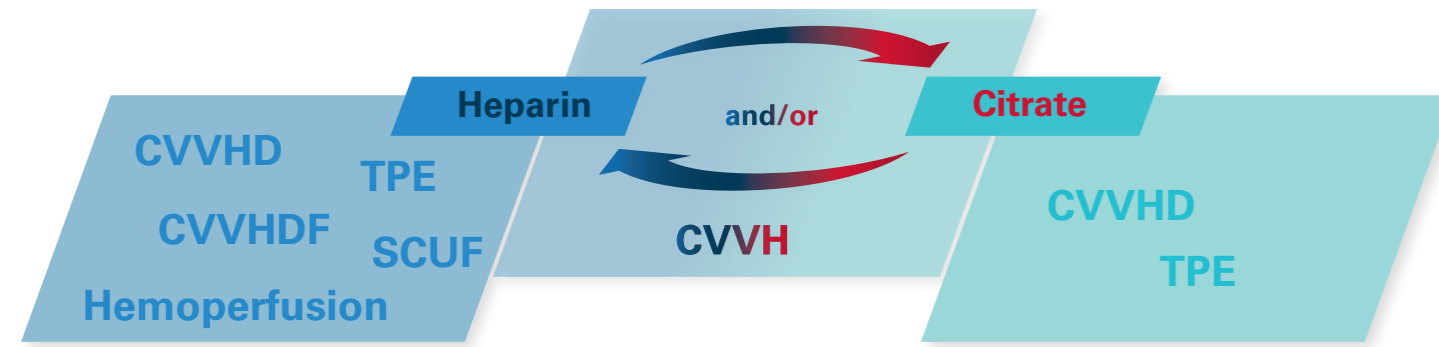


## Why Citrate?

Regional citrate anticoagulation (RCA) is a safe and effective anticoagulation method for continuous renal replacement therapy (CRRT) in children, and could be more effective than systemic heparin anticoagulation.

Citrate has a lower incidence of bleeding complications because it has no systemic anticoagulation effects and does not induce thrombocytopenia<sup>1</sup>. Additional benefits of RCA may include: prolonged lifetime of the hemofilter circuit and reduced requirement for blood transfusions<sup>1,2</sup>

Swap between **Heparin** and/or **Citrate** during CVVH treatment without interruption.



During CVVH RCA, **Aquarius+** is the only device to enable uninterrupted CRRT therapy without changing the line set or fluids, with the ability to utilise heparin or no anticoagulation\*.

**One line set = multiple choice**

### Consumables for the Aquarius™ system with RCA (GE-F095-00) - for Heparin and / or Citrate treatments

Irrespective of patient CRRT need, preferred anticoagulant, CRRT therapy, blood purification technique\*\* or even store room capacity: the Aquarius™ system with RCA provides true flexibility with one Aqualine S RCA/ Aqualine RCA for all therapies.

A regular Aqualine S or Aqualine can also be used on the Aquarius™ system with RCA for treatments without citrate anticoagulation.

**The choice is your<sup>+</sup>**

Sets for RCA therapy	CITRASETSRCA03LV	CITRASETSRCA07PLV	CITRASETRCA12
Aquamax® filter	HF03	HF07+	HF12
Membrane surface area (m <sup>2</sup> )	0.3	0.7	1.2
Bloodline	Aqualine S RCA	Aqualine S RCA	Aqualine RCA
Extracorporeal volume	102 mL	119 mL	169 mL
Ancillaries	1 effluent bag 5litre + 1 empty priming bag 2litre + 1 two-way connector		

## Aquarius™ System with Aquarius+ Software

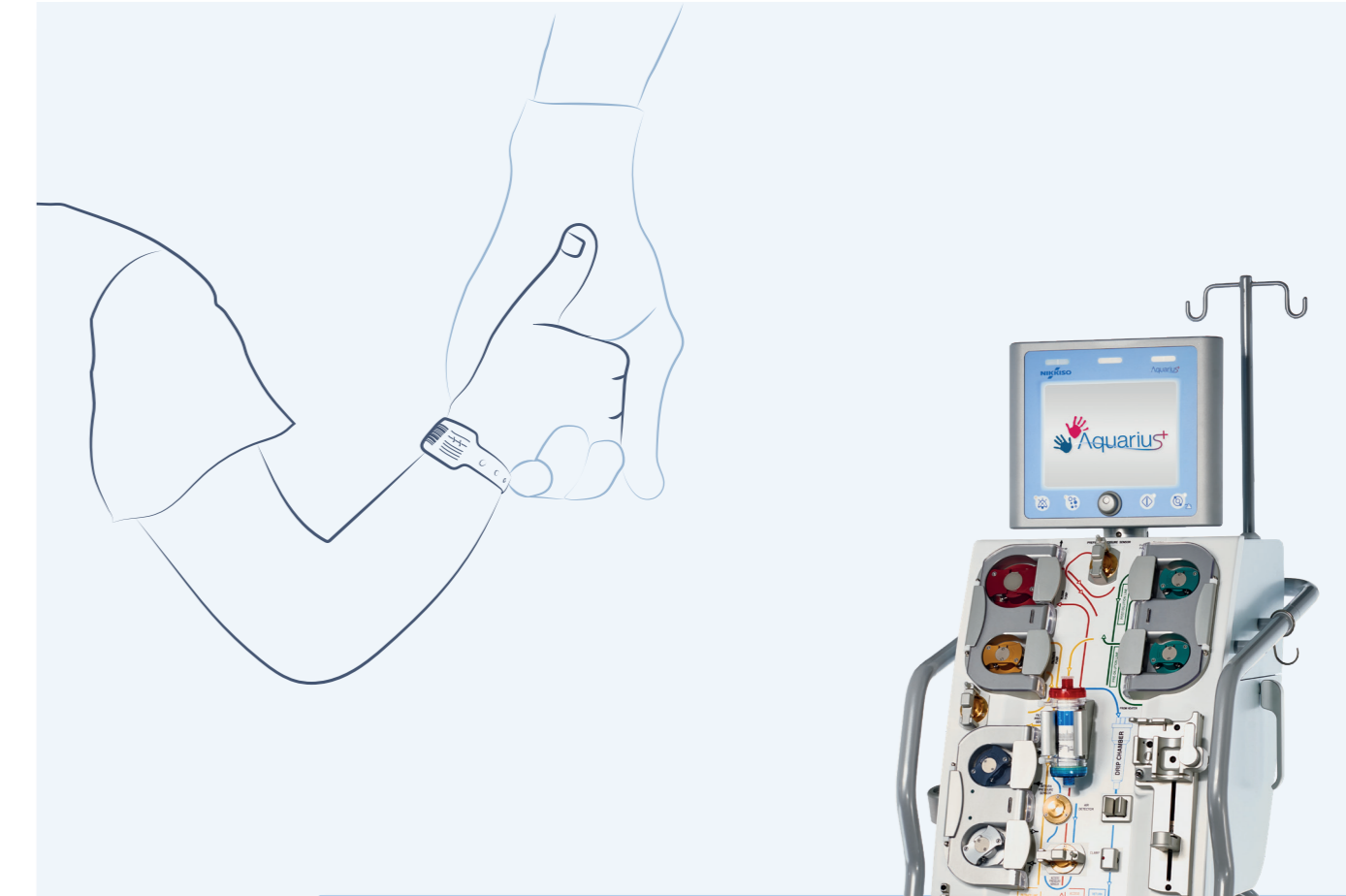
Technical Data	Low volume	Adult
Product Code GE-F095-00 (SW 6.02.19 or above)		
Priming volume		
Bloodline	Aqualine S RCA: 70 mL	Aqualine RCA: 96 mL
Max. Treatment time	100h***	100h
Scales		
Fluid balance alarm	±20g	±50g
Substitution/Filtrate scale max. load		20 kg
Citrate/Calcium scale max. load		2.2 kg
Fluid warmer		
Adjustable setting	0 (off) or 35°C to 39°C by 0.5°C	
Flow Rate		
Blood pump	10 to 200 mL/min*	for all therapies 30 to 450 mL/min, except TPE 30 to 250 mL/min and CVVHD, CVVH with RCA 30 to 300 mL/min
Pre-dilution pump	0 or 100 to 6,000 mL/h	0 or 100 to 10,000 mL/h
Post-dilution pump	0 or 100 to 4,000 mL/h	for all therapies 0 or 100 to 10,000 mL/h, except RCA 0 or 500 to 6,000 mL/h
Dialysate pump	CVVHD 0 or 100 to 6,000 mL/h CVVHDF 0 or 100 to 2,000 mL/h CVVHD RCA 0 or 100 to 4,000 mL/h	0 or 100 to 10,000 mL/h RCA 0 or 500 to 6,000 mL/h
Filtrate pump	0 or 100 to 7,000 mL/h	for all therapies 0 or 100 to 12,000 mL/h, except RCA 0 or 100 to 8,800 mL/h
Plasma	0 or 10 to 1,200 mL/h	for all therapies 0 or 10 to 3,000 mL/h, except RCA 0 or 500 to 3,000 mL/h
Patient fluid loss	0 or 10 to 1,000 mL/h	CVVH, CVVHD, CVVHDF -100 to 2,000 mL/h SCUF and RCA therapies 0 to 2,000 mL/h
Citrate pump		0 or 20 to 650 mL/h
Calcium pump		0 or 2 to 300 mL/h
Anticoagulant settings		
Heparin pump settings		0 or 0.5 to 15 mL/h, by 0.1 mL/h
Heparin syringe size		50 mL
Bolus function		0.5 to 2.5 mL by 0.5 mL
Pressure Monitoring (in treatment mode)		
Access sensor		-250 to +350 mmHg
Return sensor		+20 to +350 mmHg
Pre-filter sensor		-100 to +450 mmHg
Filtrate sensor		-400 to +450 mmHg
Detection parameters and monitor		
Air detector		Ultrasonic measurement: air bubbles at a volume of 1 µ at a blood flow rate of 200 mL/h
Blood leak detector		Measurement of clotting; 2 mL blood/ 1,000 mL filtrate at HCT 32 %
Display monitor		10.4" TFT color

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- \* May not be available in all therapies. \*\* This includes TPE and adjunctive adsorptive sepsis treatments. \*\*\* Available soon, please speak to your local Nikkiso contact for more detail.
- |   |   |   |  |
|---|---|---|--|
| <b>Aquarius system</b><br>NIKKISO Europe GmbH<br>Desbrocksriede 1<br>30855 Langenhagen<br>Germany<br>☎ 0123 | <b>AQUAMAX haemofilter</b><br>Nikkiso Belgium bv<br>Industriepark 6<br>3300 Tienen<br>Belgium<br>☎ 0123 | <b>AQUALINE tubing</b><br>Haemotronic S.p.A.<br>Via Carreri, 16<br>41037 Mirandola<br>Italy<br>☎ 0123 | <b>AQUASET &amp; CITRASET RCA</b><br>Assembled by Haemotronic<br>Via Carreri, 16<br>41037 Mirandola<br>Italy |
|---|---|---|--|

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**Aquarius™ System with Aquarius+ Software**

**Dedicated Regional Citrate Anticoagulation (RCA) capability with low volume sets.**





# Highlights<sup>+</sup>

## Aquarius<sup>+</sup> - Safeguarding your patients.

### + Treatment accuracy

The **Aquarius<sup>+</sup>** contains a double feedback mechanism which ensures the pump **accuracy** is constantly monitored by the gravimetric weight scale system. This ensures a maximum permitted deviation of 20 mL with a low volume set.

### + 270° rotating screen

Visibility of equipment in Intensive Care Units is essential for staff to safely monitor their patients and support other colleagues.

The **rotating** screen of **Aquarius<sup>+</sup>** allows the machine to be placed wherever is most convenient without compromising patient safety.

### + Integrated fluid warmer

Hypothermia has been associated with increased mortality in critical care patients<sup>3</sup>. It is also known to be one of the most common adverse events during CRRT<sup>4</sup>. It has also been noted that it is never safe to use CRRT devices without a fluid warmer<sup>5</sup>.

The **Aquarius<sup>+</sup>** and its associated disposables provides a complete solution with an integral fluid warmer and integrated heater coil in all line sets without adding any additional extracorporeal volume.

This safeguards patients by reducing the risk of hypothermia and **maintaining normothermia** whilst receiving CRRT.

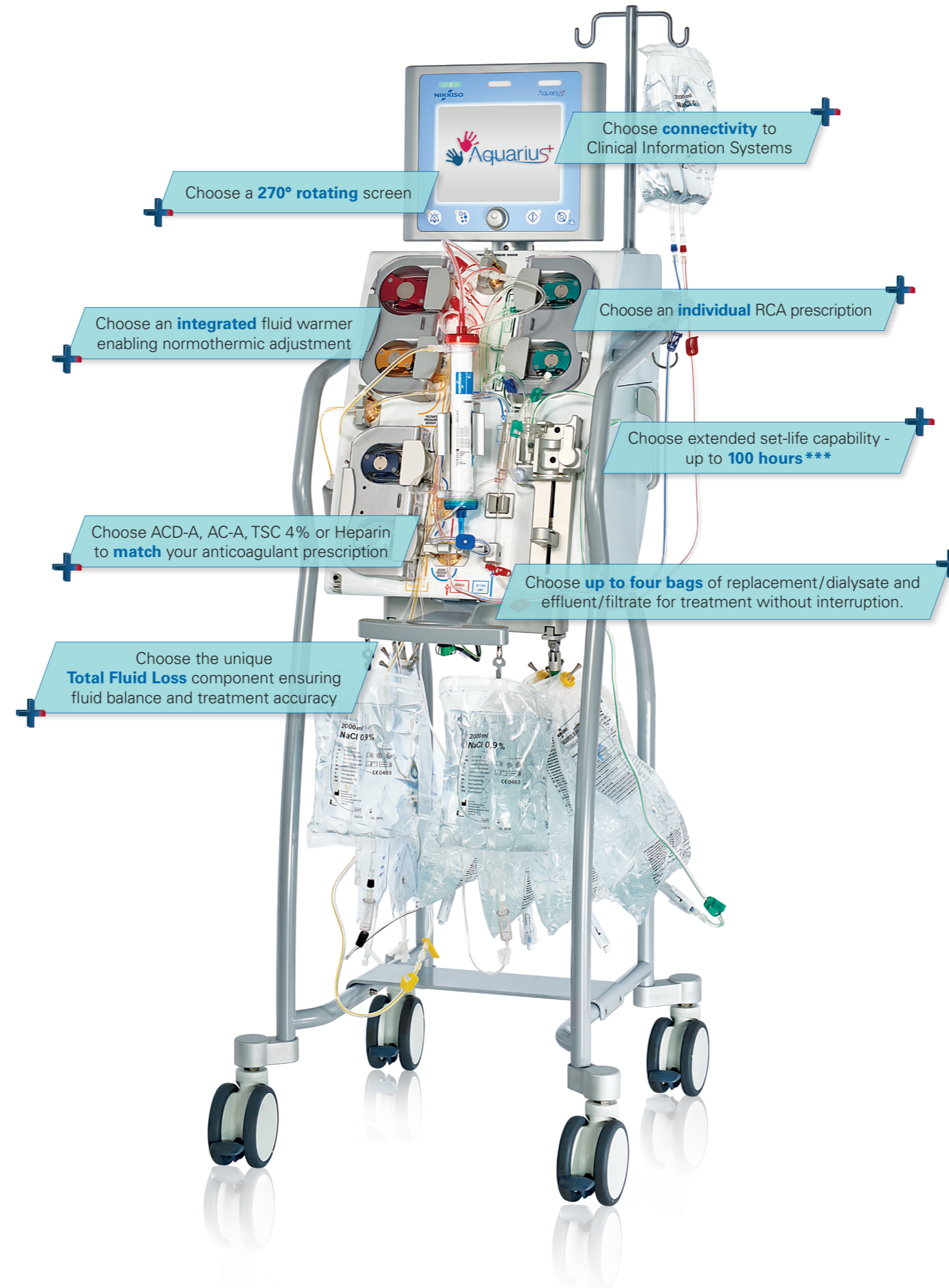
### + Total Fluid Loss

Fluid balance is a key aspect of the CRRT prescription. The possibility of making fluid balance errors has been identified throughout the history of CRRT<sup>6</sup>.

The unique, automated **Total Fluid Loss (TFL)** component provides total control over net fluid balance. TFL compensates for any net fluid balance variance ensuring all discrepancies are eliminated. Thus, helping to reduce the risk of hypo/hypervolaemia by avoiding fluid imbalance accumulation over time due to multiple balance alarms.

**Principle** - A balance alarm occurs when a +/-50 g difference (+/-20 g for low volume patients) is detected between the target ultrafiltration volume and the actual ultrafiltration volume.

The volume discrepancies are **automatically compensated** by the system when the pumps are reactivated by pressing the Treatment Start/Stop key.



## Aquarius<sup>+</sup> - Reducing your workload.

### + 100hours Set life\*\*\*

Circuit survival is intrinsically linked to treatment efficacy and cost of running CRRT. It has been hypothesised that RCA is linked to increased circuit survival compared with heparin or no anticoagulation<sup>7</sup>.

Although the possible circuit uptime of the majority of the other commercially available sets is max. 72 hours, **Aquarius<sup>+</sup>** provides the **unique, validated** option for a circuit lifespan of up to 100 hours.

This ensures **maximum treatment efficacy** for your patient coupled with potential economic advantages of **lower running costs**.

### + Flexibility of citrate dose

The dose of citrate required to anticoagulate each patient appropriately is your **individual** clinical decision.

Documented case studies and clinical protocols using a range of citrate doses from 2.5 mmol/L – 6 mmol/L are recorded<sup>8,9</sup>. Post-filter extracorporeal concentrations of calcium less than 0.35 mmol/L are usually sufficient for clotting activation to be minimal<sup>9,10</sup>. A higher citrate load can potentially be associated with an increased risk of citrate accumulation, especially in patients with marked hemodynamic instability and very high severity scores<sup>8,11</sup>.

With **Aquarius<sup>+</sup>**, the **citrate and / or calcium dose can be adjusted quickly and simply during treatment**. This is achieved via the automatic blood/citrate pump link and dialysate/calcium pump link. Thus, maintaining a **simple and safe** ability to deliver an individualised patient prescription automatically.

### + Fewer Bag Changes

A complex workload is an ongoing challenge in the ICU environment.

**Aquarius<sup>+</sup>** enables the user to hang from 5 to 20 L of replacement fluid **allowing minimal interventions and uninterrupted CRRT treatment**. For example, this could result in **only one** substitution/dialysate bag change alert in > 10 hours for an 80kg patient.

### + Connectivity

Clinical information systems (CIS) help to reduce time spent on documentation, increasing the time available for direct patient care by automatically capturing the parameters from patient monitors in the ICU<sup>12</sup>.

**Aquarius<sup>+</sup>** is able to connect to all known Clinical Information Systems and provide a real time interface allowing the user to take advantage of these technologies, releasing **more time to care** for their patient.