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KIDNEY SOLUTIONS MANUAL

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# **Dialysis Machine Operating Manual for Nurses**

## **(Fresenius 4008S NG Model)**

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## **Introduction**

Welcome to Kidney Solutions (KS), your Hemodialysis home-based dialysis service. Our aim is to provide Nurses with accurate, easy-to-read information for on-going treatment.

The aim of this education manual is to have a reference when dealing with the machine or cannulation problems and therefore allow Nurses to perform dialysis therapy safely and successfully.

We hope this manual will assist in understanding and performing kidney replacement therapy and also help patient, family and friends face the future with knowledge and confidence.

Home haemodialysis offers patients more autonomy and flexibility in managing their treatment schedule.

## **Objectives**

The objectives of this manual are:

- To provide nurses with the knowledge of haemodialysis and the 4008S NG machine.
- To provide education and training in the troubleshooting skills necessary to perform dialysis safely at home.
- To provide understanding of available technical support.

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# Machine Orientation

## 4008S Next Generation

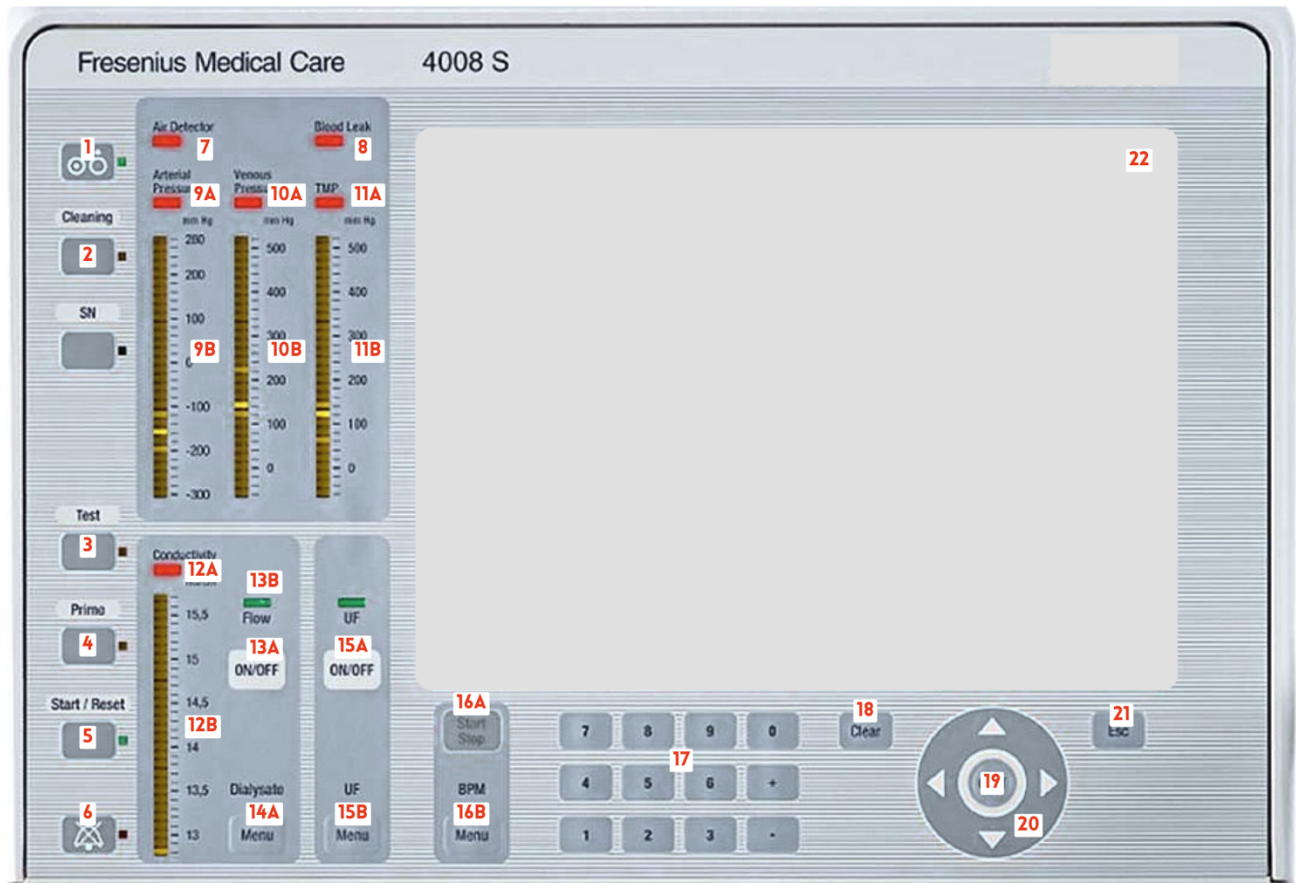
1. Monitor
2. Blood pressure cuff
3. Extracorporeal blood circuit module
4. Concentrate connectors
5. Brake
6. Shunt interlock for the dialyser connecting lines
7. IV Pole
8. Status indicator

**Possible conditions:**

- Status indicator shows green light (operation)
- Status indicator shows yellow light (warning)
- Status indicator shows red light (alarm)

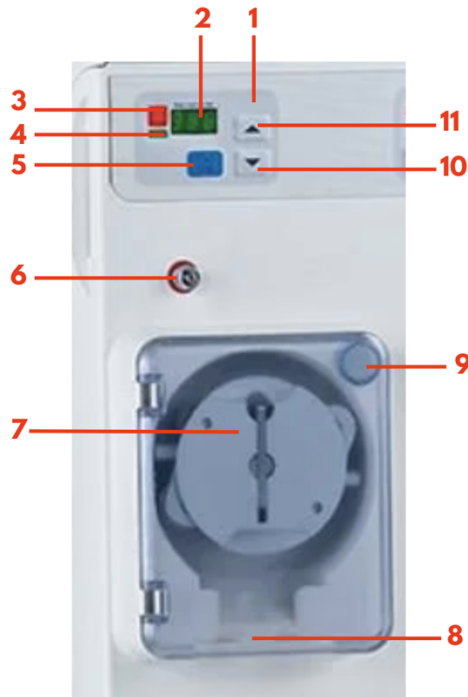


## Screen View



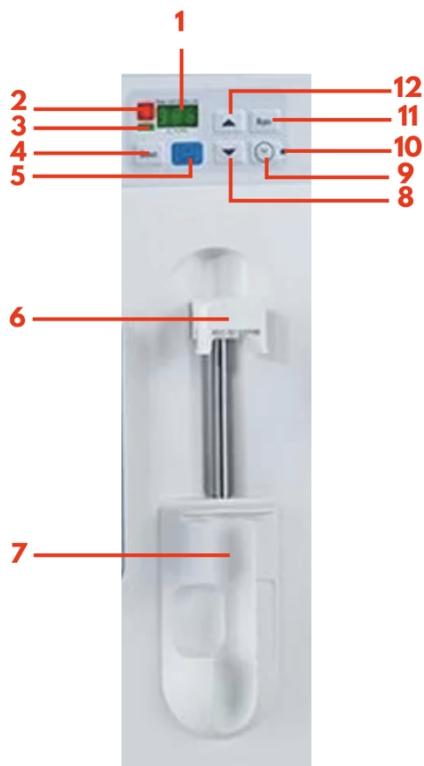
- |     |  |     |   |
|-----|--|-----|---|
| 1   | On/Off key   | 13A | Flow ON/OFF key                         |
| 2   | Cleaning key   | 13B | Flow LED                                |
| 3   | Test key   |     | LED is illuminated: The flow is on      |
| 4   | Prime key  |     | LED is not illuminated: The flow is off |
| 5   | Start/Reset key                                      |     | LED is flashing: Bypass operation       |
| 6   | Mute key   | 14A | Dialysate Menu key                      |
| 7   | Air Detector alarm indicator                         | 15A | UF ON/OFF key                           |
| 8   | Blood Leak alarm indicator                           | 15B | UF Menu key                             |
| 9A  | <b>Arterial</b> Pressure alarm indicator             | 16A | BPM Start/Stop key                      |
| 9B  | <b>Arterial</b> Pressure measurement value indicator | 16B | BPM Menu key                            |
| 10A | <b>Venous</b> Pressure alarm indicator               | 17  | Screen date entry keys                  |
| 10B | <b>Venous</b> Pressure measurement value indicator   | 18  | Cancel key                              |
| 11A | TMP alarm indicator                                  | 19  | Confirm key                             |
| 11B | TMP measurement value indicator                      | 20  | Arrow keys                              |
| 12A | Conductivity alarm indicator                         | 21  | Escape key                              |
| 12B | Conductivity measurement value indicator             | 22  | Screen                                  |

## Blood Pump



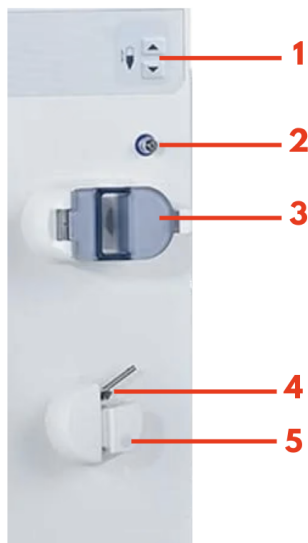
- 1 Key pad of the **arterial** blood pump
- 2 Display (indicates the delivery rate)
- 3 Alarm (red) LED
- 4 Operation (green) LED
- 5 Start/Stop key (for turning the blood pump on or off)
- 6 Pressure Connector (isolator connector of the **arterial** monitor line), highlighted in red.
- 7 Rotor (delivers the patient's blood by means of the rollers and the lines installed. (The rotor can be removed for cleaning.)
- 8 Clamping piece ( holds the installed line segment securely in place
- 9 Sensor
- 10 ▼ Key (for reducing the delivery rate)
- 11 ▲ Key (for increasing the delivery rate)

## Heparin Syringe



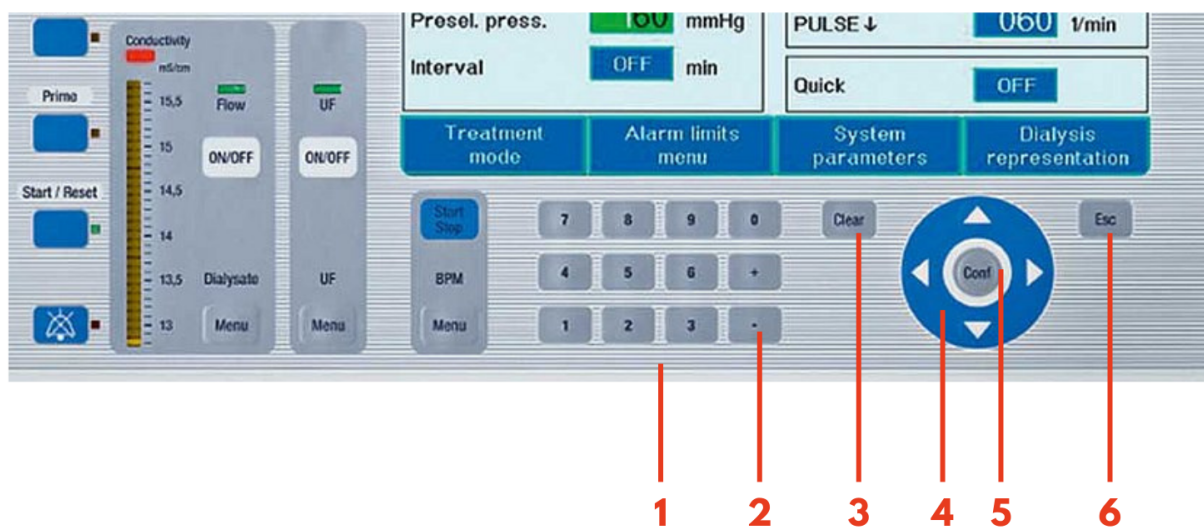
- 1 Display (displays the delivery rate, the stop time, the bolus amount or an error code)
- 2 Alarm (red) LED
- 3 Operation (green) LED
- 4 Bolus key
- 5 Start/Stop key (for turning the heparin pump on or off)
- 6 Syringe driver
- 7 Syringe holder
- 8 ▼ key (for reducing the delivery rate or the stop time and for moving the syringe driver down)
- 9 Clock key (for setting stop time)
- 10 Stop time (green) LED
- 11 Rate key (for setting the delivery rate)
- 12 ▲ key (for increasing the delivery rate or the stop time and for moving the syringe driver up)

## Air Detector



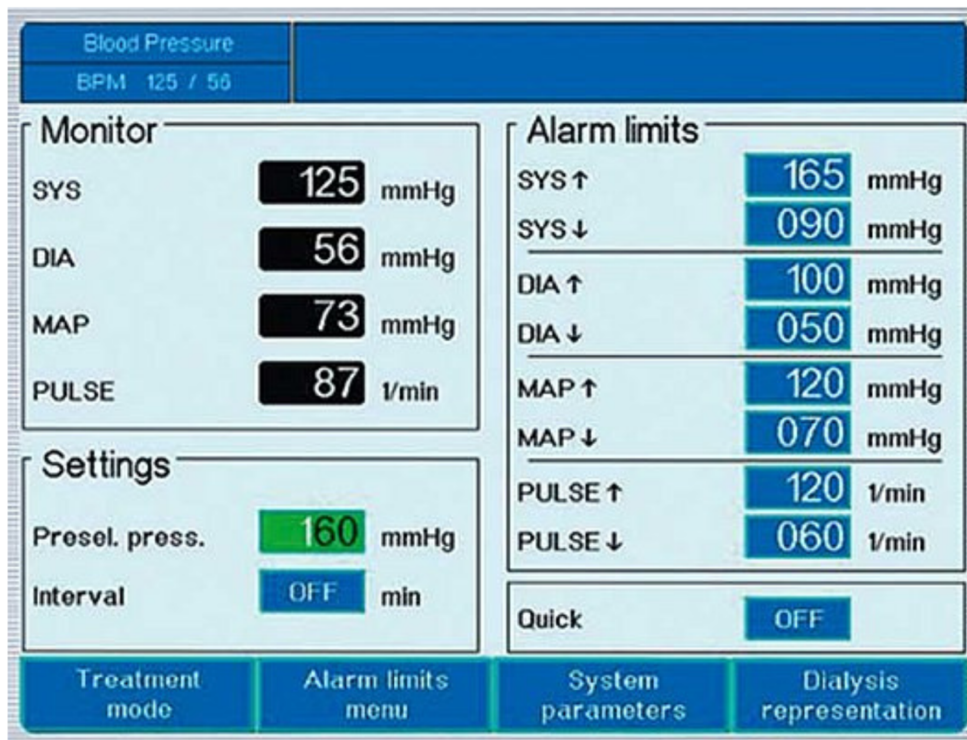
- 1 Keys (for raising (▲) and lowering (▼) the fluid in the **venous** bubble trap)
- 2 **Venous** pressure connector (isolator connector of the **venous** monitor line)
- 3 Holder for the **venous** bubble trap with air detector
- 4 **Venous** line clamp
- 5 Blood sensor

## Description of the Key Pad



- 1 Entering data (numerical values)
- 2 Changing data (numerical values) or functions
- 3 Resetting data (numerical values) to 0 or to preset value
- 4 Selecting a menu or the fields to be changed
- 5 After all data of a menu has been changed, the changes are saved by pressing the *Conf* key once
- 6 Exiting a menu without saving the data

## Description of the Screen Colors



The currently selected menu and the text bar are always displayed as follows:

White character on blue background.

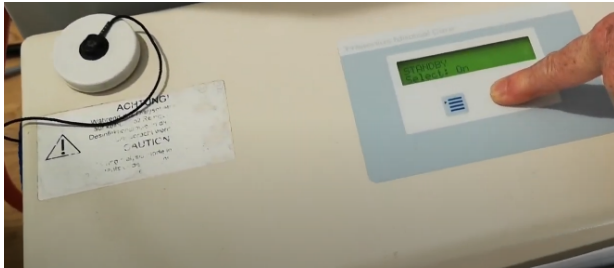
The following colours are used in the menu field and the menu bar:

Background	Characters	Function
<b>Blue</b>	<b>White</b>	Can be selected
Green	Black	Can be changed
Grey	White	Can not be selected or changed
<b>Black</b>	White	Can not be selected or changed

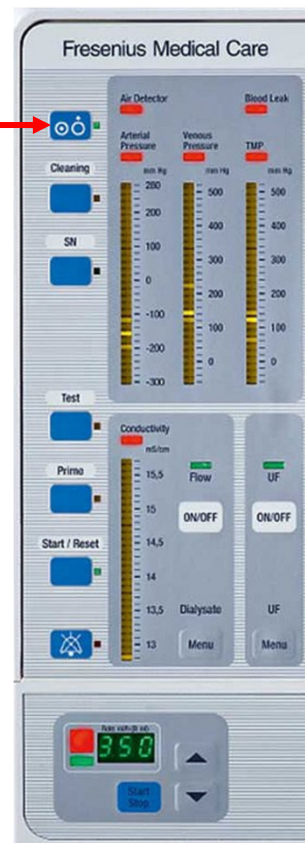
# Set-Up at Home

## Turn ON

- ⇒ Turn the Water ON
- ⇒ Switch the power ON at the wall



- ⇒ Turn the machine on by pressing ON/OFF key
- ⇒ When the RO is finished with self-test
- ⇒ Press the '**Cleaning**' key on the dialysis machine



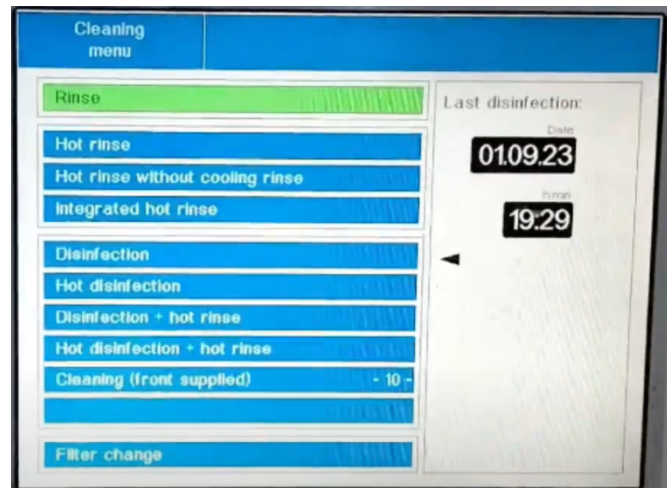
## Check Machine is Clean

Check if machine has completed a clean in the last 72 hours.

If patient has been away for more than three days call technical service.

Once the cleaning menu has been activated the following screen will open

Check the screen to see the date and time of the last disinfection

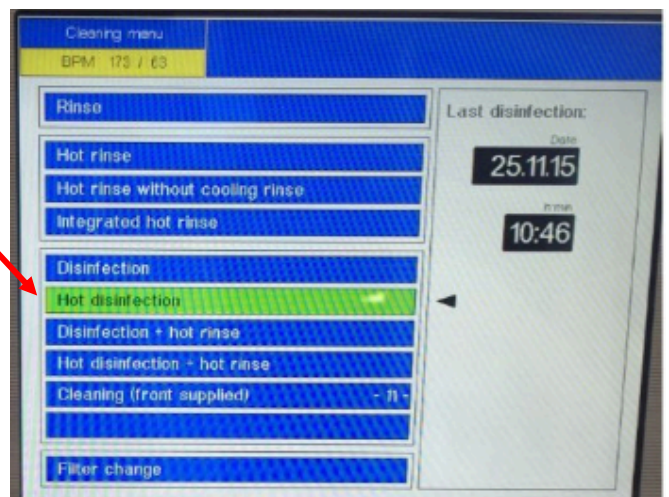


## Disinfect pre and post each dialysis session

Use the arrow keys to select 'Hot disinfection' programme

The program selected will be highlighted in green

Then press the **Conf** key



## Collect Equipment

- 1 or 2 bottles of dialysate (smart bags)
- 1 BiBag®
- 2 bags of Normal Saline (0.9% Sodium Chloride) – check expiry date
- 1 pocket of bloodlines for Fresenius®
- 1 dialyser
- 1 dressing pack
- 4 packets of gauze
- 1 x 20ml syringe
- 1 x 10ml syringe
- 1 x 2ml syringe (if using local anaesthetic)
- 1 x 18g needle (drawing-up needle) (pink packet)
- 1 x 25g needle (orange packet, if using local anaesthetic)
- 2 fistula cannulas
- 3 (or more) ampoules of heparin (5000 units in 5mls) – check expiry date
- 1 ampoule of lignocaine/xylocaine (1%) – check expiry date (if required)
- 1 blue sheet

## Machine Test (T1 Test)

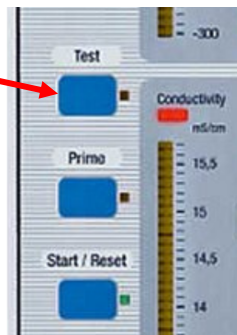
1. Machine will alarm saying MANDATORY RINSE END
2. Press MUTE button
3. **Place red wand into the Dialysate**



4. **Attached BiBag to machine**



5. **Press TEST button**



(Check patient weight, blood pressure and temperature)

# Setting Up the Machine

## Lining machine

Commence the line set-up while the machine is in **TEST**

1. Place Dialyser on holder, take white caps off
2. Open 2 packs of Normal Saline bags and hang on IV pole. Remove the blue tags of the body by twisting.
3. Open pack with lines
4. Connect isolators to arterial and venous isolator connection on machine
5. Remove normal saline priming line from package
6. Close the roller clamp on the line
7. Remove plastic cover from spike
8. Insert spoke into one of the saline bags
9. Prime the normal saline priming line: fill chamber at top (by squeezing the chamber) ½ full.
10. Hang end of line on the IV pole
11. Remove arterial line (red) from packaging
12. Tighten white connector (recirculator) on arterial line
13. Hang white connector onto the IV pole
14. Place the Arterial bubble trap in the holder upside down. Close the small red clamp on the arterial bubble trap.
15. Place blood pump segment into the blood pump (ensure heparin line [skinny line] is on the right)
16. Attach arterial monitor line to isolator on machine (ensure it's tight). Leave small red clamp open on the arterial monitor line.
17. Attach the other end of the arterial (red) line to the bottom end of the dialyser
18. Attach normal saline priming line to the saline arm of the arterial line (short line off blood line)
19. Open clamps on saline line (roller clamp and small red clamp)
20. Watch the arterial like fill with saline (by gravity), close large red clamp. Leave the line hanging on the IV pole.
21. Remove venous line (blue) from package
  - a. Ensure the drain bag is securely attached
22. Unfold the drainage bag and hang to the IV pole
23. Place the Venous bubble trap in holder and close door (picture B)

24. Place Venous line in OPTICAL DETECTOR



25. Attach the Venous monitor line to isolator on machine (ensure it's tight)

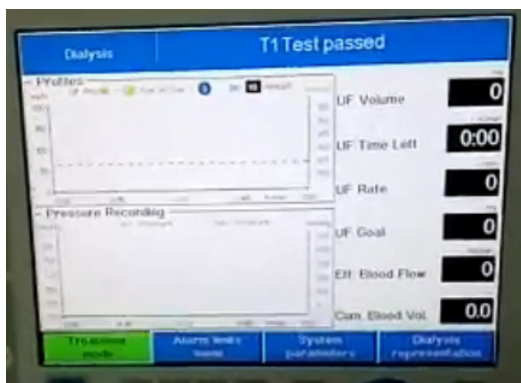


a. Close 2 small blue clamps on the top of venous air trap

26. Attach the other end of the venous line (blue) to the top of the Dialyser

## Priming the Machine

27. Machine will display T1 Test Passed

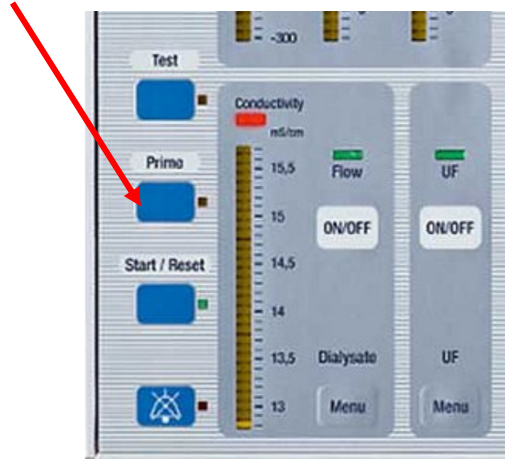


28. Attach the ports to the dialyser

- Open shunt cover (on the side of the machine) by gently lifting the bottom part of the silver door.
- Attach red port to where the red end of blood like (arterial) is connected to the dialyser

- c. Attach blue port to where the blue end of the blood line (venous) is connected to the dialyser
- d. Close shunt cover
- e. Turn dialyser upside down (red on top, blue on the bottom)
- f. Watch and feel fluid fill the dialyser. Dialyser will feel warm.
- g. Turn back dialyser to blue port on top.
- h. Turn the “flow” off

29. Press the “prime” button on the machine (this will start blood pump @ 100ml/min).



30. Raise the fluid by  $\frac{3}{4}$  in the arterial chamber by inverting the arterial air chamber. Once  $\frac{3}{4}$  full, put back to original position and attach to arterial chamber holder. Close small clamp on top of the chamber.

31. Gently expel air from the dialyser by putting the blue (venous) end of the blood line connected to the dialyser UP

32. When saline reaches the venous air chamber, blood pump rate will increase to 180ml/min and saline will start filling-in the drainage bag. Raise the fluid level by pressing the up arrow next to the air chamber. Raise the fluid on the venous air chamber by  $\frac{3}{4}$  full only.



33. When Saline bag nearly empty, blood pump will stop and display “**Rinse volume achieved**”
34. Mute the alarm
35. Disconnect the empty saline bag and change to new bag of saline

**NB.** Ensure other end of the arterial line (with the white connector) is filled with normal saline

## Recirculation

36. Close 2 clamps: on venous blood lone and drainage bag
37. Remove venous blood line from bag
38. Connect venous line to white connector on arterial line



39. Open venous and arterial clamps
40. Ensure that clamps are open on saline priming line
41. Press “dialysis start/reset alarm” button
42. Blood pump will restart

Make sure blood pump is set at 180ml/min

## Connecting the Heparin Syringe and Setting Heparin Infusion Rate and Time

43. Close the small red clamp on the heparin line
44. Draw-up 10ml (2 ampoules) heparin into 20ml syringe (draw-up more heparin if you are using more than 3ml/hr, and/or on the machine for more than 5 hours. Ensure that the amount of heparin in the syringe would last up to the end of treatment time.

45. Attach syringe to heparin line
46. Place onto the machine
47. Press down arrow till cover clicks over the end of the syringe
48. Open small red clam on heparin line and see that air bubbles have passed the heparin line. If not, press down arrow again until you can see air bubbles passing through the lines.
49. Set Heparin rate and time



- a. Press "Rate" button
  - i. Number will flash
  - ii. Press the up or down arrow to get desired rate
  - iii. Press the "rate" button to set.
- b. To set the time
  - i. Press the button with the clock in it
  - ii. Press the up or down arrow until you get the desired stop time (usually 1.00).
  - iii. Press the clock button again to set

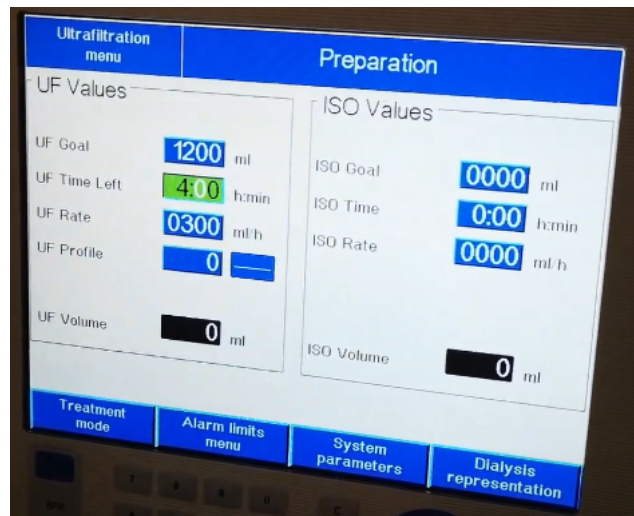
## Setting UF Goal and Time

50. Set UF values and time
51. Calculate required weight loss (UG goal)
52. Press **UF Menu**
53. Set **UF GOAL** using the number keypad



54. Use the down arrows to move to the highlighted menu down to UF Time
55. Set **TIME** via number keypad and
  - ⇒ Press **Conf** key to save

- UF Goal** = The total amount of fluid you need to remove.
- UF Time left** = The amount of hours you will be dialysing
- The UF Rate** = Will be calculated automatically you do not need to adjust



56. Ensure that lines are securely connected to the dialyser

57. Turn the dialysate “flow” button on (green light)

# Dressing Tray Setup

1. Wash hands for 30 seconds
2. Open sterile dressing pack  
Rearrange contents using the yellow forceps  
Place yellow forceps half on the plastic sterile field
3. Add to your tray:

1 x 2ml syringe	1 x 25g needle
1 x 10ml syringe	2 x cannulas
2 x 18g needle (blunt)	
4 x Chlorhexidine swabs/sticks	
4. Twist open normal saline, heparin and lignocaine ampoules
5. Prepare 6-8 tapes with tabs
6. Place tourniquet loosely on fistula arm
7. Place blue sheen on chair
8. Wash hands and fistula well (about 3 minutes)

## **WHEN HANDS HAVE BEEN WASHED**

### **TOUCH ONLY THE CONTENTS ON THE STERILE FIELD**

9. Attach 10ml syringe to 18g needle
10. Draw required amount of Heparin from ampoule
11. Fill remainder of syringe with normal saline to make up 10ml (from the normal saline ampoule)
  - Place syringe on sterile field
12. Attach 2ml syringe to 18g needle
  - Draw up 2ml of lignocaine from ampoule
  - Remove 18g needle
  - Attach 25g needle, loosen the cap
  - Remove air from syringe
  - Place syringe on sterile field

## Cannulation

1. Swab fistula with chlorhexidine 2% and alcohol 70% swabs 4 times (using different swab for each)
2. Place sterile dressing towel on blue sheet
3. Tighten tourniquet and inspect site to assess exactly where you will insert the needles
4. Loosen tourniquet
5. Inject local anaesthetic.
6. Pick up cannula ensure cap is not too tight or too loose
7. Tighten tourniquet
8. Remove protective cannula sheath  
**DO NOT TOUCH METAL SHAFT**
9. Insert cannula at 25 - 30 degree angle
10. When blood enters the cannula tubing lower the angle of the cannula
11. Push remaining metal shaft into blood vessel

### **IF THE BLOOD IN THE CANNULA STOPS PULSATING, THERE IS AN OBSTRUCTION TO THE FLOW.**

In the event of an obstruction check for the following:

- a) **Blown fistula/graft:** Check site for swelling and tenderness  
Remove if blown
- b) **Cannula against the wall:** Pull cannula back slightly until blood starts pulsating. Push cannula back in a straight line

## To continue cannulation:

1. Loosen tourniquet
2. Secure cannula with tapes (micropore™)
  - Place 1 tape across the 'wing' of the cannula
  - Place another tape under the cannula tubing and over the wing
  - Place another tape over the second tape (across the wing & the tubing).
3. Slowly unscrew cap on cannula to allow blood to flow to the end of the cannula:
  - Tighten the cap

- Clamp cannula
  - Remove cap
4. Attach 10ml syringe to cannula
    - Unclamp cannula
    - Withdraw slightly and push in 5mls of Saline
  5. Clamp cannula
    - Remove syringe
    - Cap cannula
  6. Repeat all the above steps to cannulate the Venous site

## Connecting to the Machine

1. Stop the blood pump
2. Clamp the small red clamp on saline inlet line of the blood line.
3. Clamp Arterial (RED) and Venous(BLUE) lines
4. Disconnect Arterial line from white connector and connect to Arterial cannula
5. Disconnect Venous line from white connector and connect to Venous cannula
6. Check that saline inlet line is clamped
7. Unclamp Venous bloodline and cannula
8. Unclamp Arterial bloodline AND cannula
9. Press "Dialysis start"
10. Restart blood pump (180ml/min)
11. Observe Venous and Arterial pressure
12. "Preparation End" will appear on display when blood sensed in optical detector
13. Press "Dialysis start" button, "Dialysis" will appear on display
14. Increase blood flow rate slowly to desired rate
15. Turn heparin pump on- press start/stop button on the heparin pump module (green light)
16. UF will automatically turn on (green light), as soon as the machine detects blood (ensure that you have entered the UF goal & time preceding this, otherwise the UF will not turn on automatically).

TO RESET THE ARTERIAL OR VENOUS PRESSURE LIMITS PRESS **DIALYSIS START** TWICE.

ENSURE THE PRESSURE IS SATISFACTORY BEFORE DOING THIS.

# Checklist

- Seven green lights (Central Light, on/off, dialysis start, blood pump, heparin, UF on/off, Flow on/off).
- BLOOD PUMP** on 300/350 (or higher as instructed by the dialysis nurse)
- Saline inlet clamped
- Saline bag  $\frac{3}{4}$  full
- Ensure the Arterial monitor line is only  $\frac{1}{4}$  full
- Ensure that Venous & Arterial pressures are satisfactory (Venous pressure should not rise above 200 for an AV fistula- graft 200)
- LIMITS EVENLY SPACED**
- Check level of blood in Venous & Arterial chambers are  $\frac{3}{4}$  full and that the short lines on the venous air trap are clamped
- Heparin pump switched on at correct rate and time
  - ✓ Check correct amount in syringe
  - ✓ Green light on **HEPARIN CLOCK** is lit
  - ✓ Heparin line clamp is open (unclamped)
- UF** switched on and **UF** goal and time set correctly
- Dialyser blue (venous) end up
- Dialysate ports are correctly attached to dialyser (red to Arterial and blue to Venous)
- Bloodlines are connected to the correct cannula
- Enough concentrate (bottle) to last the treatment

# Running Off the Machine

1. Machine will display “UF Goal reached” and alarm sounds
2. Press ‘Mute’
3. Press “start/reset” button twice (with a 3 second pause in between)
4. Machine will display Reinfusion
5. Press “Confirm” button (on the keypad)  
**NOTE:** Blood pump will automatically stop and alarm limits are widened
6. Close big red clamp on the arterial line
7. Open the small red clamp on saline inlet line
8. Reduce blood pump rate to 180 ml/min
9. Press “start/reset” button once
10. Blood pump will automatically restart
11. Machine will alarm when venous line is clearer.
12. Blood pump stops. Machine displays “Dialysis end”
13. Press “start/reset” button. Blood pump re-starts.
14. Machine will display **Empty BiBag?** Press “confirm” button on the keypad.
15. Blood pump would automatically stop after a few seconds, if not press “Start/Stop” button on the blood pump panel
16. Clamp venous line and venous cannula **after** the blood pump has stop.
17. Open clamp on arterial line
18. When arterial line is clear, clamp cannula and line
19. Disconnect lines from cannulas, place caps on cannulas from venous bubble trap.

## Stripping the Machine/Disinfection

1. Open shunt cover
  - Remove blue dialysate port and place on machine
  - Close shunt cover
2. Machine will display “Emptying program” on the screen. When dialyser is drained, machine will display “End emptying program”.
3. Open shunt cover
  - Remove red dialysate port from dialyser and place on the machine
  - Close shunt cover
4. Clamp all clamps on the blood lines including the saline priming line. Remove lines from the machine.
5. Press up arrow (once) on Heparin control to move the lever up.
6. Remove Heparin syringe.
7. Remove Bibag and close cover.
8. Place RED wand back in machine (twist wand clockwise until it locks)
9. Press Cleaning and select “HOT DISINFECTION” (highlighted green). Press confirm on the keypad.
10. Clean the outside of the machine with environmental wipes.
11. When disinfection complete machine will display “Mandatory rinse end”
12. Press **ON/OFF** (Power OFF) - hold for 3 seconds until power goes off.
13. Press **MAIN SWITCH** on **RO** (Light out)
14. Turn off tap
15. Turn off power at wall

## Other Procedures

### Home Hemodialysis Iron Infusion

The patient requires monthly iron infusions. Iron infusion will be administered by trained KS nurses. Only KS nurses who have undergone training and assessment by the KS Clinical Service Director are authorised to perform iron infusions.

KS nurses would only infuse 200mg of iron at any given dialysis session. If patient require more than 200mg/month i.e 1g iron, KS nurses will receive specific instructions from the LHD Home Therapy Unit.

**NOTE: Prepare this before commencing dialysis (before cannulation)**

#### Equipment:

- 1 X 100ml Normal Saline bag (*check expiration date*)
- 2 X 100mg/2ml Iron ampoule (*check expiration date*)
- 1 X infusion set
- 1 X 5 or 10ml syringe
- 1X19G needle
- 1 X alcohol wipe

#### Infusion Procedure

1. Clean table with a piece of clean cloth
2. Wash hands for 1 minute
3. Collect equipment
4. Do blood pressure, temperature, pulse and record the time
5. Check normal saline bag for expiry date, content, clarity
6. Check iron ampoule for correct medication, dosage, expiry date
7. Break (open) the top of the glass ampoule by wrapping the top of the glass ampoule with alcohol wipe or gauze (to protect fingers).
8. Connect 19g needle to 3ml syringe and draw up all of the iron from ampoule
9. Using alcohol wipe, wipe the white port of the saline bag, and inject all of the iron content into the saline bag
10. Mix the bag
11. Hang the saline bag on the IV pole, twist off the blue cap
12. Open infusion set, close roller clamp

13. Pierce the saline port through the blue connector, using a twist and push motion. Squeeze the infusion chamber and fill the chamber with fluid (iron mixture)
14. Prime the rest of the line, using the roller clamp
15. On the arterial blood line (red), close to arterial access, connect the iron mixture set to the small side connector (with small white clamp). Leave the clamp close.
16. Move the roller clamp closer to the bottom of the giving set by opening it all the way (ensure white clamp is close on the blood line)
17. Open the small white clamp and slowly open the roller clamp on the giving set.
18. Set drip rate to 1 drop per second (you can see the drops if you look at the bubble chamber on the infusion line)

### **Monitoring Blood pressure while iron is infusing.**

**NOTE:** The time the infusion started, and record the time each blood pressure and pulse is checked and recorded.

1. Check blood pressure, and pulse 5 minutes after infusion is started
2. Check blood pressure and pulse every 30 minutes until completion of infusion

### **On completion of iron infusion**

1. Close white small clamp on blood line & roller clamp on infusion line
2. Leave the entire infusion set connected until the end of dialysis and dispose of it together with the blood lines when you are stripping the machine of the blood lines on completion of dialysis.

# Administration of Erythropoetin Stimulating Agent (ESA) for Home Patients

Erythropoietin is a hormone produced by the kidneys that stimulate the bone marrow to produce red blood cells. KS nurses will be administrating patient ESA, on completion of dialysis, ESA is given according to what is prescribed by the patient's nephrologist.

**NOTE:** Store patient's ESA in the refrigerator until needed.

Brands of ESA currently used by dialysis patients are: Aranesp, NeoRecormon and Eprex, & Micera

1. Darbepo etin Beta (ARANESP) must not be used if it is left out of the refrigerator for longer than 2 days at room temperature (Up to 30°C), also should not be used if it has been frozen accidentally for more than 2 days
2. Erythropoietin Alfa (EPREX) must not be used after being left out of the fridge or away from a chilled "cool pack" for longer than 7 days
3. Erythropoietin Beta (NeoRecormon) can't be used if left out the fridge for more than 3 days at room temperature (Up to 25°C).

## How to administer ESA through the dialysis machine

1. Take specific ESA out from the fridge prior to the finishing time (Approximately 30mins before finishing dialysis)
2. Check syringe for the right dosage, right drug and expiry date
3. Once reinfusion is commenced and returning blood on the venous line, clean the injection port on venous line with an alcohol wipe

**NOTE:** Injection port is located on the line between venous air trap and dialyser

4. Place fingers on the sides of the injection in order to stabilise the line
5. Inject ESA into port on a 90° angle.

# PROBLEM SOLVING

## Dropping Blood Pressure whilst on the Machine

If the patient's blood pressure drops on dialysis, **TREAT IT IMMEDIATELY**. It will not improve without treatment.

Patient will feel at least some of the following symptoms:

Dizzy	Muscle cramps
Blurred Vision	Yawning
Hot	Clammy
Discomfort	Abdominal Discomfort
Sweaty	Agitation
Loss of Concentration	Nausea or Vomiting

### IMMEDIATELY

1. Turn UF off
2. Press down arrow on the blood pump once (this will open-up the upper arterial alarm limit)
3. Unclamp saline line
4. Clamp arterial clamp (Red)
5. Machine will alarm and display "Dialysis End" once the normal saline has reached the venous chamber
6. Open arterial clamp (Red)
7. Clamp saline line.
8. Press blood pump up arrow once (this will open-up the lower arterial alarm limit)
9. Machine will alarm again and display "Preparation end" once the blood is detected on the venous chamber
10. Press "dialysis start" twice (to open-up the limits)

### NOTE:

- Patient start to feel better immediately.
- If patient do not feel any better give more Saline (up to 600ml in 200ml increments). If patient still do not feel better after 600ml of saline, return blood and call for assistance (000).

## **Dropping BP in last hour of dialysis**

1. Turn UF off
2. Press UF menu button and using the keypad buttons, reduce UF goal to the amount of fluid already taken off
3. Turn JF on (to recommence dialysis time, without taking fluid off).

**NOTE:** When the time is reached at the end of Dialysis **TIMER STOPS U/F RATE** appears on display.

## **Dropping BP with more than one hour of dialysis**

1. Turn UF off
2. Re-check your original fluid calculation
3. Decrease goal by half of original goal (press UF menu and using the keypad buttons, enter new UF goal)
4. Turn UF on

If patient go flat again, give Saline and decrease UF goal to the amount already taken off

If nurses are at all concerned about patient blood pressure or physical wellbeing, contact KS Clinical Service Director, LHD Home Therapy Unit and Patient's Renal Consultant.

# Arterial Pressure

The Arterial pressure shows us how easily the blood is coming out of the Arterial cannula.

This is affected by:

- Availability of blood flow (e.g. the position of the cannula, kink in blood tube, clamp closed)
- Your individual access
- The speed of the blood flow rate
- The size of the cannula

## How it works.

- The Arterial pressure is measured via the Arterial transducer (Isolator)
- The brighter bar indicates the actual Arterial pressure
- The dimmer bars are the limits
- The limits will set automatically 50mmHg either side of the Arterial pressure
- To reset the limits, press **DIALYSIS START** twice
- If the bright bar moves and touches either limit this will cause an **ARTERIAL PRESSURE ALARM**

## Arterial Pressure Alarm

The following will occur:

- Arterial pressure alarm light on (Flashes)
- Venous pressure alarm **may** light (Steady)
- TMP alarm may light (Steady)
- Audible alarm sounds
- Red central light on
- **BLOOD PUMP** stops
- Mute light flashes
- Dialysis start light flashes

## What to do for a low arterial pressure (more negative, towards the bottom number on the monitor)?

1. Check for the Arterial line for any:
  - Kinks
  - Clamps left on

Fix problem, if one of these restart the blood pump

2. Check cannula for:
  - Cannula strapped incorrectly or too tight – loosen tape and re-secure
  - Position against the wall of fistula – pull back cannula slightly and re-align (turn over cannula – black dot to red dot – if necessary)

Restart the blood pump

**Do not** attempt to realign the cannula for more than 5 minutes. It is more likely to damage the vessel, and/or clot.

3. Other causes:
  - Too much fluid removed or too quickly
  - Blood flow rate too high for vein and collapses

### **Causes of High Arterial Pressure Alarm?**

A high Arterial pressure is caused by a decrease in the resistance of the blood flow from the cannula.

1. Clamp on arterial isolator on
2. Saline priming line open
3. Other alarms which cause the **BLOOD PUMP** to stop will cause a secondary Arterial pressure alarm
4. Arterial flow improved  
For example: The cannula becomes free from the vessel wall
5. The Arterial line/cannula becomes disconnected or has fallen out

### **What to do for high arterial pressure (less negative, actual pressure is on 0 or above 0)?**

1. Look for possible causes- clamp on, saline open
2. Resolve the problem
3. Restart the blood pump

# Venous Pressure

The Venous pressure is the resistance met when the blood returns to the body. It is created by the BLOOD PUMP pushing the blood back into the Venous needle. It is dependent on:

- The speed of the pump
- The size of the cannula
- Individual access

## How it works.

The Venous pressure is measured at the Venous bubble trap via the Venous transducer (Monitor)

- The brighter bar indicates the actual Venous pressure
- The dimmer bars are the limits
- The limits will set automatically, 50 mmHg either side of the Venous pressure
- To reset the limits, press **DIALYSIS START** twice
- If the bright bar moves and touches either limit this will cause a Venous pressure alarm

## Venous Pressure Alarm

The following will occur:

- Red central light on
- Audible alarm sounds
- Venous Pressure light on (Flashes)
- TMP light on (Steady)
- Arterial pressure light on (Steady)
- Mute light flashes
- Dialysis start light flashes
- **BLOOD PUMP** stops
- Venous line clamp shuts

## How to fix a high venous pressure?

1. Press **MUTE**. Do not restart **BLOOD PUMP** until problem is identified

Check for:

- Check venous cannula site for swelling (need to re-cannulate)
- Check for obstruction in the Venous line
  - Kinks
  - Clamp on blood line of cannula
  - A clotted bubble trap or cannula

- Position of the cannula
    - Tape on too tight
    - Arm bent
    - Cannula taped crooked
    - Cannula against wall of vessel
2. Press **DIALYSIS START** repeatedly until **DIALYSIS** appears on display.  
Observe venous pressure closely
  3. If the pressure remains high  
Try to realign cannula again  
Flip over or prop up with gauze

Do not attempt to realign the cannula for more than 5 minutes. It is more likely to damage the vessel and/or clot.

4. If still unsuccessful return blood via arterial cannula and re-cannulate later (venous site).

### Causes of a Low Venous Pressure

Any obstruction from the Arterial cannula to the top of the Venous bubble Trap, for example: clotted Arterial needle, kink in the line on extension, clotted kidney, kink in Venous line between kidney and bubble trap.

1. Isolator filled with saline
2. Clamp on isolator line
3. UF not on/small UF volume
4. Low blood pump speed
5. Low Arterial pressure - obstruction between Arterial cannula and Arterial pressure transducer (Isolator)

### How to Correct Low Venous Pressure

1. Press MUTE
  2. Identify where the problem is
  3. Correct problem
  4. Press **DIALYSIS START** repeatedly until **DIALYSIS** appears on display
- Ensure Venous pressure is satisfactory

# Lowering the Level in Venous Pressure and Arterial Pressure Transducer Line

## Venous Pressure Transducer (Isolator)

If a loose connection around the isolator, or an unclamped short line attached to the Venous bubble trap, the pressure in the bubble trap will force the air out and the blood level in the chamber will rise.

If the level gets too high it may rise into the Isolator line and wet the Isolator.

Press **DOWN ARROW** next to Venous bubble trap to lower level  $\frac{3}{4}$  full



## Arterial Pressure Transducer (Isolator)

A low Arterial pressure alarm will cause the Arterial transducer line to fill. If the line over-fills, the isolator will get wet.

Nurses will need to lower the blood level in the line to  $\frac{1}{4}$  full.

## Procedure for Lowering Blood Level in Arterial Isolator

1. Place clean 10ml syringe on table
2. Press **BLOOD PUMP DOWN ARROW** to 130 mls/min
3. Close **RED** clamp on transducer line
4. Disconnect the transducer from the machine
5. Place 3mls of air in a 10ml syringe
6. Connect syringe to the transducer line
7. As you push down on the plunger, open the RED clamp
  - Lower the level in the transducer line no less than  $\frac{1}{4}$  full

8. Close RED clamp on transducer line
9. Reconnect transducer and line to the machine
10. Open RED clamp from transducer line
  - Press **BLOOD PUMP UP ARROW** to original speed
11. The Arterial pressure should now return to normal.  
Your Arterial pressure is \_\_\_\_\_
12. If the Arterial pressure remains at 0 you may have a faulty transducer, follow procedure  
CHANGING TRANSDUCER

## Changing the Transducer/Isolator

Nurses will need to change the Transducer if it is

- a. Wet with blood or saline
- b. Faulty

**NOTE:** If the Transducer is wet with Saline push the Saline off the Transducer. It should read the pressure correctly.

1. Place new transducer on the table
2. Press **BLOOD PUMP DOWN ARROW** to 150 mls/min
3. Close clamp on isolator line
4. Disconnect Transducer from the machine
5. Remove Transducer from the Transducer line
6. Attach new Transducer onto the Transducer line
7. Connect new Transducer with line attached to the machine
8. Open clamp on Transducer line
9. Press **BLOOD PUMP UP ARROW** to 300-350 mls/min

## Recirculation (Going to the toilet during treatment)

**NOTE:** Blood must be returned (like coming off the machine) before disconnection of the lines.

### Procedure

1. Press **U/F PAD - OFF** - green light off
2. Open saline inlet
3. Close big red clamp (arterial line)
4. Press **BLOOD PUMPDOWN ARROW** to 180  
When line is clear (pink) blood pump automatically stops (machine displays dialysis end). If blood pump does not stop press Stop/Start button on the blood pump.
5. Clamp Venous line and cannula
6. Open big red clamp (arterial line) and let saline go in by gravity
7. Once line is pink, clamp arterial line and cannula
8. Disconnect arterial line from cannula
9. Disconnect venous line from cannula
10. Attach blue connector to arterial line and connect to venous line
11. Attach caps to cannulas (arterial & venous) and secure both cannulas well with tape.
12. Unclamp both arterial (red) and venous (blue) line. Hang over the lines within easy reach (i.e. next to the blood pump)

### Recirculation

13. Open clamps (saline inlet & roller clamp) on saline line.
14. Press **DIALYSIS START/RESET**
15. **Press BLOOD PUMP PAD - START/STOP (ON)**
  - Ensure Heparin remains on

Checklist: **Blood Pump 180**  
**Heparin On**  
**Saline Clamps Open**  
**Red and Blue Clamps are Open**  
**Venous and Arterial Pressures Satisfactory**  
**UF Off**

16. Go to bathroom
17. Reconnect as per procedure of running onto machine

# T1 Test Failure

Machine displays **T1 Test Failed**

1. Press **Test** again
2. The machine will display which part of test has failed
3. Press **Test** again
4. Machine will retest the failed part of the test and display either

## **T1 Test Passed** or **T1 Test Failed**

5. A. If **T1 Test Passed** continue with set-up procedure  
B. If **T1 Test Failed** Press TEST again and write down the message that is displayed.
6. Carry out disinfection cycle on the machine
7. Contact the Technician if still unable to pass T1 Test

# Air Detector Alarm/Air in Circuit

## IMPORTANT

**DO NOT TRY TO RESET UNTIL YOU CHECK THAT THERE IS NO AIR.**

**Purpose of Air Detector: This alarm is to protect patient from air going into their body.**

- Prime lines properly in order to avoid excess air in Venous bubble trap.
- Keep the levels of the bubble traps  $\frac{3}{4}$  full.

### How it works.

If air passes all the way through the venous bubble trap to the level of the air detector it will cause an alarm and the Blood Pump will stop. This protects patient from receiving unwanted air. On the other hand the air detector is very sensitive and may go off when tiny bubbles bounce around in the bubble trap.

**Always check the bubble trap to identify the cause if the alarm.**

When air detector alarms the following occurs:

- Audible alarm sounds
- Air detector alarm light on (Flashing)
- Red central light on
- **BLOOD PUMP** stops
- Venous line clamp shuts
- DIALYSIS START flashes
- MUTE flashes
- Arterial pressure alarm light on (Steady)

### Action

- Press MUTE
- Check to see if there is air in the line below bubble trap
- Check arterial air trap is still  $\frac{3}{4}$  full
  - If not, open clamp on short line at top  
Slowly unscrew cap on line  
When  $\frac{3}{4}$  full, close cap and close clamp
- Ensure level in bubble trap is still  $\frac{3}{4}$  full
  - Raise level if too low

- Check connections to:
  - Cannulas
  - Blood lines to dialyser
  - Heparin line to blood line
  - Saline priming line to blood line
- If no air - Press **DIALYSIS START** repeatedly until **DIALYSIS** appears on display

**If unable to remove air from the bloodline**

- Follow RECIRCULATION procedure.

Also, check for small bubbles in venous air trap

**Unable to reset the air detector**

If the whole circuit is full of air and **CANNOT CANCEL** the air detector within 5 minutes, turn off the blood pump, clamp your lines and cannulas, disconnect and **THROW AWAY** the blood in the lines and the dialyser.

## Changing the Heparin Syringe

If Heparin runs out before the due time, nurses will need to change the Heparin syringe.

Machine will alarm Heparin Pump Overload

1. Draw up 5ml of Heparin in a new 20ml syringe and place on table
2. Press **HEPARIN PAD - OFF**
3. Close clamp on Heparin line
4. Remove syringe from holder
5. Attach new syringe to Heparin line
6. Hold finger on **BOLUS** pad until Heparin pump alarm appears on display



The Bolus is delivered 5.0ml lots. If the lever stops before it reaches the bottom, remove finger from bolus pad, then press bolus pad again. Continue until Heparin Pump alarm appears on display.

7. Press **DIALYSIS START**
8. Press **UP ARROW** to raise lever to the top
9. Place syringe in holder
10. Press **DOWN ARROW** to move lever into position
11. Open clamp on Heparin line
12. Press **HEPARIN PAD - ON** - green bar

# Coming Off via Arterial Cannula

You need to do this is:

- a. Venous site is blown
- b. Venouse cannula has come out

**THE BLOOD PUMP SHOULD ALREADY BE OFF (Do not press start/reset button)**

1. Close 4 clamps: venous needle, venous blood line (BLUE), arterial needle, and arterial blood line (RED).
2. Close roller clamp on priming line and disconnect Priming line from Saline Inlet
3. Attach saline priming set to recirculator, hang within easy reach
4. Disconnect arterial blood line from arterial cannula
5. Join Arterial Bloodline (RED) to recirculator on the saline priming line
6. Disconnect Venous line from Venous cannula and cap Venous cannula
7. Connect Venous Bloodline (BLUE) to Arterial Cannula (bottom needle)
8. Open 3 clamps:
  - Venous Bloodline (BLUE)
  - Arterial Cannula
  - Arterial Bloodline (RED)
9. Open Saline roller clamp on priming set
10. Press start/reset button
11. Press BLOOD PUMP DOWN ARROW to 180
12. Press start on the blood pump
13. When blood is light pink in the Venous line, blood pump automatically stops, if not, press BLOOD PUMP OFF
14. Clamp Venous Line (BLUE) AND Arterial Cannula
  - Disconnect line from Cannula
15. Cap Arterial cannula & remove.

# Power Alarm Failure

**Emergency Operation** appears on display

This is to alert that the power has been shut off to the machine.

## How to recognise it?

1. Audible alarm sounds - **BLOOD PUMP** continues
2. 2. Dialysis start light is on
3. 3. Green central light on
4. RO turns OFF
5. Mute light flashes
6. Following panel lights cancel: **TMP**  
**CONDUCTIVITY**  
**FLOW**  
**TEMPERATURE**

## Causes:

1. Plug may have come out of the socket.
2. Circuit breaker may have tripped.
3. Power point may have been turned off.
4. An actual power failure has occurred. (No power to the house)
5. A fuse may have blown at the fuse box.

## Action:

1. Press **MUTE**
2. The blood pump of the machine will remain functional for 20 minutes, but not actually dialysing.
3. If power cannot be restored after 15 minutes, come off as usual

**NOTE:** If patient have to come off early remember that patient need to make up the time for next dialysis .

**REMEMBER** – When power returns press **RUN** button on **RO**  
Conductivity will alarm – Press **MUTE**

## Other Problems

### If you experience the following:

- a. Blood leak alarm – A blood leak and the blood leak override is not working
- b. **BLOOD PUMP** won't work - due to a technical error

### Need to finish dialysis:

1. Press **UF PAD - OFF** (light off)
2. Close all clamps on cannula and blood lines
3. Remove Venous line from clamp. **DIALYSIS END** appears on display
  - o Press MUTE
4. Disconnect lines and cap cannula
5. Remove cannula

# Flow Alarm

This alarm indicates that there is not enough water coming into the machine

1. 'Flow alarm' is displayed on the machine. Audible alarm sounds.
2. Dialysate flow below 300 - bar flashes
3. Mute flashes
4. Rec central light ON

## Causes

1. Water is not turned on at tap.
2. Failure of mains supply.
3. Blocked filter
4. Kinked tubing or machine wheels have rolled on to tubing from tap.
5. Failure of membrane on RO

## What to do

1. Ensure tap is on at wall
2. Unkink or roll wheels off tubing
3. If no water supply to rest of the house assume mains failure. Ring water board determine if water supply will be restored within minutes. If longer than five minutes, come off machine.

**FIRST** turn off **RO**

**IF THE WATER CANNOT BE RESTORED AFTER 5 MINUTES,  
PATIENT WILL HAVE TO COME OFF FROM THE MACHINE.**

If the water supply resumes, press flashing **on/off** button on the RO, press **MUTE** if conductivity alarms.

# Blood Leak Alarm

## Purpose

The blood leak detector alarm is an information of leaking fibres inside the kidney. If there are leaking fibres, the blood will leak into the dialysate.

## THIS IS NOT A NORMAL SITUATION

The blood leak detector can detect very small amounts of blood.

## If a blood leak alarm, the following occurs:

- Red central light on
- Blood leak light on
- Audible alarm sounds
- BLOOD PUMP stops
- Venous line clamp shuts
- **UF** pump and time stops
- Dialysis start flashes
- Mute flashes
- Message appears on the main screen:
  - ! Blood LeakOverride with {Conf} key (key pad)

## Action:

- If blood is visible in the Arterial (red) dialysate hose – turn blood pump off. Clamp lines and cannulas - disconnect – throw away lines.
  - Take blood lines out of the machine
  - Put the ports back into the machine
  - Take Bibag out
  - Put back red wand back into the machine
  - Press “cleaning” button
  - Select “disinfection” (highlighted green). Press confirm key
  - Notify the KS Clinical Service Director, LHD Home Therapy Unit and Fresenius Technician.
- If blood is not visible on the red dialysate hose, press the **Conf** key on the key pad

Message displays: Bld. Leak overridden

**NOTE:** Override time: 2 minutes each time the key is pressed). When in override, the **BLOOD PUMP** will work, and the dialysate flow will run as usual.

- The status indicator will go out if it's not a true blood leak
- Return blood back as you do at the end of the dialysis.

**NOTE:** If patient have only done 1 hour (or less) of dialysis, set-up new blood lines (and dialyser) again and re-start dialysis.

# Conductivity Indicator and Alarm

## Purpose

The purpose of the conductivity meter is to ensure that the correct mixture of dialysate (concentrate and water) is maintained during dialysis.

The conductivity bar graph displays:

Solid Bar - actual value

Dim Bars - limits

## How it functions

Water is mixed with concentrate in a ratio of 44 parts of water to 1 part of concentrate. When mixed together the solution formed is called **DIALYSATE**.

The conductivity is set at between 13.5 and 14.5. The limits are set at 4 bars above and below this.

The alarm will be activated if the conductivity falls below the limit or goes higher than the limit.

## Conductivity Alarm

The following will occur:

- Red central light on
- Conductivity light on (Steady)
- Audible alarm will sound
- The machine will go into bypass (the flow bar flashes)
- Mute flashes

## Dangers of Incorrect Strength of Dialysate

It is essential that the dialysate solution be the correct strength.

A too high strength of dialysate will cause patient's blood cells to shrink (Plasmolysis).

A too low strength will cause patient's blood cells to burst (Haemolysis).

**Symptoms:** Chest pain, breathlessness

**Signs:** Blood returning from the dialyser a peculiar colour (port wine colour).

## Causes of High Conductivity Alarm

1. Usually a technical problem.

2. Using the wrong concentrate.
3. Bad batch - Try another bottle
4. Water failure

ACTION: Press MUTE

If not correctable please ring KS Clinical Service Director and Fresenius Technician.

### **Causes of a Low Conductivity Alarm**

(Too much water or not enough concentrate)

1. No concentrate in Bottle/Smart Bag
2. Concentrate wand not in Bottle/Smart Bag properly.
3. Concentrate wand blocked
4. Incorrect concentrate
5. BiBag empty
6. Low water level in BiBag
7. Air in BiBag

**NOTE:** Routinely tap BiBag in last hour in Dialysis to prevent conductivity alarm.

**Action:** Press MUTE

If not correctable please ring KS Clinical Service Director and Fresenius Technician.

### **Changing the BiBag Mid Dialysis**

1. Press dialysate menu
2. Press DOWN arrow on the keypad until **EMPTY BiBAG** is highlighted green
3. Press +/- sign
4. Screen displays "yes" Press confirm
5. When BiBag is empty **LOW TEMPERATURE ALARM** appears on display
6. Remote BiBag
7. Place new BiBag in place

# Temperature Indicator and Alarm

## Purpose

The purpose of the temperature control system is to heat the DIALYSATE to 36.0°C, which will in turn warm the blood.

The temperature alarm is a safety device for protection.

The Temperature Bar displays the actual temperature

## How it functions

1. The temperature is set at 36.0°C
2. The alarm will be activated if the temperature of the dialysate is lower than 35° C or higher than 39°C

## Temperature Alarm.

The following will occur:

- Red central light is on
- The temperature bar will indicate a high or low temperature
- The machine will go into bypass (flow bar flashes)
- **UPPER TEMP ALARM** or **LOWER TEMP ALARM** appears on display

## Dangers

High Temperature

If the blood is warmed by over-heated dialysate fluid patient's red blood cells would be destroyed. (Haemolysis)

## Symptoms

Pain or tightness in the chest, shortness of breath.

## Signs

Blood returning from dialyser is a peculiar colour.

## Low Temperature

If the blood is constantly too cold patient will become cold also and the kidney and blood will be more prone to clotting.

**NOTE:** As long as dialysis machine in bypass mode is functioning, patient is protected from these conditions.

**Causes of a high or low temperature alarm**

1. The temperature may be set too high or too low (Technical problem)
2. The heater may not be functioning correctly. (Technical problem)

**Action:** Ring KS Clinical Service Director and Fresenius Technician.

# **MACHINE MAINTENANCE**

# Maintenance of Fresenius with RO

This procedure maybe included when the technician services the machine (every 6 months)

On certain occasion, i.e. whenever the pressure gauge under the machine drops below 100 KPA with the machine running, it requires to change micron filters.

## To change filters

1. Turn off **MAIN SWITCH** on dialysis machine and RO if running
2. Tun off water at tap
3. Turn on **RO**, press **RUN** button, when **RUN** button blinks, turn **RO** main switch off

### **THE ABOVE STEPS ARE NECESSARY TO RELIEVE THE WATER PRESSURE IN THE FILTER HOUSING**

4. Remove filter from either the wall or the temporary filter stand. Clean housing and replace with a new **5 MICRON FILTER**
5. Remove filter housing from behind the dialysis machine. Remove old filter. Clean housing and replace it with a new **1 MICRON FILTER**. Replace housing and **TURN ON WATER** at tap.
6. Check for any water leaks

# Maintenance If Machine is Not Used for More Than One Week

## To be performed at least twice a week

1. Turn on water at wall, turn on the RO MAIN SWITCH, push the RO RINSE button. After about one hour the rinse light will go out. The rinsing is complete, Turn off RO MAIN SWITCH, water, and power at wall.

## To use the machine again

1. Switch on power at wall
2. Turn on water at tap
3. Press MAIN SWITCH button on RO
  - Press RUN button on RO (solid light)
4. Press ON/OFF on machine
5. Wait 30 seconds for 4008S /V11.8 to appear on display
  - Press CLEANING
  - Under cleaning menu, arrow down & select HOT DISINFECTION (highlighted in GREEN). (Cycle takes around 30 minutes)
  - Press confirm button on the keypad
6. If patient desire to use the machine straight after the above, it will require to "cool down" the machine by putting the machine into RINSE mode, otherwise it will experience High Temperature alarms

**If not been able to perform the above twice a week, nurses will need to perform the following:**

1. Switch on power at wall
2. Turn on water at tap
3. Turn the **RO MAIN SWITCH** on, push the **RUN** button, when the **RUN** button flashes, turn **RO MAIN SWITCH** off.

**THIS IS NECESSARY TO RELIEVE THE WATER PRESSURE IN THE HOUSING.**

4. Remove both the filters from the housings at the wall and under the machine, replace these filters with new 1 and 5 micron filters, replace housing.

**DO NOT TURN ON THE WATER;** let them dry until you return to use the machine.

**To use machine again**

1. Turn on water and power
2. Rinse **RO**
3. Disinfect machine

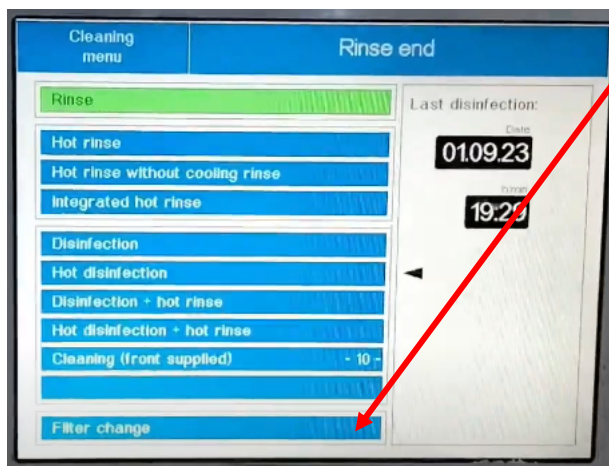
# Changing Diasafe Plus Filter

## The Diasafeplus Filter Requires Changing if:

- The maximum service life of the filter reached.
- 100 treatments have been performed
- 11 bleach cycles have been performed
- The filter is defective (T1 test failed)

## Change Filter Procedure (Patient must be disconnected)

1. Press **Cleaning** key
2. Press down arrow on the keypad - Highlight **Filter Change program**



3. Press **Conf** key
  - a. Yellow text box reads ! Empty Filter
  - b. Filterx is being drained of fluid
  - c. Yellow text box reads ! Filter Changed?
4. Open the locking levers



5. Slide the used filter upwards and out of the guide slot and discard old filter



6. Remove the new filter from the packaging. Write the date on the orange sticker and place it on the side of the new filter
7. Remove the protective straps and slide the new filter from the top into the guide slot and close locking levers



8. Press **Conf** key
9. Yellow text box reads ! Filling Filter
10. Once the filter is primed the **Cleaning** Menu is displayed
11. **Hot disinfection** is highlighted
12. Press **Conf** key

Lever down



Orange sticker



## Stock Maintenance

Should discuss any changes in regime with KS.

If run out of stock or require extra equipment and the stocktake is not due yet, contact the company for a top up of the supplies.

We encourage patient to avoid hoarding of stock due to space issues and wastage.

**DO NOT OPEN ALL BOXES UPON RECEIPT. ONLY OPEN THEM AS NEEDED.**

### **What are required to do for stocktake:**

- Count any remaining sealed stock boxes.
- Count any remaining ancillaries i.e. concentrates, tapes, citrosteril, sharps container, etc.
- The stock company will call two weeks before delivery date to discuss a stocktake
- Patient will need to be able to tell the stock representative how many boxes have left, and if patient need any extra stock.
- The stock representative will then calculate the amount of stock will require to last for 2 months (or a month if on monthly delivery), and give a delivery date.
- Patient will need to be home or have someone at home to accept delivery.

# **SELF CARE MAINTENANCE**

## **HANDWASHING: Vital for infection prevention**

It is essential to perform handwashing before setting up machine, and before cannulating.

Hands are covered with bacteria, viruses and fungi. Most of the bacteria have a permanent home on the skin and are not normally infectious but in their own environment. However, all bacteria are opportunistic and will cause severe infections if they are allowed to go where they should not be. All types of bacteria, fungi and viruses cause trouble if they get inside the fistula which is normally sterile (completely free from germs).

If handwashing is not done before handling dialysis equipment or fistula or graft, the bacteria on the hands will be transferred to everything you touch- the end result will be infected fistula, and possibly loss of fistula.



### **Points to remember**

- Use running water - even if you have to use the cold tap
- Use antibacterial liquid soap only
- Remove large jewelry
- Ensure nails are clean and short
- Rub all surfaces of the hands and wrists - not forgetting the back of the hands and between fingers
- Use paper towel to dry hands and turn off the taps
- After hand washing do not touch anything other than the dialysis equipment
- Keep skin healthy by using lots of hand cream after treatment.
- Report any infections or hand irritations to the Doctor

## What is Vascular access?

Vascular access is a surgical procedure which involves joining an artery and vein together in order to be able to have sufficient blood flow for Haemodialysis.

There are two types of permanent access:

- Native (A-V Fistula)
- Artificial (Graft)

The A-V (arteriovenous) fistula or graft have in the arm or leg provides a safe, efficient and reliable access to the bloodstream.

Whether on haemodialysis or peritoneal dialysis, it is always important to look after the access at all times.

If the access is inaccessible or infected, a temporary Vascular Catheter in place for haemodialysis.

A healthy fistula looks/feels:

- Dry
- Clean
- No redness
- No tenderness
- No oozing
- Soft
- Bruit and thrill present
- Pulsating

Maintaining fistula involves:

- Checking fistula for a bruit daily
- Wash arm before cannulating
- Contact KS Clinical Service Director and LHD Home Therapy Unit if
  - Cannot feel a bruit
  - You notice signs of infection: redness, heat, discharge

## Care of Fistula/Graft

- Check access three times a day for the presence of the thrill/ buzzing feeling when touch the skin over the access site or a bruit (churning or swishing sound when listen with a stethoscope).
- Notify KS Clinical Service Director and LHD Home Therapy Unit immediately if access is not working or having problem cannulating.
- Avoid wearing tight garments, watches or bracelets on the access arm so not to restrict the flow of the fistula.
- When carrying bags or parcels make sure the straps or handles are not hooked over the access arm
- Ensure that no blood pressure measurements are taken on patient's fistula arm
- Make sure that no blood specimens are taken or injections are given in the fistula arm
- If access seems red, tender, swollen, hot or there is any discharge report to KS Clinical Service Director and Renal Home Therapies Unit (during working hours) and/or Emergency Department immediately.
- Avoid sleeping with access arm under the pillow or body.
- Ensure cannulation sites are well covered and protected after removal of needles for at least after 24 hours.
- If any pets (dogs, cats, etc.), or are near any animals, ensure that the fistula is well covered & protected (i.e. long-sleeves shirt/pants/clothing, clean dressing/gauze squares secured with tape).
- If in a dusty environment, ensure that the fistula is well covered and protected (i.e. long-sleeve shirts/clothing). An old sock with the end cut-off could be a protective cover. Ensure the cover is non-constrictive

## Exercise program for the fistula

Develop an exercise program for the fistula, exercising fistula is an important step in the development of a strong reliable and mature fistula for long term dialysis.

### Exercise program:

- Let arm hang down by the side

- Squeeze the exercise ball firmly for one to two minutes; repeat the exercise often, preferably do this four times a day.
- Once it start using the fistula for haemodialysis, continue the exercise this will keep the fistula strong

**NOTE:** Do not use tourniquet whilst exercising the fistula.

## Ideal Body Weight (Target Weight)

The ideal body weight (target weight) is when fluid weight is in balance, i.e. patient are not showing signs of too much fluid (fluid overload) or too little fluid (dehydration). It is important to stay as close to ideal weight (target weight) as possible, to maintain a good blood pressure.

*If patient is above ideal weight, patient may demonstrate one or more of the following signs:*

- Blood pressure higher than normal
- Puffy eyes, ankles or fingers
- Difficulty with breathing, especially when lying flat
- Tiredness
- Headache

*If patient is under ideal weight, patient may show the following signs:*

- Blood p-essure lower than normal
- Feeling faint or dizzy when standing
- Feeling thirsty
- Dry mouth, skin

It is essential to keep a daily record of weight and blood pressure to see if weight is creeping up.

## Eating Guide for Haemodialysis

The kidneys remove waste products, excess water and excess minerals from the body. These waste products come from foods after the body has digested them. The waste products are filtered out of the blood by the kidneys and pass into the urine.

When the kidneys no longer work, the haemodialysis takes over the job of removing the waste products from the body.

However, it is still important to be careful with what patient eat and drink to help keep feeling well.

# 1. Protein Foods

When having dialysis some protein is removed from the body. If patient don't eat enough protein, the muscles will start to waste away as patient lose more protein from body.





**To prevent muscle wasting patient needs to include protein foods in meals 2 or 3 times every day. Examples of protein food include those pictured below:**

Talk to the Dietitian about how much of these foods to eat.

The best protein foods are:

Meat	Fish	Seafood	Poultry	Eggs
				

Other good choices include:

Milk, Soy Milk	Cheese	Yoghurt	Dried Beans, lentils (instead of meat)
			

## 2. Salt

It is best to avoid salt because it may increase blood pressure, cause fluid build up and can make patient thirsty. This can lead to heart disease, stroke and breathing problems. But don't despair. the taste buds will adjust to having less salt within a few weeks.

To help cut down the amount of salt use, try the following ideas:

- Use "salt reduced" products when they are available e.g. Salt reduced margarine and no added salt tomato sauce.
- Do not add salt or salty sauces to food at the table or in cooking
- Use herbs, spices, lemon, garlic and vinegar to flavour foods
- Do not eat salty foods such as bacon, ham, corned meats or salami. Instead try roast meats, tuna and salmon in oil or spring water.
- Takeaway foods are generally high in salt. It is best to eat these foods only about once per month.

### 3. Phosphorus

The right balance of phosphorus and calcium is important to keep bones strong. In kidney failure the phosphate can build up in blood and the calcium can be lost from bones. This can lead to weak bones that are easily broken. Too much phosphate in blood can also cause itchiness.

To help control blood phosphate level patient should:

1. Avoid foods that are high in phosphorus:

- cola soft drinks
- chocolate
- nuts, peanut butter
- Vegemite, Marmite
- organ meats e.g. brains, liver, kidney
- processed meats e.g. frankfurts, sausages, salami, devon
- pate, liverwurst, fish paste
- packet soups, stock powder and cubes
- egg noodles

2. Milk and milk products are high in phosphorus.

Try to have no more than 1 - 3 serves of the following foods each day.

1 serve is:

- 100ml milk
- ½ carton (or 100g) of plain or flavoured yoghurt
- 2 scoops of ice cream
- ½ cup of custard
- 1 slice of cheese (20g)

3. Take phosphate binder tablet with first mouthful of food at mealtime as advised by the doctor. These bind the phosphate from food before it can be absorbed into blood. Common phosphate binders include Caltrate, Fosrenol, Renagel, and Velphoro.

## 4. Potassium

Potassium is a mineral found in most foods. It is needed by all muscles in the body. Potassium cannot be seen, tasted or smelled in food.

Kidneys remove extra potassium from body. When the kidneys are not working well, too much potassium can build up in the blood. This can lead to serious heart problems, including a heart attack.

An eating plan low in potassium will help to prevent this. Some foods have more potassium than others. Use the following table to control intake.

### Fruits high in potassium

- Apple
- Avocado
- Banana
- Orange
- Peach
- Prunes
- Dried fruit
- Nuts
- Baked beans
- Soya beans
- Cabbage
- Carrots
- Peas
- Potato
- Pumpkin
- Tomatoes

### Vegetables high in potassium

- Green beans

### Dairy products high in potassium

- Soy
- Yoghurt
- Ice cream

## Schedules

- ✓ Blood test: first week of each month (mid-week) before dialysis.
- ✓ Iron Infusion: 200mg (2 ampoules) in 100ml saline each month. Second week of the month, mid-week (Wednesday or Thursday) or last dialysis day (i.e. Friday or Saturday).
- ✓ Diasafe filter change (back of the machine) - every 4 months
- ✓ Micron filter change (water treatment) 1 and 5 micron - every month (Sunday) or as instructed by the technician.
- ✓ Fistula access flow measurement - every 3 months (every month for grafts)
- ✓ Kidney doctor (Nephrologist) - clinic visit as per schedule (usually every 3 months)
- ✓ Vascular surgeon - follow-up at least every 6 months (more frequently if patient have problems with fistula)

## Notes