AK 98 Dialysis Machine

Introduction module

Reference: **AK 98** Operator's Manual 2.XX
Chapters 2 & 3

Important notice

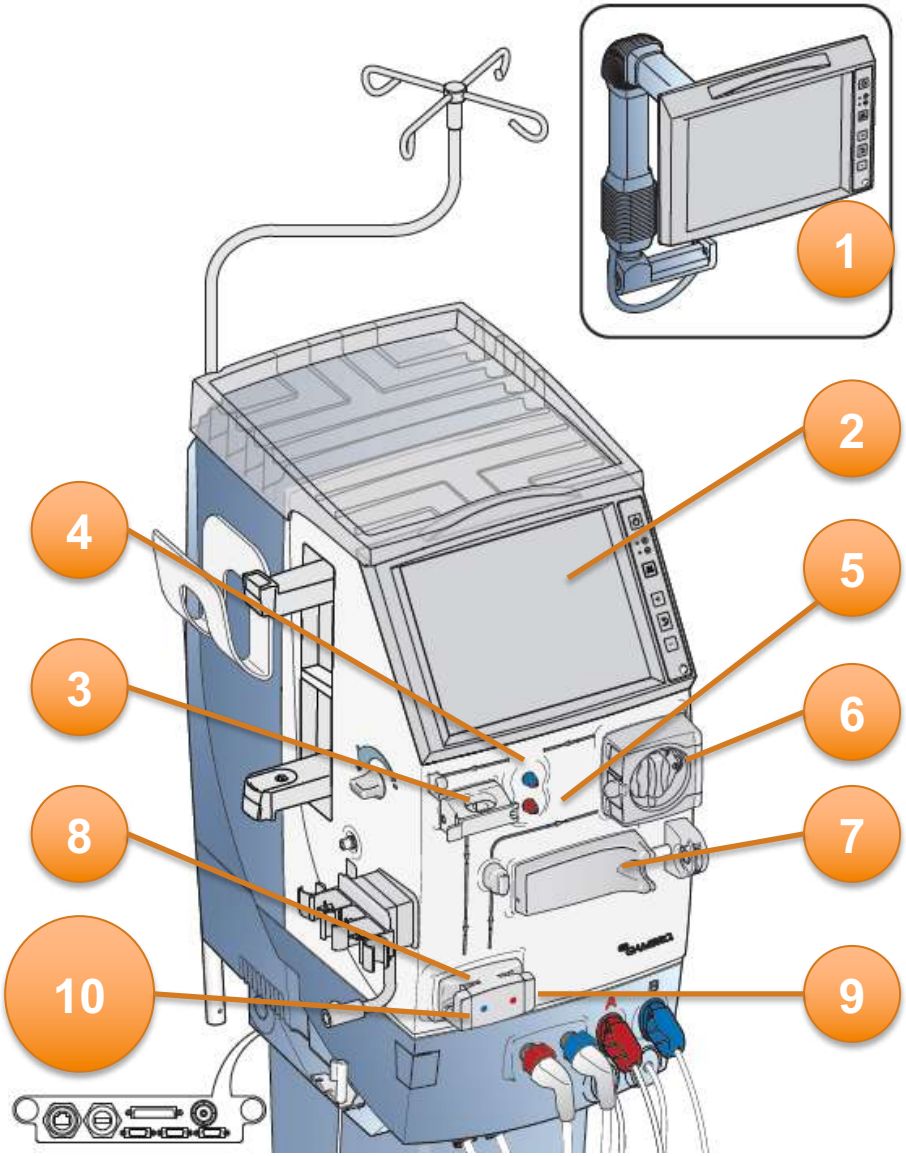
The contents of this training module are based on the **AK 98** Dialysis Machine Operator's Manual. The completion of this training does not relieve the operator from their responsibility to read and understand the full text of the Operator's Manual. If there are deviations between the text contained in this module and the Operator's manual, then the Operator's manual takes precedence.

Learning objectives

The aim of this module is to get an overview of the **AK 98** dialysis machine with special focus on:

- The blood part of the machine
- The fluid part of the machine
- The operator's panel
- Setting of the treatment parameters and activating functions

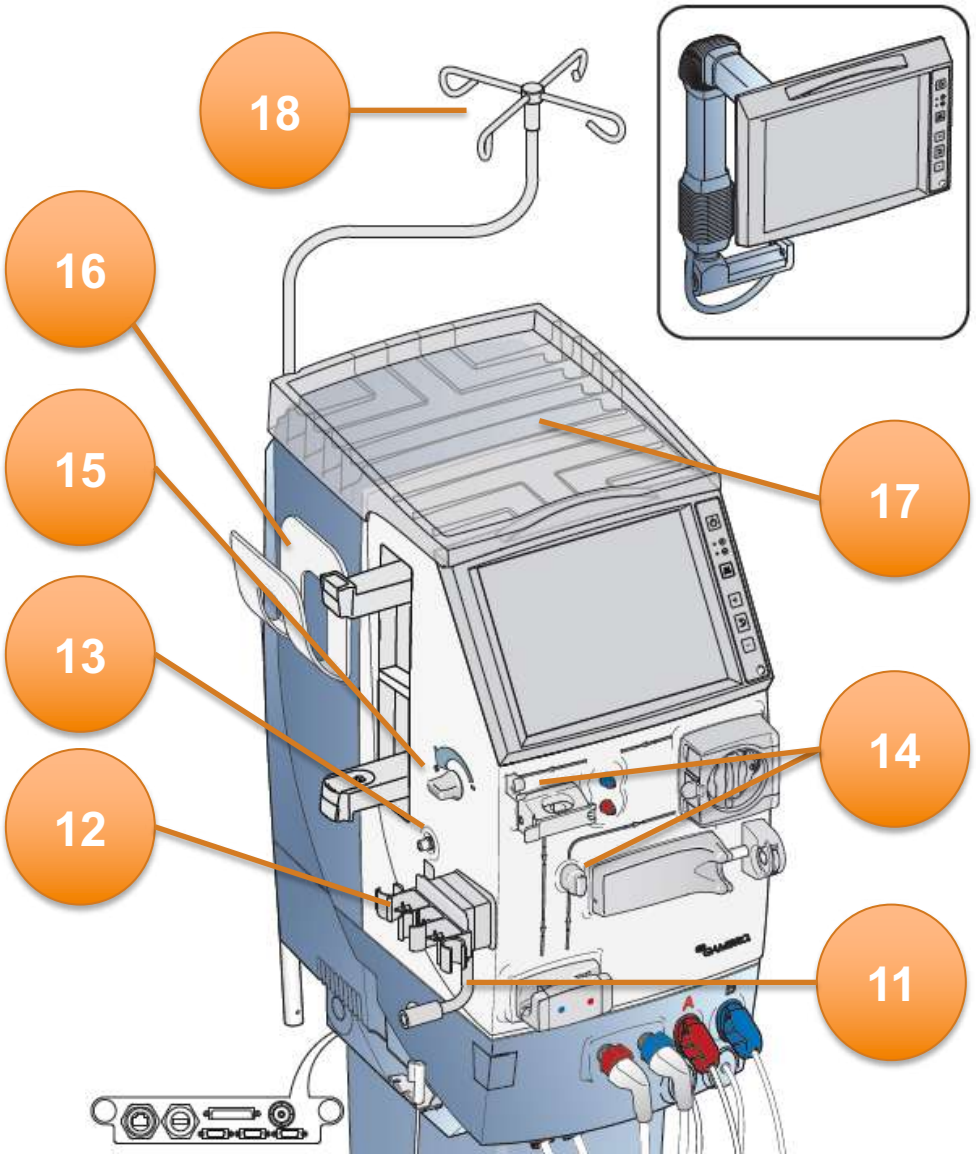
Machine external components – blood part



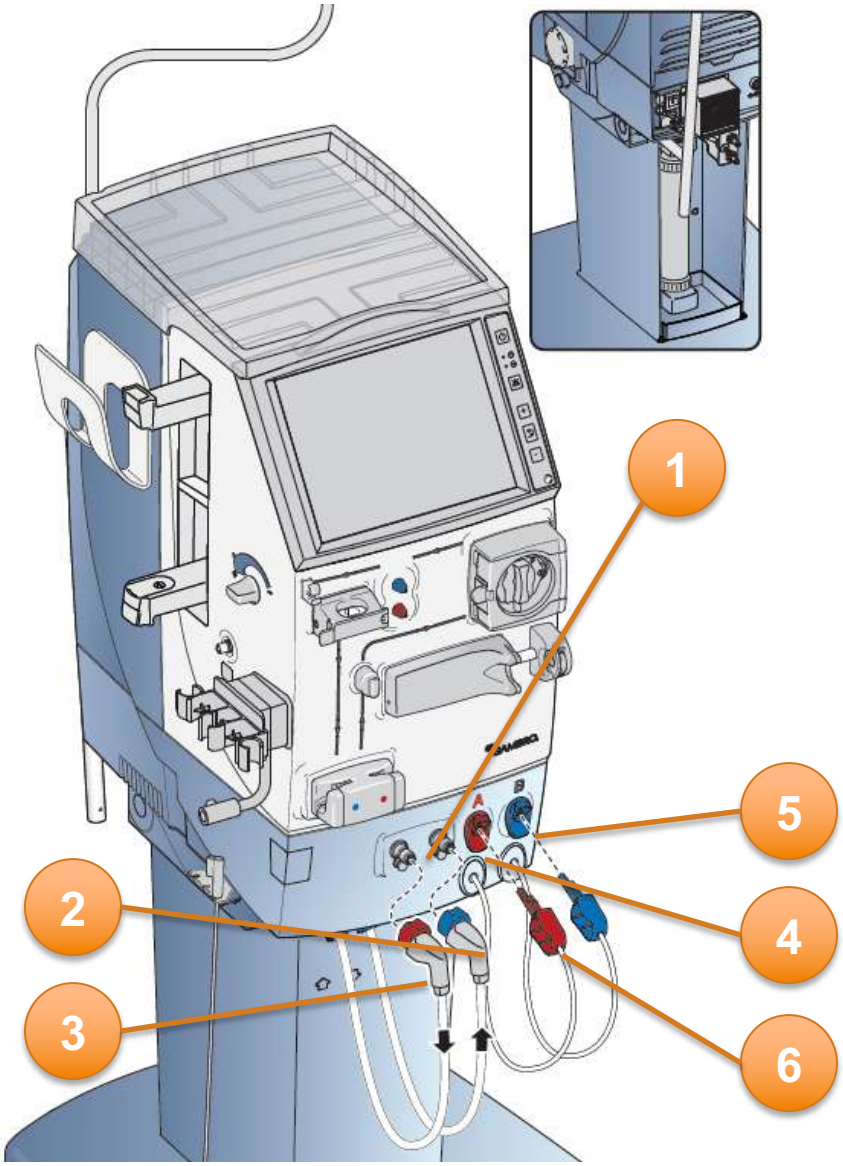
1. Remote Operator's panel
2. Operator's panel
3. Air detector
4. Venous pressure transducer connector
5. Arterial pressure transducer connector
6. Blood pump
7. Heparin pump
8. Priming detector
9. Arterial blood line clamp
10. Venous blood line clamp

Machine external components – blood part

11. Arm for dialyzer holder
12. Expansion chamber holder
13. Blood pressure monitor (BPM)
14. Blood line guides
15. Level adjustment knob
16. BPM cuff holder
17. Top tray
18. Infusion stand

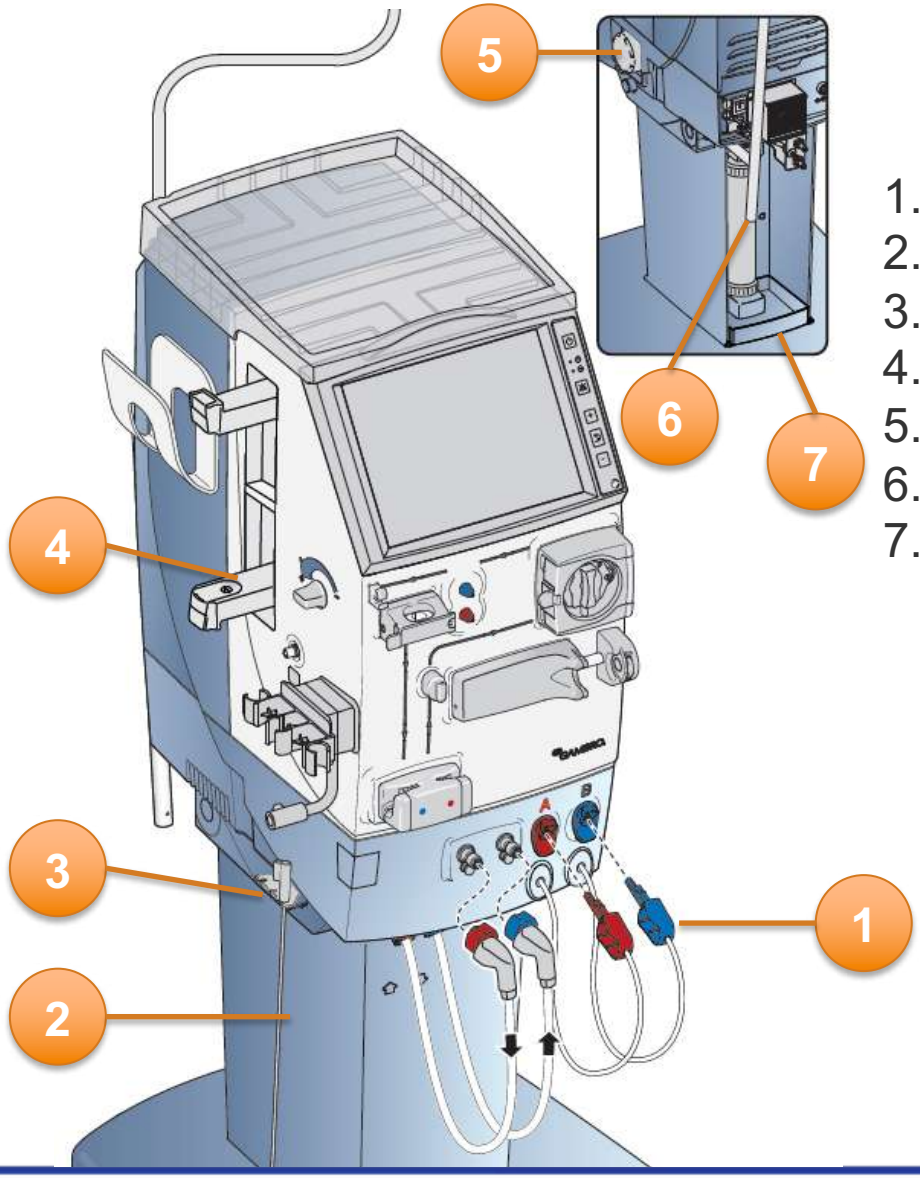


Machine external components – fluid part



1. Safety couplings for dialysis fluid tubes
2. Dialysis fluid tube from machine to dialyzer (blue)
3. Dialysis fluid tube from dialyzer to machine (red)
4. Stand-by port for red concentrate connector
5. Stand-by port for blue concentrate connector
6. Concentrate connector, red

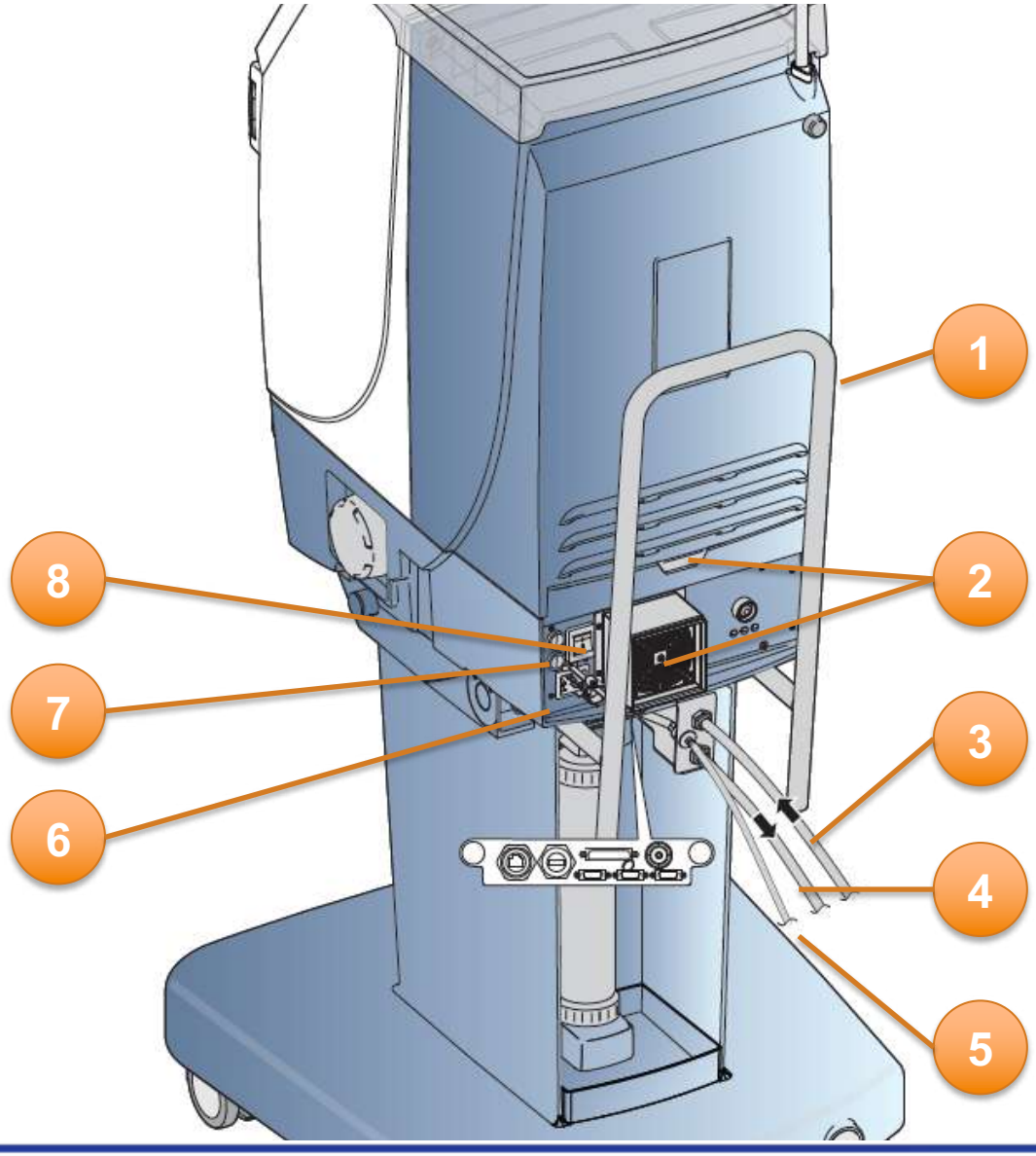
Machine external components – fluid part



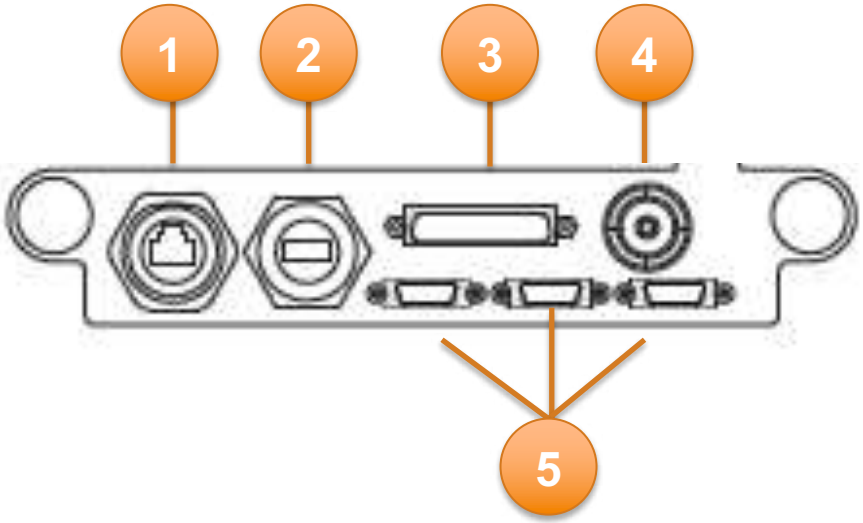
1. Concentrate connector, blue
2. Pick-up tube
3. Pick-up tube holder
4. **BiCart** cartridge holder
5. Blood leak detector
6. Ultrafilter
7. Fluid leakage detector tray

Machine external components - rear

1. Transportation handle
2. Air filters
3. Inlet water tube
4. Outlet tube (drain)
5. Disinfectant inlet tube
6. Mains connection
7. Fuses
8. Main switch



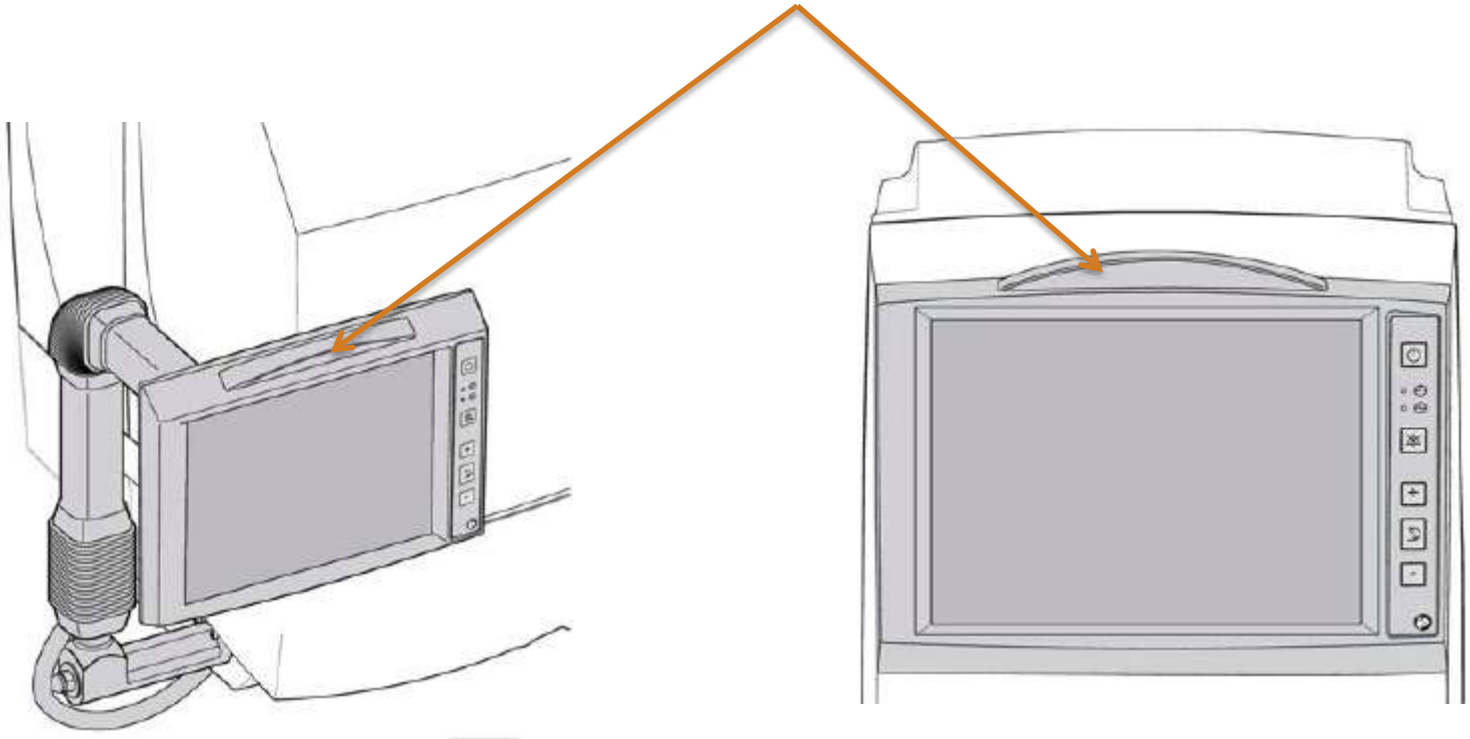
Machine external components - rear



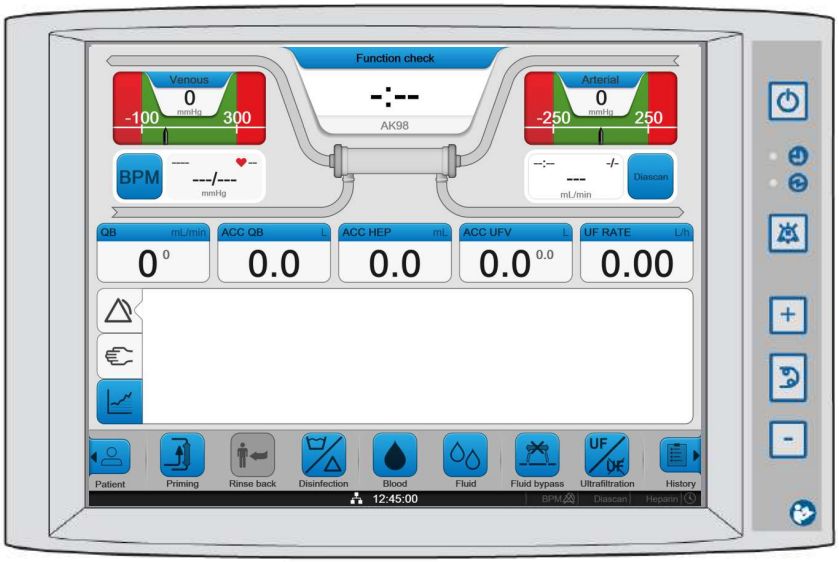
1. Ethernet port
2. USB port
3. External communication port
4. Potential equalisation connection
5. Remote panel contacts

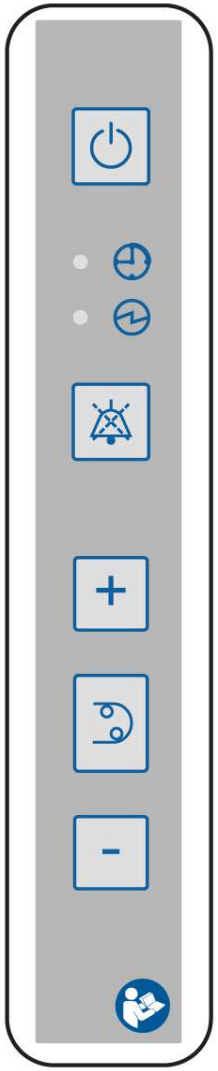
The Operator's panel – alarm indication light

The machine has an alarm indication light placed on the top of the operator's panel. It can either be a blue, yellow or red flashing light, depending on the attention or alarm status. When there is no information to display, the light is off.



The Operator's panel – hard buttons





On/off button

Schedule indicator
Main switch indicator

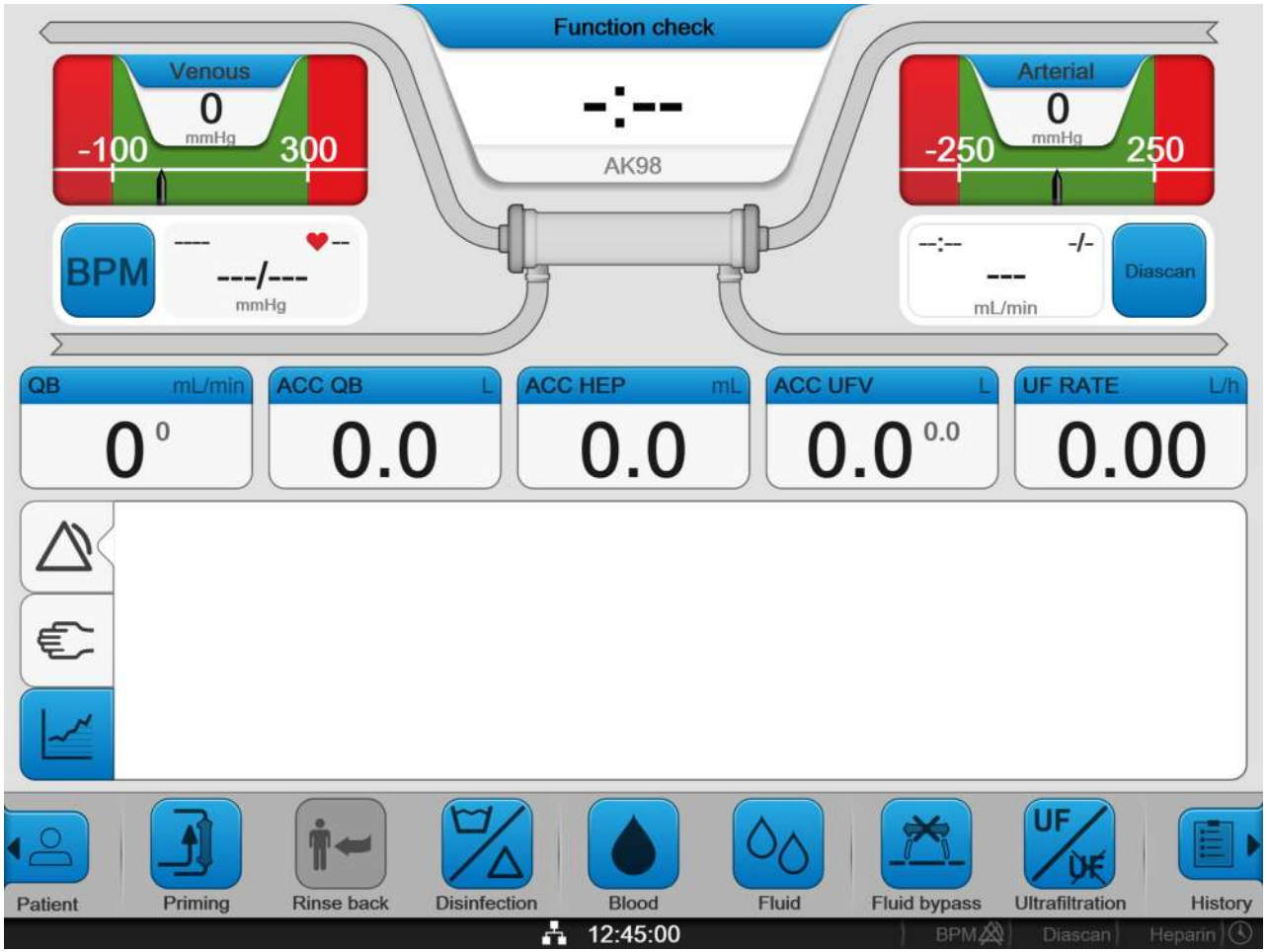
Mute button

Blood pump increase

Blood pump button

Blood pump decrease

The Operator's panel – touch screen layout



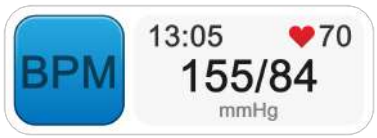
The Operator's panel – touch screen buttons

The machine state indicator shows the state the machine is currently in; functional check, treatment or disinfection.

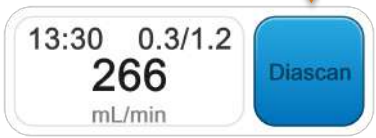
It is possible to set a customized name, or identifier for the machine.

The time indictor shows in h:mm the remaining time in different machine states.

The **Diascan** button opens the clearance menu.



The BPM read-out field shows the latest reading. Pressing it performs a single BPM reading.

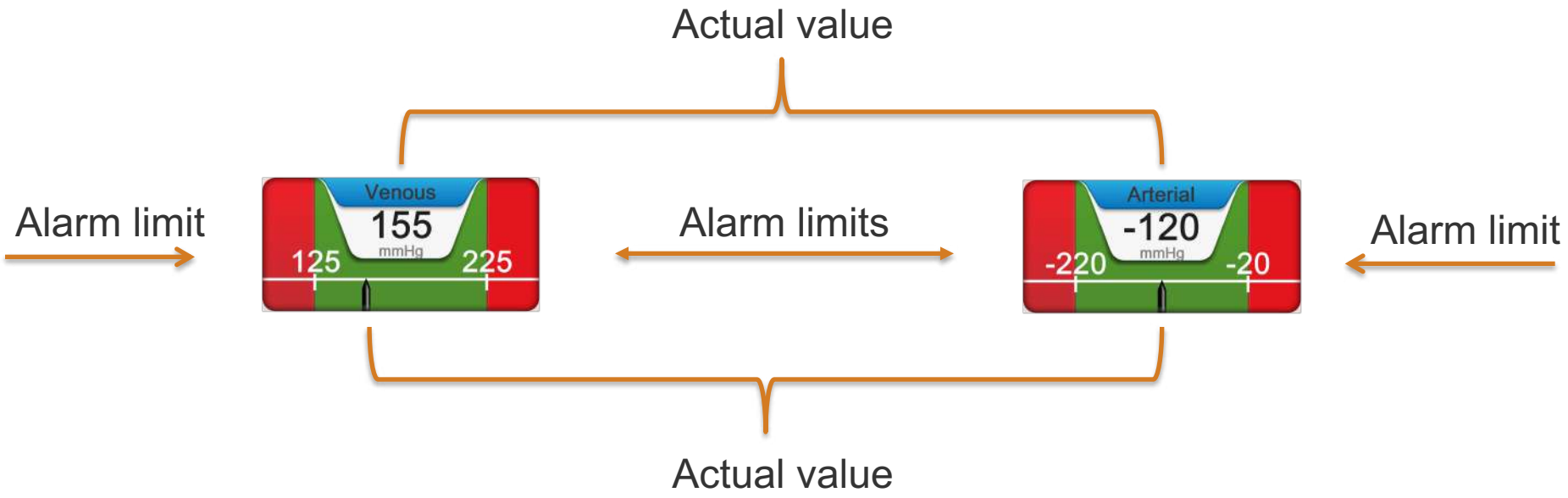


The BPM button opens the blood pressure menu.

The clearance read-out field shows the data from the last performed **Diascan** monitoring system.

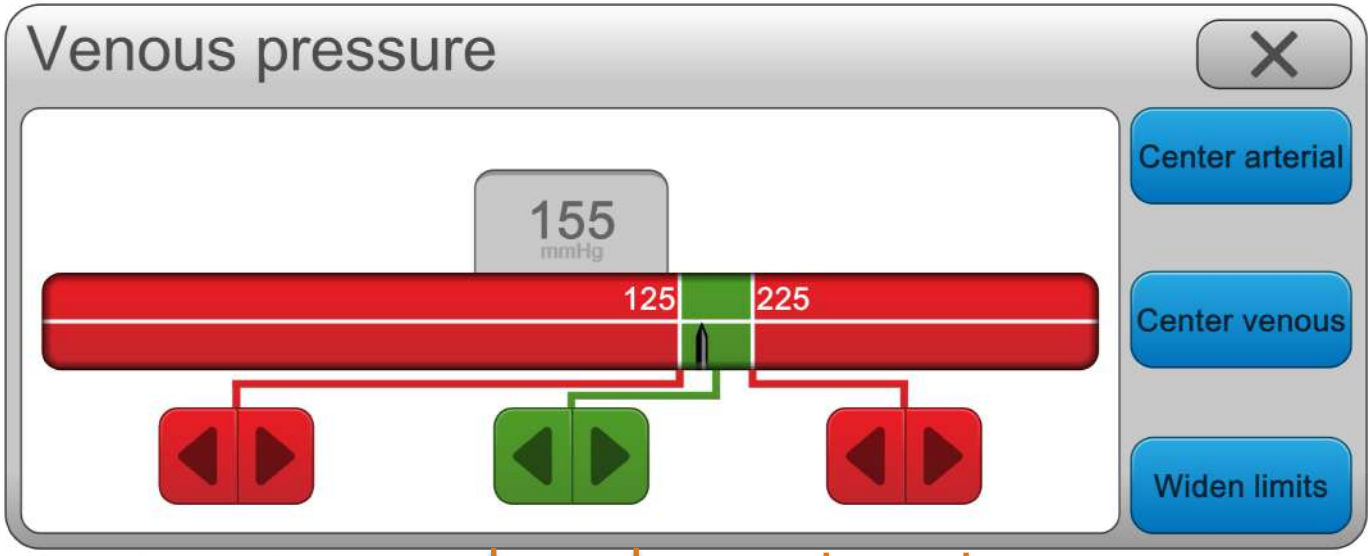
The Operator's panel – arterial and venous pressure areas

The arterial and venous pressure areas show the current pressure as a numerical value and graphically as the grey pointer. The values in white text are the alarm limits, beyond these points, alarms will be generated. When the pressure areas are flashing, pressing them will centralize the alarm limits around the current value.



Pressing each area, when they are not flashing, opens the settings boxes where the alarm limits can be adjusted.

The Operator's panel – direct actions to the alarm limits



Centralize the arterial and venous pressures around the current value

Move the lower alarm limit up/down using the red left and right arrows

Move the upper alarm limit up/down using the red left and right arrows

Widen both the arterial and venous alarm limits to their widest point

Move the entire alarm window up/down using the green left and right arrows

The Operator's panel – flow paths

Depending on the status of the machine the flow paths are lit in different colors.

Treatment

Bypass

Isolated ultrafiltration

Incorrect conductivity

The Operator's panel – treatment overview fields

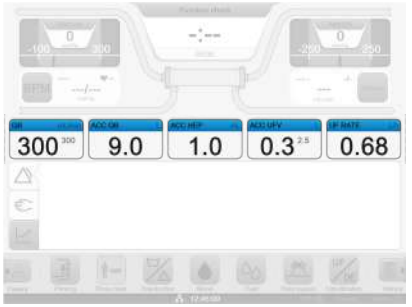
Blood flow rate in mL/min. Pressing it opens the blood menu.

Accumulated blood volume treated in L. Pressing it opens the blood menu.

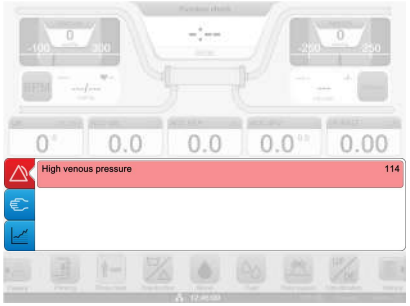
Accumulated heparin volume delivered in mL. Pressing it opens the blood menu.

Accumulated ultrafiltration volume in L. Pressing it opens the fluid menu.

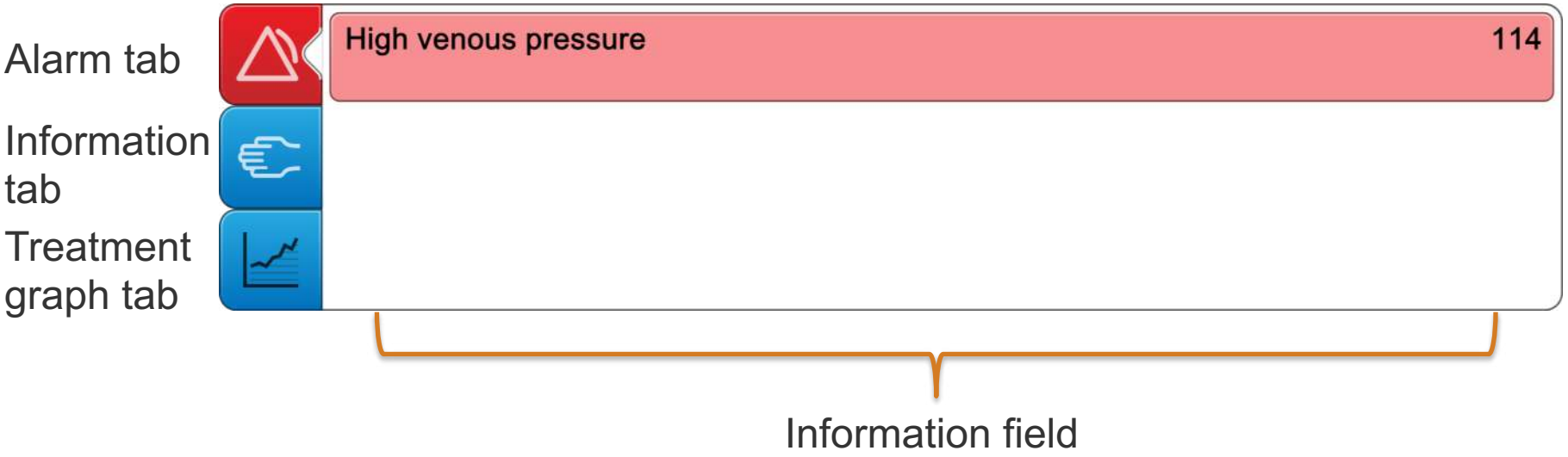
Ultrafiltration rate in L/h. Pressing it opens the fluid menu.



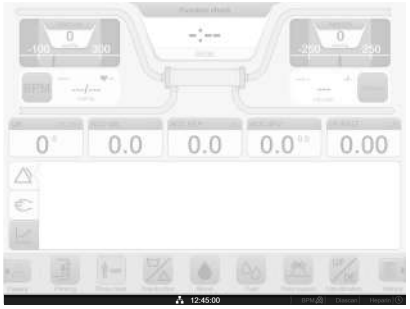
The Operator's panel – alarms, attentions & graphs



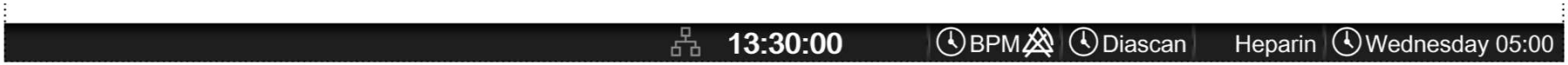
When the machine has information to display to the operator it can be found in the information field. If it is an alarm then the alarm tab will be flashing. If it is an attention or operator message then the information tab will be flashing. The treatment graph tab opens the treatment graphs, where key treatment parameters are displayed in a graphical format.



The Operator's panel – status information bar



The status information bar is found at the bottom of the screen. When text appears in grey on the bar that function is not activated. Text in white shows active functions.



The icons that appear on the status information bar are;

The clock icon indicates that the machine is set for an auto process.

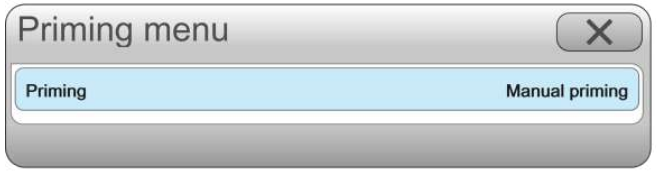
The BPM alarm off icon tells you that the BPM alarms have not been set

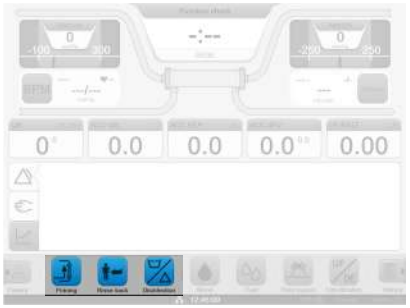
The network connection icon is solid white when connected and has a grey outline when not connected

The Operator's panel – touch screen buttons

The patient button opens the patient page where information regarding the patient is handled. The available functionality will depend on the CIS (Clinical Information System) in use in the clinic.

The Operator's panel – touch screen buttons





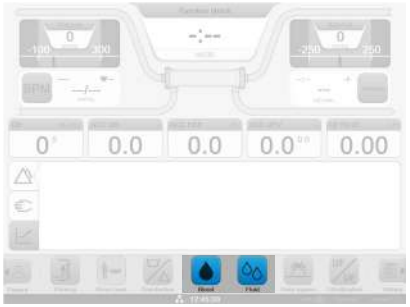
The priming button opens the priming menu where manual or automatic priming can be selected.

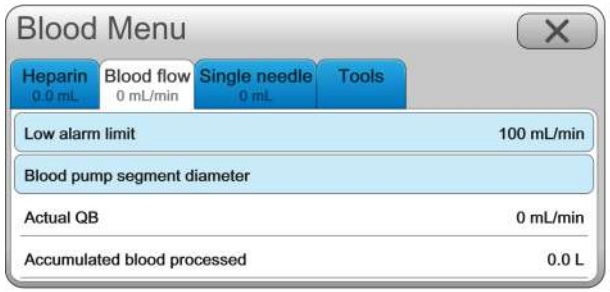
The rinse back button can be used to discontinue the treatment prematurely. New blood circuit allows the blood circuit to be changed during the treatment

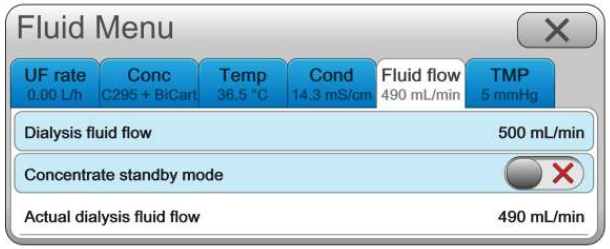
The disinfection/rinse button opens the disinfection/rinse menu where the different disinfection/rinse programs can be selected and activated, the disinfection history tab can also be found here. The ultrafilter data can be found in the tools tab.

The Operator's panel – touch screen buttons

The blood button opens the blood menu, which contains the tabs used for setting parameters relating to blood. Access to the technical service area is via the tools tab.



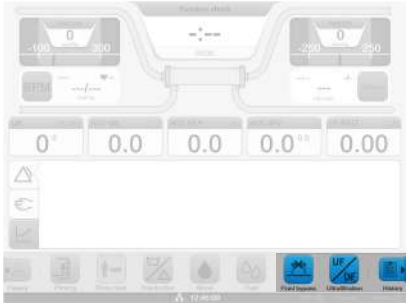




The fluid button opens the fluid menu, which contains the tabs used for setting parameters relating to fluid.

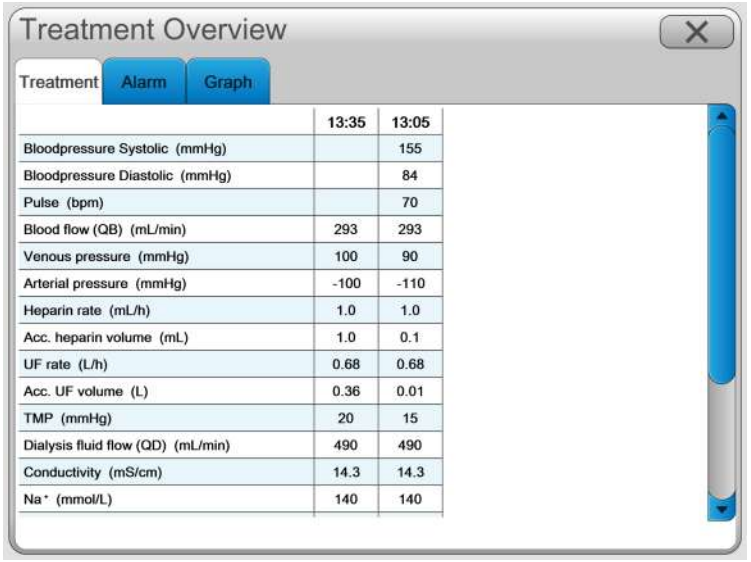
The Operator's panel – touch screen buttons

When the fluid bypass button starts to flash, the dialysis fluid is in bypass. This can be also seen on the fluid flow path.



When the ultrafiltration button is lit, ultrafiltration is performed. This can be confirmed by looking at the value in the UF rate treatment overview field.

The history button opens the treatment history page. Here the treatment and alarm history and the treatment graphs are displayed.



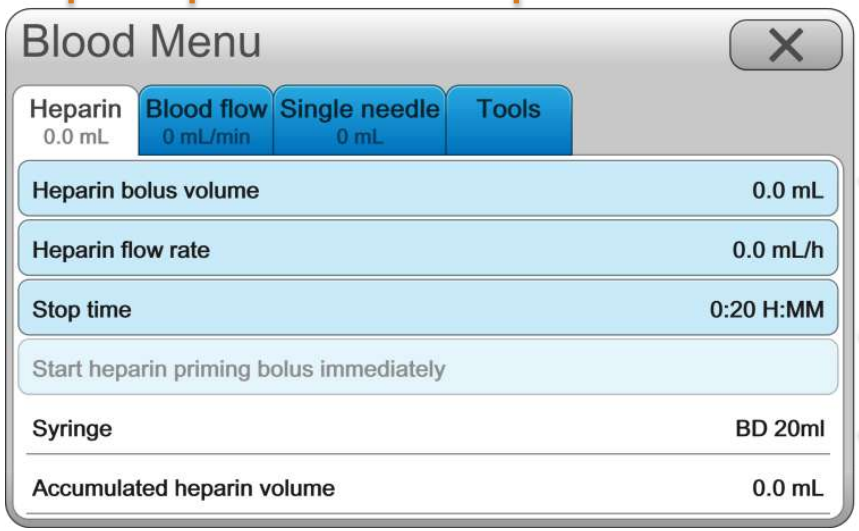
	13:35	13:05
Bloodpressure Systolic (mmHg)		155
Bloodpressure Diastolic (mmHg)		84
Pulse (bpm)		70
Blood flow (QB) (mL/min)	293	293
Venous pressure (mmHg)	100	90
Arterial pressure (mmHg)	-100	-110
Heparin rate (mL/h)	1.0	1.0
Acc. heparin volume (mL)	1.0	0.1
UF rate (L/h)	0.68	0.68
Acc. UF volume (L)	0.36	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

The Operator's panel - menus

All of the menus are handled in the same manner described here.

Current menu tab shown in white

Other accessible menu tabs are dark blue



Key actual values are shown on the tab

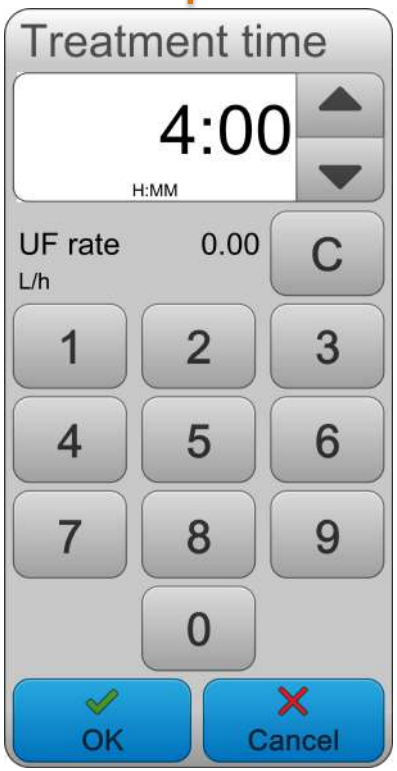
Press the blue bars to open keypads to change the value

Not currently available in this phase; shown as dimmed

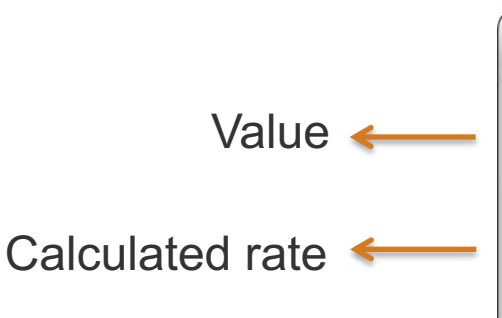
Presets shown in white

Accumulated or actual values shown in white

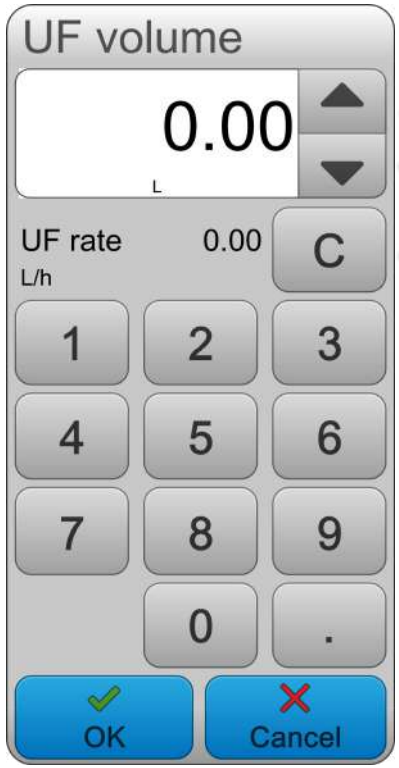
The Operator's panel – setting parameters keypad



Press OK to confirm the value you have set



When setting treatment time, use the overtype method. To set 3:45 type in the number 3, then 4, and then 5. The colon : is added automatically and the time will be set to 3:45



Increase

Decrease

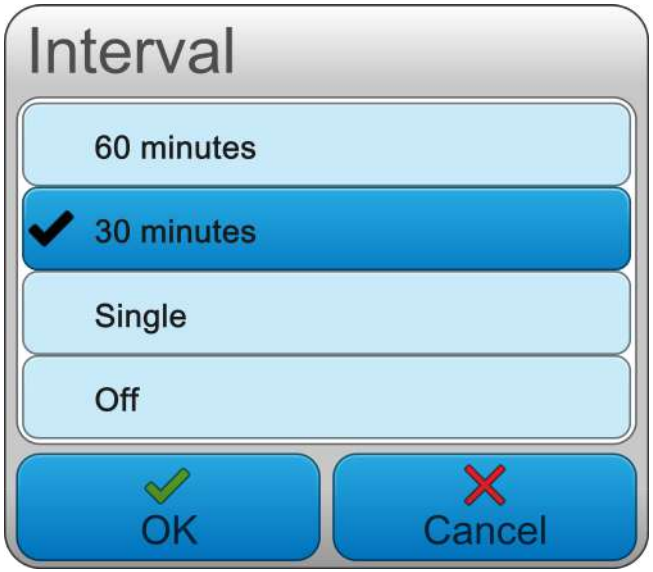
Clear

A decimal point is used when setting volumes

Press cancel to leave the keypad without changing the value

The operator's panel - setting parameters selectpad

Some of the machine parameters can also be set using a selectpad.



The dark blue bar and check mark show the selected parameter, to change press one of the light blue bars.

Press OK to confirm a change or cancel to exit.

Baxter, Gambro, AK 98, BiCart and Diascan are trademarks of Baxter International Inc. or its subsidiaries.

AK 98 Dialysis Machine

Preparation module

Reference: **AK 98** Operator's Manual 2.XX
Chapters 4 & 12

Important notice

The contents of this training module are based on the **AK 98** Dialysis Machine Operator's Manual. The completion of this training does not relieve the operator from their responsibility to read and understand the full text of the Operator's Manual. If there are deviations between the text contained in this module and the Operator's manual, then the Operator's manual takes precedence.

Learning objectives

The aim of this module is to get an overview of the **AK 98** dialysis machine with special focus on:

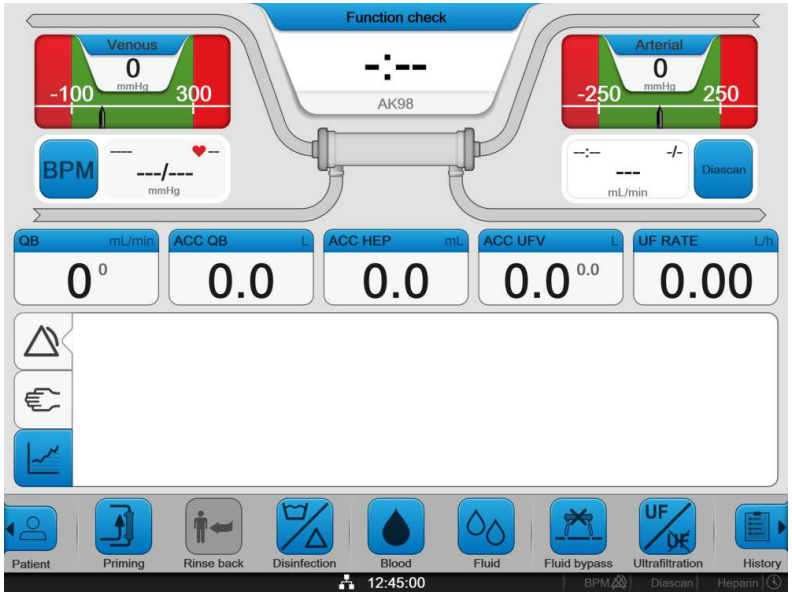
- Attaching the concentrates
- Attaching the blood lines and heparin syringe
- Priming the extracorporeal circuit
- Setting the treatment parameters

Preparing the machine – Switch on & functional check

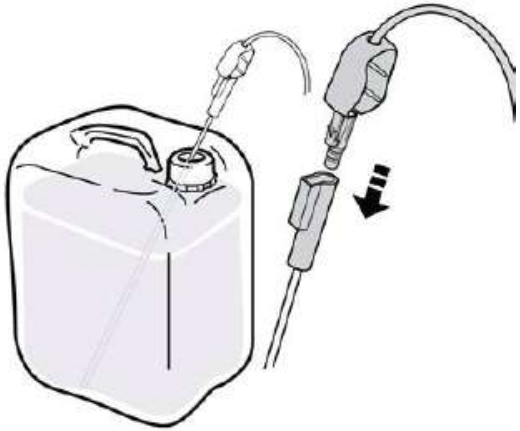
Check the connections to water/drain and electricity, and then switch the machine on by lightly pressing the On/Off button.

The functional check will start, the lights of the operator's panel hard buttons, the screen, the alarm indication light and the buzzer will be tested first.

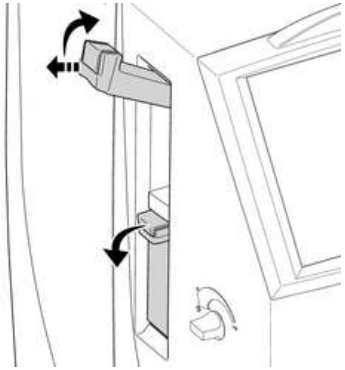
The program version will be shown on the start-up screen, then the treatment screen will be shown. Function check will appear in the machine state indicator.



Preparing the machine - Concentrates

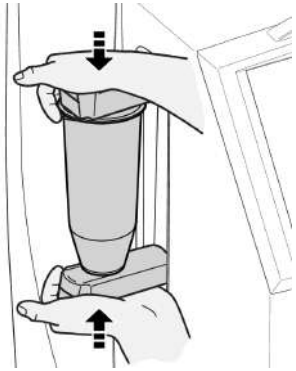


Turn the red concentrate connector clockwise and then remove it from the standby port of the machine. Connect the red concentrate connector to a pick up tube until a ‘click’ is heard. Place the pick up tube into the proper acidic concentrate container. Confirm the concentrate combination.



Press the release buttons. Open the upper latch of the **BiCart** cartridge holder. Pull it outwards and upwards. Open the lower latch.

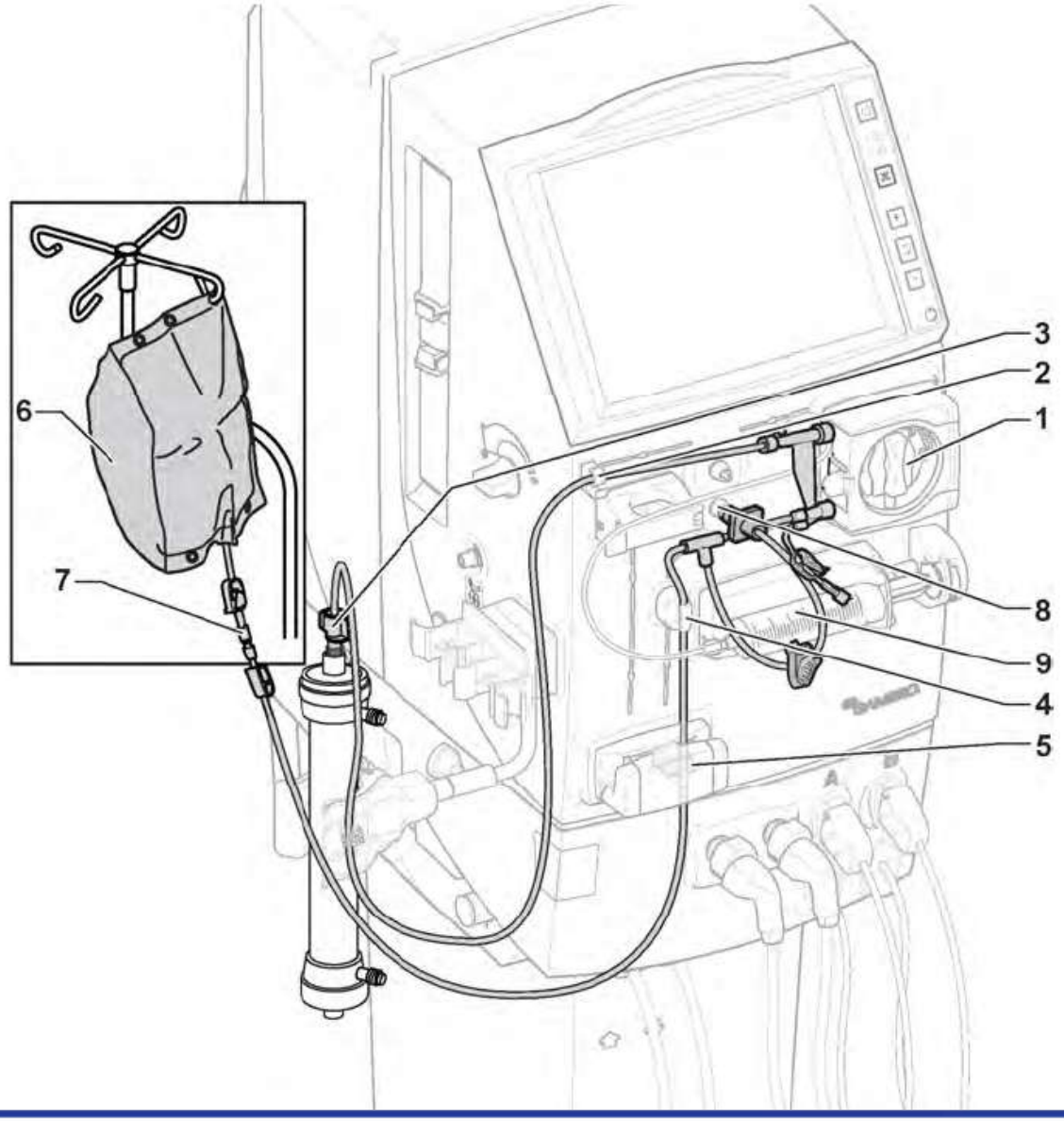
Place the bottom port of the **BiCart** cartridge into the hole of the lower latch.



Bring down the upper latch to align the hole with the top port of the **BiCart** cartridge.

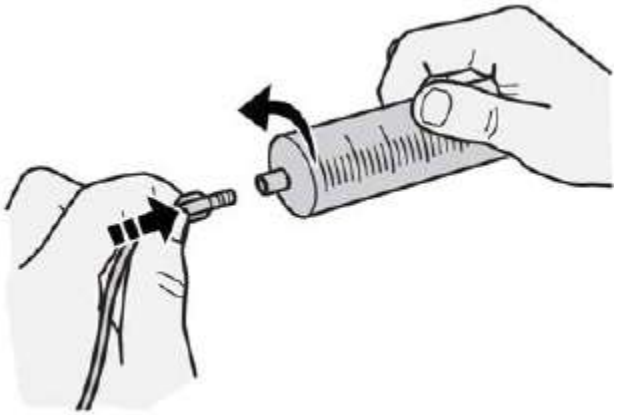
Preparing the machine – arterial blood line

The machine is ready to be lined once the blood pump button is flashing.

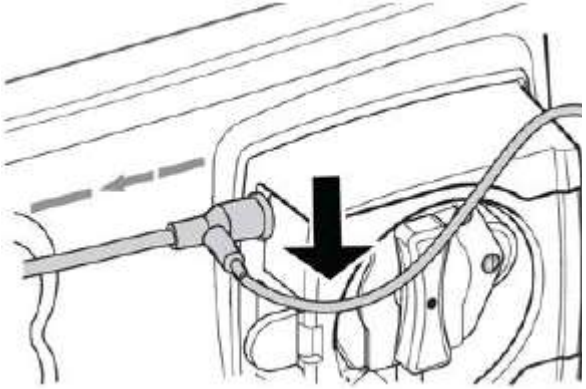


1. Blood pump
2. Blood line guide
3. Dialyzer connection
4. Blood line guide
5. Arterial line clamp
6. Saline or priming bag
7. Arterial patient connector
8. Arterial pressure transducer connector
9. Heparin pump

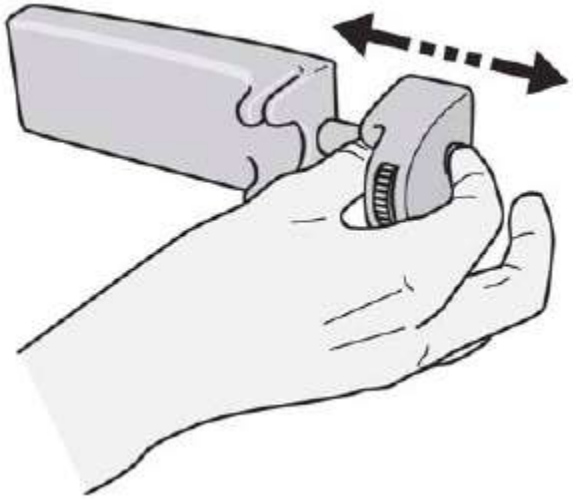
Preparing the machine – attach the heparin syringe



Connect the prepared luer lock syringe to the heparin line



Manually prime the heparin solution all the way up to the arterial blood line

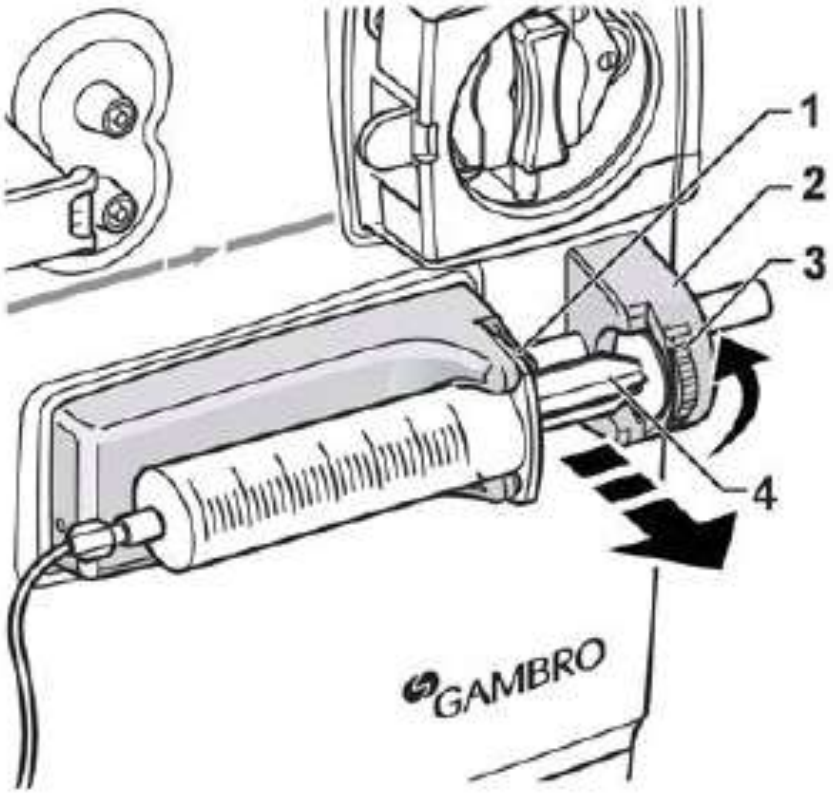


Press in the end of the piston and move it all the way out to the right hand side

Preparing the machine – attach the heparin syringe

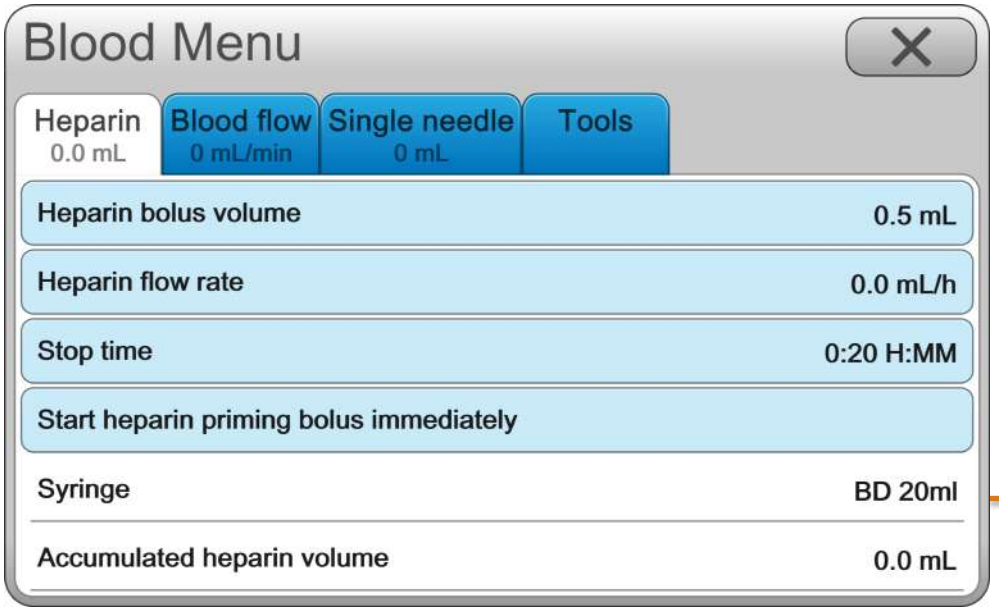
It is important to correctly install the heparin syringe, it should be installed as follows;

1. Insert the plastic collar of the syringe into the groove of the pump
2. Insert the plate on the end of the plunger into the groove on the piston
3. Turn the locking wheel upwards until resistance is felt
4. Check the syringe is firmly in place by lightly pulling on the plunger



Preparing the machine – setting the heparin

To set the heparin, press the blood button to open the blood menu. Here choose the heparin tab. Pressing each of the blue bars will open a keypad to set the desired value.

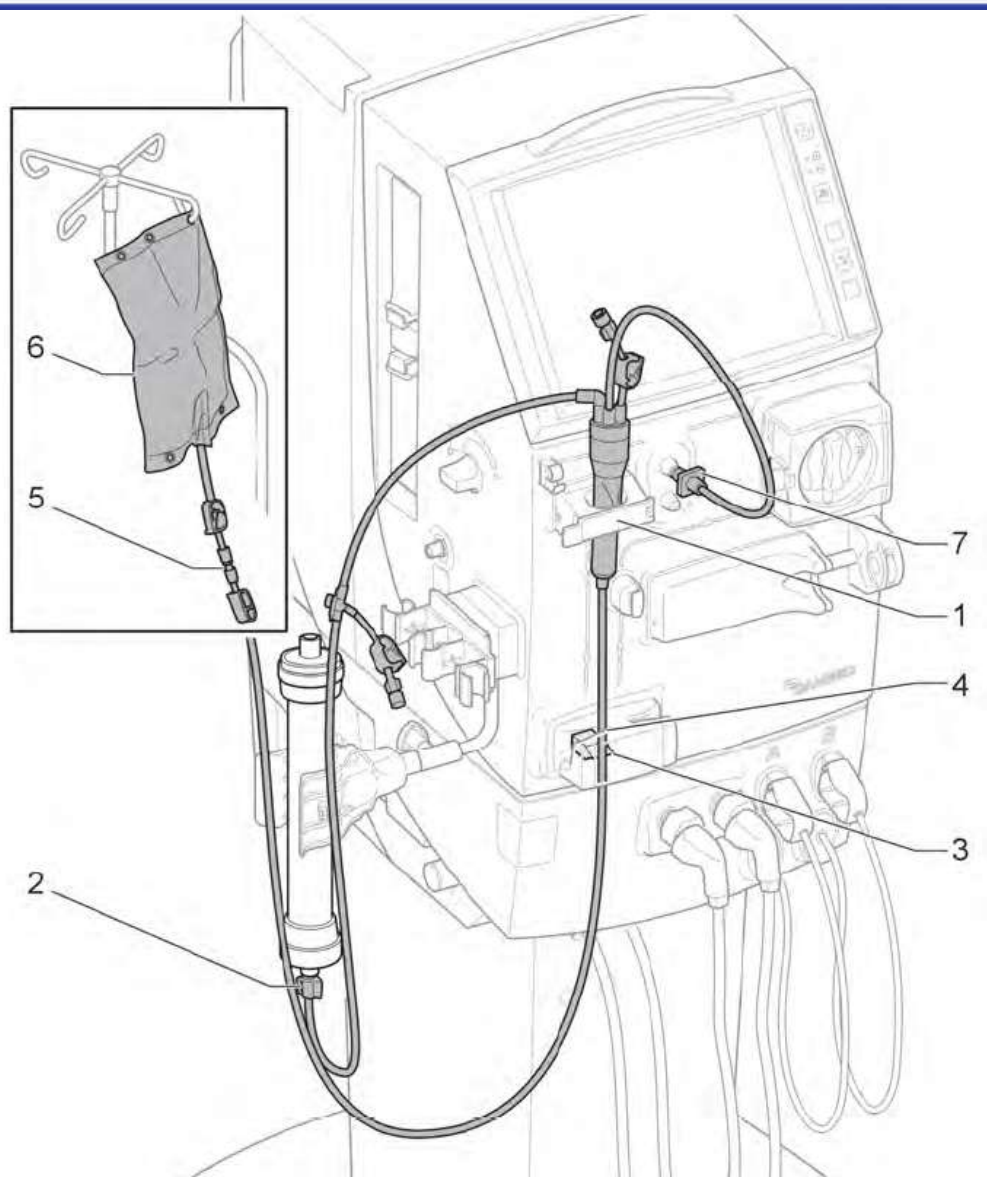


To deliver a bolus during priming

Preset brand and volume

Preparing the machine – venous blood 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



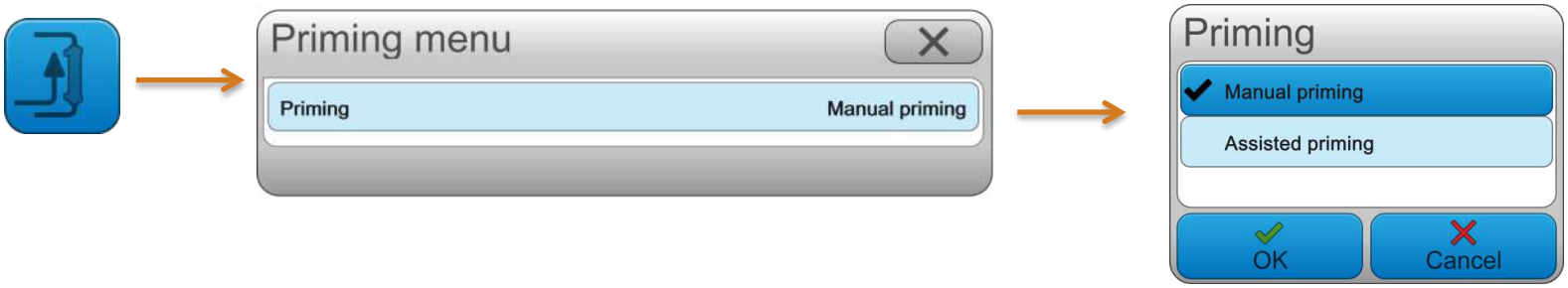
Preparing the machine – manual priming

In manual priming the operator is in charge of the priming process. Priming of the blood side of the circuit can start as soon as the blood pump button is flashing, and the blood lines have been attached. In this case, the caps from the dialyzer blood ports should be moved to the dialyzer fluid ports to prevent spillage.

Alternatively, priming can also be delayed so that it is completed once the machine has reached full conductivity, as displayed by the green flow path. In this situation the dialysis fluid tubes of the machine can be connected to the dialyzer, while remaining in bypass, allowing the blood side priming to be started and preventing spillage. The dialyzer is then rotated and the machine taken out of bypass at the appropriate point

Preparing the machine – assisted priming

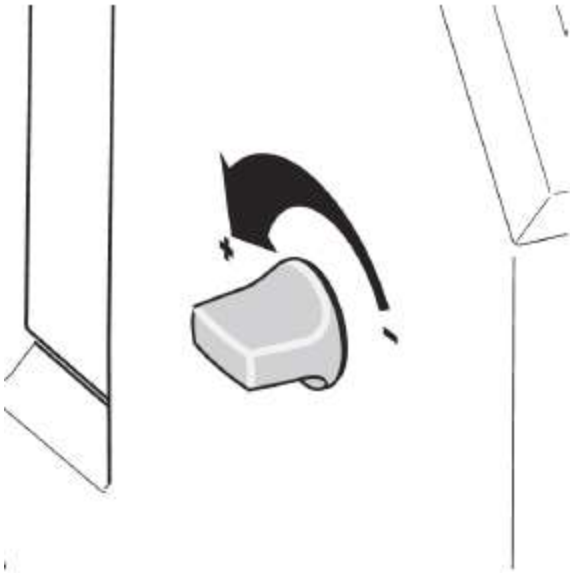
In assisted priming the machine will guide the operator through the priming procedure.

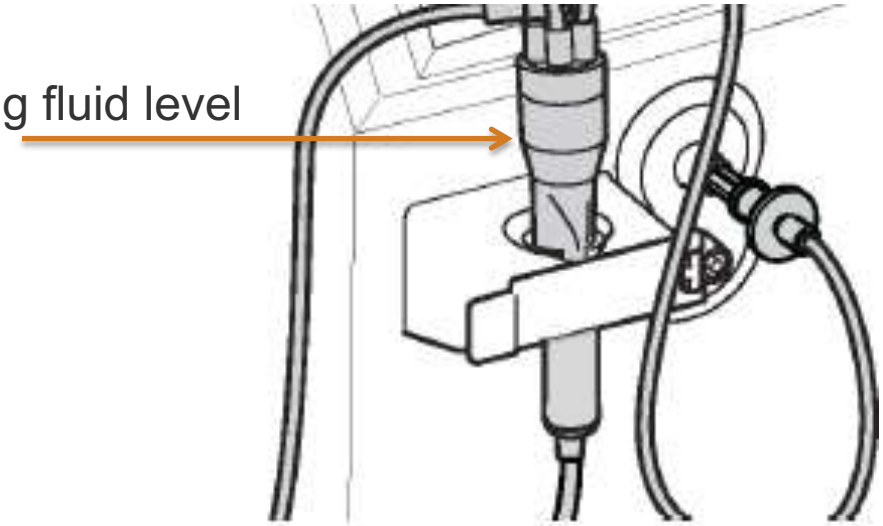


By pressing the priming button the priming menu will be opened, the default priming mode is shown, here its manual priming. It is possible to change to assisted priming using the keypad. Once assisted priming has been selected, the operator should follow the on screen instructions.

Preparing the machine – activating the air detector

The level of the priming fluid in the venous drip chamber should be increased during the priming phase using the adjustment knob.

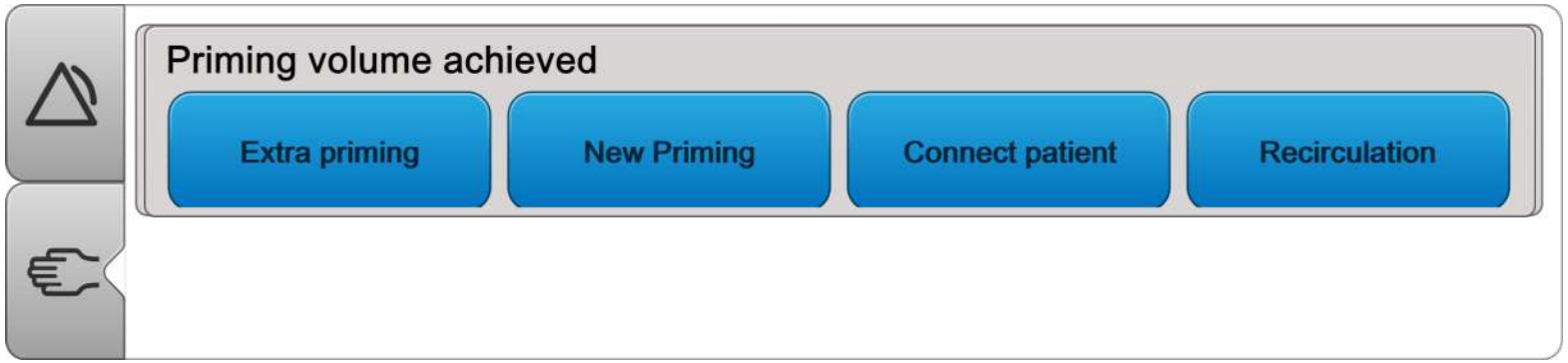




The level should be well above the air detector head. Once the level is set press the air detector icon in the information field to activate the air detector.

Preparing the machine – extra priming & recirculation

It is possible after the completion of either manual or assisted priming, to perform extra priming or to recirculate the priming solution. For both procedures the operator must ensure that there is enough priming solution to complete the action.

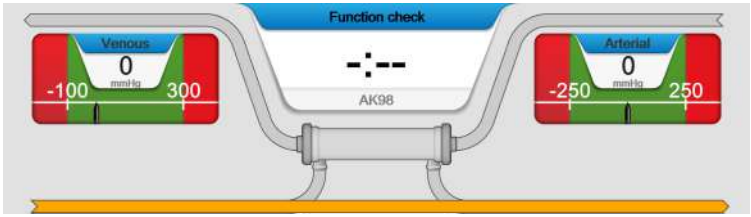


For recirculation, both ends of the blood lines must be connected together using a sterile accessory. The priming fluid should be connected to the circuit via an infusion line to compensate for the ultrafiltration that occurs in the dialyzer during the recirculation phase.

Preparing the machine – concentrate stand-by mode

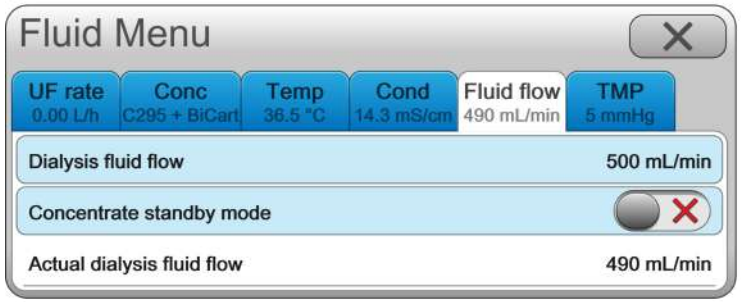
The machine can be preset to enter concentrate stand-by mode when;

- The green fluid path is achieved, or a preset time thereafter
- Or when the set priming volume is achieved



Concentrate stand-by mode fluid flow path

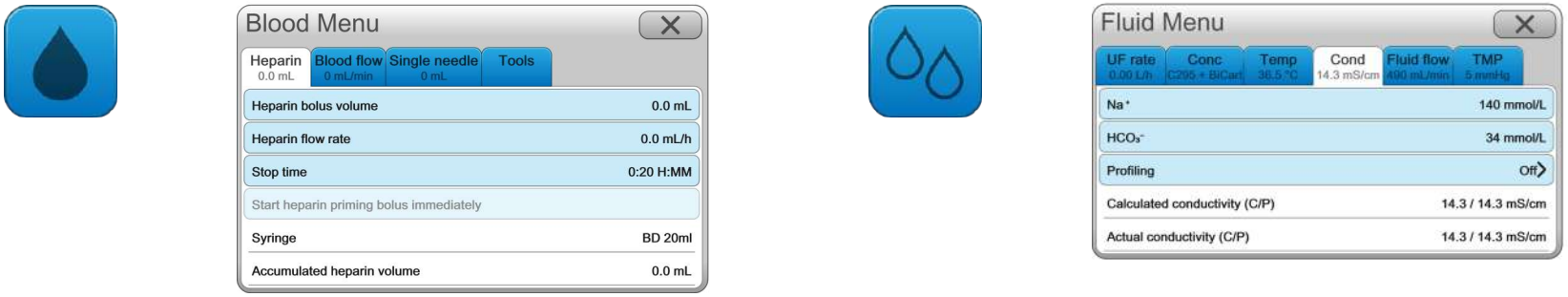
If concentrate stand-by mode has not been preset, it can be activated manually by pressing the fluid button and then activating concentrate stand-by mode in the fluid flow tab.



Preparing the machine – setting treatment parameters

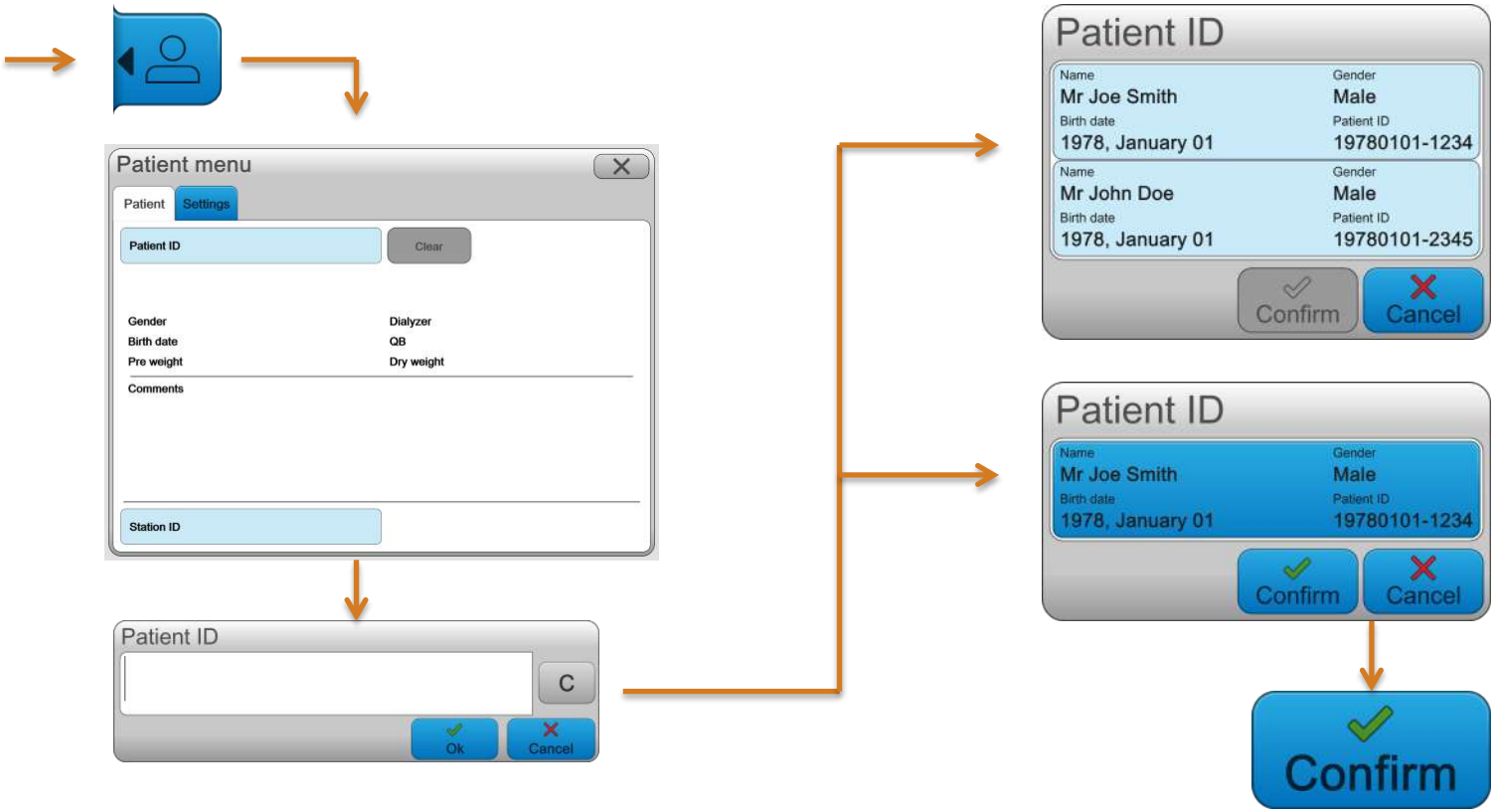
To set the treatment parameters press the time indicator, the time menu will open, from here both the time and the UF volume can be set using the keypads.

Check and adjust additional parameters by pressing the blood or fluid buttons to view their menus.



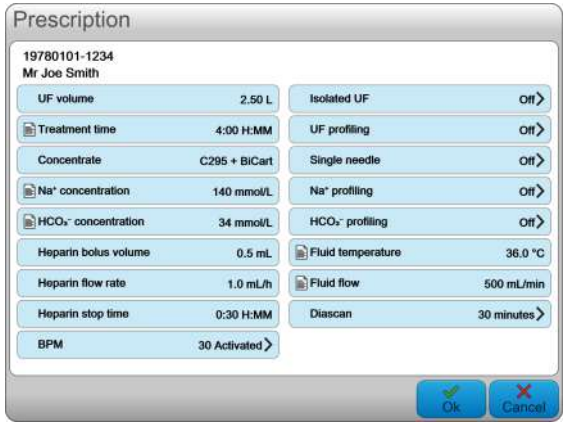
Preparing the machine – IT connectivity

Confirming patient ID and retrieving the patient prescription from the CIS.



Preparing the machine – IT connectivity

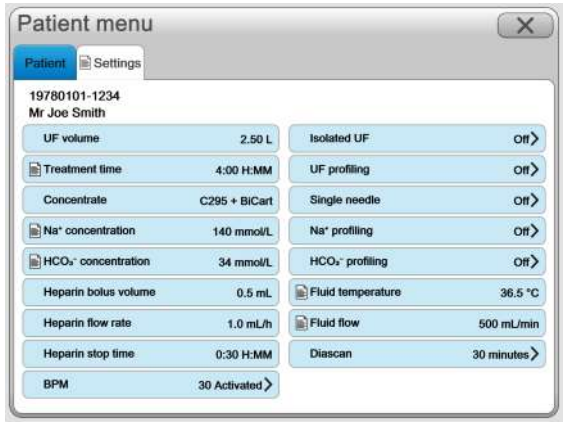
Reviewing the prescription



Prescription parameters from the CIS

CIS prescription parameters that have been altered by the operator

Prescription parameters with no icon are set to the machine default or preset settings

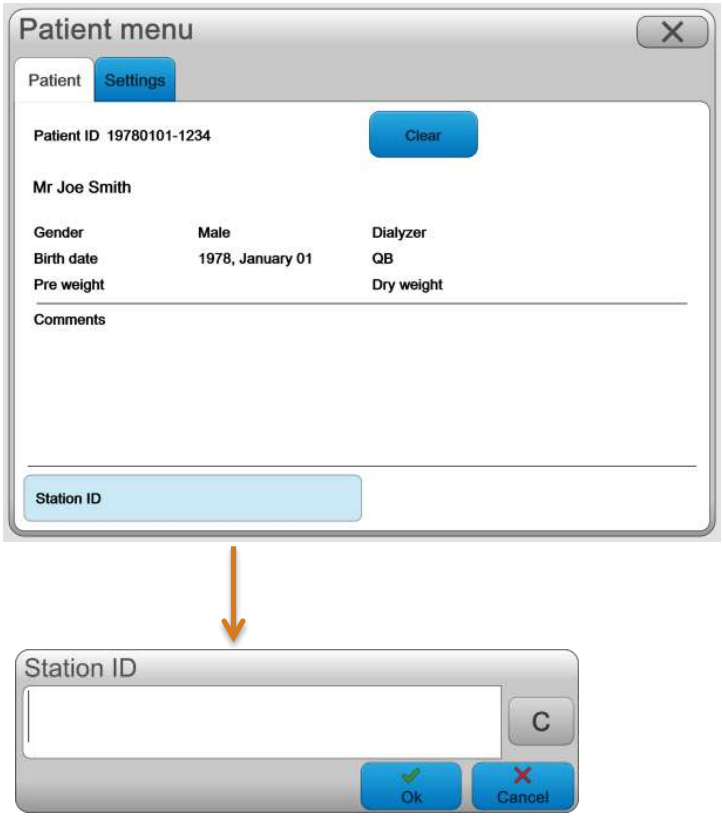


Once Ok has been pressed in the prescription, then the prescription icon will appear in the settings tab. All parameters can still be changed by the operator by pressing on their respective blue tabs.

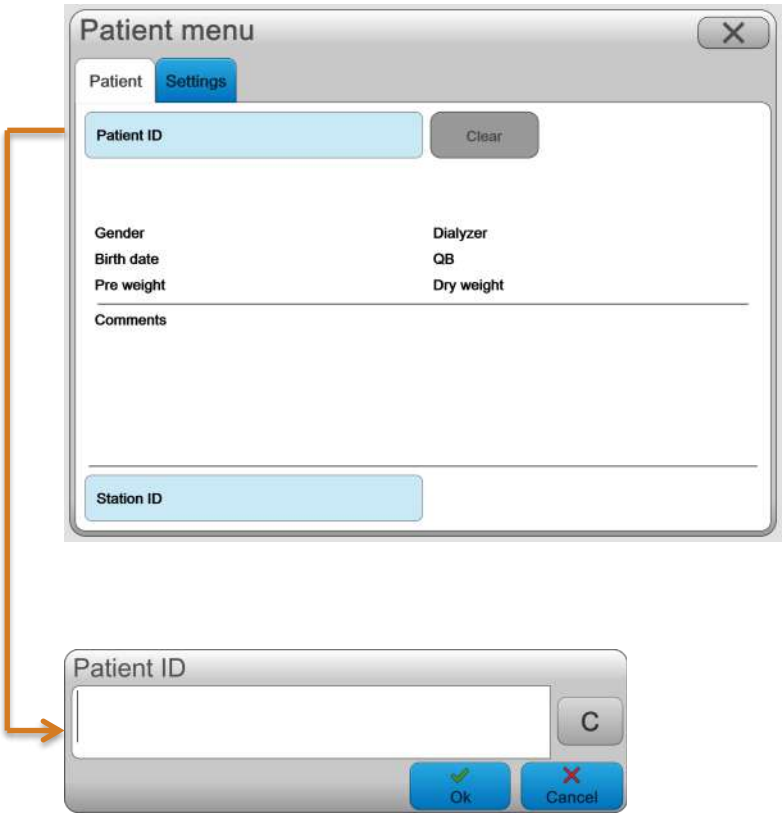
The patient button has a black check mark when OK has been pressed.

Preparing the machine – IT connectivity

Setting station ID



Using patient ID as a label



Hands on

Connect and confirm the concentrate combination
Attach the blood lines and heparin syringe
Manual priming
Recirculation
Concentrate standby mode
Set the prescription:

- Time 3:00
- UF Vol 1.5L
- Fluid flow 600mls/min
- Heparin
  - Bolus 1.0ml
  - Flow rate 1.5mls/hr
  - Stop time 30 min

Baxter, Gambro, AK 98 and BiCart are trademarks of Baxter International Inc. or its subsidiaries.

AK 98 Dialysis Machine

Treatment module

Reference: **AK 98** Operator's Manual 2.XX
Chapters 4 & 8

AK 98 Dialysis Machine

Important notice

The contents of this training module are based on the **AK 98** Dialysis Machine Operator's Manual. The completion of this training does not relieve the operator from their responsibility to read and understand the full text of the Operator's Manual. If there are deviations between the text contained in this module and the Operator's manual, then the Operator's manual takes precedence.

Learning objectives

The aim of this module is to get an overview of the **AK 98** dialysis machine with special focus on:

- Connecting the patient and starting the treatment
- Actions during treatment – heparin bolus and BPM
- End the treatment and rinseback
- Machine aftercare

Hemodialysis treatment – check the settings

Before starting the patient treatment, the operator should carefully inspect the machine has been lined and primed in the correct manner.

Pay special attention to the position of the venous blood line in the priming detector, and observe that there are no kinks in the blood lines, as well as checking all of the treatment settings have been set to appropriate values for the patient.

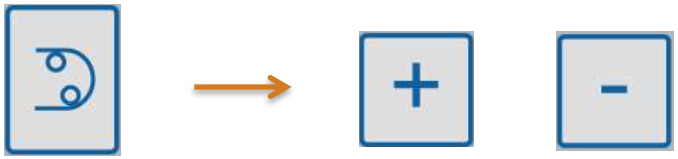
Hemodialysis treatment – connect the patient

The patient connection can take place with either just the arterial line connected to the patient (bleed out), or both the arterial and venous blood lines connected to the patient (straight connection).

The operator should make all the relevant safety checks and then start the blood pump. The default blood pump speed is 100mL/min.

The machine is preset by default to stop the blood pump automatically when the priming detector senses the change between the priming solution and the blood.

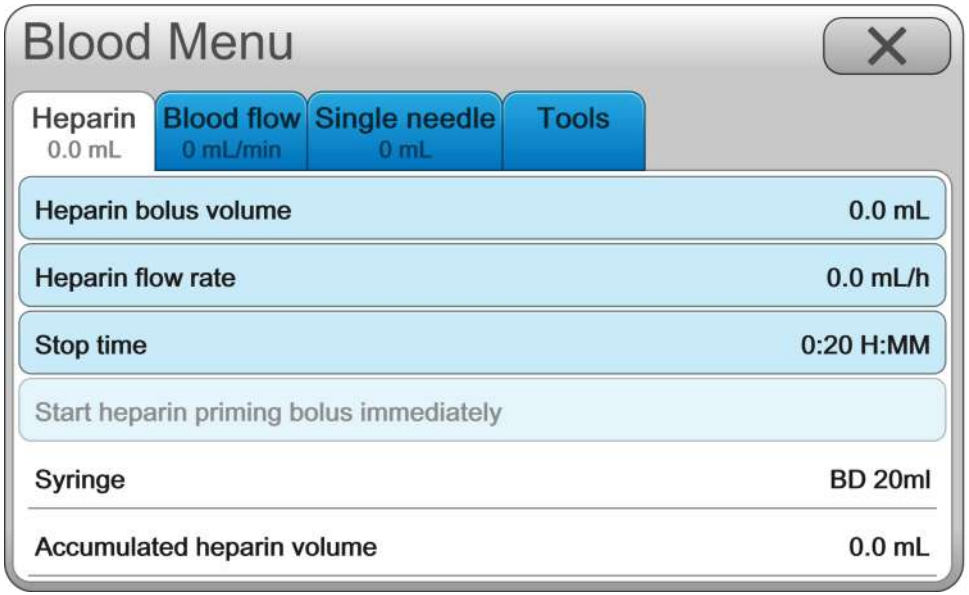
When the machine detects blood, by default the blood pump will stop. Press the flashing blood pump button to restart the blood pump and then use the blood pump up and down buttons to adjust the blood flow. Observe that the blood flow path is lit red.



When ready, start the ultrafiltration and then centralize the alarm limits around the current pressure by pressing the flashing arterial and venous pressure controls.

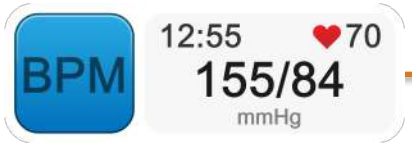
Hemodialysis treatment – heparin bolus

If an additional bolus of heparin is required by the patient during the treatment, this can be delivered by the machine.

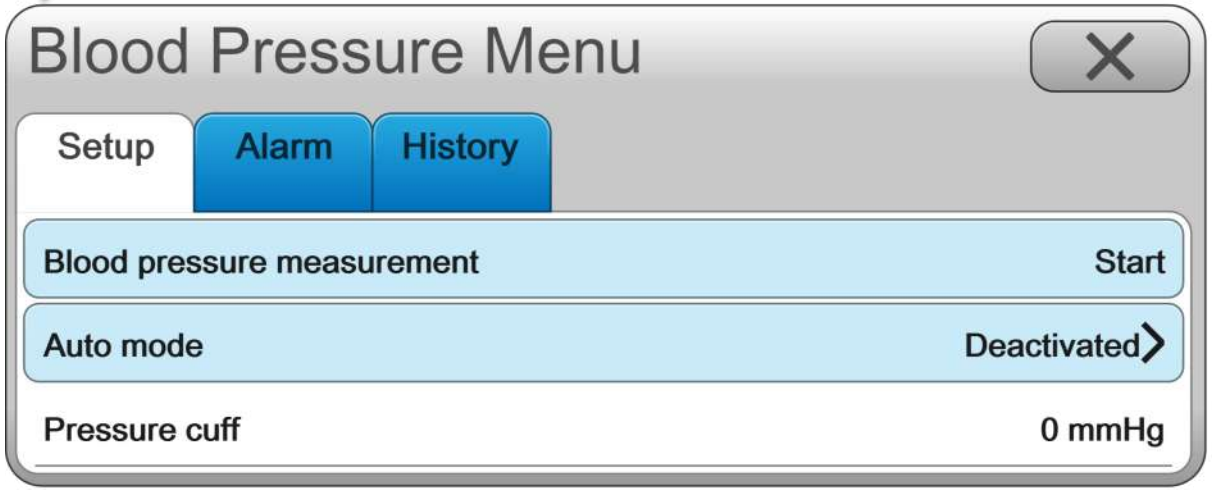


Press the heparin bolus volume settings bar and use the keypad to set to correct volume. Once OK has been pressed, then the bolus will be delivered.

Hemodialysis treatment – BPM single and interval



To take a single blood pressure reading press the BPM read out field and the measurement will start.



To set up automatic blood pressure readings open the setup tab and press the auto mode bar.

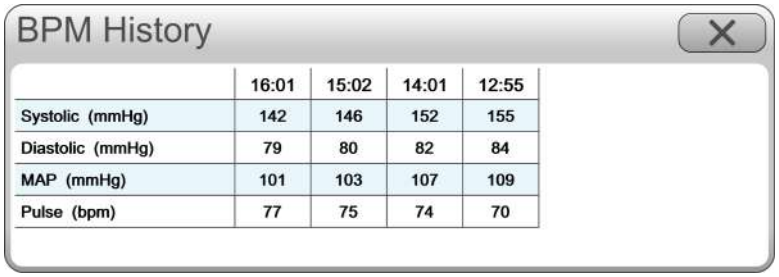
Activate

From here the interval time can be set between 5 and 60 minutes, press OK to confirm the time and activate to activate the automatic readings.

Hemodialysis treatment – BPM history and alarm limits

The blood pressure menu also has tabs for accessing the BPM alarm limits and history.

The set limits tab allows the operator to customize the alarm limits to meet the patients requirements.



	16:01	15:02	14:01	12:55
Systolic (mmHg)	142	146	152	155
Diastolic (mmHg)	79	80	82	84
MAP (mmHg)	101	103	107	109
Pulse (bpm)	77	75	74	70

The history tab within the blood pressure menu contains the data from all the blood pressure readings performed during the treatment.

Hemodialysis treatment – end the treatment

When the treatment time is completed the operator's is alerted by an audible buzzer, a lit alarm indication light and an attention message.

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

After pressing confirm, the on screen instructions should be followed.

If the treatment needs to be finished before the set treatment time has expired, then the time needs to be reduced down to 0:00 first. This is done by pressing the time indicator and using the keypad to change the time.

Hemodialysis treatment – rinse back

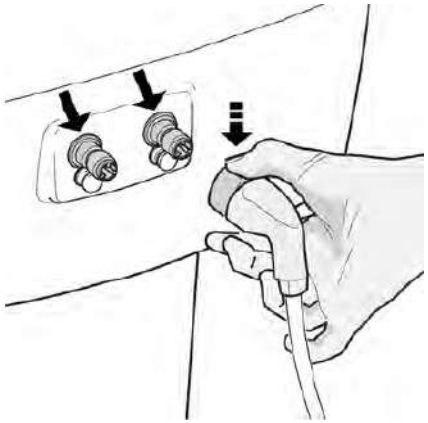
After the treatment time expired attention has been confirmed, the rinse back menu will appear. Press rinse back and confirm. When the operator is ready, the blood pump is started. It will run until either the blood is no longer detected, the preset volume is reached, or the blood pump is manually stopped by the operator.

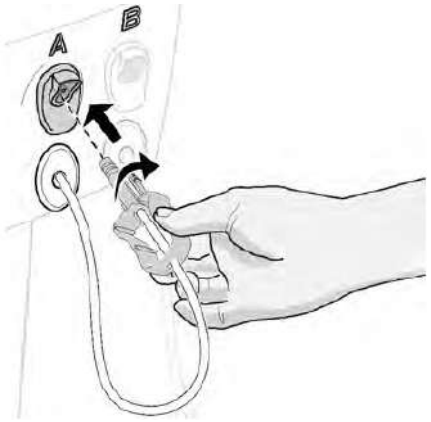
Once the rinse back is completed then there will be the option to continue the rinse back or disconnect the patient.

Hemodialysis treatment – machine aftercare

After the end of the treatment, once the patient has been confirmed as being disconnected from the machine, and the venous blood line has been removed from the priming detector, there will be handling instructions on the screen on how to prepare the machine for disinfection.

The dialyzer draining is initiated by returning the blue dialysis fluid tube to the machine. The red concentrate connector should be inserted carefully into the stand-by port. By following the on-screen instructions the **BiCart** cartridge can be drained by the machine.





Hands on

Straight connection
Start the treatment
Heparin bolus 0.5ml
Single BPM measurement
Set the BPM alarm guards
End treatment
Rinse back
Drain the dialyzer and the **BiCart** cartridge

Baxter, Gambro, AK 98 and BiCart are trademarks of Baxter International Inc. or its subsidiaries.

AK 98 Dialysis Machine

Functions module

Reference: **AK 98** Operator's Manual 2.XX
Chapters 6, 7 & 9

Important notice

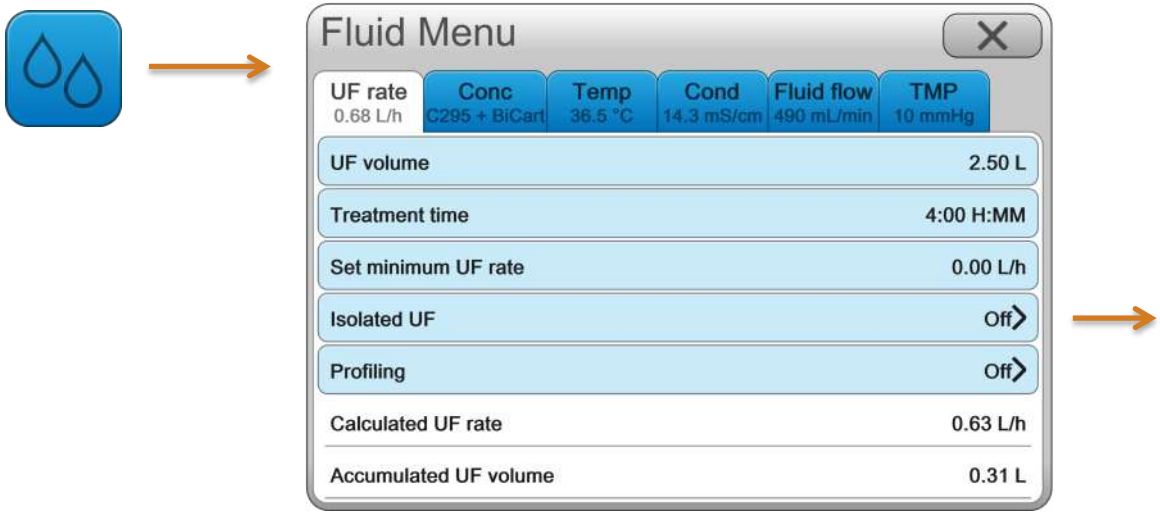
The contents of this training module are based on the **AK 98** Dialysis Machine Operator's Manual. The completion of this training does not relieve the operator from their responsibility to read and understand the full text of the Operator's Manual. If there are deviations between the text contained in this module and the Operator's manual, then the Operator's manual takes precedence.

Aims & objectives

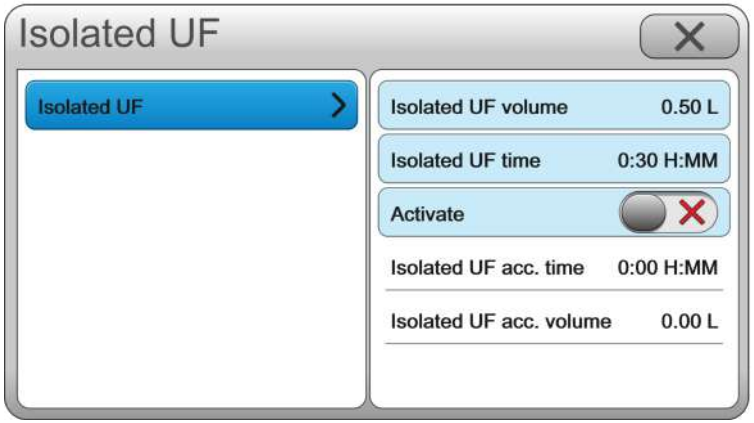
The aim of this module is to get an overview of the **AK 98** dialysis machine with special focus on:

- Isolated ultrafiltration
- Profiling – UF, sodium and bicarbonate
- **Diascan** monitoring system

Functions – isolated ultrafiltration activation



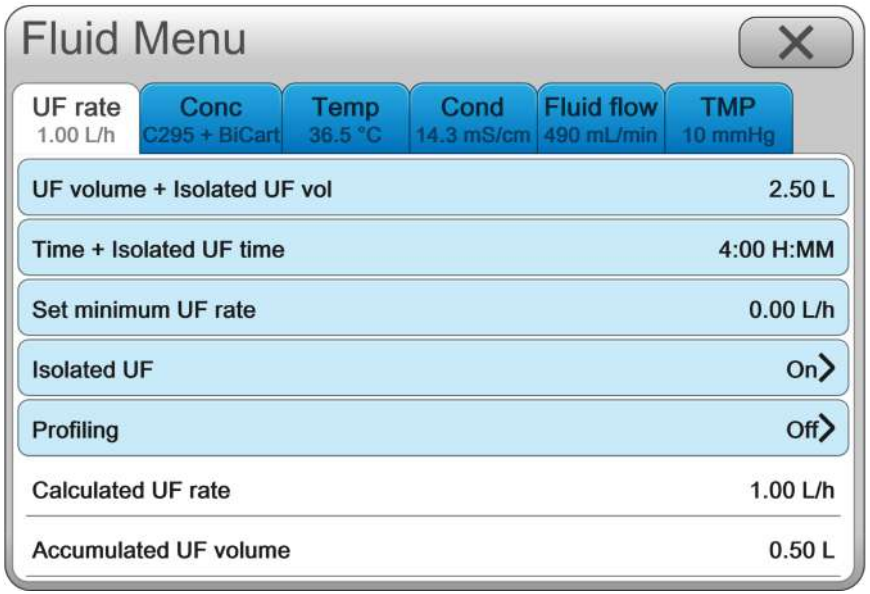
The Isolated UF settings are reached by pressing the fluid button and then isolated UF, in the fluid menu.



Once in the isolated UF menu, the time and volume for isolated UF are set and isolated UF is activated.

Functions – isolated ultrafiltration activation

Once the isolated UF time and volume are set, they are automatically added, by default to the total treatment time and UF volume.

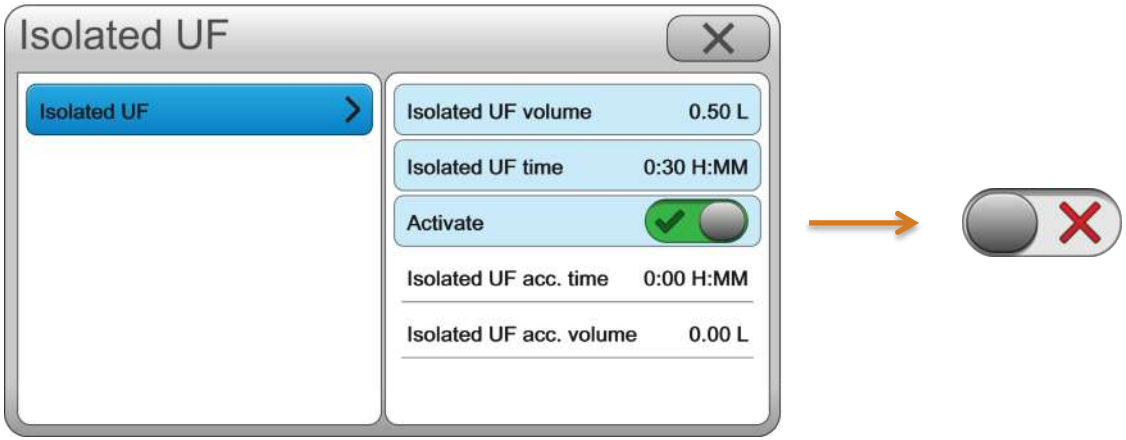


When the isolated UF phase is completed the machine will automatically switch into the diffusive phase.

Functions – isolated ultrafiltration 2nd phase & deactivation

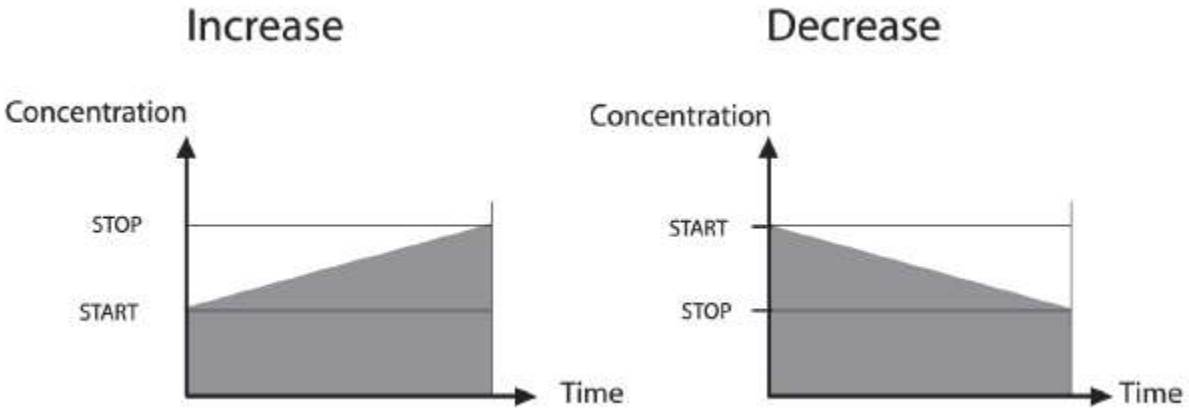
Second and subsequent phases of isolated UF can be activated at any point during the treatment. The time and volume for the new phase must be added to the previous to create a cumulative amount.

A currently running isolated UF phase can be deactivated at any time as required by the operator. Press deactivate in the isolated UF menu.



Functions - profiling sodium and bicarbonate

Both sodium and bicarbonate concentrations in the dialysis fluid can be profiled. They can either be profiled upwards or downwards at a smooth liner rate.



When deactivating a profile, check the set value that the treatment will continue at.

Functions - profiling ultrafiltration

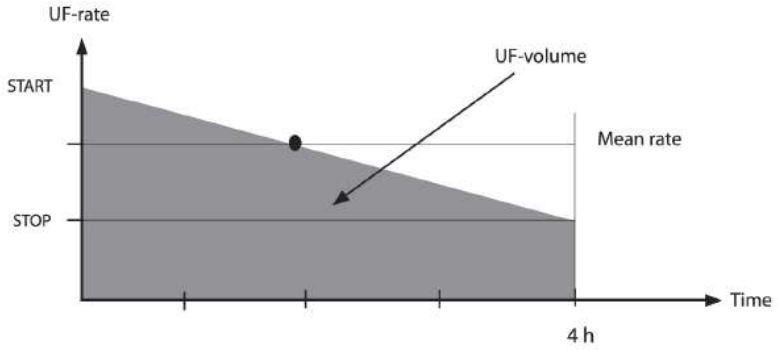
There are three profile types available for ultrafiltration profiling;

- Linear
- Step
- Interval

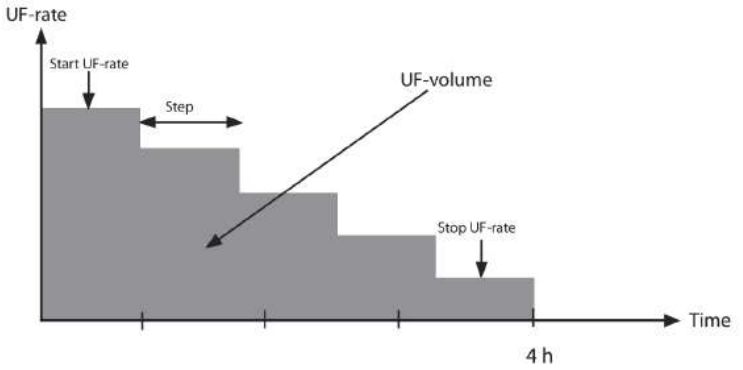
Changes to the UF are determined by;

- Total UF volume
- Treatment time
- Starting value for the UF rate
- In step mode: number of steps
- In interval mode: number of intervals

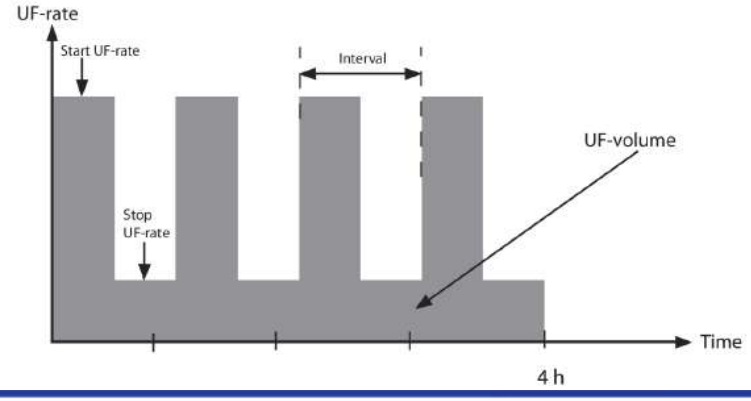
Functions – profiling ultrafiltration



With linear profiles the machine knows the set time and UF volume, the operator sets the start UF rate, and the machine will calculate a smooth decreasing profile.

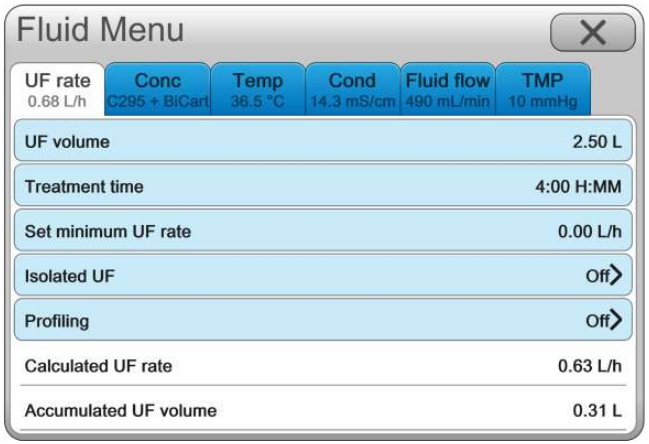


With step profiles the machine knows the set time and UF volume, the operator sets the start UF rate, and the number of steps and the machine will calculate the profile.

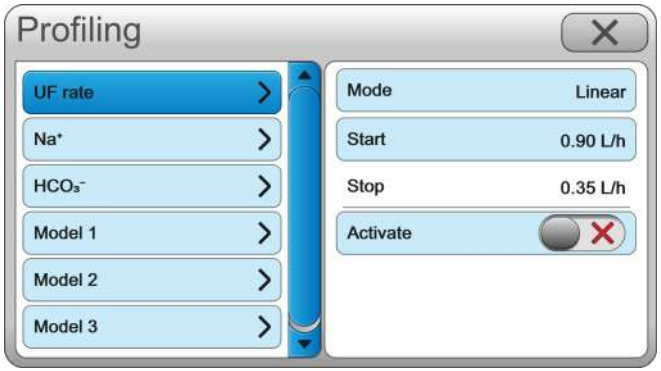


With interval profiles the machine knows the set time and UF volume, the operator sets the start UF rate, and the number of intervals and the machine will calculate the profile.

Functions - profiling settings and activation



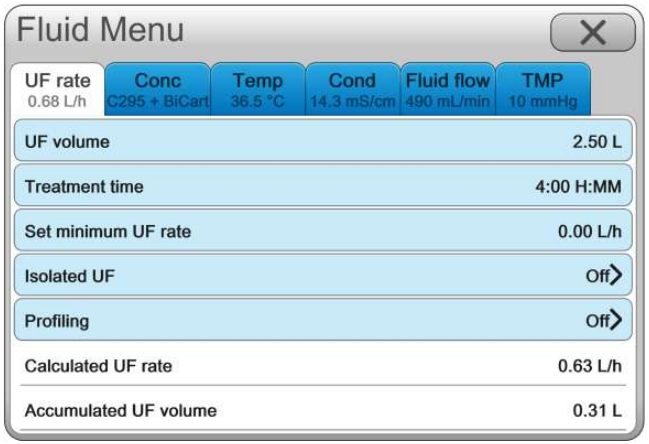
All of the profiling settings are reached by pressing the fluid button and then profiling, in the fluid menu.



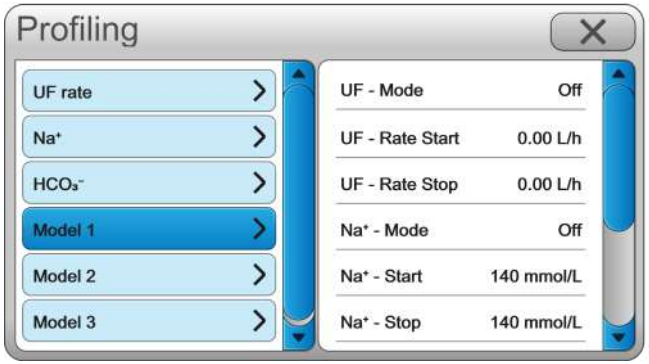
Choose the desired mode; depending on which mode is selected, set and OK the other parameters. After doing so, activate profiling.

The status bar at the bottom of the screen will show which profiles are running.

Functions - profiling when using a profiling model



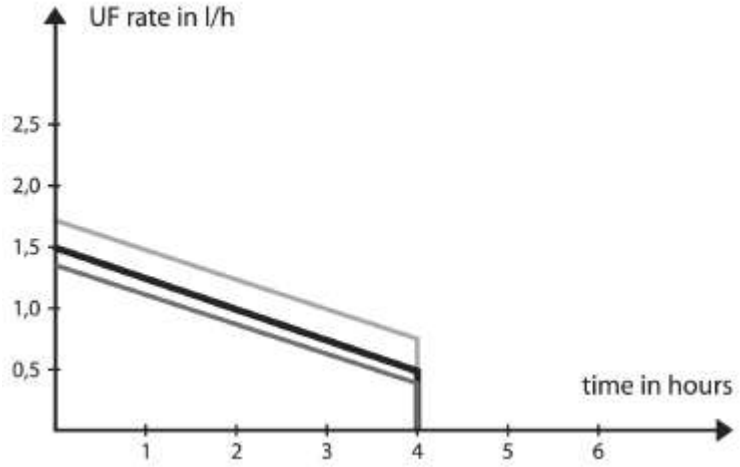
All of the profiling settings are reached by pressing the fluid button and then profiling, in the fluid menu.



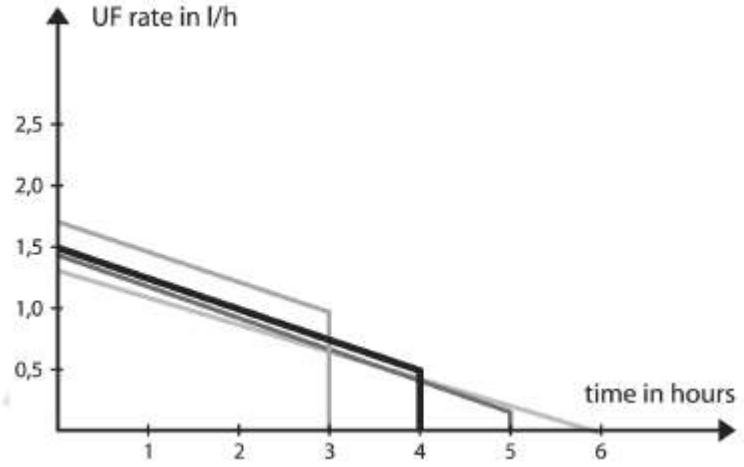
Choose the desired model, and check that the preset values are appropriate for the patient. After doing so, activate profiling.

Functions – changes to the ultrafiltration profile

When running an ultrafiltration profile, any changes to the treatment time and/or the ultrafiltration volume will have an effect on the ultrafiltration rate and change the shape of the profile.



The original profile in black and changes to the UF volume in grey



The original profile in black and changes to the treatment time in grey

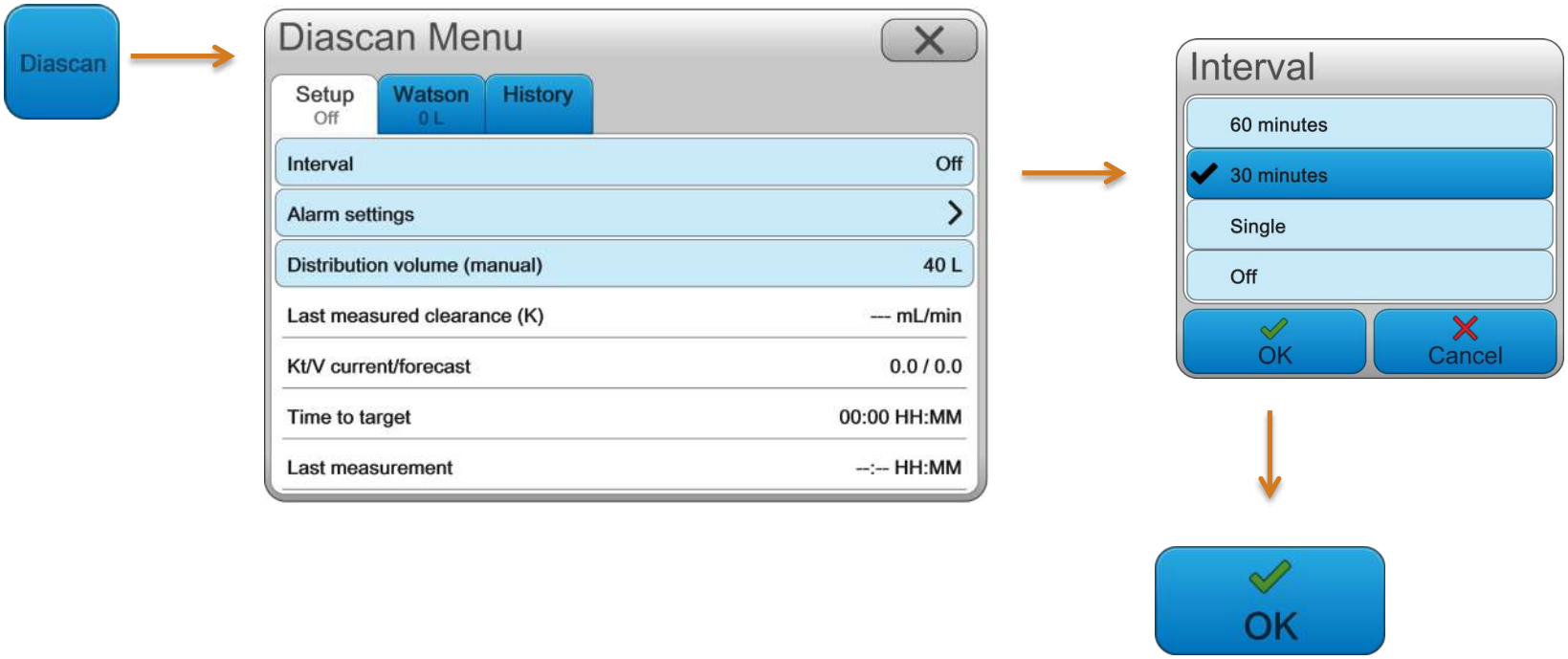
Functions – Diascan monitoring system checking K, Kt and Kt/V

The **Diascan** monitoring system measures and calculates the following parameters;

- **Clearance (K)** – How much blood has been cleaned per unit of time (mL/min)
- **Clearance multiplied by treatment time (Kt)** – The volume of the blood that has been cleaned so far in the treatment
- **Clearance multiplied by treatment time and divided by the patients fluid distribution volume (Kt/V)** – the patient's dialysis dose

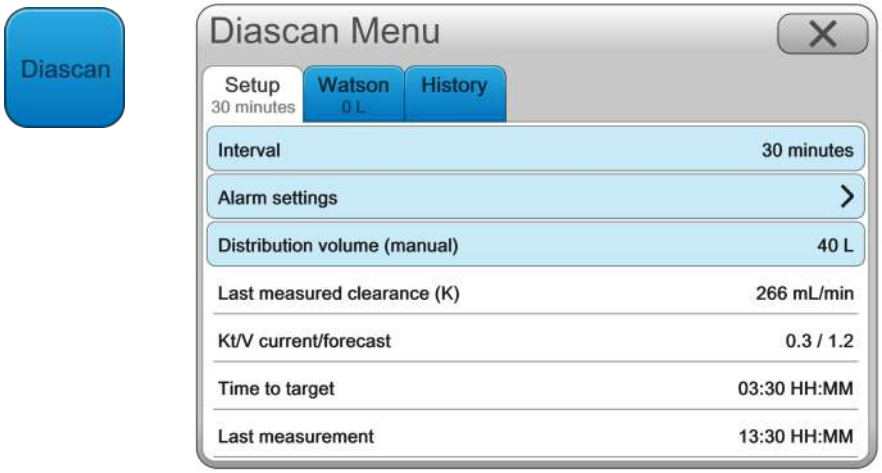
Functions - Diascan monitoring system measurement frequency

The **Diascan** monitoring system measurements can take place every 30 or 60 minutes, or as a single reading. This is done by pressing interval within the setup tab.



Functions - Diascan monitoring system setting the V value

To get a Kt/V reading, the patients distribution volume has to be entered into the machine. This can either be done in the setup tab if the distribution volume is known, or through the Watson tab if it needs to be calculated.

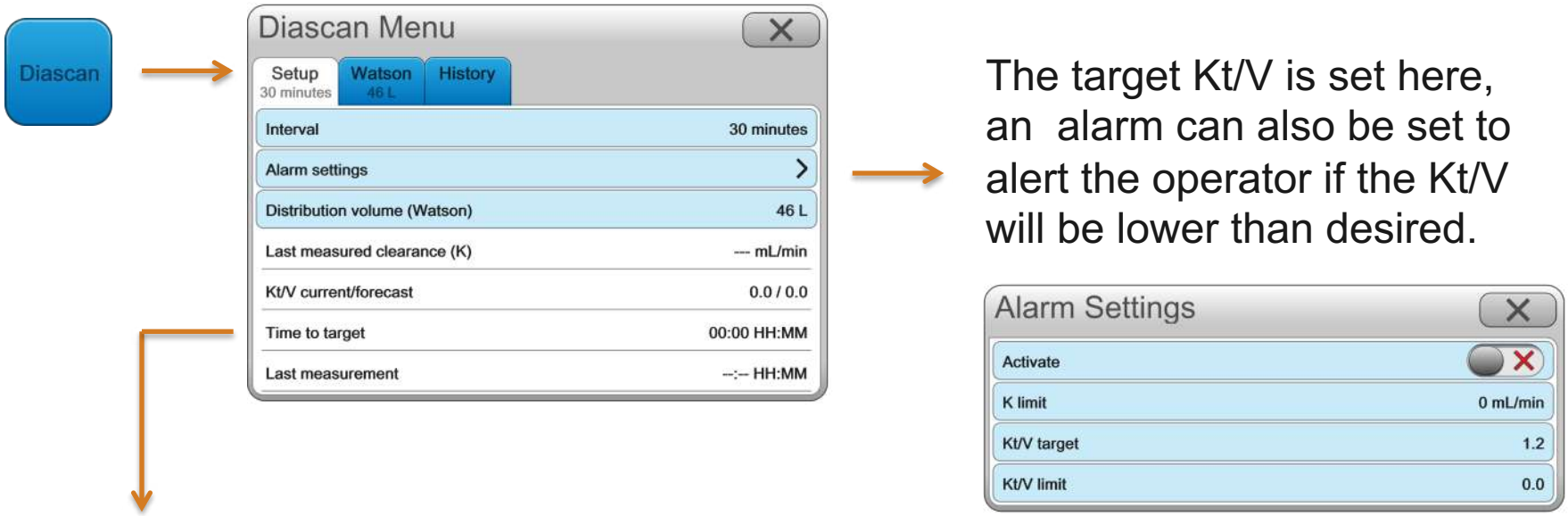


An already calculated distribution volume can be set manually.

Using the Watson tab, the patients data is set to calculate the distribution volume.

Functions - Diascan monitoring system targets & alarms

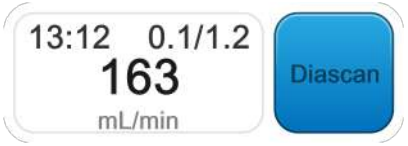
It is possible to set both targets and alarms for the **Diascan** monitoring system readings.



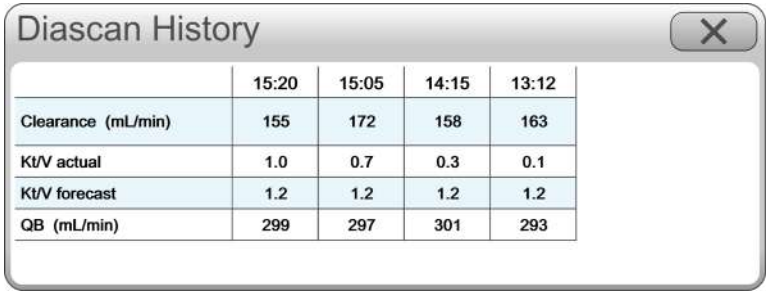
Time to target indicates how much more treatment needs to be completed to achieve the set target Kt/V. It should always be less than the remaining treatment time in order to achieve the target.

Functions - Diascan monitoring system history

The clearance rate from the most recent reading of the **Diascan** monitoring system is always displayed in the clearance area, alongside the current and forecast Kt/V.



To view the previous clearance rates, Kt/V actual and forecast, and the Qb at the time of the reading, press the history tab within the **Diascan** menu.



	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

Hands on

Assisted priming
Set the prescription:

- Time 3:30
- UF Vol 1.5L
- Fluid flow 600mls/min
- Heparin
  - Bolus 1.5mls
  - Flow rate 1.0ml/hr
  - Stop time 0 min
- Isolated UF
  - 0.2L
  - 10 minutes
- Na^+ profile (deactivate after 10 minutes)
  - 144 – 136
- **Diascan** (start after Isolated UF and profiling are finished)
  - Interval 30 minutes
  - Watson
  - Kt/V target 1.2
  - Kt/V limit 1.0

Baxter, Gambro, AK 98 and Diascan are trademarks of Baxter International Inc. or its subsidiaries.

AK 98 Dialysis Machine

Troubleshooting module

Reference: **AK 98** Operator's Manual 2.XX
Chapters 2 & 3

AK 98 Dialysis Machine

Important notice

The contents of this training module are based on the **AK 98** Dialysis Machine Operator's Manual. The completion of this training does not relieve the operator from their responsibility to read and understand the full text of the Operator's Manual. If there are deviations between the text contained in this module and the Operator's manual, then the Operator's manual takes precedence.

Aims & objectives

The aim of this module is to get an overview of the **AK 98** dialysis machine with special focus on:

- Troubleshooting
  - UF supervision
  - Halt button
  - Power failure
  - Manual rinse back
  - Air in venous drip chamber
  - Changing the **BiCart** cartridge
  - Changing the blood lines and dialyzer

Machine functionality – UF supervision alarms

There are two alarms associated with the UF supervision.

220 UF volume deviation
Actual UF may differ from set UF with {0} mL. Check patient weight loss. If not accepted discontinue treatment and call technical service, to continue treatment press Confirm.

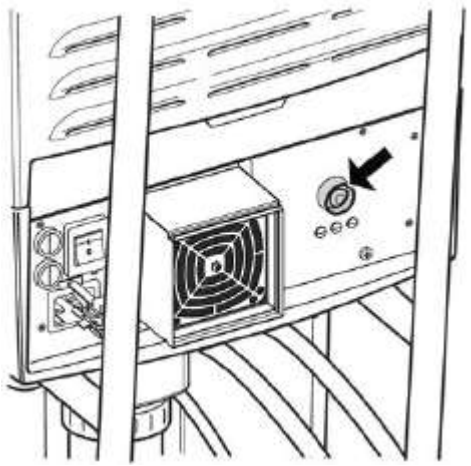
221 UF volume deviation
Second UF volume deviation {0} mL. Check patient weight loss. Discontinue treatment and call service.

They appear when the UF volume measurements are not within the specification of the machine, this can happen when:

- The UF control is not calibrated or incorrectly calibrated
- The UF control does not work correctly
- The protective system UF sensor does not work correctly

Troubleshooting – halt button

If it is necessary to perform a ‘reset’ of the machine, this can be done by pressing and holding in the halt button on the rear of the machine. This interrupts the power supply to the machine and overrides the battery back up. When the button is released the machine will perform a recovery.



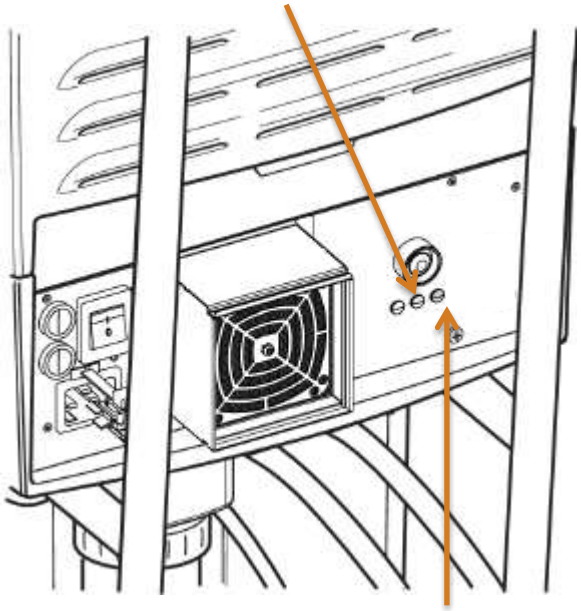
Troubleshooting – power failure

If there is a power failure, the machine has a battery back-up which lasts approximately 30 minutes and keeps the screen and the blood pump operational. During this time the dialysis fluid is not heated.

If all the battery back-up charge is used up, or it does not work for some reason, then the machine will shut down. All the settings and the actual values will be kept.

When the power returns, press the On/Off button to start the machine. The machine will perform a recovery and the treatment will continue from where it stopped. However, all the treatment parameters must be checked when starting after a recovery.

Battery connect indicator is lit green if the battery back-up has been installed

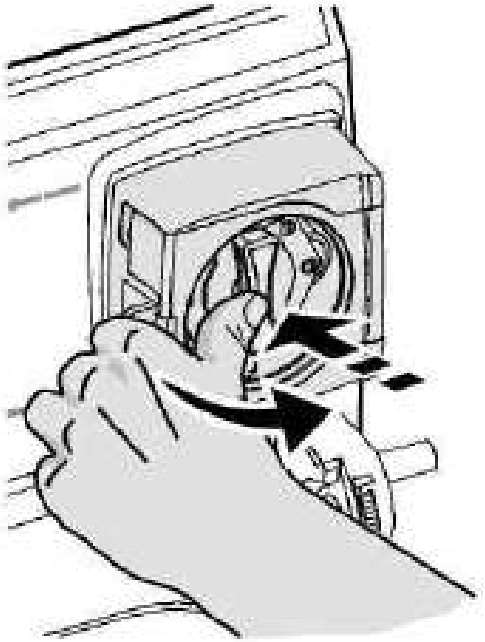


Battery charge indicator is lit yellow when the mains cable is connected to the mains supply and the main switch is switched on

Troubleshooting – manual rinse back

The blood can be returned manually in the event of a power failure when no battery back-up is available.

- Connect arterial blood line to the rinse-back solution
- Open the blood pump cover
- Manually turn the blood pump anti-clockwise

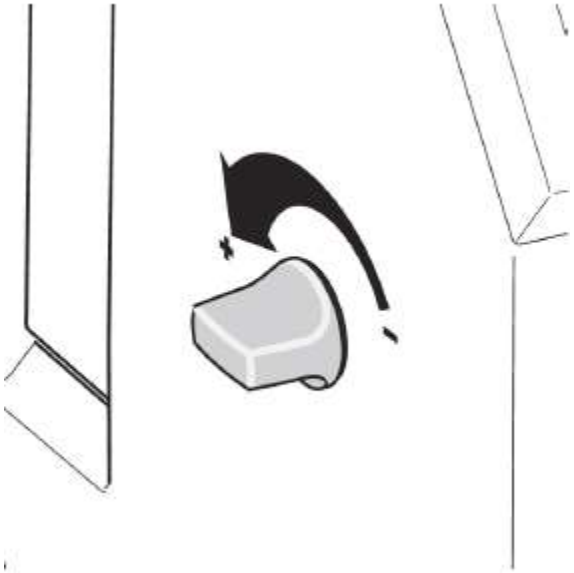


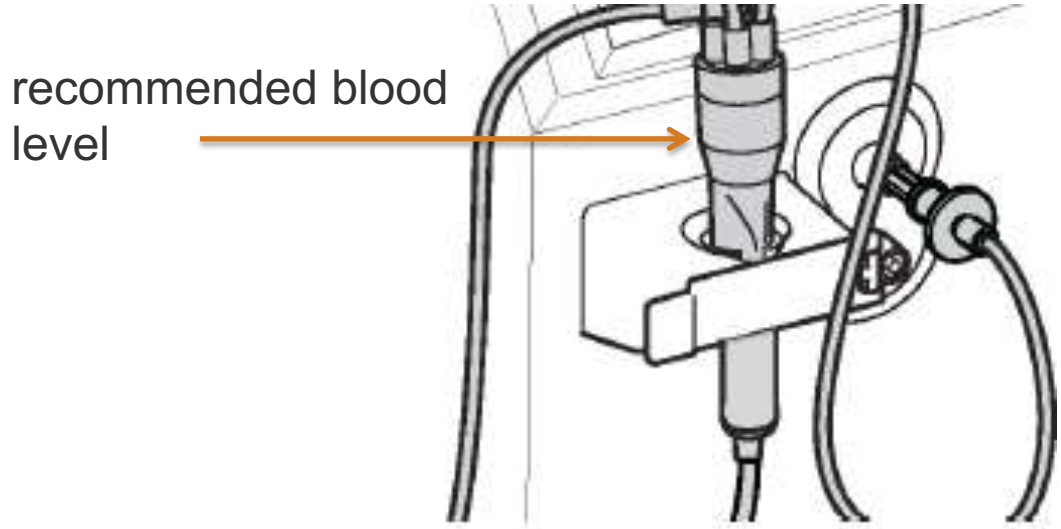
When returning the blood manually, the operator is responsible for visually observing all safety parameters

Troubleshooting – Air in venous drip chamber

When the blood level in the venous chamber drops below the level of the air detector, then alarm #100 Air in venous drip chamber is triggered.

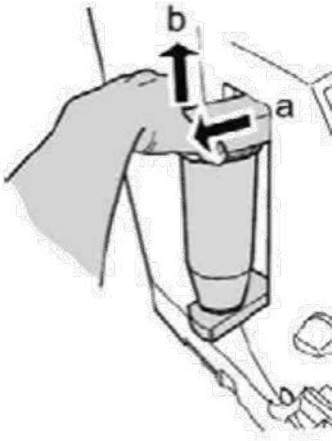
Check the blood circuit connections are tight. Use the timer or confirm icon in the alarm message to restart the blood pump, at the same time increase the blood level in the venous chamber using the level adjustment knob.



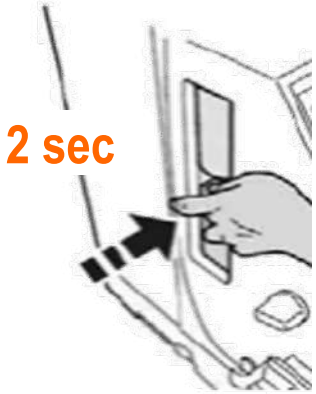


Troubleshooting – change the BiCart cartridge

If the **BiCart** cartridge needs to be changed during the treatment, follow these steps;



Remove the empty **BiCart** cartridge



Close the latches and wait for 2 seconds

Attach the new **BiCart** cartridge

Trouble shooting – changing the dialyzer & blood lines

If the dialyzer and the blood lines need to be replaced during the treatment this can be done by pressing the rinse back button.

In the rinse back menu there are two options; rinse back if the treatment should be ended and the patient disconnected, or new blood circuit if the treatment should be continued.

Within new blood circuit there are two options; rinse back if this is possible, or new blood circuit if it is not possible or desired to rinse back.

The dialyzer fluid tubes are returned to the machine, and then the blood lines can be removed. New blood lines and dialyzer are mounted. The new circuit is then primed and then the patient can be reconnected.

Hands on

Resolve an air in venous drip chamber alarm
Change the **BiCart** cartridge
Change the blood lines and the dialyzer and continue the treatment
End the treatment
Simulate a power failure and rinse back the blood manually

Baxter, Gambro, AK 98 and BiCart are trademarks of Baxter International Inc. or its subsidiaries.

AK 98 Dialysis Machine

Single needle module

Reference: **AK 98** Operator's Manual 2.XX
Chapter 5

AK 98 Dialysis Machine

Important notice

The contents of this training module are based on the **AK 98** Dialysis Machine Operator's Manual. The completion of this training does not relieve the operator from their responsibility to read and understand the full text of the Operator's Manual. If there are deviations between the text contained in this module and the Operator's manual, then the Operator's manual takes precedence.

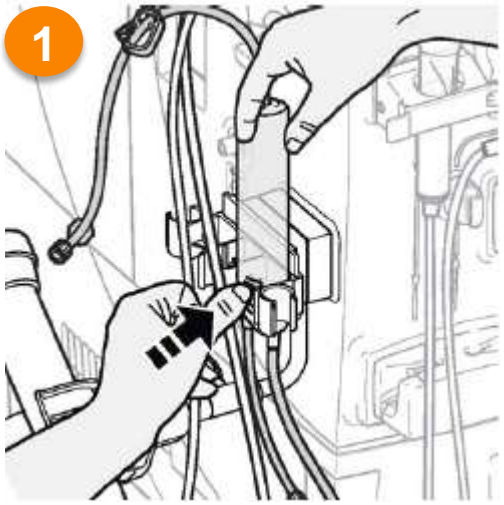
Aims & objectives

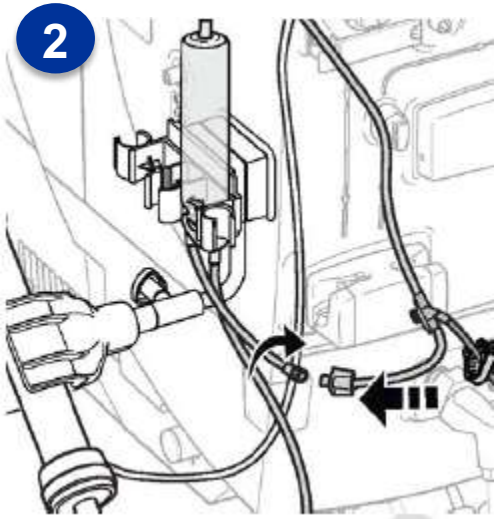
The aim of this module is to get an overview of the **AK 98** dialysis machine with special focus on:

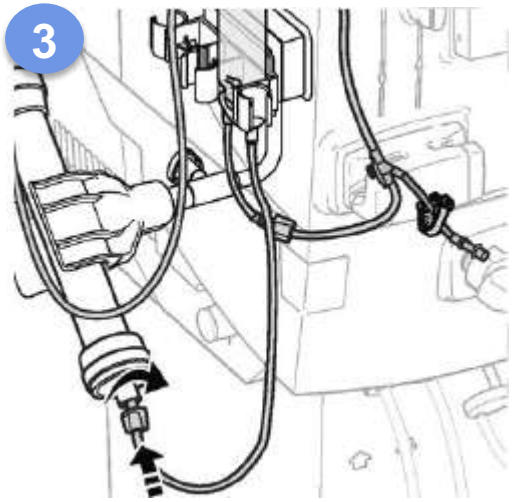
- Single needle
  - Lining and priming
  - Terminology
  - Activation
  - Start the treatment
  - End the treatment

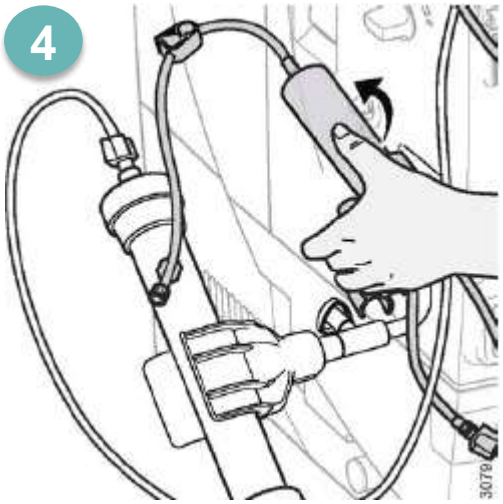
Single needle – lining & priming the machine

1. Push the venous expansion chamber, into the expansion chamber holder, until it ‘clicks’ into position.
2. Attach the venous dialyzer line to the expansion chamber blood line.









3. Attach the expansion chamber dialyzer line to the dialyzer.
4. Tilt the expansion chamber holder backwards until it ‘clicks’ into position.

Single needle - terminology

In single needle the patient's blood is removed from, and returned to, the single access point in a cycle with two phases;

- **The Arterial phase**. The venous blood line is clamped, and blood is withdrawn from the patient into the arterial blood line. The pressure and volume in the circuit increases.

- **The Venous phase**. The arterial blood line is clamped, and the blood that entered in the arterial phase is returned to the patient via pressure and gravity.

Single needle parameters;

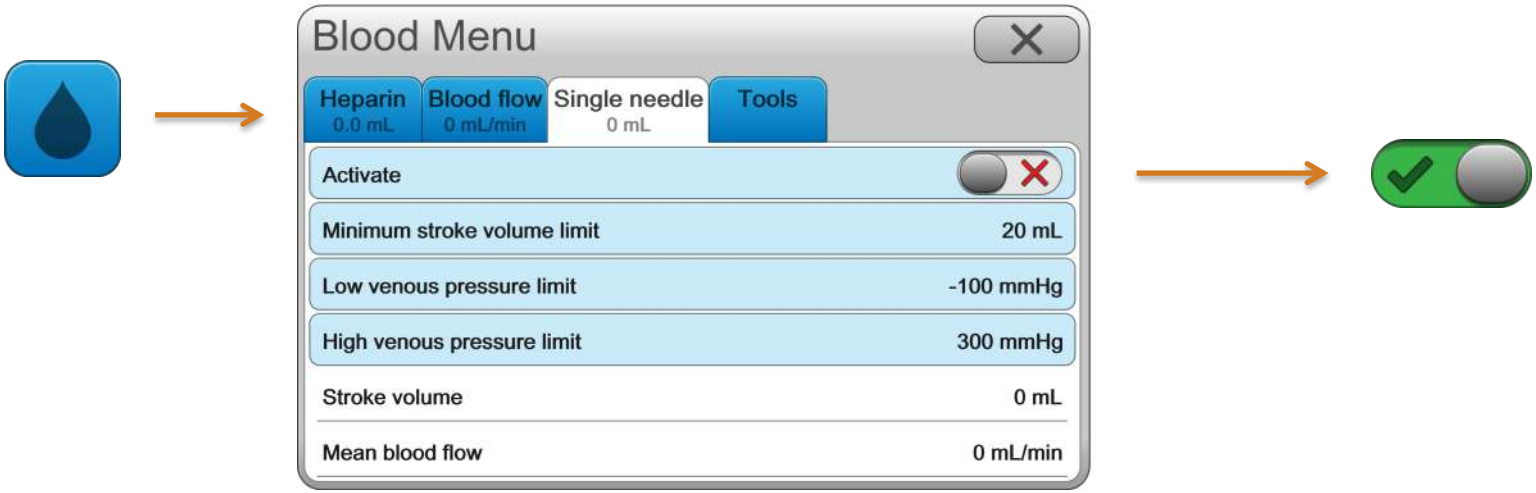
- **Mean blood flow**. Is the effective mean blood flow rate during the complete cycle.

- **Stroke volume**. Is the blood volume which passes through the dialyzer during a cycle. The higher the stroke volume the more efficient the treatment.

Single needle - activate

After priming is completed, check the priming fluid level in the expansion chamber is around the groove and return it to the upright position.

Press the blood button and open the blood menu. Press the single needle tab and set a minimum stroke volume limit, and then activate single needle. The machine is now ready for patient connection.



Single needle – start the treatment

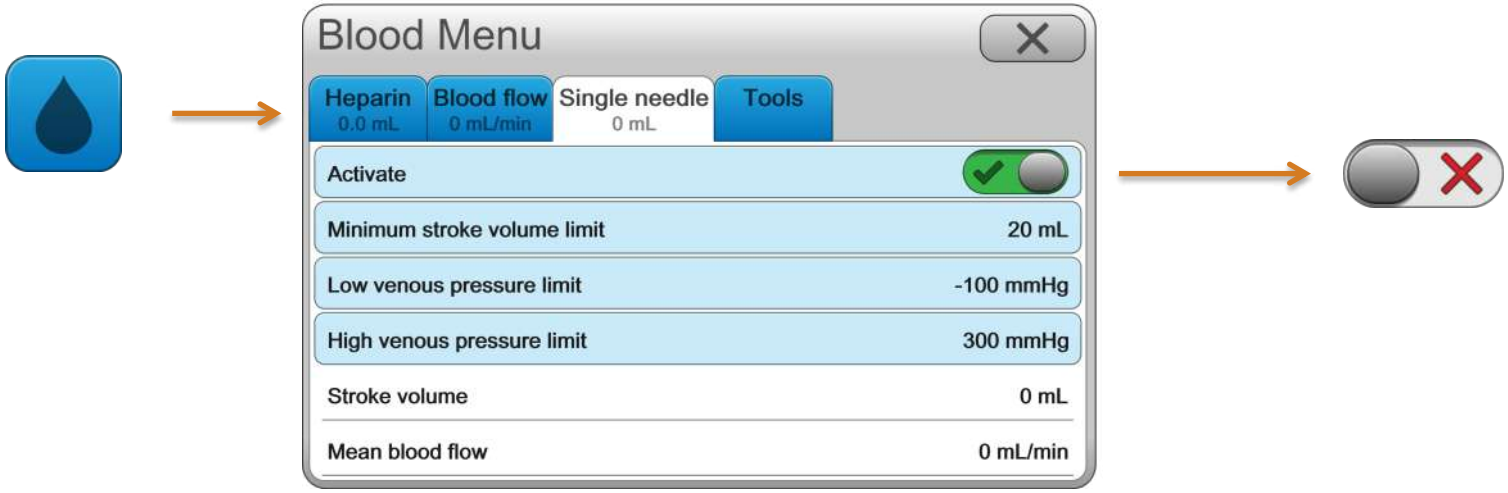
Once the treatment has been started, press the flashing arterial pressure control to centralize the alarm limits around the current value.

The alarm limits for the venous pressure are automatically set once the treatment has started to +350mmHg (high limit) and +150mmHg (low limit). Press the venous pressure control if it is necessary to change the limits.

The stroke volume that can be achieved is determined by the size and position of the venous pressure alarm window, and the potential expansion volume provided by the expansion chamber.

Single needle – end the treatment

At the treatment end before rinseback, deactivate single needle.



Hands on

Line and prime the machine
Connect the patient
Activate single needle
Optimise the stroke volume
End the treatment
Deactivate single needle
Rinse back

Baxter, Gambro and AK 98 are trademarks of
Baxter International Inc. or its subsidiaries.

AK 98 Dialysis Machine

Hygienic maintenance module

Reference: **AK 98** Operator's Manual 2.XX
Chapters 10 & 11

AK 98 Dialysis Machine

Important notice

The contents of this training module are based on the **AK 98** Dialysis Machine Operator's Manual. The completion of this training does not relieve the operator from their responsibility to read and understand the full text of the Operator's Manual. If there are deviations between the text contained in this module and the Operator's manual, then the Operator's manual takes precedence.

Aims & objectives

The aim of this module is to get an overview of the **AK 98** dialysis machine with special focus on:

- Hygienic maintenance
  - Exterior
  - Heat **CleanCart** cartridge
  - Short heat citric
  - Chemical
  - Integrated Heat
  - Ultrafilters

Hygienic maintenance – external components

After each dialysis treatment, the machine exterior surfaces must be disinfected.

Using a cloth moistened with either ethanol 70% or isopropanol 60%, wipe all of the machines exterior surfaces and the top tray.

The pick-up tubes need to be flushed inside and out with water between each treatment, and then returned to the holder to dry naturally. Once a week, repeat exactly the same procedure using ethanol 70% instead of water.

Hygienic maintenance - programs

There are different programs for cleaning and disinfecting the machine:

- Heat
- Chemical
- Rinse

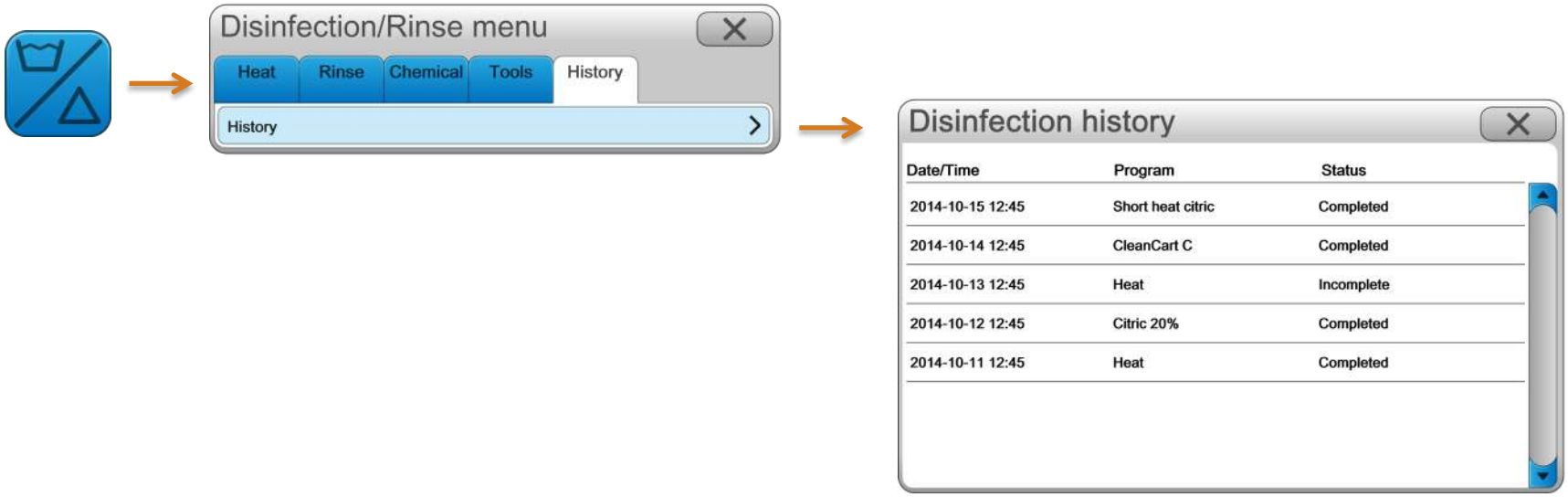
Hygienic maintenance – disinfection schedule

The hygienic maintenance of the machine must follow this schedule;

Frequency	Activity	Result
After each treatment	1. Run a heat disinfection program (with or without citric acid), or a short heat citric program. 2. Wipe the outside of the dialysis machine with 70% ethanol or 60% isopropanol. 3. Rinse the outside and flush the inside of the pick-up tubes with water. Let them dry naturally.	Disinfection
At least after every 3rd treatment	1. Run a heat disinfection program together with **CleanCart** C cartridge.	Cleaning Decalcification Disinfection
At least once every 7th treatment day	1. Run a chemical disinfection program with sodium hypochlorite. A heat disinfection program together with **CleanCart** C cartridge shall be performed before a sodium hypochlorite program. **or** 1. Run a heat disinfection program together with **CleanCart** C cartridge. 2. Run a heat disinfection program together with **CleanCart** A cartridge 3. Wipe the outside and flush the inside of the pick-up tubes with 70% ethanol. Let them dry naturally.	Cleaning Decalcification Disinfection
When more than 7 days have passed since last disinfection	1. Run a heat disinfection program before treatment	Disinfection
Every 1-3 months if UFD is installed	1. Change the ultrafilter 2. Run a heat disinfection program	Disinfection

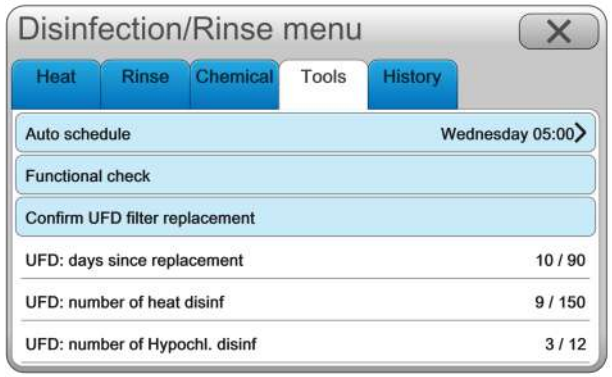
Hygienic maintenance – disinfection history

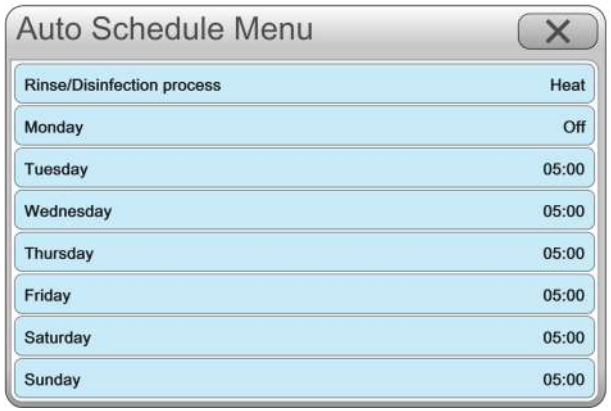
To view the disinfection history of the machine, press the disinfection button. Within the disinfection/rinse menu press the history tab. This will open the list where the details of the previous disinfection processes can be found.



Hygienic maintenance – auto schedule

It is possible to set the machine up to perform scheduled heat or rinse program. Press the disinfection button and then the tools tab. In the auto schedule select either heat or rinse and then the ready time for each day required.



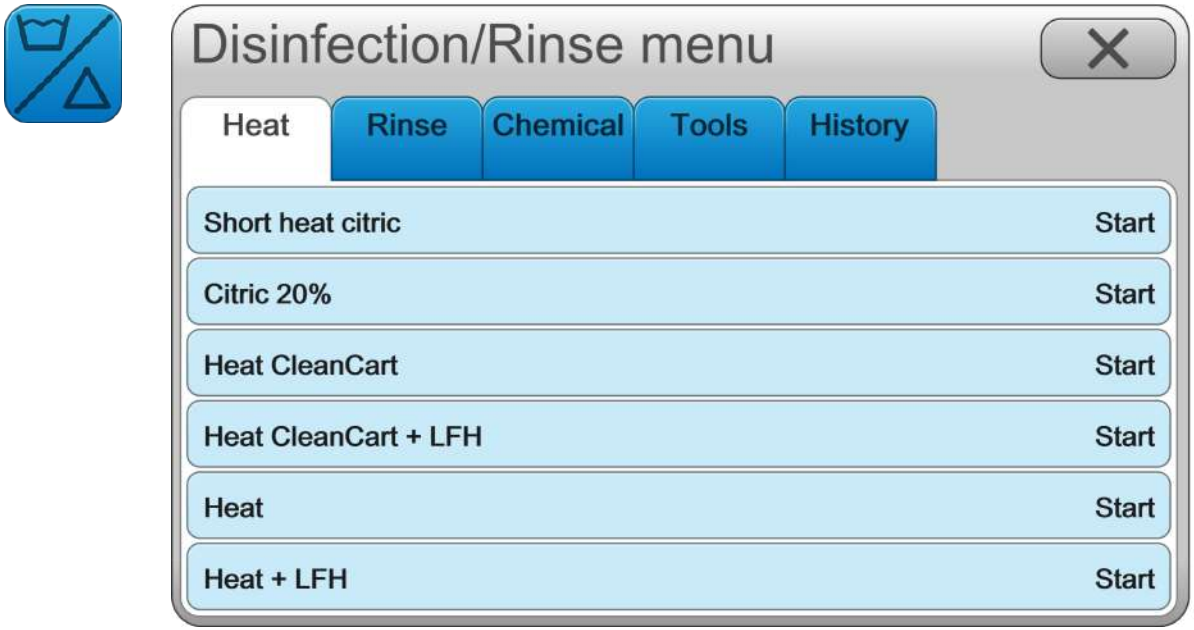


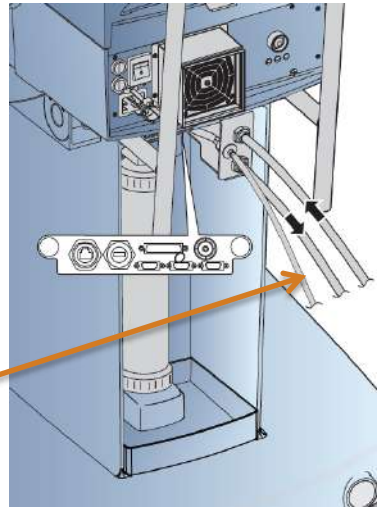
Hygienic maintenance – heat with CleanCart cartridge

To run a **CleanCart** cartridge disinfection program, press the disinfection button. Under the heat tab press Heat CleanCart to start the process. Wait for the attention message to appear before inserting the **CleanCart** cartridge into the **BiCart** cartridge holder.

Hygienic maintenance – short heat disinfection

It is possible to run a short heat disinfection with liquid citric acid. The disinfectant inlet tube on the rear of the machine must be placed into the disinfectant solution.

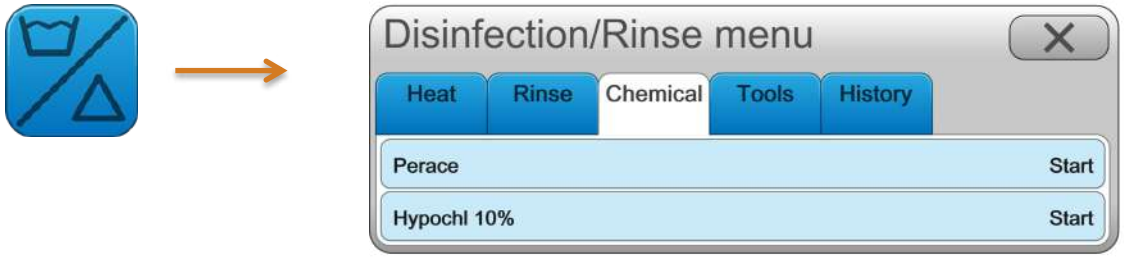


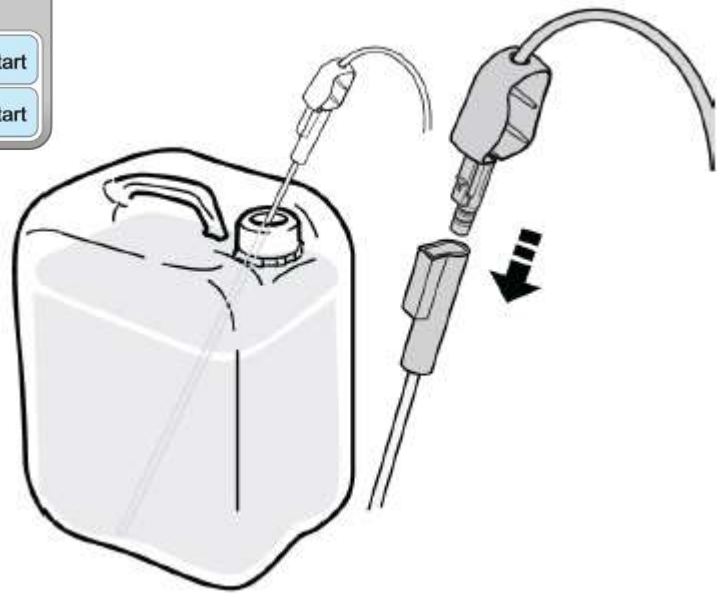


Disinfectant inlet tube

Hygienic maintenance – chemical disinfection

To perform a chemical disinfection, press the disinfection button and then the chemical tab. Chemical disinfections must take place from the front of the machine. Connect the blue concentrate connector to the yellow pick-up tube.

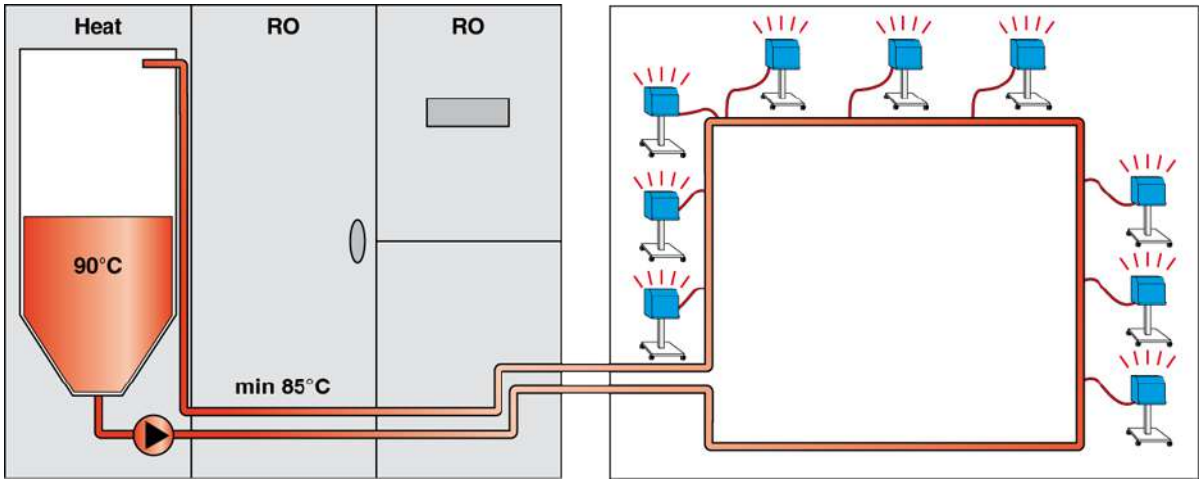




Hygienic maintenance – integration CWP

The machine can perform a heat disinfection that is integrated with the central water plant (CWP). During this integrated heat clean the machine automatically switches on, and receives hot water from the CWP, it can also be switched on manually if required.

The integration between the machine and the CWP allows the water inlet tube to be included into the disinfection process.



Hygienic maintenance – integration WRO 300 H unit

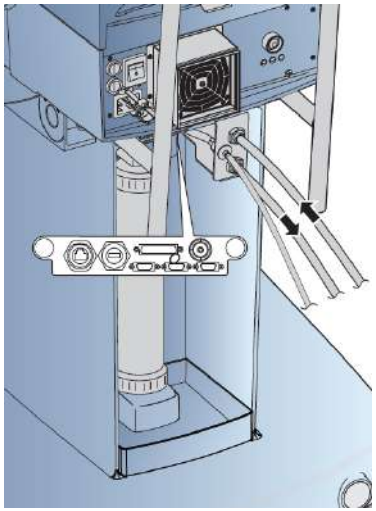
It is possible to perform an integrated heat disinfection between the machine and the **WRO 300 H** unit.

The integrated heat disinfection procedure includes the following phases when preset by the service technician:

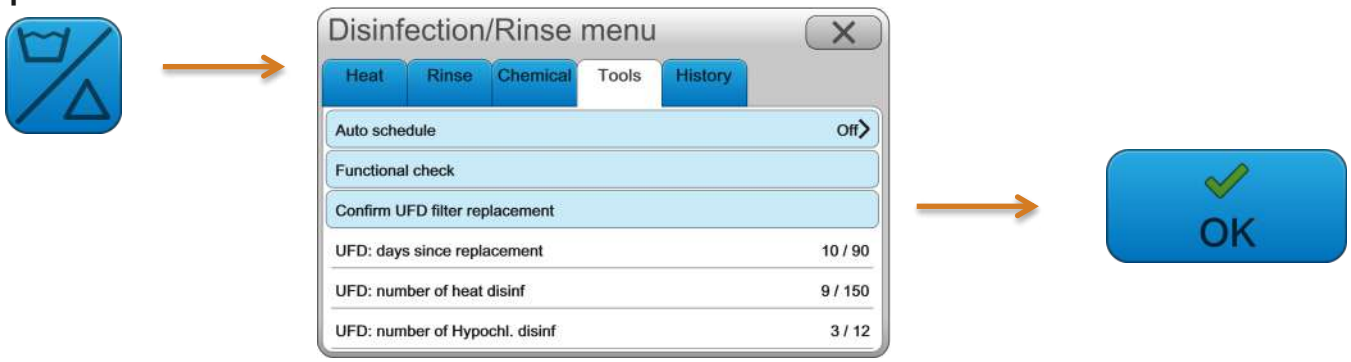
- Heat disinfection of the **AK 98** dialysis machine
- Low flow heat (LFH), where all the wet parts of the system between the machine and the **WRO 300 H** unit are exposed to hot water at a low flow rate
- Heat disinfection of the **WRO 300 H** unit

Hygienic maintenance – changing the ultrafilter

1. Pull the latch and press 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. Push the lower latch into position and close the holder until a ‘click’ is heard



Press the disinfection button, under the tools tab press and confirm the UFD filter replacement. After changing the ultrafilter, a heat disinfection must be performed before a new treatment.



Hands on

Set an auto schedule for heat disinfections
Perform a heat with a **CleanCart** cartridge
Change the **U9000** ultrafilter

Baxter, Gambro, AK 98, BiCart, CleanCart and U9000 are trademarks of Baxter International Inc. or its subsidiaries.