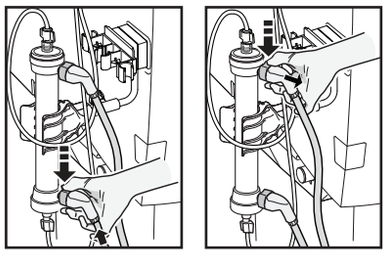
5. Open the clamps on the arterial blood line and the saline bag if present.

6. Press the flashing **Blood pump** button.



7. Once some saline has reached the drain bag, turn the level adjustment knob to increase the level in the venous chamber and press the air detector button to activate the air detector.

8. When the blood pump stops turn the dialyzer over so the arterial blood line connection is now at the top.



9. Attach the dialysis fluid tubes to the dialyzer. The red fluid tube goes to the end of the dialyzer with the arterial (red) blood line connector and the blue fluid tube to the end of the dialyzer with the venous (blue) blood line connector.

10. Press the **Fluid bypass** button. Dialysis fluid will enter and prime the fluid side of the dialyzer.

CAUTION

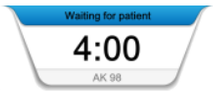
Check carefully that the venous blood line is correctly placed in the priming detector to make sure that the supervision of alarms is activated.

CAUTION

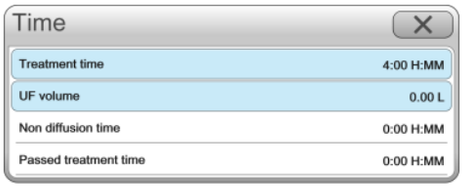
11. When the manual priming procedure is complete it is possible to perform extra priming or recirculation. See section 4.2.8 in the Operator's manual

6.6 Setting parameters

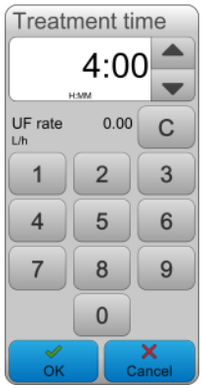
6.6.1 Treatment time



1. Press the **Time** indicator.



2. Press **Treatment time**.



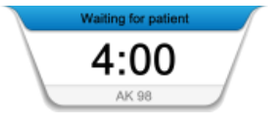
3. Set the desired treatment time.

4. Press **OK**.

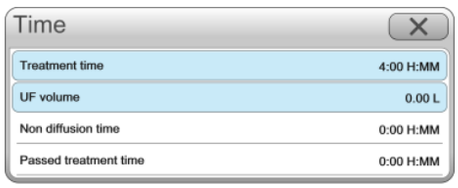
6.6.2 Ultrafiltration volume

Ultrafiltration volume (UF volume) is the desired total weight loss for a patient in a treatment.

Calculate UF volume
The patient's ultrafiltration volume is used to set the desired weight loss for the treatment.



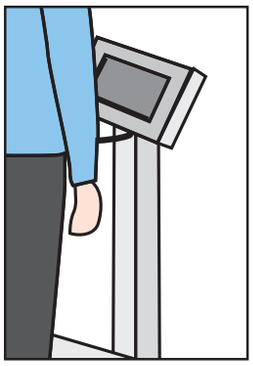
1. Press the **Time** indicator.



2. Press **UF volume**.

3. Calculate the patient's ultrafiltration volume.
   + Current Weight
   + Drink and Food
   + Rinse Back Volume
   Total: _____
   - Dry weight
   Your UF to set: _____

UF volume and weight loss

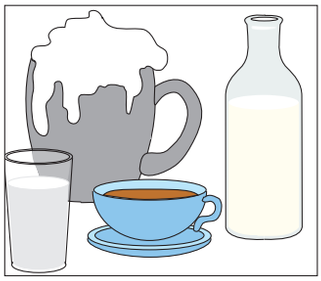


The UF volume is used to set the desired weight loss for the treatment.

This is calculated from: your pre-dialysis weight (kg).

MINUS
Your dry weight (kg). This is the weight you could be if your kidneys worked properly.
This is given to you by your doctor.

PLUS
The volume of drinks/ice/other fluids you will have during dialysis.



PLUS
Your rinse back volume. This is the volume of saline required to return your blood to your body at the end of the treatment.

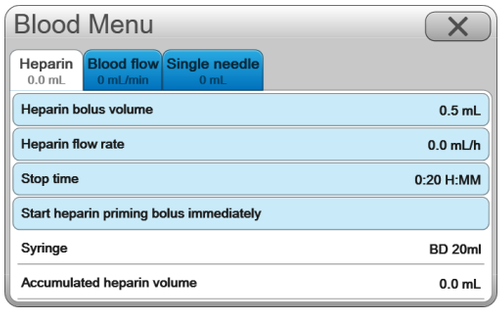
Your dry weight is _____kg
Your rinse back volume is _____ml

4. Enter your ultrafiltration volume.
5. Press **OK**.

6.6.3 Heparin values

Make sure to set the prescribed heparin values.

1. Press the **Blood** button.
2. Select the **Heparin** tab.



3. Press the settings one by one and set the desired treatment parameters.
4. If a bolus dose of heparin solution is to be administered at treatment start, press Heparin bolus volume and set a bolus volume in mL suitable for the patient.

6.7 Connect the patient

WARNING

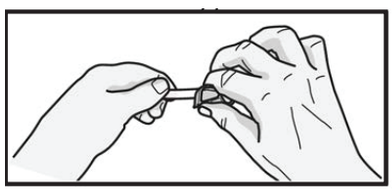
Check that the blood lines and the patient accesses (needles or catheters) are tightly connected.

WARNING

CAUTION

Select Connect patient before connecting the blood lines to the access. This allows the machine to detect blood and to start the treatment.

CAUTION



1. Check that the venous line is placed in the priming detector.
2. Clamp the priming bag.
3. Disconnect the arterial blood line from the priming bag (or recirculation connector).
4. Connect the arterial blood line to the arterial access (needle or catheter). Make sure the connection is secure and that there is no leakage.
5. Disconnect the venous blood line from the waste bag (or recirculation connector). If a bleed out connection is to be performed, leave the venous blood line attached to the waste bag.
6. Check that there is no air in the venous blood line. If a straight connection is to be performed, connect the venous blood line to the venous access (needle or catheter). Make sure the connection is secure and that there is no leakage.

7. Press the flashing **Blood pump** button to start the blood pump.
8. Once the machine detects blood, the blood pump stops. Follow the next steps to continue.
9. Check that all relevant clamps are closed to prevent blood loss.

6.8 Start your treatment

1. Press the flashing **Blood pump** button to restart the blood pump.

2. Adjust the blood flow rate using the **Blood pump up** and **Blood pump down** buttons.

3. Check that the blood path is lit and that treatment time is counting down. If this is not the case, check that the venous blood line is correctly placed in the priming detector.

4. Check the blood flow rate. Adjust the blood flow rate using the **Blood pump up** and **Blood pump down** buttons.

5. Press the flashing **Ultrafiltration** button to start ultrafiltration.

6. The **Arterial** and **Venous** pressure alarm limits will automatically be centralized around the actual values. The arterial pressure should not be lower than ____mmHg.

7. The venous pressure should not exceed ____mmHg.

8. Check that the venous drip chamber is filled to the correct level, and that the short lines on the top of the chamber are clamped.

6.9 End your treatment

6.9.1 End your treatment

When a treatment is finished and treatment time on the screen has counted down to 0:00, an attention will appear.

```
596 Treatment time expired
To discontinue press Confirm.
```

To continue the treatment, press the Time indicator and increase the treatment time. Increase the UF volume or set the min UF rate to zero.

Procedure

1. Press **Confirm** to confirm end of treatment.

2. Press the **Rinse back** button that appears in the Information field.
3. Press **Confirm**. The blood pump will now stop.
4. Disconnect the arterial blood line from the access.

CAUTION

Keep an eye on the venous needle and venous pressure during the rinse back, since there is no automatic supervision at this stage.

CAUTION

WARNING

Check that the arterial blood line is connected to the rinseback solution to prevent patient blood loss.

WARNING

5. Connect the arterial blood line to the rinse back solution. Open clamp on rinse back line and/or the arterial blood line.
6. Press the **Blood pump** button to start the blood pump.
7. When the rinse back is finished and the blood pump stops, disconnect the venous blood line from the access.

6.9.2 Confirm disconnect patient

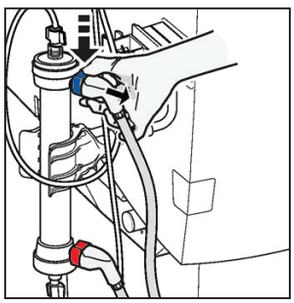
To avoid air infusion, ensure that the patient is physically disconnected from the arterial and venous blood lines before confirming **Disconnect patient**. When **Disconnect patient** has been confirmed the air detector is deactivated. The patient must not be reconnected.

Procedure

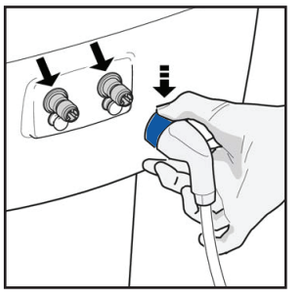
1. Press **Disconnect patient**.
2. Confirm that the arterial and venous blood lines are disconnected.
3. Remove the venous blood line from the priming detector.

6.10 Machine aftercare

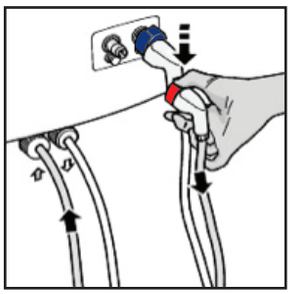
Procedure



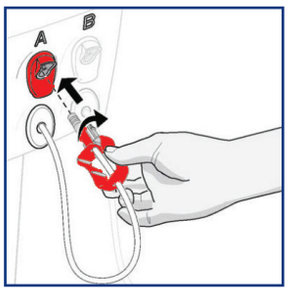
1. Turn the dialyzer so that the blue dialysis fluid tube is uppermost.



2. Follow instructions on the screen; remove the blue (outlet) dialysis fluid tube from the dialyzer and attach it to the blue marked safety coupling. This empties the dialyzer of dialysis fluid.



3. When the dialyzer is empty, remove the red (inlet) dialysis fluid tube from the dialyzer and attach it to the red marked standby port.



4. Disconnect the red connector from the pick-up tube or **SoftPac** container and move it to its standby port.
5. Drain the **BiCart** cartridge by following the instructions on the screen.
6. Remove the **BiCart** cartridge.
7. Close the cartridge holder latches.

8. Press the flashing **Disinfection** button to start a disinfection program, see Section 10 **"Disinfection and cleaning"** in the Operator's Manual.
9. Remove the arterial and venous blood lines and dialyzer.

6.11 Check before you start

Check this before you start any kind of cleaning or disinfecting activity:

- The dialysis fluid tubes are connected to the standby ports.
- The latches for the **BiCart** cartridge holder are closed to avoid fluid leakage from the machine.
- The concentrate connectors are placed in their corresponding standby ports.
- The arrangement of the drain connection from the machine, i.e. there must be a sufficient air gap between the drain tube of the machine and the drainage system to avoid back contamination from the drainage system.

Your disinfection schedule:

Heat disinfection: _____

Heat disinfection with **CleanCart C**: _____

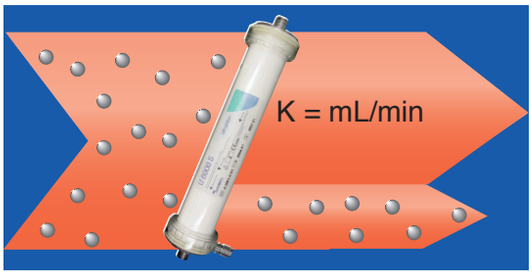
Heat disinfection with **CleanCart A**: _____

Disinfection of **AK 98** dialysis machine: _____

Disinfection of **WRO 300 H** machine: _____

7 The **Diascan** monitoring system - efficiency of dialysis

Ref: Operator's manual for the **AK 98** dialysis machine, Chapter 9 Diascan



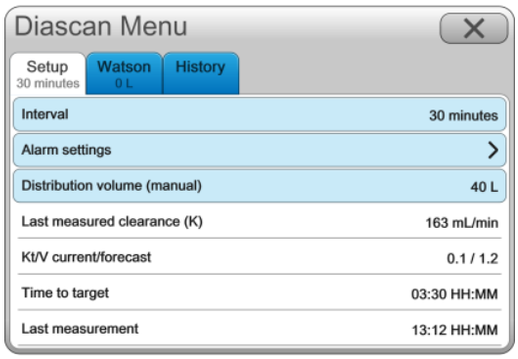
The **AK 98** dialysis machine has an integrated feature that, if activated, can give you information on the efficiency of your treatment. When activated the **Diascan** monitoring system can be used for clearance measurement (K) and Kt/V:

Clearance (K) tells you how much blood in ml/min is cleaned of urea after it has passed through the dialyzer.

The measurement values for K are displayed in the **Diascan** read out screen next to the **Diascan** menu button.

Kt/V is a calculation done by the machine depending on your distribution volume (V), which can either be preset by your nurse into the machine, or inputted by yourself. The distribution volume (V) is calculated by knowing:

- Your height in cm
- Your weight in Kg
- Your age in years
- Whether you are male or female



Once your distribution volume (V) number is known, it can be entered manually in the set up tab of the **Diascan** menu.

This value should be recalculated when any of the following occur:

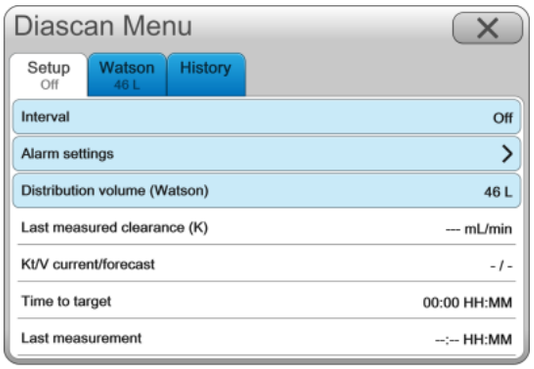
- You have a birthday
- Your dry weight from your Doctor is changed

7.1 Automatic activation of **Diascan**

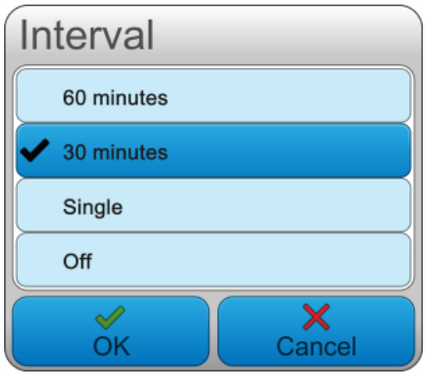
This will be set up for you by your Nurse.

7.2 Manual activation of **Diascan**

1. Press the **Diascan** button on the main screen.



2. Select the **Setup** tab.
3. Press the **Interval** bar.



You will have options of:

a. 60 minutes

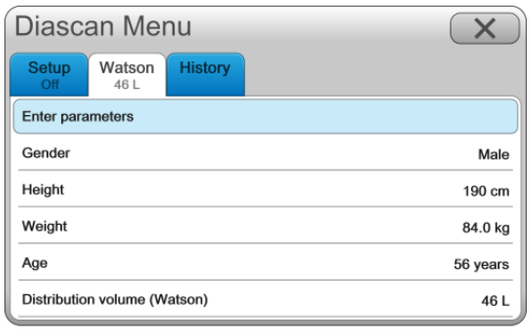
b. 30 minutes

c. Single scan

d. Off

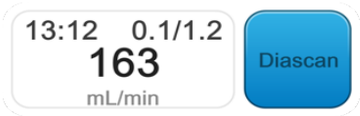
4. Select interval required and press **OK.**

   You will know the scan is happening when the word **Diascan** is flashing in the status bar.



5. If you know your distribution volume press the **Distribution volume** bar and input the volume you have been given.
6. If you don't know your distribution volume press the **Watson** tab, select the **Enter parameters** bar and use the keypads to enter your details.

7.3 Results



The result of the **Diascan** measurement is displayed in the clearance measurement readout field.

The clearance measurement readout field shows:

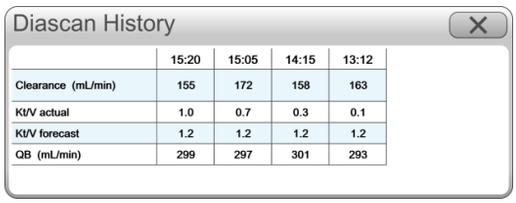
- The time of most recent measurement
- The most recent measured clearance value
- The current and the forecast Kt/V

7.4 Measurement History

1. Press the **Diascan** button.

2. Select the **History** tab.

3. Press the **History** bar.



	15:20	15:05	14:15	13:12
Clearance (mL/min)	155	172	158	163
Kt/V actual	1.0	0.7	0.3	0.1
Kt/V forecast	1.2	1.2	1.2	1.2
QB (mL/min)	299	297	301	293

You will have the list of all **Diascan** measurements with the most recent scan results at the left hand side.

This will show you:

- Clearance rate in mL/min
- Kt/V actual at the time of the most recent scan in your treatment
- Kt/V forecast what you are aiming for to achieve a good quality dialysis
- QB, the blood pump speed at the time of the **Diascan** measurement
- Diascan measurement history can also be found in the treatment overview table in the History button

8 Blood pressure monitoring during the treatment

Ref: Operator's manual for the **AK 98** dialysis machine, Chapter 8 Measuring blood pressure.

The blood pressure monitor (BPM) measures blood pressure and pulse rate. It is possible to use the BPM at any time when the machine is on i.e. the on/off button is lit.

NOTE

- Excess movement can interfere with readings. Ensure that you don't move during readings
- Avoid applying external pressure to the cuff during readings
- Do not apply the blood pressure cuff to a limb with an access, e.g. fistula or graft
- Ensure the Blood Pressure cuff is correctly positioned on your measuring limb prior to activating any measurement.

NOTE

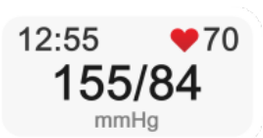
It is possible to use the BPM in two different ways: 1. Single measurement 2. Interval measurements.

In addition to the BPM features included in the **AK 98** dialysis machine, a blood pressure measurement cuff and a cuff hose are necessary.

8.1 Single measurement

1. Press the **BP read out field** once to initiate a blood pressure reading. The measurement starts. The heart in the read out field starts flashing and BPM will be flashing in the status bar.

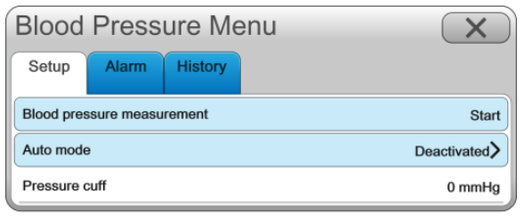
2. To cancel the BP reading press the **BP read out field** once. The heart icon will stop flashing.



3. As soon as the measurement check has been successfully performed, the readout will appear in the BPM read out field.

8.2 Automatic - Interval measurement

1. Press the **BPM** button.



2. Press the **Setup** tab.

3. Press the **Auto mode** bar.

4. Press **Interval time** and set the frequency of the Blood Pressure readings, which can be between 5 & 60 minutes.

5. Press **OK** to confirm the timing.

6. Press **Activate** to activate interval blood pressure measurement.

NOTE

If desired, both high and low alarm limits can be set for the following:

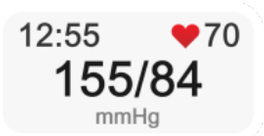
- systolic
- diastolic
- mean blood pressure (MAP)
- pulse rate

NOTE

NOTE

It is possible to start a single measurement check at any time between the automatic measurement checks if necessary.

NOTE



Press the **BP read out field** directly to start a single measurement even when interval measurements are scheduled.

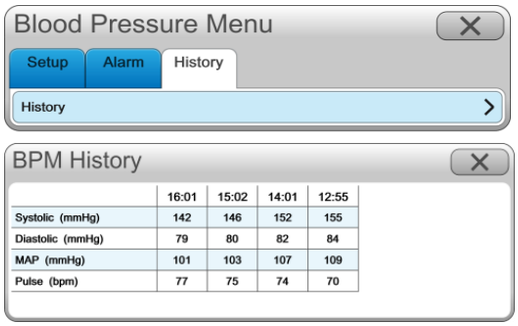
8.3 Blood Pressure measurement history

The blood pressure measurements are logged and saved during the treatment. The measurement data can be viewed in either:

- The BPM history tab
- The treatment history button

8.3.1 In BPM Menu

1. Press the **BPM** button.



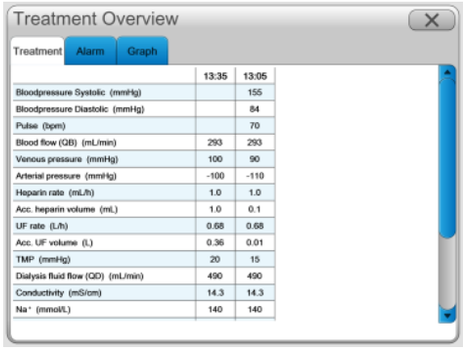
2. Select the **History** tab.

3. Then select the **History** bar.

4. The list starts with the most recent measurement at the left.

8.3.2 In Treatment History

1. Press the **History** button.



2. Select the **Treatment** tab.

3. The most recent results will appear on the left hand side of the list with the time of the measurement at the top.

9 Profiling of ultrafiltration, sodium and bicarbonate

Ref: Operator's manual for the **AK 98** dialysis machine, Chapter 7 Profiling

9.1 General

Your doctor may prescribe a profile to be used during your treatment. The **AK 98** dialysis machine is able to profile ultrafiltration, sodium and bicarbonate.

CAUTION

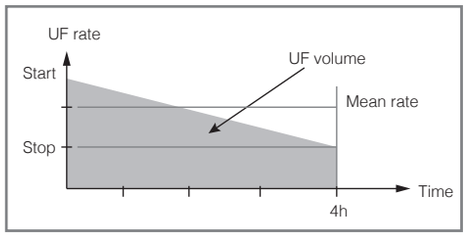
The operator has to make sure that the profile chosen is suitable for the patient treated. The profiling parameters have to be checked prior to the treatment.

CAUTION

9.2 Ultrafiltration profiling

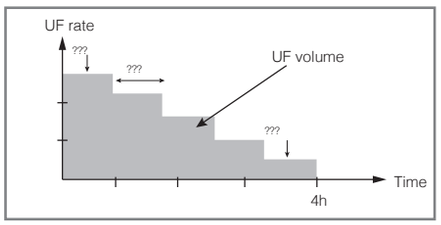
There a three types of profile available for adjusting the ultrafiltration rate during the treatment.

- Linear



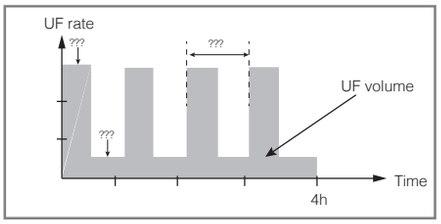
Changes in the ultrafiltration rate in a linear profile are determined by the total UF volume, the treatment time and the starting value for the UF rate.

- Step



Changes in the ultrafiltration rate in a step profile are determined by the total UF volume, the treatment time, the starting value for the UF rate and the number of steps.

- Interval



Changes in the ultrafiltration rate in an interval profile are determined by the total UF volume, the treatment time, the starting value for the UF rate and the number of intervals.

NOTE

If UF volume or treatment time is changed, during activated UF profiling, the profile parameters will automatically change as well. Always check the UF profile settings if UF volume or treatment time is changed when a UF profile is activated, see section 7.3 "Profiling of ultrafiltration rate" of the Operator's manual.

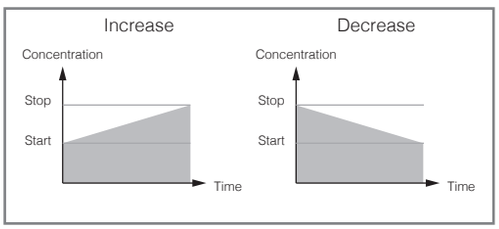
NOTE

NOTE

If UF profiling is deactivated during treatment, the machine will recalculate the UF rate according to remaining UF volume and treatment time. If UF profiling is reactivated, without changed profiling parameters, the UF profiling graph will automatically change according to remaining UF volume and treatment time. Always check the UF profile settings after deactivating and reactivating a UF profile.

NOTE

9.3 Sodium and bicarbonate profiling



Profiling of sodium (Na+) and bicarbonate (HCO3-) takes place at a smooth and constant increasing or decreasing rate.

NOTE

If treatment time is changed during sodium and/or bicarbonate profiling the profiling graphs will not change. As a consequence the next stop values will not be reached if treatment time is decreased.

NOTE

NOTE

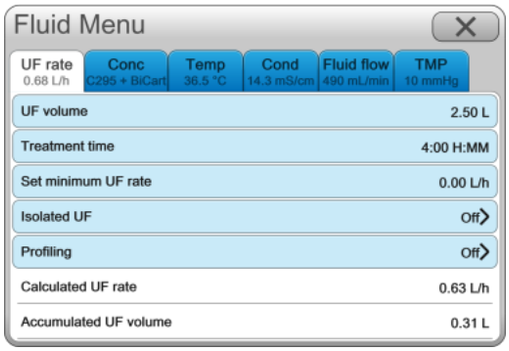
If sodium and/or bicarbonate profiling is deactivated during treatment, the machine will continue running on the values from the point at which it was stopped. If profiling is reactivated without changed profiling parameters, the machine will continue running from the point where profiling was deactivated.

NOTE

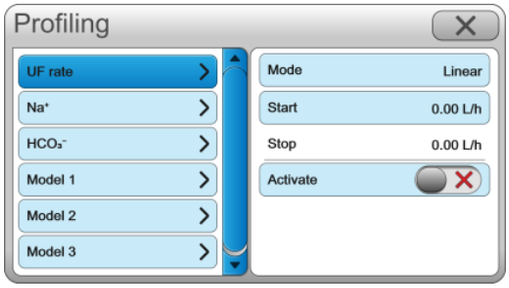
9.4 Profiling without a preset model

9.4.1 Profiling ultrafiltration without a preset model

1. Press the **Fluid** button.



2. Select the **UF rate** tab.
3. Press **Profiling**.



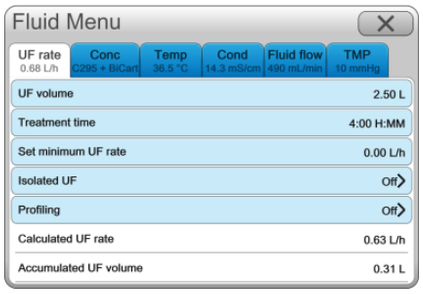
4. Press **UF rate**.
5. Press **Mode** and select linear, step or interval.

6. Press **Confirm**.
7. If the profile is step or interval; set the number of steps . or intervals according to your prescription.
8. Set the start value for the UF rate.

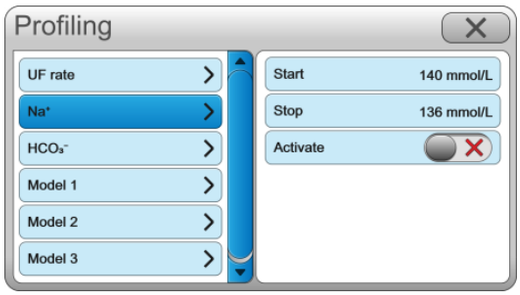
9. Press **Activate** to activate.

9.4.2 Profiling sodium without a preset model

1. Press the **Fluid** button.



2. Select the **UF rate** tab.
3. Press **Profiling**.

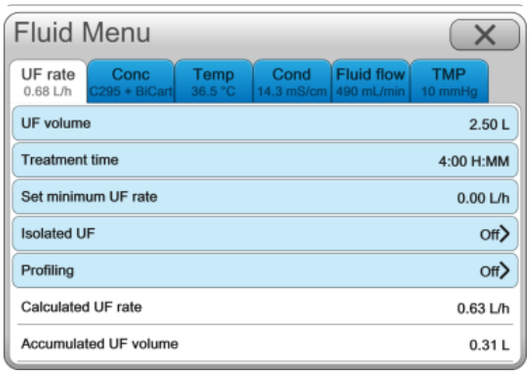


4. Press **Na+**.
5. Set the start and stop values.

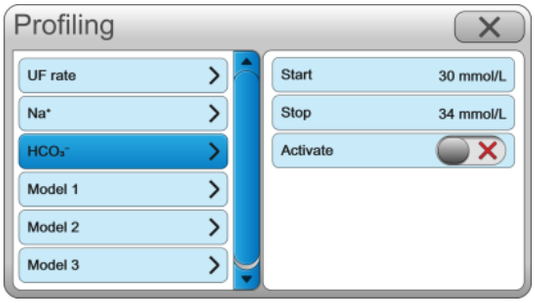
6. Press **Activate** to activate.

9.4.3 Profiling bicarbonate without a preset model

1. Press the **Fluid** button.



2. Select the **UF rate** tab.
3. Press **Profiling**.

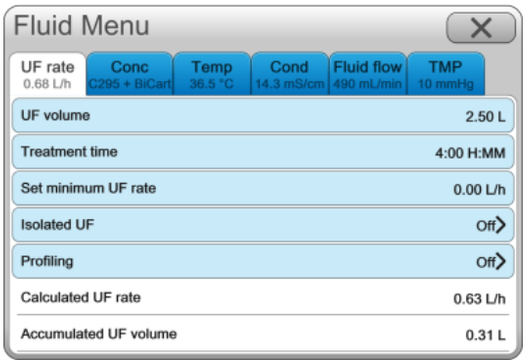


4. Press **HCO3$^-$**.
5. Set the start and stop values.

6. Press **Activate** to activate.

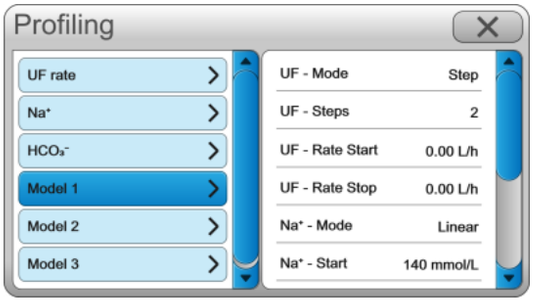
9.5 Profiling with a preset model

1. Press the **Fluid** button.



2. Select the **UF rate** tab.

3. Press **Profiling**.



4. Select your prescribed preset model 1,2 or 3.

5. Check the preset values in the model are correct.

6. Press **Activate** to activate.

10 Pause the treatment

Operator's manual AK 98 dialysis machine, Chapter 4 hemodialysis - double needle treatment section 4:3

NOTE

If recirculation is allowed, recirculate as per hospital policy. The recirculation instructions below are just one example.

NOTE

The maximum recirculation time from your unit policy guide is _____ minutes.

Reasons you may need to recirculate during your treatment include:

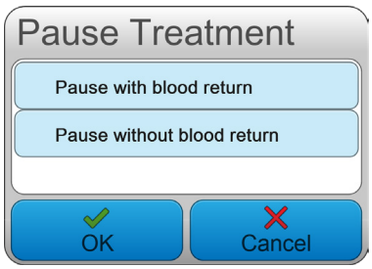
- Access problems
- Excess air in the blood circuit
- Toilet break

10.1 Pause the treatment

Action steps:

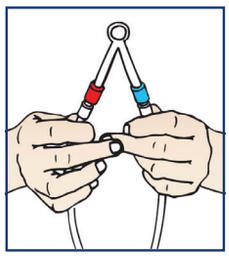
1. Press the **Functions** button to open the Functions menu.

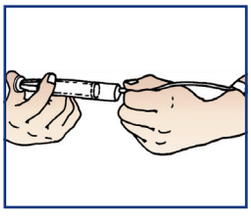
2. Press **Pause treatmen**t.



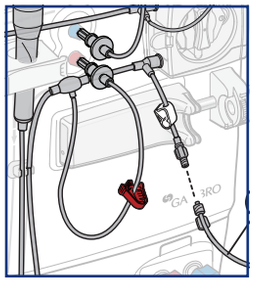
3. Choose an alternative:
   - Pause with blood return
   - Pause without blood return

4. Follow the instructions on the screen to proceed.
5. Clamp the blood lines and access lines.
6. Disconnect the lines from the access as per hospital policy.
7. Attach a sterile recirculator between the arterial and venous blood lines.

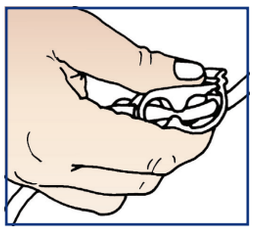




8. Flush the access with saline as per hospital policy.



9. Make sure saline is attached to the infusion line (just before blood pump).
10. Open the clamp on the saline infusion port and open the roller clamp on the infusion line.



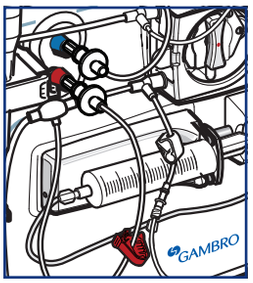
11. Open the clamps on the arterial and venous blood lines.

12. Press the Blood pump button to start the blood pump.

Every 15 minutes you will have a Pause treatment reminder to let you know you have been recirculating for 15 minutes. Press Confirm to continue recirculation for another 15 minutes before the reminder is triggered again.

10.2 Re-connecting after recirculating

1. Ensure both patient access lines are clamped.
2. Press the **Blood pump** button to stop the blood pump.
3. Clamp both the arterial and venous blood lines.

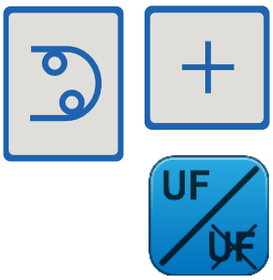


4. Close the clamp on the infusion port and the roller clamp on the infusion line.

5. Press Reconnect patient and press Confirm

6. Reconnect the blood lines from the machine to your access lines.

7. Open the clamps on both the blood lines and access lines.



8. Press the **Blood pump** button to restart the blood pump and increase the blood flow up to the correct flow for your treatment.

9. Press the flashing **UF Start/Stop** button.

10. If you have less than_____mls of saline in your saline bag, change the spike over to a new bag.

11 Problems during treatment

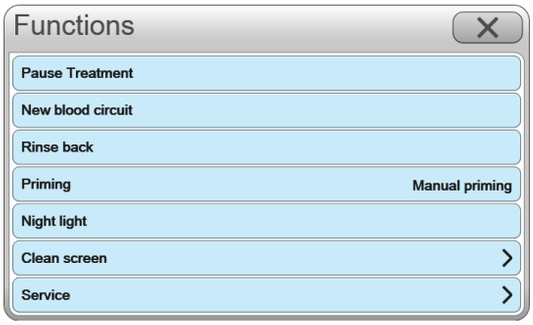
Ref: Operator's manual for the **AK 98** dialysis machine, Chapter 3 Handling the dialysis machine. Section 3.7

11.1 Change of dialyzer and bloodlines during treatment

The blood lines and dialyzer may need to be changed during a treatment, for example if the blood clots. If the new blood circuit procedure is performed, all values and settings are kept in the machine and it will continue on from when treatment was stopped.

Procedure

1. Press the **Functions** button.



2. Press **New blood circuit**.
3. Check that the blood pump is stopped.
4. Choose an alternative:
   - To return the blood to the patient first: Press **Rinse back** and follow the normal procedure to return the blood, see section 4.4.1 "End the treatment"
   - To disconnect the patient immediately: Press **Disconnect patient**, clamp the blood lines and disconnect them from the patient.
5. Disconnect both of the dialysis fluid tubes and return them to the safety couplings, there is no dialyzer draining during the **New blood circuit** procedure.
6. Remove the dialyzer and the blood lines.
7. Attach the new dialyzer and blood lines, see section 4.2.3 "Set up the dialysis machine"
8. Prime and remove the air from the new blood lines, see section 4.2.7 "Priming the dialysis circuit"
9. Connect the patient and start the treatment again, see section 4.2.12 "Connect the patient" and section 4.2.13 "Start the treatment"

11.2 Power failure with battery back-up

Ref: Operator's manual for the **AK 98** dialysis machine, Chapter 3 section 3.6.1

If the dialysis machine loses power, it has a back-up battery that temporarily provides power to the blood unit. All settings and actual values are kept. The blood pump will continue to operate on battery power. Heating of dialysis fluid is not provided. The back-up battery will only last a limited time, 30 minutes can be expected from a fully loaded battery in good condition.

NOTE

Consider whether to discontinue treatment if the power failure is expected to last more than a few minutes.

If the dialysis machine loses power and the back-up battery does not work, the dialysis machine shuts down. All settings and actual values are kept, see section 3.6.3 "Return the blood to the patient manually".

NOTE

11.2.1 Power failure without battery back-up

Ref: Operator's manual for the **AK 98** dialysis machine, Chapter 3 section 3.6.2

If the dialysis machine loses power it shuts down. All settings and actual values are kept.

Continue the treatment after power failure

Press the **On/Off** button to start the machine when the power returns. The machine will recover and continue the treatment from where it was stopped. All settings and actual values are kept. However, all treatment parameters need to be checked by the operator after a recovery.

CAUTION

After recovery, check treatment parameters to ensure that treatment is continued according to prescription.

CAUTION

11.2.2 Returning your blood manually during a machine shutdown

Ref: Operator's manual for the **AK 98** dialysis machine, Chapter 3 section 3.6.3

NOTE

Please follow your clinic's specific instructions to perform this procedure. Do not attempt this if you have not received proper training from your clinic nurse.

NOTE

WARNING

During manual procedure to return blood to patient during a power failure, the operator shall take full responsibility for visually monitoring all safety parameters that cannot be monitored by the machine during a power failure (for example air detection).

WARNING

WARNING

Check that the arterial blood line is connected to the rinseback solution to prevent patient blood loss.

If the dialysis machine is shut down, you can manually return the blood to the patient.

Pay attention to possible risks when manually returning the blood to the patient, since the dialysis machine is off and cannot trigger alarms.

WARNING

Procedure

1. Clamp the arterial blood line and patient access clamp.
2. Disconnect the arterial blood line from the patient.
3. Connect the arterial blood line to the rinse-back solution and unclamp the arterial blood line and any clamps on the rinse-back line.
4. Remove the blood lines from the machine clamps.
5. Open the blood pump cover.
6. Turn (anticlockwise) the blood pump handle manually to circulate the blood.
7. When the blood is returned to the patient, clamp the venous blood line and patient access clamp.
8. Disconnect the venous blood line from the patient.

12 Isolated ultrafiltration

Ref: Operator's manual for the **AK 98** dialysis machine, Chapter 6 Isolated ultrafiltration

12.1 General

Your doctor may on occasion prescribe isolated ultrafiltration to be used during your treatment. The **AK 98** dialysis machine is able to perform isolated ultrafiltration at any point during the treatment as many times as is needed.

When isolated ultrafiltration is performed there is no diffusion in the dialyzer as the dialysis fluid is in bypass. This means that only fluid will be ultrafiltered from your blood, there will be no correction/diffusion of waste products or electrolytes.

As the UF rate during isolated ultrafiltration is usually higher than in normal dialysis, your blood flow rate should be as high as possible to avoid possible clotting; which can also be caused by a cooling of the blood due to the dialysis fluid being in bypass. As such, isolated ultrafiltration normally only takes place for short intervals to avoid the risk of potential clotting.

CAUTION

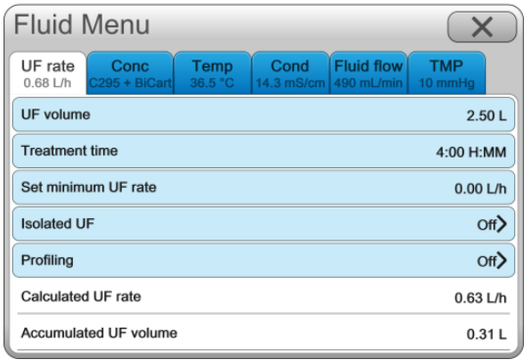
Once treatment parameters are set, you must verify that all calculated treatment values are as intended.

CAUTION

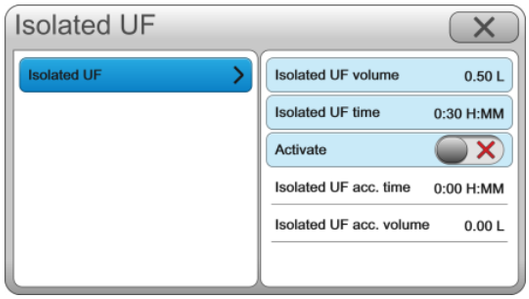
12.2 Activate isolated ultrafiltration

Before activating isolated ultrafiltration, set the treatment time and the UF volume that you want to remove in the normal dialysis session. Then:

1. Press the **Fluid** button.



2. Select the **UF rate** tab.
3. Press **Isolated UF**.



4. Press **Isolated UF volume** and set the volume of fluid to be removed during the isolated UF phase.
5. Press **Isolated UF time** and set the time for the isolated UF phase.

6. Press **Activate** to activate.

The isolated UF time and the isolated UF volume are added to the values you have already set for the normal dialysis session.

When the isolated ultrafiltration phase is complete the machine will automatically go into the normal dialysis session and perform diffusion as well as ultrafiltration.

12.3 Activate a second phase of isolated ultrafiltration

If, after completing one phase of isolated ultrafiltration you need to perform a second phase, the settings are calculated as below, and set in the manner described above in section 12.2 activate isolated ultrafiltration.

The values set for both isolated UF time and volume will remain in the blue setting bars. Values for the second phase must be higher than the values set for the first phase. Follow the same principle if more than two phases of isolated ultrafiltration are required.

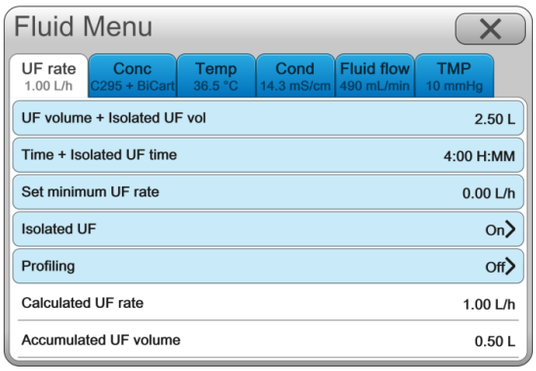
Example:

Isolated UF volume phase 1 = 0.5L	Isolated UF time phase 1 = 30 minutes
Desired isolated UF volume for phase 2 = 0.2L	Desired isolated UF time for phase 2 =15 minutes
Set isolated UF volume for phase 2 = 0.7L	Set isolated UF time for phase 2 = 45 minutes

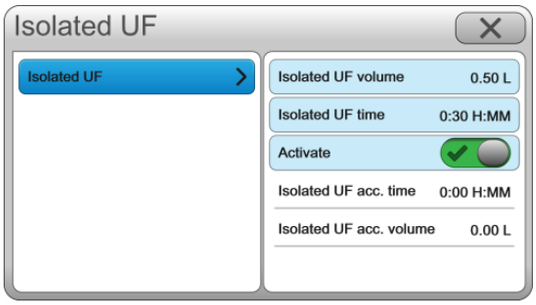
12.4 Deactivate isolated ultrafiltration

If it is necessary you can deactivate isolated ultrafiltration at any time during the phase.

1. Press the **Fluid** button.



2. Select the **UF rate** tab.



3. Press **Isolated UF**.

4. Press **Deactivate** to deactivate.

12.5 Heparin settings in isolated ultrafiltration

If the heparin pump is to be used during the normal dialysis session, it will run during the complete isolated ultrafiltration phase. The only exception to this rule is if the isolated ultrafiltration phase takes place at the end of the normal dialysis phase and the heparin stop time has already been met.

13 IT connectivity

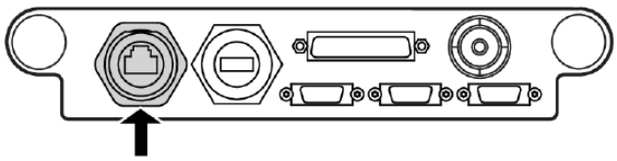
Ref: Operator's manual for the AK 98 dialysis machine, Chapter 12 IT connectivity.

13.1 General

The **AK 98** dialysis machine can be configured by your nurse and service technician to communicate with the hospital Clinical Information System (CIS). It will be able to retrieve your treatment prescription from the CIS and apply it to your machine, it will also be able to send data from your machine back to the CIS. No treatment data is held on your machine once a new functional check has been started.

13.2 IT network connection

The connection to the IT network is made using the Ethernet port on the rear of the machine.



Ethernet port

13.3 Network connection icon

A successful connection to the IT network is displayed in the status bar using the Network connection icon.

When the icon is white the AK 98 dialysis machine is connected to the IT network.

When the icon is grey there is no connection to the IT network.

13.4 Confirmed patient ID and patient prescription retrieval

CAUTION

When retrieving patients from the CIS make sure that the retrieved patient is identical to the patient to be treated.

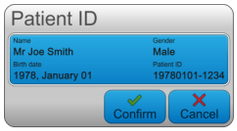
CAUTION

Action steps:

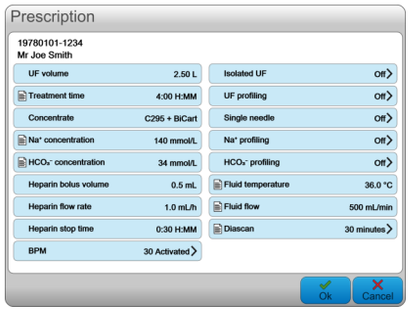
1. Press the **Patient** button.

2. Press the **Patient** ID bar.

3. Enter your ID and press **OK**.



4. Carefully check the correct patient data has been retrieved, and then press **Confirm** to accept.



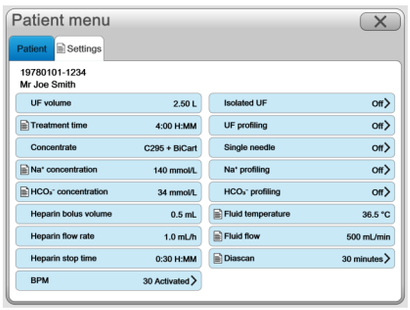
5. Review the prescription dialog box.

Shows the prescription parameters which have come from the CIS. The other parameters are either your hospitals' settings, or the machine default values.

Any parameter can be changed if needed by pressing the blue bars.

Shows the prescription parameters that have come from the CIS and have been changed.

6. Verify that all the required treatment parameters have been set correctly, and then press **OK**.



The settings tab in the patient menu now has the prescription icon, and the patient button is filled in and has a check mark. This confirms the machine is running with the patient prescription coming from the CIS.

13.5 Setting treatment parameters manually

The treatment parameters can also be entered manually in the Patient menu under the settings tab.

Or they can be entered using the Blood and Fluid buttons as described in section 6.6 Setting parameters of this Patient Guideline.

14 AK 98 hygiene and maintenance

Ref: Operator's manual for the **AK 98** dialysis machine

Chapter 10 Disinfection and Cleaning
Chapter 11 Disinfection with the **AK 98** dialysis machine and WRO system
Chapter 13 Maintenance handling

NOTE

In order to maintain a high microbiological quality of the dialysis fluid, it is important that you precisely follow the instructions your nurse gave you for the maintenance program.

The **AK 98** dialysis machine may be disinfected using heat through the fluid path.

The **WRO 300 H** water purification unit and the interconnecting hydraulic flow path can also be integrated in the heat process.

Clean and disinfect the dialysis machine only according to the recommendations in the Operator's Manual.

These recommendations are dependent on the type of bicarbonate used, and are designed to keep a high level of performance of the machine. They are guidelines for maintaining the hygiene of the fluid path and the exterior of the machine to ensure the safety of the patient. If there is evidence of a blood leak into the fluid flow path, the machine should be disinfected before next treatment.

NOTE

14.1 Schedule for hygiene and maintenance recommendations

14.1.1 Operating conditions

The standard cleaning, decalcification and disinfection schedule recommendation is based on the machine operating conditions below.

Dialysis time	4 h
Dialysis fluid flow	300-800 mL/min
Dialysis fluid Bicarbonate value (HCO3-)	34 mmol/L
Dialysis fluid Calcium value (Ca2+)	1.5 mmol/L
Dialysis fluid Sodium value (Na+)	140 mmol/L
Bicarbonate concentrate	BICART cartridge
Acetic acid or citric acid based A-concentrate	Acetate (3 mmol/L) or citrate (1 mmol/L)
Dialysis fluid temperature	37 °C

If your treatment is within the specifications contained in 14.1.1, then you should follow the cleaning, decalcification and disinfection schedule recommendations shown in section 14.1.2

14.1.2 Cleaning, decalcification and disinfection schedule after treatment

Frequency	Activity
After each treatment	1. Wipe the outside of the dialysis machine with 70% ethanol or 60% isopropanol or 1% hypochlorite. In case of cleaning with hypochlorite, wipe afterwards with water. 2. Rinse the outside and flush the inside of the pick-up tubes with water. Let them dry naturally.
After each treatment, or at least once per day	Run a disinfection program.
After each treatment, if no disinfection program	Run a descaling program.
At least after every 3rd treatment or at high usage of the equipment[a] at least once per day	Run a heat disinfection program together with **CleanCart C** cartridge or a heat disinfection program with liquid citric acid.
At least once every 7th treatment day	Cleaning using **CleanCart A** 1. Run a heat disinfection program together with **CleanCart A** cartridge 2. Run a heat disinfection program together with **CleanCart C** cartridge or a heat disinfection program with liquid citric acid. 3. Wipe the outside and flush the inside of the pick-up tubes with 70% ethanol. Let them dry naturally. Cleaning using Sodium Hypochlorite 1. Run a heat disinfection program together with **CleanCart C** cartridge or a heat disinfection program with liquid citric acid. 2. Run a chemical disinfection with sodium hypochlorite. 3. Wipe the outside and flush the inside of the pick-up tubes with 70% ethanol. Let them dry naturally.
When more than 7 days passed since last disinfection	Run a heat disinfection program before treatment.
Every 1-3 months	1. Change the ultrafilter. 2. Run a heat disinfection program.

[a] e.g. 4 treatments á 3 hour dialysis time per treatment

Additional constraints if the **U9000** Ultrafilter is used:

- Disinfection using **CleanCart A** cartridge, shall not be performed before periods when the machine is inactive, e.g. storage over weekend.
- The recommended process is; heat disinfection using **CleanCart A** cartridge followed by heat disinfection using **CleanCart C** cartridge in the same day, this should preferably be performed in the middle of the week.
- Do not perform more than eight sodium carbonate, e.g. **CleanCart A** cartridge, based disinfections during the Ultrafilter **U9000** life cycle.
- Do not perform more than 12 sodium hypochlorite based disinfections during the ultrafilter **U9000** life cycle.

Your disinfection schedule:

Disinfection Type	Day of Disinfection
Heat disinfection	
Heat disinfection with **CleanCart C**	
Heat disinfection with **CleanCart A**	
Disinfection of **AK 98** dialysis machine and **WRO 300 H**	

14.2 Heat disinfection program with the **WRO 300 H** water purification unit

The AK 98 dialysis machine and the WRO 300 H purification unit can be preset to be disinfected in different ways. As different hospitals have different policies, make sure to follow your hospital policy. The instructions below are just one of several different ways but the following points should always be checked before starting the disinfection procedure.

It is recommended that you choose integrated heat disinfection when possible, since this program also disinfects the inlet water tubing. See Section 10.3.7.1 "Integrated heat disinfection" and Section 11.2 "Integrated heat disinfection with a WRO 300 H unit" in the AK 98 Operator's Manual.

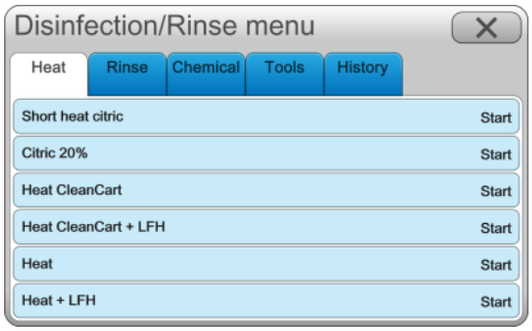
NOTE

Check before starting the procedure:

1. That the dialysis fluid tubes are connected to the safety couplings.
2. That the latches of the holder for the **BiCart** cartridge are closed.
3. That the concentrate connectors are placed in the corresponding red and blue standby ports of the machine.
4. Make sure that the **WRO 300 H** unit is switched on.

NOTE

1. Press the **Disinfection** button.



2. Select the **Heat** tab.
3. Select the **Heat + LFH** (Low Flow Heat) bar.

4. Respond to the text shown on the screen:

   Press **Confirm** to include the WRO unit and start the heat disinfection program.

   DISINFECTION IN PROGRESS will be displayed and will remain throughout the program.

5. If an automatic switch off is required at the end of the disinfection, press the **ON/OFF** button for 3 seconds.

NOTE

During the low flow heat phase, your **AK 98** dialysis machine will receive hot water from the **WRO 300 H** unit, at a low flow rate, for 15 minutes.

NOTE

14.3 Short Heat Citric disinfection program

NOTE

Check before starting the procedure:

1. That the dialysis fluid tubes are connected to the safety couplings.
2. That the latches of the holder for the **BiCart** cartridge are closed.
3. That the concentrate connectors are placed in the corresponding red and blue standby ports of the machine.

NOTE

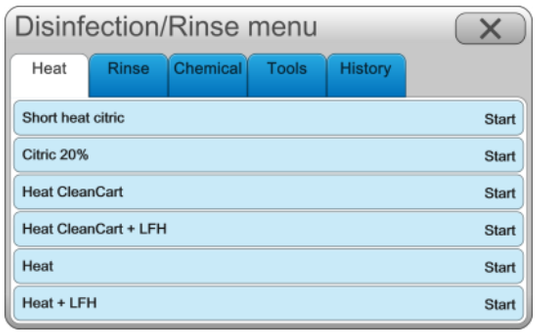
NOTE

Only liquid citric acid shall be used from the back of the machine.

Liquid citric acid shall never be used from the front of the machine.

NOTE

1. Press the **Disinfection** button.



2. Select the **Heat** tab.

3. Select **Short heat citric**. The citric acid container must be connected to the back of the machine.

4. Respond to the text shown on the screen:

   Press **Confirm** to start the heat disinfection program.

   DISINFECTION IN PROGRESS will be displayed and will remain through¬out the program.

5. If an automatic switch off is required at the end of the disinfection, press the **ON/OFF** button for 3 seconds.

14.4 Heat disinfection with **CleanCart** cartridge and Low Flow Heat (LFH)

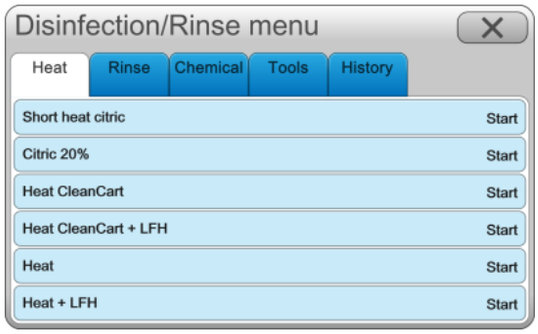
NOTE

Check before starting the procedure:

1. That the dialysis fluid tubes are connected to the safety couplings.
2. That the latches of the holder for the **BiCart** cartridge are closed.
3. That the concentrate connectors are placed in the corresponding red and blue standby ports of the machine.
4. Make sure that the **WRO 300 H** unit is switched on.

NOTE

1. Press the **Disinfection** button.



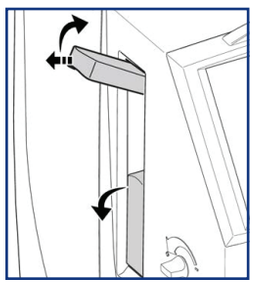
2. Select the **Heat** tab.

3. Select Heat **CleanCart** + LFH option.

   The program starts with a rinse phase, therefore wait for the attention message from the machine before attaching the **CleanCart C** cartridge to the holder.

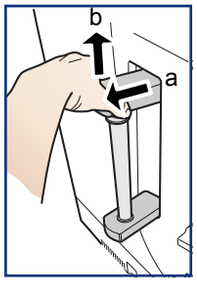
   When you are prompted by an ATTENTION message:

```
506 BiCart is not attached to the holder
Attach BiCart cartridge.
```



4. Attach the **CleanCart C** to the machine in the **BiCart** Holder.

5. Respond to the text shown on the screen:
   Press **Confirm** to include the **WRO 300 H** unit and start the heat disinfection program.



6. When the **CleanCart C** cartridge is empty, the following attention will appear: (if preset).

```
517 CleanCart C fill is completed
Open upper latch, press Confirm and wait
for CleanCart C cartridge to drain.
```

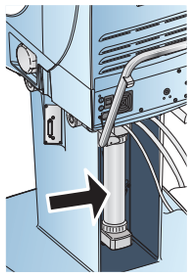
7. Open the upper latch of the holder of the **BiCart** cartridge holder.

8. Press **Confirm**.

9. Remove the **CleanCart C** cartridge, close the latches and the program will continue.

10. Press the **ON/OFF** button for 3 seconds and the **AK 98** machine will automatically switch off at the end of the disinfection program.

14.5 Change of U9000 Ultrafilter

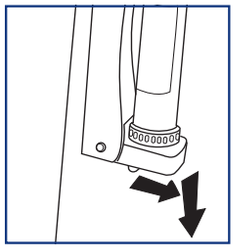


NOTE

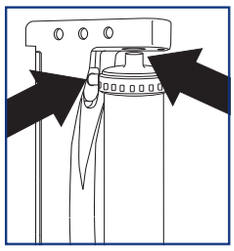
Change the **U9000** Ultrafilter as per the schedule you were given by your Home Training nurse, to maintain high hygienic quality and before commencing an integrated disinfection program.

Make sure that the ultrafilter is handled in an aseptic way according to the corresponding package.

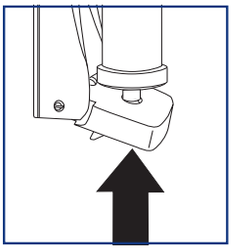
NOTE



1. Pull the handle of the lower latch to open the locking mechanism and press the lower latch downwards.

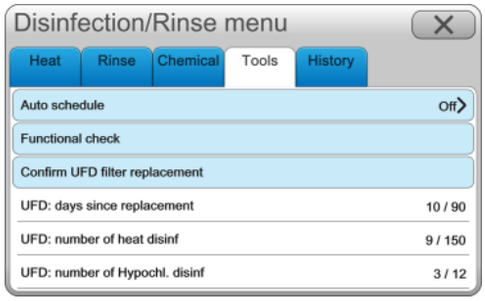


2. Pull the ultrafilter gently downwards and remove it.
3. Label the new ultrafilter with the actual date.



4. Lubricate the ultrafilter connections with RO-water.
5. Insert the new ultrafilter into the holder and push it gently upwards.
6. Make sure the ultrafilter is pushed all the way upwards.
7. Close the lower latch by pushing it gently upwards until the locking mechanism becomes locked. A distinct "click" shall be generated.
8. Make sure the lower latch is locked into position by pushing the lower latch upwards without using the handle.

9. Press the **Disinfection** button.



10. Select the **Tools** tab.
11. Press **Confirm UFD filter replacement**.

12. Press **Confirm**.
13. Perform a disinfection of the dialysis machine before a new treatment.
14. Check carefully during and/or after disinfection that there is no leakage from the ultrafilter.
15. Check Fluid leakage detector tray for leakage, and wipe dry if needed.

WARNING

Check carefully that there is no leakage from the ultrafilter after changing it.

WARNING

WARNING

Before a new treatment can be performed after changing the ultrafilter, the machine must go through a disinfection to ensure the quality of the dialysis fluid.

WARNING

14.6 Disinfection and cleaning - general

In order to maintain a high microbiological quality of the dialysis fluid, it is important that you tend to the hygiene and maintenance of the machine.

14.6.1 Surface and top tray

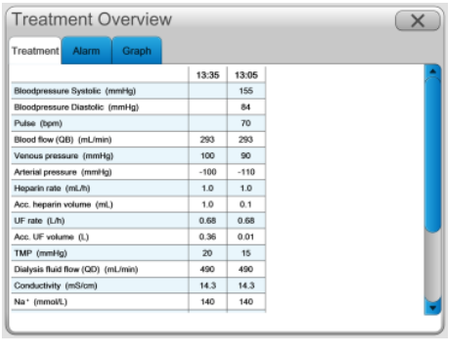
After each treatment, you need to clean and disinfect the exterior surface and the top tray of the dialysis machine. Wipe them with a cloth moistened with ethanol (70%) or isopropanol (60%) or sodium hypochlorite (1%). In case of cleaning with hypochlorite, wipe afterwards with water.

15 History screens and tools options

Ref: Operator's manual for the **AK 98** dialysis machine, section 3.4.

15.1 Treatment parameters

The **History** button opens the treatment history page. Here both the treatment history and the alarm history are displayed. The alarms are listed for the actual treatment. The last alarm is shown at the top.

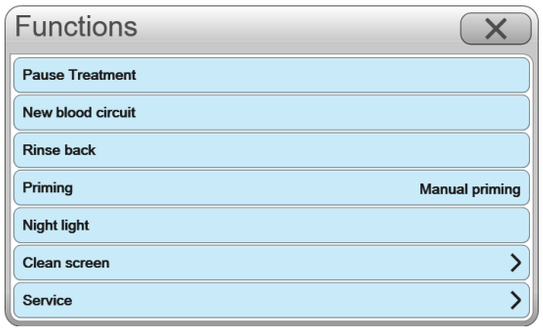


	13:35	13:05
Bloodpressure Systolic (mmHg)		155
Bloodpressure Diastolic (mmHg)		84
Pulse (bpm)		70
Blood flow (QB) (mL/min)	293	293
Venous pressure (mmHg)	100	90
Arterial pressure (mmHg)	-100	-110
Heparin rate (mL/h)	1.0	1.0
Acc. heparin volume (mL)	1.0	0.1
UF rate (L/h)	0.68	0.68
Acc. UF volume (L)	0.36	0.01
TMP (mmHg)	20	15
Dialysis fluid flow (QD) (mL/min)	490	490
Conductivity (mS/cm)	14.3	14.3
Na^+ (mmol/L)	140	140

15.2 Tools Option

Ref: Operator's manual for the **AK 98** dialysis machine, section 3.4.

The **Functions** button opens the Functions menu which is the entry point to the service menu.

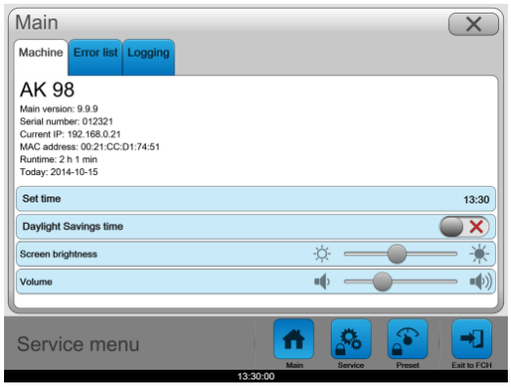


The **Clean Screen** option will temporarily lock the screen allowing the operator to clean it.

The **Night light** option will turn off the operator's panel. Touch the Operator's panel at any time to reactivate it. A new alarm will reactivate the Operator's panel.

Press **Service** to open the service menu.

In the Service menu under the **Machine** tab you can:



1. Set the time.
2. Adjust the time by 1 hour for daylight savings.
   The changes you make to the set time or daylight savings time will be applied everytime the machine is switched on, until you change them again.
3. Adjust the screen brightness, by changing the position of the slider.
4. Adjust the volume of the speakers, by changing the position of the slider. The screen brightness and the speaker volume will return to the default settings when a new function check is performed.

16 Alarms and attentions

Ref: Operator's manual for the **AK 98** dialysis machine, Alarm handbook Chapter 1 Alarms & 2 Attentions

NOTE

All alarms and attentions should be handled according to your local clinical/hospital protocols. The following sections are suggested handling routines only.

NOTE

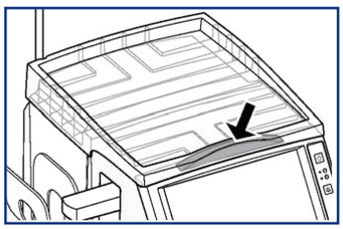
16.1 Alarm indication

There are two alarm levels, high priority (red) alarms and medium priority (yellow) alarms. When an alarm is generated, the machine will indicate the alarm as follows:

The alarm tab will be flashing; the colour will indicate the severity of the alarm.

The information field will display the alarm text.

The mute button will be flashing.



The alarm indicator light will be flashing.

The audible buzzer will be sounding.

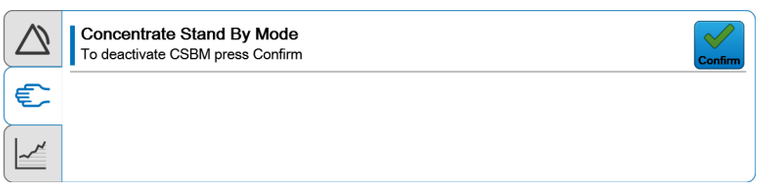
General alarm handling:

The information field will display the alarm text, three alarms can be displayed at the same time, if more than three alarms are occurring then the list will be scrollable.

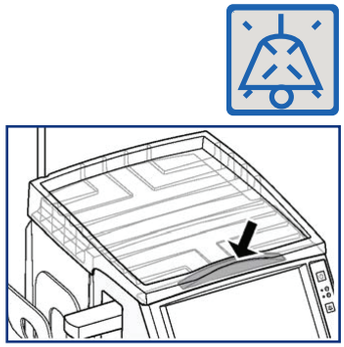
High priority alarms have priority over medium priority alarms and attentions.

If the alarm tab is pressed, the audible buzzer will also be muted for 2 minutes.

16.1.2 Attention indication



When an attention is generated, the machine indicates the attention as follows:



- The information tab is flashing.
- The information field will display the attention text.
- The mute button will be flashing.
- The attention indicator light will be flashing.
- The audible buzzer will be sounding the notification sound.

General attention handling:

Press the flashing attention tab to show the attention message.

16.2 Alarm overview

Function	Alarm text
Arterial pressure alarms	109 High arterial pressure 115 Low arterial pressure
Venous pressure alarms	114 High venous pressure 120 Low venous pressure
Air in venous drip chamber	100 Air in venous drip chamber.
Blood pressure alarms	110 High diastolic blood pressure To clear the alarm press confirm 111 High mean blood pressure To clear the alarm press confirm 112 High pulse rate To clear the alarm press alarm 113 High systolic blood pressure To clear the alarm press confirm 116 Low diastolic blood pressure To clear the alarm press confirm 117 Low mean blood pressure To clear the alarm press confirm 118 Low pulse rate To clear the alarm press confirm 119 Low systolic blood pressure To clear the alarm press confirm
Blood path alarm	201 Blood flow is too low 215 Single needle stroke volume is too low

Function	Alarm text
Blood in fluid path alarm	101 Blood detected in fluid path To start blood pump for (0) sec. to rinse detector, press timer button
Fluid path alarm	205 High dialysis fluid temperature 211 Conductivity out of limits 212 Low dialysis fluid temperature 217 TMP is too high 218 TMP is too low
Connect patient alarm	104 Blood is not detected Check cause and press confirm
Technical alarm	124 Technical error Contact technical service

16.2.1 Arterial pressure alarms

109 High arterial pressure

Appears:

When the arterial pressure alarm has reached the set arterial pressure high limit.

The arterial pressure measurement measures the pulling pressure of the blood coming out of the arterial access.

Machine actions:

1. The blood pump stops.
2. The venous blood clamp closes.
3. The ultrafiltration rate is set to zero.

When the arterial pressure is within the set alarm limits again, the blood pump automatically starts and the venous blood line clamp opens.

Possible causes:

1. The arterial blood line has separated from the arterial needle.
2. The position of the arterial needle has changed.
3. Air has entered the arterial blood line between the arterial needle and the blood pump e.g. when an infusion is connected to the arterial blood line prior to the blood pump.

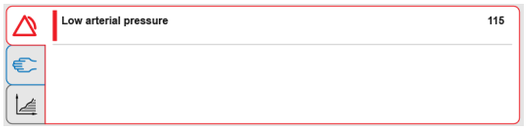
Actions:

1. Stop the blood pump. This will automatically widen the arterial and venous pressure limits.

2. Check for cause and take actions accordingly.

3. Restart the blood pump and adjust the blood flow.

115 Low arterial pressure



Appears:

When the arterial pressure has reached the set arterial pressure low alarm limit.

Machine actions:

1. The blood pump stops.

2. The venous blood line clamp closes.

3. The ultrafiltration rate is set to zero.

When the arterial pressure is within the set alarm limits again, the blood pump automatically starts and the venous blood line clamp opens.

Possible causes:

1. The performance of the patient's vascular blood access is not in accordance with the set blood flow rate.

2. Blood pressure has dropped.

3. The arterial blood line is kinked or clotted between the arterial needle and the arterial pressure measurement point.

4. The position of the arterial needle has changed.

Actions:

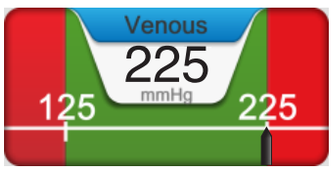
1. Stop the blood pump. This will automatically widen the arterial and venous pressure limits.

2. Check for cause and take actions accordingly.

3. Restart the blood pump and adjust the blood flow.

16.2.2 Venous pressure alarms

114 High venous pressure



Appears:

When the venous pressure has reached the set venous pressure high alarm limit. The venous pressure measures the resistance of blood returning to the access.

Machine actions:

1. The blood pump stops.
2. The arterial blood line clamp closes in single needle mode.
3. The ultrafiltration rate is set to zero.

When the venous pressure is within the set alarm limits again, the blood pump automatically starts.

Possible causes:

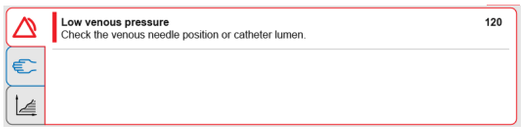
1. The venous blood line is kinked or clamped.
2. The position of the venous needle has changed.
3. Clotting has occurred in the venous blood line after the venous pressure measurement point; in the blood line, in the venous drip chamber, or in the needle.

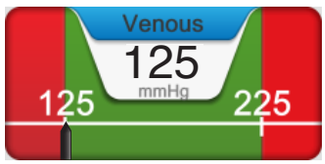
Actions:

1. Stop the blood pump. This will automatically widen the arterial and venous pressure limits.

2. Check for cause and take actions accordingly.
3. Restart the blood pump and adjust the blood flow.

120 Low venous pressure





Appears:

When the venous pressure has reached the set venous pressure low alarm limit.

Machine actions:

1. The blood pump stops.
2. The venous blood line clamp closes.
3. The ultrafiltration rate is set to zero.

   When the venous pressure is within the set alarm limits again, the blood pump automatically starts and the venous blood line clamp opens.

Possible causes:

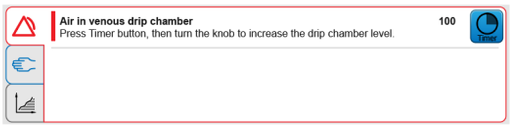
1. The venous blood line has separated from the dialyzer.
2. The venous blood line has separated from the venous needle.
3. The position of the venous needle has changed.
4. Clotting before or in the dialyzer.

Actions:

1. Stop the blood pump. This will automatically widen the arterial and venous pressure limits.
2. Check for cause and take actions accordingly.
3. Restart the blood pump and adjust the blood flow.

16.2.3 Air detector alarm

100 Air in venous drip chamber



Appears:

When air has entered the venous drip chamber.

Machine actions:

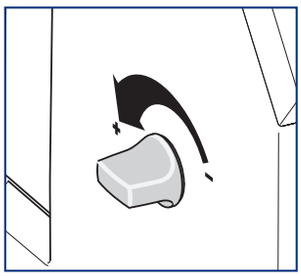
1. The blood pump stops.
2. The venous and the arterial blood line clamps close.
3. The ultrafiltration rate is set to zero and the dialysis fluid is bypassed from the dialyzer.

Possible causes:

1. The blood line connections to the arterial needle or dialyzer are not tight.
2. The air has not been fully removed from the blood lines or dialyzer during priming.
3. The arterial needle is not in the correct position
4. Air has entered the blood lines e.g. when an infusion is connected to the blood lines.

Actions:

1. Check the blood line connections.
2. Check the position of the arterial needle.
3. Press the **timer** button in the alarm message, at the same time increase the blood level in the venous drip chamber by turning the level adjustment knob anticlockwise
4. When the level is correct and the alarm text has changed, ensure there is no air in the venous, arterial and infusion lines before pressing confirm in the alarm message to re-start the blood pump.
5. Adjust the blood flow rate.



16.2.4 Heparin pump overload

203 Heparin pump is overloaded

Appears:

When the pressure in the syringe is too high.

Machine actions:

The heparin pump stops.

Possible causes:

1. The heparin syringe is not installed.
2. The heparin syringe is empty.
3. There is a clamp on the heparin line.

   This alarm may also appear if there is a high pressure in the circuit caused by a kink in the blood line; either between the blood pump and dialyzer or between the dialyzer and the venous drip chamber.

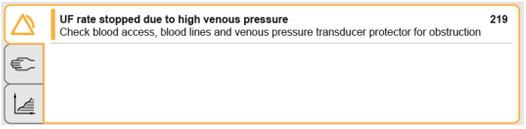
Actions:

1. Check that the heparin syringe is installed.
2. Check that the heparin syringe is filled.
3. Check for kinks and clamps on the heparin line.

   When the pressure in the syringe is within limits again the heparin pump starts automatically and the attention will disappear.

16.2.5 UF alarms

219 UF rate stopped due to high venous pressure



Appears:

When the net UF rate cannot be obtained due to the current high venous pressure.

Machine actions:

The dialysis fluid bypasses the dialyzer.

Actions:

1. Check possible reason for the current high venous pressure, e.g. your blood access, dialyzer clotting, the venous pressure transducer. Take appropriate actions when you find an issue.

2. If needed, decrease the blood flow until the attention disappears..

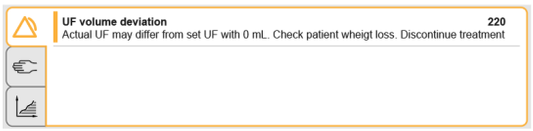
NOTE

If it is not possible to decrease the actual venous pressure, wait (maximum 5 minutes) until the dialysis fluid enters the dialyzer again.

If the alarm reappears, consider ending the treatment.

NOTE

220 UF deviation



Appears:

When the ultrafiltration volume measurements are not within the specification of the dialysis machine.

Machine actions:

The dialysis fluid bypasses the dialyzer.

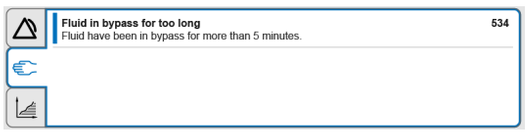
Actions:

1. Check your weight loss is correct for the current point in the treatment time.

2. Discontinue the treatment.

16.2.6 UF Attentions

534 Fluid in bypass for too long



Appears:

5 minutes after the dialysis fluid has been bypassed (the **Fluid bypass** button has been pressed).

Machine actions:

Buzzer is activated.

Operator action:

Press the **Fluid bypass** button.

Mute time:

2 minutes.

594 Too High TMP required

Appears:

When the machine cannot maitain the required UF rate.

Machine actions:

Buzzer is activated 2 min. after attention is generated.

Action:

1. Check if the dialyzer is the right size or if there is clotting.
2. If possible, increase the treatment time or decrease the UF volume until the TMP decreases.

597 UF has been stopped for too long

Appears:

5 minutes after UF has been manually stopped.

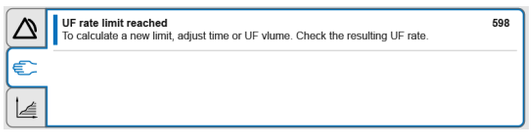
Machine actions:

Buzzer is activated.

Action:

Press the flashing **Ultrafiltration** button to start the ultrafiltration again or press the mute button to continue with no ultrafiltration for another 5 minutes.

598 UF rate limit is reached



Appears:

When the current UF rate differs more than 20% from the initially calculated UF rate.

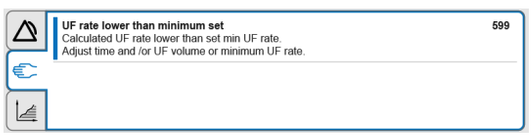
Machine actions:

Buzzer is activated 2 min. after attention is generated.

Action:

Adjust time and/or UF volume to allow the machine to calculate a new UF rate.

599 UF rate lower than minimum set



Appears:

When the machine needs to decrease the UF rate below the set minimum in order to obtain the set UF volume at the end of the treatment.

Machine actions:

Buzzer is activated 2 min. after attention is generated.

Action:

You should change one or several of these settings:

1. Decrease the set minimum UF rate.
2. Decrease the treatment time to increase the UF rate.
3. Increase the UF volume.

16.2.7 Other attentions during Fch/Priming

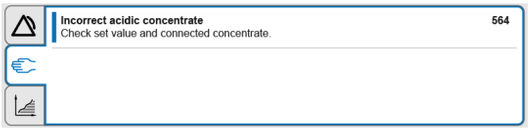
500 Air detector not activated

Press the **Air detector** button to activate the air detector alarm function.

521 Concentrate tube B is out of position

Check the placement of the blue concentrate connector.

564 Incorrect acidic concentrate



Check that the correct concentrate is connected to the machine and that the correct concentrate has been selected in the '**Conc**' tab of the fluid menu.

609 Start Air detector test

When the blood pump is running, fill the venous drip chamber using the level adjustment knob. The level of priming fluid should be well above the air detector head.

When the venous drip chamber is filled, the machine will finish the functional check.

16.2.8 Other attentions during treatment

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556 Heparin flow rate set to 0.0 mL/h

If no heparin is required for your treatment, press the **Confirm** button.

603 UF volume is set to 0.0 L

Press **Confirm** to confirm that you do not want to perform any ultrafiltration during your treatment.

Machine Alarms and attentions handling Notes

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