Troubleshooting Guide

for the multiFiltrate



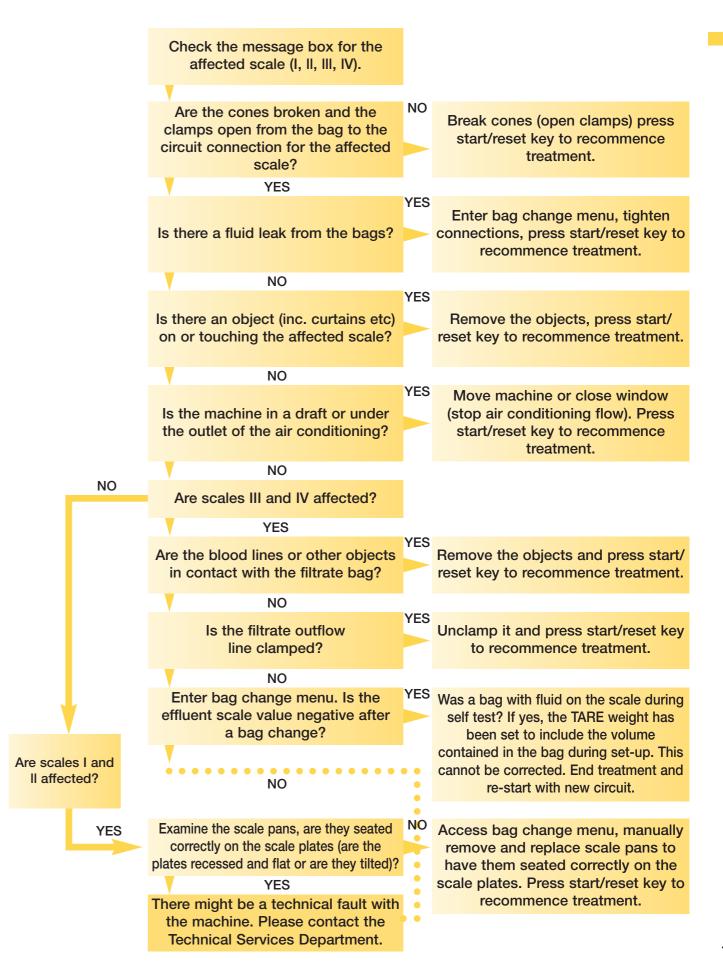
Contents

Introduction Balancing error on scales 2 Arterial pressure too low Arterial pressure too high 3 Venous pressure too low 5 Venous pressure too high TMP pressure too low TMP pressure too high 8 Blood leak detected 9 Air detected in venous return chamber Pressure before filter too low 10 Pressure before filter too high 11 12 Non-opaque/opaque fluid detector Balancing error - UF rate or substituation rate too high 13 Heater unable to achieve set temperature 14 15 Heater over temperature Scales reverse alarm 16 Drop Counter Rate Citrate/Calcium too low 17 Drop Counter Rate Citrate/Calcium too high 18 Recommended filter size and blood flow rates 19 Useful contact numbers 20

This Guide has been produced by Fresenius Medical Care to help you get the best out of the multiFiltrate machine. This Guide is intended as a support tool and will not replace the operating manual or the judgement and experience of the nurse and the attending physician.

Please read this Guide and familiarise yourself with the content. This Guide contains information on how to resolve some of the most common machine alarms. This Guide is intended to be kept with the multiFiltrate machine so it is always to hand. Decisions concerning specific treatments for patients are within the sole responsibility of the attending physician and nurse.

Balancing error on scales

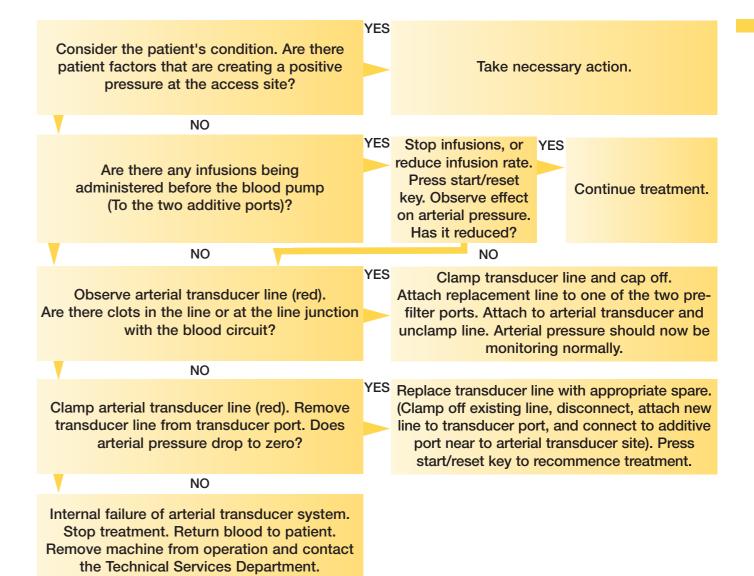


Arterial pressure too low

YES Unkink catheter, press start/reset to Is the patient catheter kinked at the patient end? recommence treatment. NO Manipulate catheter. Press start/reset key until Is the access catheter in the correct flow is re-established. Consider swapping position to allow adequate flow? over lines if difficult to re-establish flows. YES NO Internal failure of arterial pressure sensor. Press start/reset key. Clamp and disconnect Stop treatment. Washback patient blood. arterial transducer line. Does arterial pressure Remove machine from service and contact the drop to zero? Technical Services Department. YES Replace transducer line with appropriate spare. Check the arterial transducer line (red). Has (Clamp off existing line, disconnect, attach new line to transducer port, and connect to additive fluid advanced all the way to the hydrophyllic filter? port near to arterial transducer site). Press start/reset key to recommence treatment. NO YES Is there a clot at the base of the arterial Replace line as detailed above. transducer line (red)? NO Remove clots manually, following unit policy. Establish if there are clots in the catheter. Flush catheter once clots removed, Are there clots in the access catheter? recommence treatment with start/reset key. NO YES Reconnect arterial transducer line (red). Blood Consider patient's hydration - have they become underfilled? Consult medical staff for pump rate may be too high for patient's condition. Reduce blood pump speed. fluid assessment. Consider reducing goal for Does this reduce the negative pressure? fluid removal. NO YES Consider general circuit clotting. It may be Has the circuit been up for a significant period, time to change the circuit before failure due to do they have a high platelet count? clotting. NO

There might be a technical fault with the machine. Please contact the Technical Services Department.

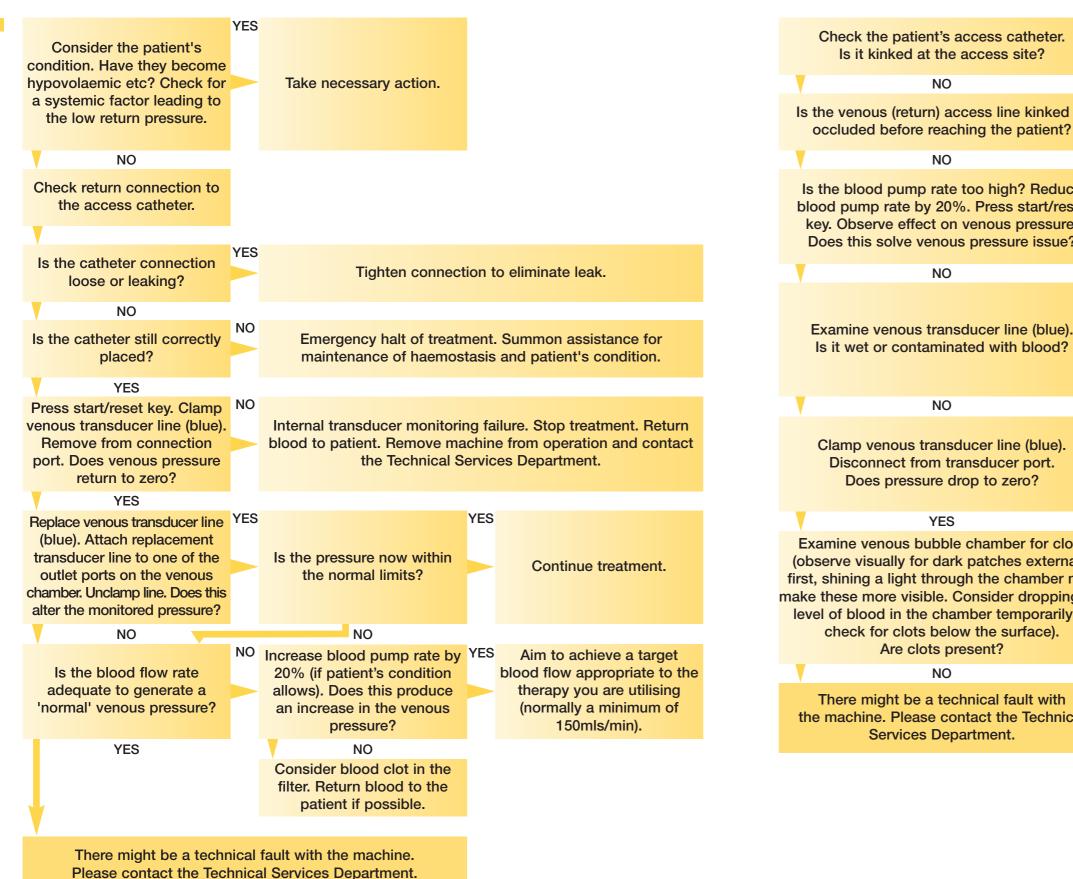
Arterial pressure too high



Please refer to Page 20 for useful contact telephone numbers.

Venous pressure too low

Venous pressure too high



Unkink catheter, press start/reset key to recommence treatment. YES Manipulate catheter. Press start/reset key until Is the venous (return) access line kinked or flow is re-established. Consider swapping occluded before reaching the patient? over lines if difficult to re-establish flows. Run circuit at reduced pump speed. If pump Is the blood pump rate too high? Reduce speed needs to be less than 150 - 180 mls per blood pump rate by 20%. Press start/reset minute, consider the circuit to be clotting. key. Observe effect on venous pressure. Consider circuit washback and recommence Does this solve venous pressure issue? treatment. YES Clamp and cap existing transducer line. Attach replacement line to one of the two Examine venous transducer line (blue). ports on the venous chamber and to the venous transducer port. Unclamp line. Venous pressure monitoring should be re-established. Potential internal monitoring failure. Washback circuit, remove machine from operation and contact the Technical Services Department. Examine venous bubble chamber for clots (observe visually for dark patches externally Consider clotting as the potential cause of first, shining a light through the chamber may venous pressure increase. Consider circuit make these more visible. Consider dropping the washback if venous pressure is excessive. level of blood in the chamber temporarily to Reducing pump speed will reduce venous pressure in the short term. the machine. Please contact the Technical

Please refer to Page 20 for useful contact telephone numbers.

TMP pressure too low

TMP pressure too high

Increase the replacement fluid rate by 20%. Press start/reset key. Does this increase the TMP pressure?	YES	Ensure replacement rate is kept at a suitable level for the patient's body mass and the size of the filter being used.		
NO				
Is the blood pump rate high enough? Increase the blood pump rate by 20% (if tolerated by the patient). Does this increase the TMP pressure?	YES	Aim for a blood pump speed that is adequate for the therapy chosen, the replacement fluid volume selected and the filter size used.		Discontinue treatment, recommence when able. If the
NO				leak may be due to a
Is there a leakage in the tubing system from the filter to the waste bag?	YES	Can the connections be tightened to stop the fluid leak (and re-establish correct pressure)?	NO	manufacturing error, retain kit for examination in a yellow plastic bag. Contact the Quality Helpline to report incident and arrange
NO		YES		collection of kit in question. Observe for further failures of
↓		Press start/reset key and recommence treatment.		same batch in short term.
	VEC	B	\/F0	
Is there a pre-filter infusion running?	YES	Reduce infusion rate, or change infusion site. A change in blood viscosity can artificially reduce the TMP. Has this altered the TMP pressure?	YES	Press start/reset key and recommence treatment.
NO NO		NO		
Check the yellow pressure transducer. Is it wet?	YES			
Check the yellow pressure	YES	The TMP pressure transducer cannot be replaced. Accurate TMP pressure monitoring will no longer be possible. It is advised that the patient's blood be washed back and treatment be		
Check the yellow pressure transducer. Is it wet?	YES	The TMP pressure transducer cannot be replaced. Accurate TMP pressure monitoring will no longer be possible. It is advised that the patient's blood be washed back and treatment be recommenced with a new circuit.	YES	Press start/reset key and recommence treatment.
Check the yellow pressure transducer. Is it wet? NO Check the white pre-filter	-	The TMP pressure transducer cannot be replaced. Accurate TMP pressure monitoring will no longer be possible. It is advised that the patient's blood be washed back and treatment be recommenced with a new circuit. Clamp line and remove from the white pressure transducer port. Attach replacement transducer line to the port on the top of the arterial chamber, and then to the pressure monitoring port. Unclamp the line. Has this altered the	YES	
Check the yellow pressure transducer. Is it wet? NO Check the white pre-filter transducer line. Is it wet?	-	The TMP pressure transducer cannot be replaced. Accurate TMP pressure monitoring will no longer be possible. It is advised that the patient's blood be washed back and treatment be recommenced with a new circuit. Clamp line and remove from the white pressure transducer port. Attach replacement transducer line to the port on the top of the arterial chamber, and then to the pressure monitoring port. Unclamp the line. Has this altered the monitored TMP pressure?		
Check the yellow pressure transducer. Is it wet? NO Check the white pre-filter transducer line. Is it wet? NO Consider undiagnosed issue with the fluid lines or machine. Discontinue treatment. Wash blood back to patient. Once circuit is unloaded, switch machine off and then switch on. Perform pre-	YES	The TMP pressure transducer cannot be replaced. Accurate TMP pressure monitoring will no longer be possible. It is advised that the patient's blood be washed back and treatment be recommenced with a new circuit. Clamp line and remove from the white pressure transducer port. Attach replacement transducer line to the port on the top of the arterial chamber, and then to the pressure monitoring port. Unclamp the line. Has this altered the monitored TMP pressure? NO Return machine to patient use. Retain used kit for examination, place in yellow bag. Contact the Quality Helpline to report incident and arrange collection of kit in question. Observe for further failures		
Check the yellow pressure transducer. Is it wet? NO Check the white pre-filter transducer line. Is it wet? NO Consider undiagnosed issue with the fluid lines or machine. Discontinue treatment. Wash blood back to patient. Once circuit is unloaded, switch machine off and then switch on. Perform pre-treatment self test. Is test passed? NO	YES	The TMP pressure transducer cannot be replaced. Accurate TMP pressure monitoring will no longer be possible. It is advised that the patient's blood be washed back and treatment be recommenced with a new circuit. Clamp line and remove from the white pressure transducer port. Attach replacement transducer line to the port on the top of the arterial chamber, and then to the pressure monitoring port. Unclamp the line. Has this altered the monitored TMP pressure? NO Return machine to patient use. Retain used kit for examination, place in yellow bag. Contact the Quality Helpline to report incident and arrange collection of kit in question. Observe for further failures		

YES Is there evidence that the filter Consider that the circuit has reached its lifespan. Wash back blood to is clotting? (Associated rise in the patient and recommence treatment. If circuit lifespan has been the pre-filter pressure, visibly low, consider the dose of anticoagulant, exchange rate, blood pump clotted areas at the top surface rate etc. of the filter etc). YES Is the effluent outlet line Unclamp line and press start/reset key to recommence treatment. clamped? NO YES YES Check the blood pump rate, is it Reduce blood pump rate to too high for the filter size? within acceptable operating (Check reference ranges of limits. Press start/reset key. Has Continue treatment. maximum blood flow rates for this altered the monitored TMP AV 600 and AV 1000 filters). pressure? NO Press start/reset key. Check the YES Either reduce the rate of ultrafiltrate YES removal, or increase the blood blood pump rate to ultrafiltration pump rate to compensate. Press Continue treatment. rate ratio (BPR/UFR). Is this too start/reset key. Has this altered the high (above 20%)? monitored TMP pressure? NO NO The TMP pressure transducer cannot be replaced. Accurate TMP Check the yellow pressure pressure monitoring will no longer be possible. It is advised that the transducer. Is it wet? patient's blood be washed back and treatment be recommenced with a new circuit. NO YES Clamp line and remove from the YES white pressure transducer port. Attach replacement transducer Check the white pre-filter line to the port on the top of the Press start/reset key to transducer. Is it wet? arterial chamber, and then to the recommence treatment. pressure monitoring port. Unclamp the line. Has this altered the monitored TMP pressure? NO NO Is the venous return line kinked YES Unkink or clear return line to re-establish unimpeded flow. or occluded? Press start/reset key to recommence treatment. NO Consider undiagnosed issue with the YES Return machine to patient use. fluid lines or machine. Discontinue Retain used kit for examination. treatment, Wash blood back to place in yellow bag. Contact Quality patient. Once circuit is unloaded, Helpline to report incident and switch machine off and then switch arrange collection of the kit in on. Perform pre-treatment self test. Is question. Observe for further test passed? failures of same batch in short term. NO There might be a technical fault with the machine.

Please contact the Technical Services Department.

Blood leak detected

YES

Air/microbubbles detected in venous return chamber

Check filtrate line for the presence of 'frank' (visible) blood. Can you see blood in the line?

Visible blood suggests a significant membrane failure. Were TMP pressures high before blood leak detected, or has it failed very early in treatment?

Consider filter production issues. Retain filter in yellow bag for collection by Fresenius staff. Take filter reference number if possible. Contact Quality Helpline to report incident and arrange collection of filter in question. Observe for further failures of same batch in

short term.

NO

Microscopic blood leak.
Consider unit policy on
microscopic blood leak
(washback or continue as
advised by local policy).
Clotting will occur within filter
once the membrane has
ruptured, circuit lifespan is
likely to be greatly reduced.

Discontinue treatment.
Washback circuit blood and recommence treatment.

YES

NO Has the treatment begun - is Lower venous chamber using down arrow until chamber is clear of air. blood in the venous chamber? Raise using up arrow. Press start/reset key to recommence treatment. YES Use up arrow to raise the level Is the level of blood above the of the venous chamber to within air detector (within 2 cm of the 2cm of the top. top of the venous chamber)? Press start/reset key. YES Raise the level of the bubble YES chamber above the inflow port of Press start/reset key. Has the the replacement line. Check for any replacement fluid flow become turbulent following a bag change remaining air in the replacement line. Continue treatment, observing (small amounts of air entering via the replacement line)? for any drop in the level of blood in the chamber. NO YES YES Check connections on fluid replacement bags. Tighten if Is a large amount of air entering Does the source appear to be necessary. Check connection of the bubble chamber? the replacement fluid line? line to the venous bubble chamber. Tighten if required. NO NO YES Check outlet connection to the filter. Tighten if necessary. Check Does the source appear to be the 2 pre-filter fluid additive the filter outlet line (blue)? ports are clamped. Check that access line is not kinked. NO Are the two additive ports on the top of the venous chamber Clamp port lines. firmly clamped? YES If a large amount of air is entering the circuit from an unidentified source, attempt to wash the blood back. It may not be possible to achieve safely. Disconnect patient. Consider circuit flaw. Retain circuit for examination in yellow bag. Contact Quality Helpline to report incident and arrange collection of circuit in question. Observe for further failures of same batch in short term. YES Raise the level of the chamber Is the replacement flow turbulent due to a low level using the up arrow to above the in the venous chamber? inlet port. NO If a cause of the air detector alarm cannot be identified, the blood should be returned to the patient if possible and treatment discontinued. (Note, it may not be safe to return the blood if it appears to be frankly airated). Please contact the Technical Services Department.

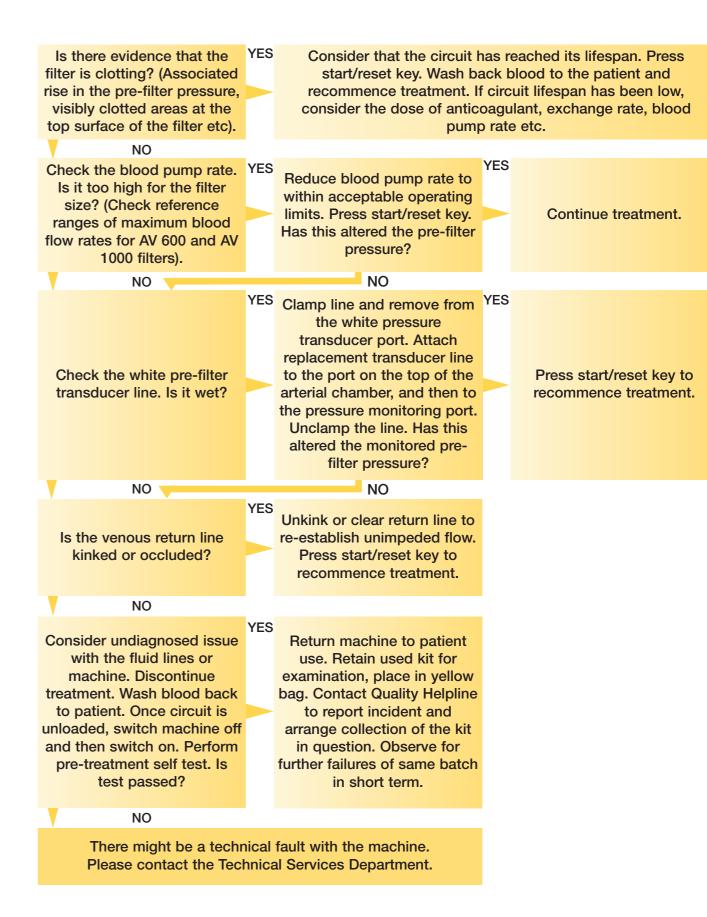
9

Please refer to Page 20 for useful contact telephone numbers.

Pressure before filter too low

Pressure before filter too high

Press start/reset key. Is there any visible leakage in the	VEC			
tubing system? (Consider from the patient access to the filter blood circuit connector).		Tighten loose connections, e	nsure pamped.	ore-filter additive ports are
NO				
Is the pre-filter pressure transducer (white) connected firmly and correctly?	NO	Tighten transducer into cor threaded and a tight fit is no pressure transducer with a rep of the arterial	longer olacem	possible replace pre-filter ent line attached to the top
YES	•			
Check the white pre-filter transducer line. Is it wet?	YES	Clamp line and remove from the white pressure transducer port. Attach replacement transducer line to the port on the top of the arterial chamber, and then to the pressure monitoring port. Unclamp the line. Has this altered the monitored TMP pressure?	YES	Press start/reset key to recommence treatment.
NO NO		NO		
Check blood pump segment. Is it correctly positioned within its housing?	NO	Stop blood pump tempor Manipulate pump segment un housing. Close door	til bloo	d tubing lies correctly in its
YES				
VES Consider undiagnosed issue with the fluid lines or machine. Discontinue treatment. Wash blood back to patient. Once circuit is unloaded, switch machine off and then switch on. Perform pre-treatment self test. Is test passed?	YES	Return machine to patient use. Retain used kit for examination, place in yellow bag. Contact Quality Helpline to report incident and arrange collection of the kit in question. Observe for further failures of same batch in short term.		
Consider undiagnosed issue with the fluid lines or machine. Discontinue treatment. Wash blood back to patient. Once circuit is unloaded, switch machine off and then switch on. Perform pre-treatment self test. Is		Return machine to patient use. Retain used kit for examination, place in yellow bag. Contact Quality Helpline to report incident and arrange collection of the kit in question. Observe for further failures of same batch		



Please refer to Page 20 for useful contact telephone numbers.

Non-opaque/opaque fluid detector

Balancing error - UF rate or substituation rate too high

If alarm persists,

override alarm. If

blood pump rate

due to the patient's

condition, then

reduce the rate of

replacement fluid

until BPR/UFR is

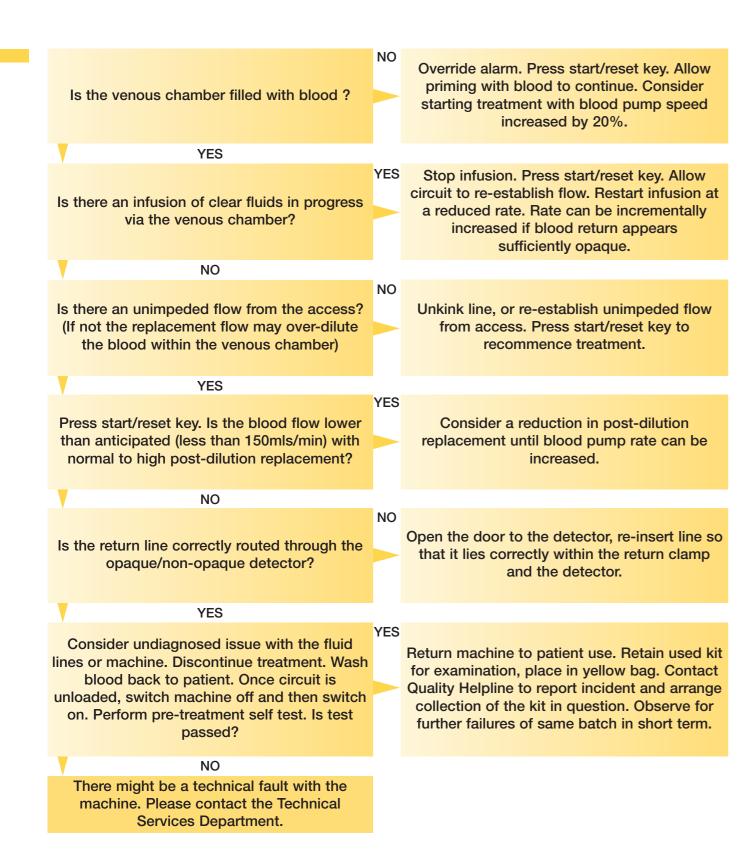
alarm persist?

YES

to recommence

treatment.

NO

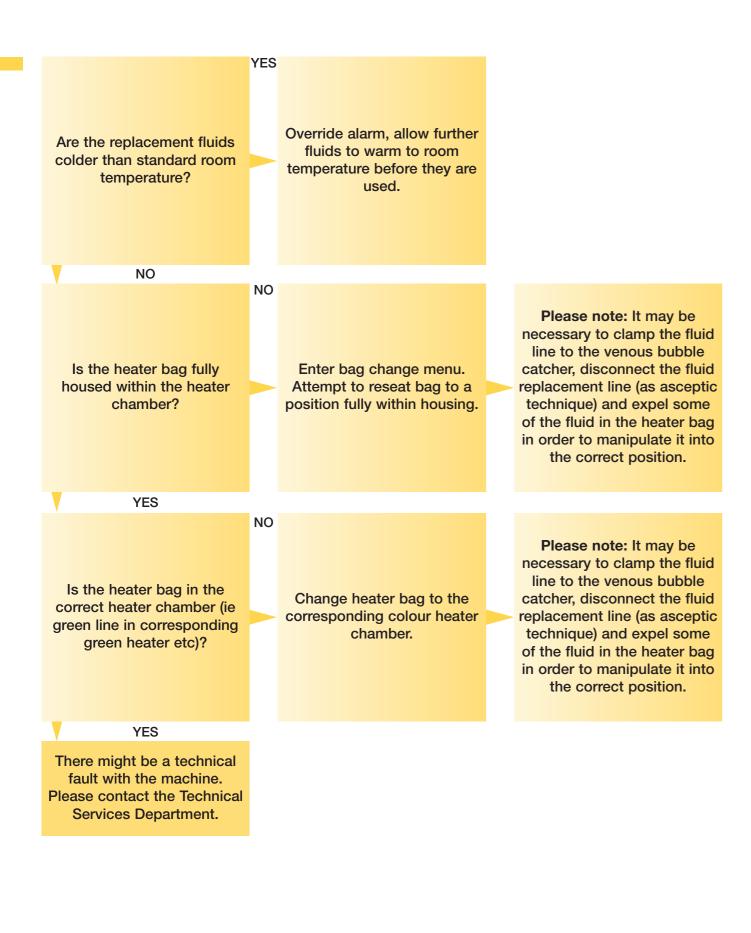




Please refer to Page 20 for useful contact telephone numbers.

Heater unable to achieve set temperature

Heater over temperature



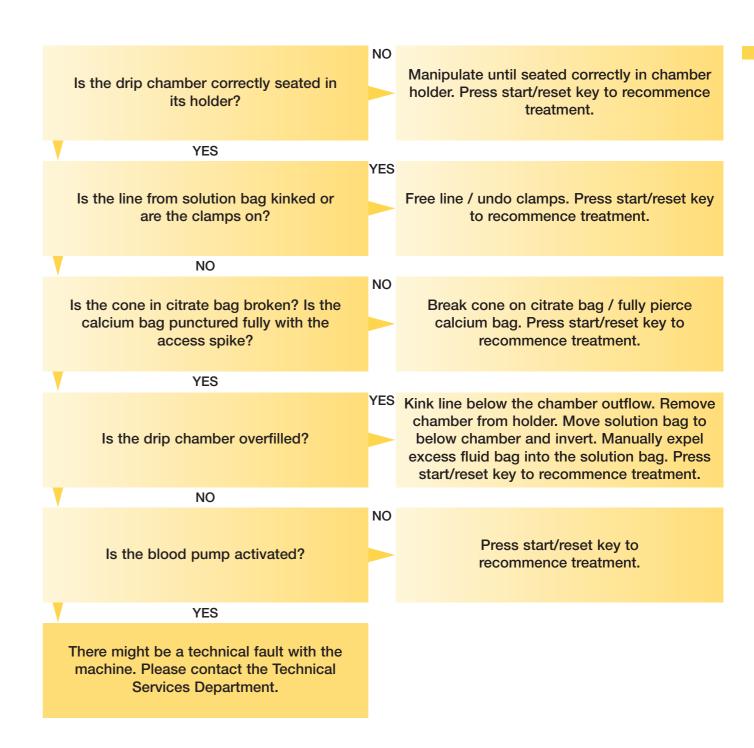
Initially allow alarm to occur, reset 2-3 times, particularly if replacement flows are very low. NO Press start/reset key to Does the alarm persist? recommence treatment. YES NO Please note: It may be necessary to clamp the fluid line to the venous bubble Reposition heater bag until catcher, disconnect the fluid Is the door to the heater door closes fully. Press replacement line (as asceptic chamber fully closed? start/reset key to technique) and expel some recommence treatment. of the fluid in the heater bag in order to manipulate it into the correct position. YES NO Please note: It may be necessary to clamp the fluid Change heater bag to the line to the venous bubble Is the heater bag in the corresponding colour heater catcher, disconnect the fluid correct heater chamber (ie chamber. Press start/reset replacement line (as asceptic green line in corresponding key to recommence technique) and expel some green heater etc)? of the fluid in the heater bag treatment. in order to manipulate it into the correct position. YES Check if the clamps in the replacement fluid bag are open. If Is there air in the not, open the clamps. Then enter bag change menu. Select deaeration of corresponding line. Carry out deaeration heater bag? procedure. Continue treatment. NO There might be a technical fault with the machine. Please contact the Technical Services Department.

Please refer to Page 20 for useful contact telephone numbers.

Scales reverse alarm

Are the bags sat on the wrong scale for corresponding pump? NO There might be a technical fault with the machine. Please contact the Technical Services Department.

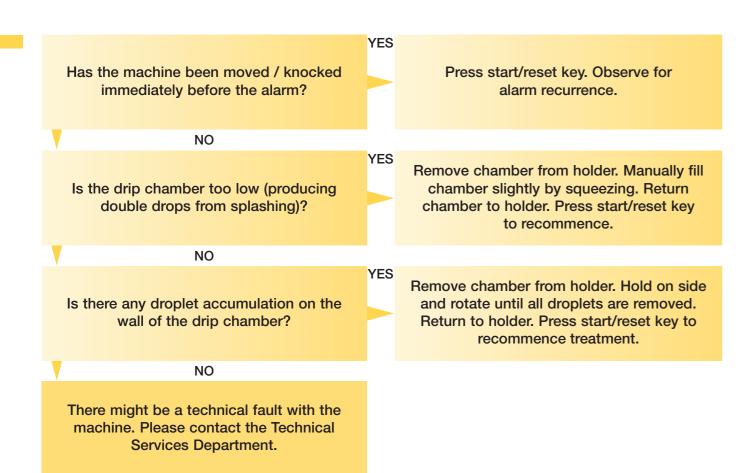
Drop Counter Rate Citrate/Calcium too low

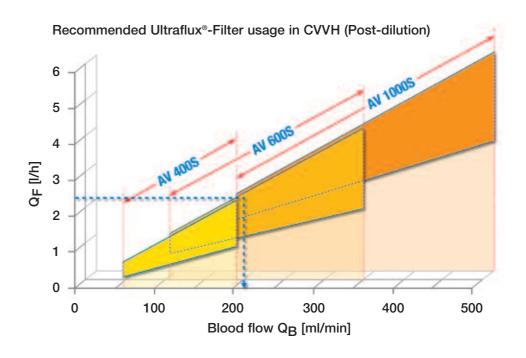


Please refer to Page 20 for useful contact telephone numbers.

Drop Counter Rate Citrate/Calcium too high

Recommended filter size and blood flow rates





Useful contact numbers

If you have followed all the advice in this guide, and you are still experiencing problems, please refer to the table below to help you decide how to proceed.

		8.30am - 5.00pm	Telephone		
	Monday to Friday	Fresenius Medical Care (Switchboard)	01623 445100		
Day of week	Monday to Friday	Technical Services Department	01623 445197		
Day of	Monday to Friday	Quality Helpline	01623 445215		
	24/7	Acute Operational Helpline*	08704 587971		

^{*} All calls are put through to a call centre in the UK. The call centre will bleep the on-call person who in turn will respond to the customer within 15 minutes.

