

Acute Therapy Systems

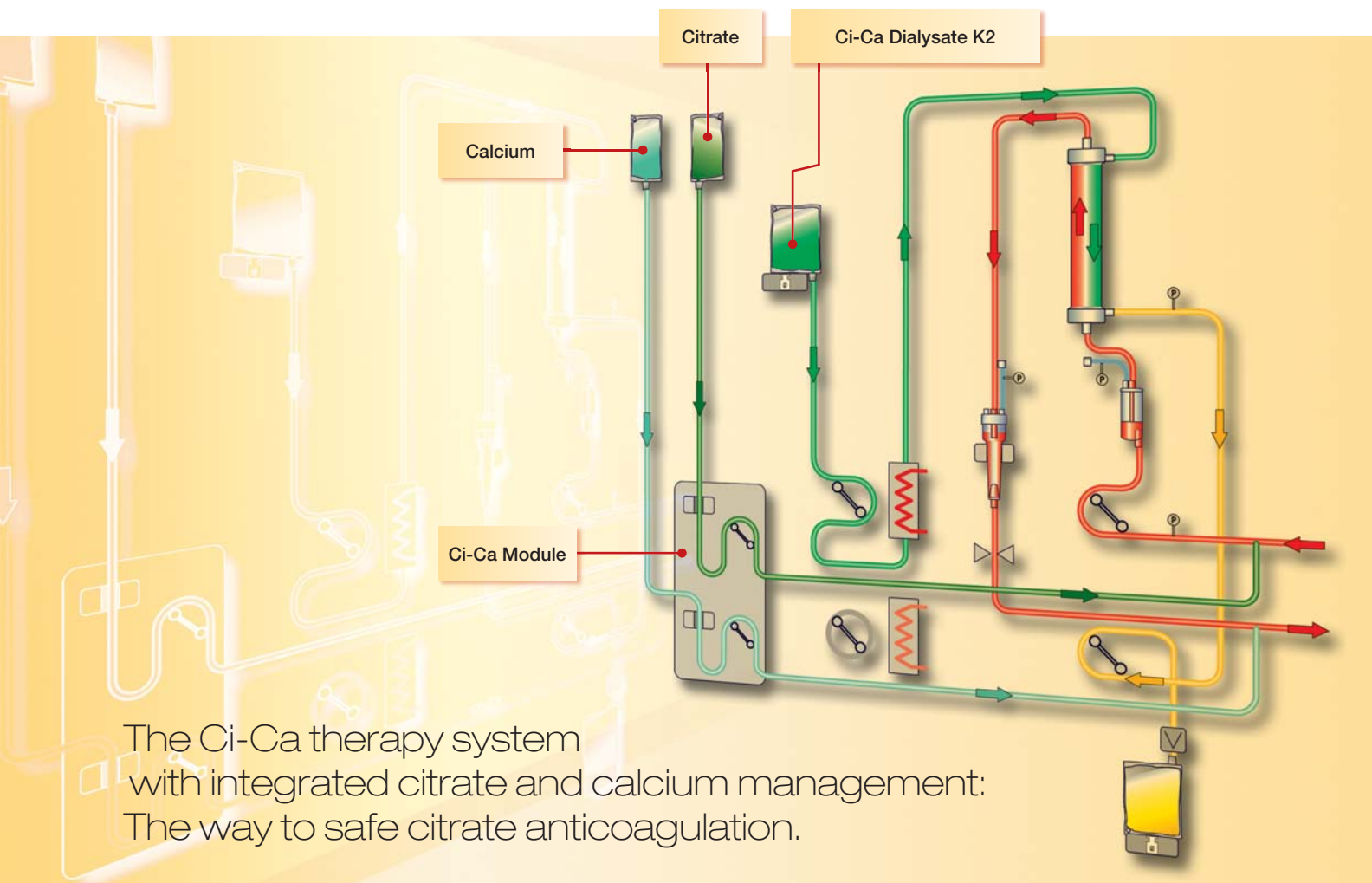
Ci-Ca

The way to safe citrate anticoagulation



Fresenius Medical Care

The Ci-Ca Therapy



Citrate anticoagulation

- Citrate forms complexes with ionised calcium, which leads to an effective anticoagulation in the extra-corporeal circuit.
- The infused citrate is eliminated partially by both diffusion and metabolism, which avoids systemic anticoagulation.

Advantages of citrate anticoagulation

- More effective treatment and less therapy disruptions due to reduced clotting
- Clearly reduced risk of bleeding complications compared to systemic anticoagulation, such as with heparin

Special features of Ci-Ca CVVHD

- ▶ Effective treatment despite low blood flow
- ▶ Low systemic citrate load
- ▶ Targeted influencing of the acid-base status
- ▶ Easy adjustment of treatment dose

Management of the acid base balance

The serum bicarbonate concentration can specifically be influenced by the ratio of blood to dialysis solution flow. An increase in the dialysis solution flow facilitates the compensation of a metabolic alkalosis. In case of a metabolic acidosis, the acid-base status can be normalised by increasing the blood flow.

Disposables and solutions for the Ci-Ca Therapy

The multi**Filtrate** Ci-Ca Cassette is safe and easy to use due to:

- Integrated citrate and calcium lines
- Components which are colour-coded and arranged in a way that avoids any mix-up
- Specific connectors for citrate and calcium

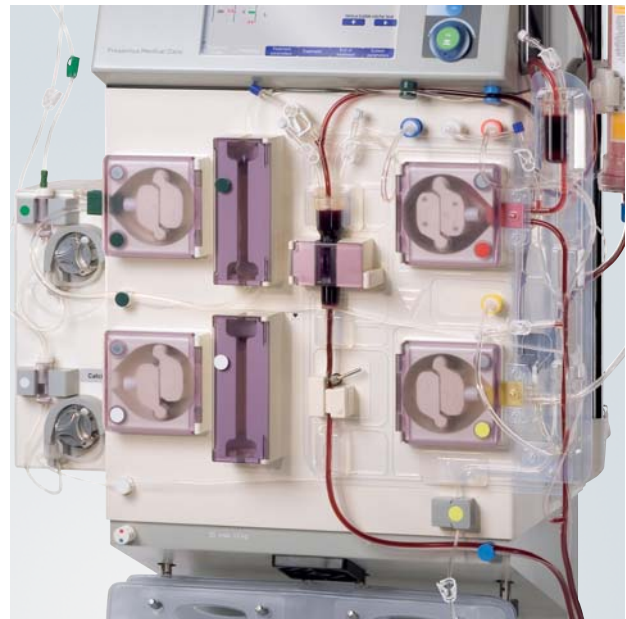
Connections in error are practically excluded and a rapid set-up is ensured.

The Ultraflux® AV 1000 S with its large surface of 1.8 m² and its effective high-flux membrane enables an extremely efficient removal of the uraemic toxins as well as a rapid correction of the electrolytes and the acid-base status.

All disposables (tubing systems and filter) required for a Ci-Ca therapy are ready-to-use out of the multi**Filtrate** Kit Ci-Ca CVVHD 1000.

The 4% sodium citrate solution required for the regional anticoagulation is available in 1 litre bags and specifically adapted to the multi**Filtrate** Ci-Ca system. The solution bag is equipped with a transparent HF connector.

Article	Art. no.	Composition of the solution
		Citrate mmol/l
4% Na ₃ citrate	E2011	136
1 litre bag		pH adjustment with citric acid
10 bags per box		



multi Filtrate Kit Ci-Ca 1000		Art. No. 503 901 1
Article	Description	
Ultraflux® AV 1000 S	Ultraflux haemofilter, steam-sterilised, surface area 1.8 m ² , Fresenius High-Flux Polysulfon® membrane	
multi Filtrate Ci-Ca Cassette	multi Filtrate Cassette with arterial and venous blood tubing systems, filtrate system and integrated citrate and calcium lines	
Dialysate system multi Filtrate	Dialysate system for multi Filtrate with integrated heating bag	



Ci-Ca Dialysate K2 is a calcium-free dialysis solution specifically developed for citrate anticoagulation:

- Reduced sodium concentration (133 mmol/l)
⇒ compensates sodium supply with citrate solution
- Adapted bicarbonate concentration (20 mmol/l)
⇒ targeted influencing of the acid base balance
- Slightly increased magnesium concentration (0.75 mmol/l) ⇒ compensation for the removed complexed magnesium
- Calcium-free ⇒ minimum citrate requirement



Article	Art. no.	Composition of the solution						
		Na ⁺ mmol/l	K ⁺ mmol/l	Ca ⁺⁺ mmol/l	Mg ⁺⁺ mmol/l	Cl ⁻ mmol/l	HCO ₃ ⁻ mmol/l	Glucose g/l
Ci-Ca Dialysate K2	968 920 1	133	2.0	0	0.75	116.5	20	1.0
5 litres bag		Other components: water for injection, hydrochloric acid 25%, carbon dioxide						
Packaging: 2 bags per box								

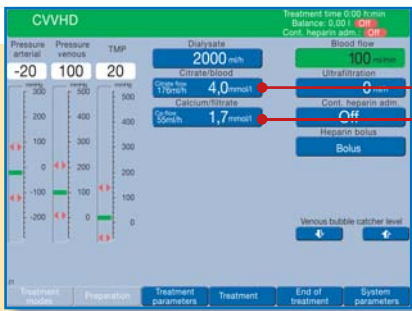
Ci-Ca Basic Package

All products required for a 48 hour Ci-Ca treatment are compiled in one package to facilitate your ordering process. The components of the Ci-Ca basic package are perfectly matched to each other and provide a high therapy safety.

Ci-Ca Basic Package 48h*		Art.-Nr. 509 579 1
Article	Quantity	
multiFiltrate Kit Ci-Ca 1000	1	
Ci-Ca Dialysate K2	20	
4% sodium citrate solution	10	
Filtrate bag	1	

* Adjusted to the requirements to perform a Ci-Ca therapy with the following standard parameters:

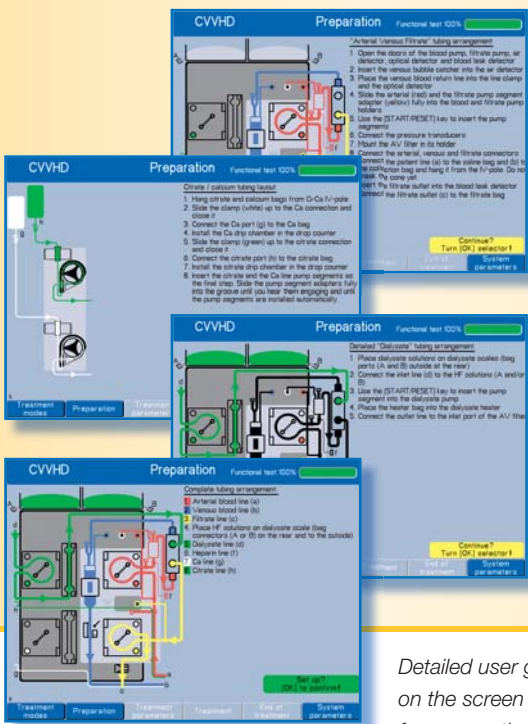
Blood flow:	100 ml/min
Dialysate flow:	2 l/h
Citrate dose:	4.0 mmol/l blood
Calcium dose:	1.7 mmol/l effluent
UF rate:	100 ml/h



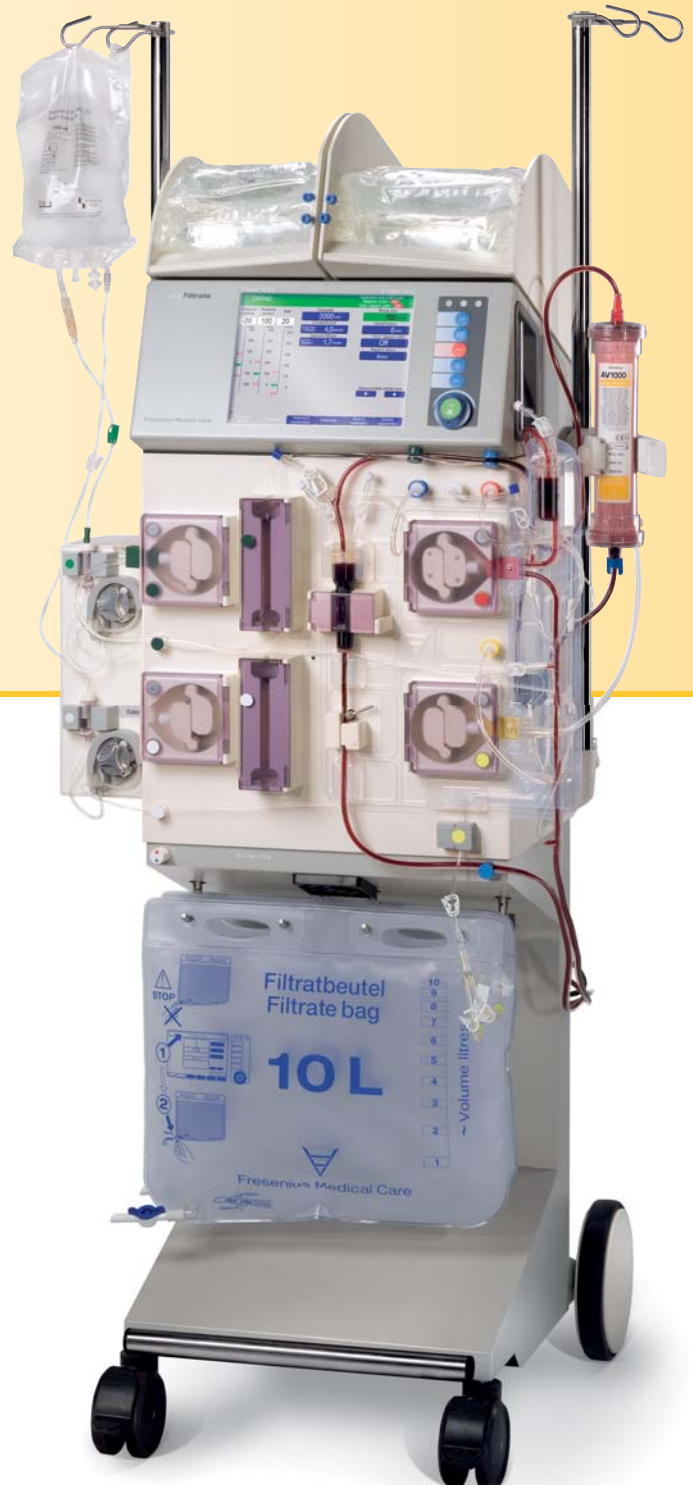
Citrate dose
Setting of regional anticoagulation

Calcium dose
Setting of calcium balance

Screen presentation during Ci-Ca treatment



Detailed user guidance on the screen for preparation



The advantages of the system:

- Safe control of anticoagulation by coupling the citrate infusion to the blood flow
- Device-assisted calcium management for a proper calcium balance
- Citrate and calcium infusion is automatically taken into account for fluid balancing
- Integrated alarm management prevents undesired infusion of citrate or calcium when the device is stopped
- Self-explanatory user interface with graphical user guidance

multiFiltrate Ci-Ca – Technical data***Dimensions and weight**

Height	150 cm
Width	46 cm (+ 13 cm Ci-Ca Module)
Depth	60 cm
Weight	80 kg

Power supply

Mains voltage	100/120//230/240 V AC ± 10 %, 50/60 Hz
Operating current	max. 1.2 A (230V)
Rechargeable lead batteries	18V/3.4 Ah, maintenance-free
Emergency operating time	approx. 15 min

Electrical safety

Type of protection against electric shock:	Protection Class I
Degree of protection against electric shock:	Type CF

Treatment parameters (Ci-Ca CVVHD-mode)

Blood flow	10–200 ml/min ± 10 %
Dialysis fluid flow	10–70 ml/min, controlled
Ultrafiltration rate	0–1,800 ml/h, controlled
Citrate dose (citrate/blood)	2.0–6.0 mmol/l of blood
Calcium dose (calcium/effluent)	0–3.0 mmol/l of effluent

Syringe pump (anticoagulants)

Continuous flow	0.1–25 ml/h
Bolus	0.1–5 ml/bolus

Balancing

Number of scales	4
Measuring principle	gravimetric
Load capacity per scales max.	12 kg
Resolution per scales	1 g
Linearity deviation max.	± 1 %

Heating

Dialysis fluid	up to 39°C
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Arterial pressure

Display range	–280 to +300 mmHg
Accuracy	± 10 mmHg

Venous pressure

Display range	–80 to +500 mmHg
Accuracy	± 10 mmHg

Transmembrane pressure

Display range	–60 to +520 mmHg
Accuracy	± 10 mmHg

Pre-filter pressure

Measuring range	0 to +750 mmHg
Accuracy	± 10 mmHg

Air detector

Measuring method	ultrasonic transmission and optical monitoring in venous clamp
Sensitivity	decrease in fluid level, air bubbles or micro-foam

Blood leak detector

Measuring method	optical
Sensitivity	≤ 0.5 ml/min blood loss at Hct 32% and maximum effluent flow

External connections

Serial port	RS 232 (service port)
Data port multiDataLink	(LAN/Ethernet, 10 Base-T) for connection to a network (option)
Alarm out	zero potential alarm outlet
Equipotential bonding	

Equipment/function

Screen	10.4", TFT-LCD
Service menu	settings via screen
Error memory	stores all events up to a treatment period of max. 48 hours

* Please refer to the product brochure of the basic version of the multiFiltrate for the technical data of treatment procedures without citrate anticoagulation.



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