

Baxter

AK 98

DIALYSIS MACHINE

AK 98

Your path to target



OUR PATIENT AND CLINIC CENTRIC APPROACH TO RENAL CARE

We believe every person suffering from kidney disease deserves the right therapy, at the right time, in the right clinical environment.

It is for this reason we have designed the **AK 98** system, to provide healthcare professionals with an HD solution to help overcome their challenges, potentially improve the quality of life for their patients and find the balance between clinical targets and operational requirements. When combined with Baxter's wide range of consumables and services this integrated treatment option enables you to find the right solution for you and your clinic, no matter where in the world you are.

This is how we help to keep you on your path to target.



OPERATIONAL EFFICIENCY

The **AK 98** system has been designed to help control and minimize operational and labour costs and improve clinical workflows.

- Easy to use and learn
- Short time between treatments
- Smart alarm design
- Bi-directional connectivity for prescription upload and download



PATIENT CARE

We aim to always provide healthcare professionals with integrated solutions for patients.

- The **AK 98** system can be used to deliver HDx therapy
- The HDx therapy enabled by the **Theranova*** dialyzer, provides HDF performance and beyond in the removal of larger middle molecules
- Reach treatment targets more frequently through real-time monitoring of the dose by using the **Diascan** function



THE **AK 98** SYSTEM

The **AK 98** system is a key component in our range of treatment options and is designed to meet the various needs of our customers. Used in combination with our latest innovations and consumables, the **AK 98** system enables health care professionals to stay on their path to target in terms of both improving patient care and operational efficiency.

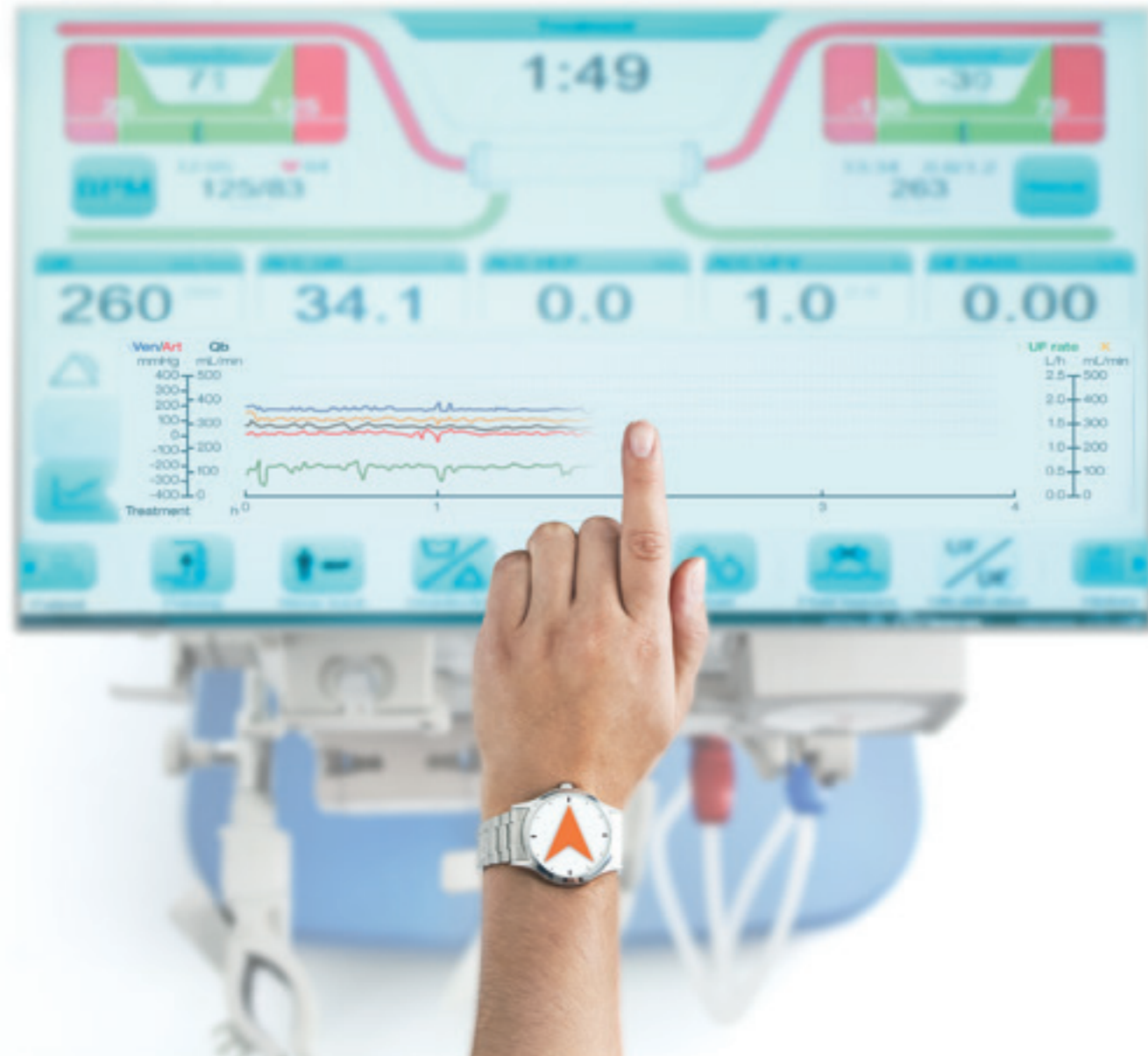
*Do not use Theranova dialyzers in HDF or HF mode.

EASE OF USE IS AT YOUR FINGERTIPS

The **AK 98** system features a user-friendly touchscreen for smooth dialysis monitoring

It is important that any system introduced into a dialysis clinic is easy to use and supports the clinical workflow. Improving clinics efficiency and reducing staff stress is our top priority. From treatment setup, monitoring, disinfection and treatment management, the **AK 98** system helps to accomplish this through a number of features.

A graphical user interface (GUI) facilitates an easy-to-use treatment process. Treatment set-up now requires fewer button pushes while a centrally positioned external alarm provides visible indicators to caregivers on treatment progress to support simple session monitoring. The **AK 98** system also provides a short time-between-treatments to help prepare even the busiest clinic for their next patient.



MAKING EACH SESSION EASIER FOR YOU



GRAPHICAL USER INTERFACE [GUI]

Graphical user interface (GUI) navigates all working environments and helps ensure that each and every session is delivered easily and efficiently

- Straightforward prescription management
- Simple treatment supervision and report generation
- Easily-access blood and fluid settings
- Parameters are grouped by functions
- Operator messages help guide the decision-making process



EXTERNAL ALARMS

External alarms allow you to always keep warnings in sight

- Centrally positioned lights show when the machine is ready to start
- Alarms provide visible indicators to caregivers on treatment progress
- Easy to prioritize alarms which may defuse certain stressful situations or conditions
- Saves time, as caregivers immediately know which treatment needs to be corrected



IMPROVED TIME BETWEEN TREATMENTS

Improved preparation and disinfection aim to decrease time between treatments

- 32 minutes disinfection time
- Short heat and liquid citric acid ensure disinfection is never compromised
- Fewer button pushes make system preparation quicker and more efficient
- Complements the workflows of even the busiest clinics

REACH YOUR TREATMENT TARGETS

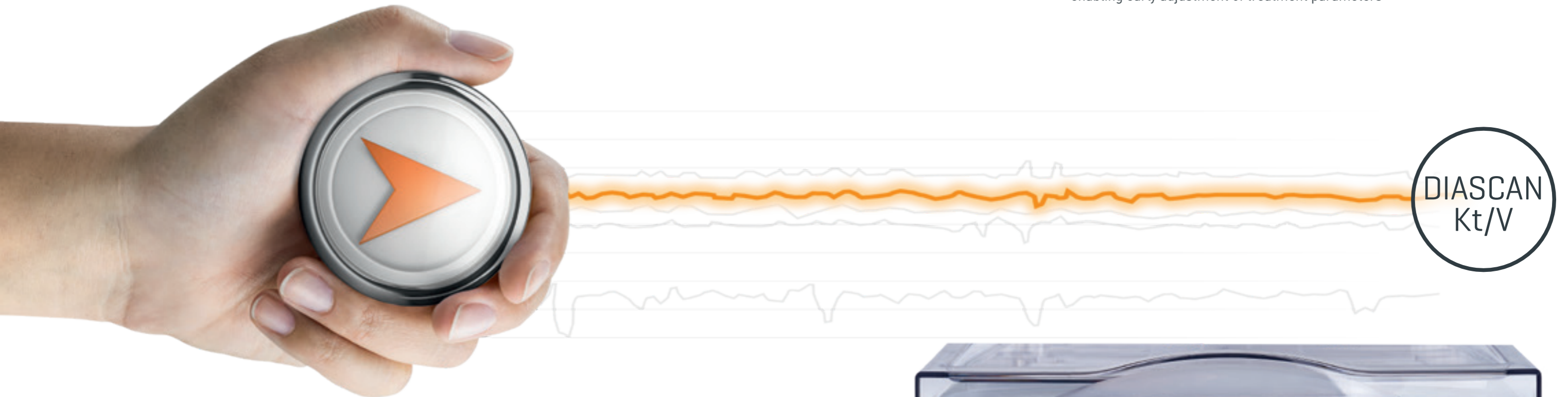
Real-time Kt/V clearance with the **Diascan** function

Hemodialysis places a huge responsibility on those delivering the therapy. It is up to you to monitor treatments and to make sure patients reach their treatment targets. It is important that your patients consistently reach their treatment targets as it may reduce the risk of all cause mortality and is essential if patients are to receive the benefits of the treatment.^{1,2,3}



THE **DIASCAN** MONITORING SYSTEM:
DESIGNED TO REACH THE PRESCRIBED DOSE

- Real time measurement of treatment adequacy
- The repeated measurement of clearance during session is helpful to identify possible deviation
- Early alarm if prescribed target will not be reached, enabling early adjustment of treatment parameters



The **Diascan** on-line monitoring system is an integrated feature of the **AK 98** system. With no extra set-up time needed, you are now supported in your daily monitoring through the collection of immediate information.

Alarm system and GUI further support the **Diascan** function. Proactive alerts give you all the relevant information for dialysis dose tracking; therefore you may have the opportunity to adjust the settings in-treatment in cases when prescription targets are at risk.



IT CONNECTIVITY FOR SIMPLIFIED WORKFLOW

As clinical environments become more active and complex – connectivity and digitization becomes crucial to improving quality control and operational efficiency. The **AK 98** system is ready to address this challenge

Connectivity between the **AK 98** system and your central IT network allows seamless management and integration of your clinic and patient information. Staff can easily access patient data and files eliminating time spent manually handling documents and decreasing the possibility of errors. At the end of each session treatment data is easily transferred and stored for traceability and quality assurance.



HDF PERFORMANCE AND BEYOND AS SIMPLE AS HD⁴

HDx Therapy enabled by **Theranova***

The **Theranova** dialyzer, featuring an innovative membrane, effectively targets large middle molecules† not efficiently removed by currently available dialysis treatments. It provides expanded hemodialysis therapy, HDx, providing HDF performance and beyond in the removal of larger middle molecules, using regular HD infrastructure.

The premium performance and simplicity of the HDx therapy, enabled by the **Theranova** dialyzer, opens up another option for patients with chronic or acute renal failure requiring hemodialysis.

DESIGNED TO TARGET LARGE MIDDLE MOLECULES EFFECTIVELY AND WITH SAFETY IN MIND

Higher permeability

With an increased nominal pore size along the membrane, the **Theranova** dialyzer has a higher permeability for large middle molecules than conventional high-flux membranes.^{5,6}

Enhanced selectivity by size exclusion⁷

The **Theranova** dialyzer membrane, combining a unique asymmetric 3-layer structure^{8,9,10} with an increased nominal pore size along the membrane's inner layer, enables a stable separation profile and selectivity throughout the treatment.

Retention

The adsorption properties of the **Theranova** membrane maintain the same level of bacteria and endotoxin retention as other standard dialysis membranes.¹¹ Despite its higher permeability, the **Theranova** membrane appears to be a safe and effective barrier to potential dialysis fluid contaminants. It is compatible with standard fluid quality (ISO 11663:2014) and does not require any additional fluid quality control measure.¹²

Internal filtration

The inner diameter of the **Theranova** membrane has been carefully reduced in order to increase internal filtration along the membrane, conducive to an enhanced removal of large middle molecules.

A step closer to the natural kidney

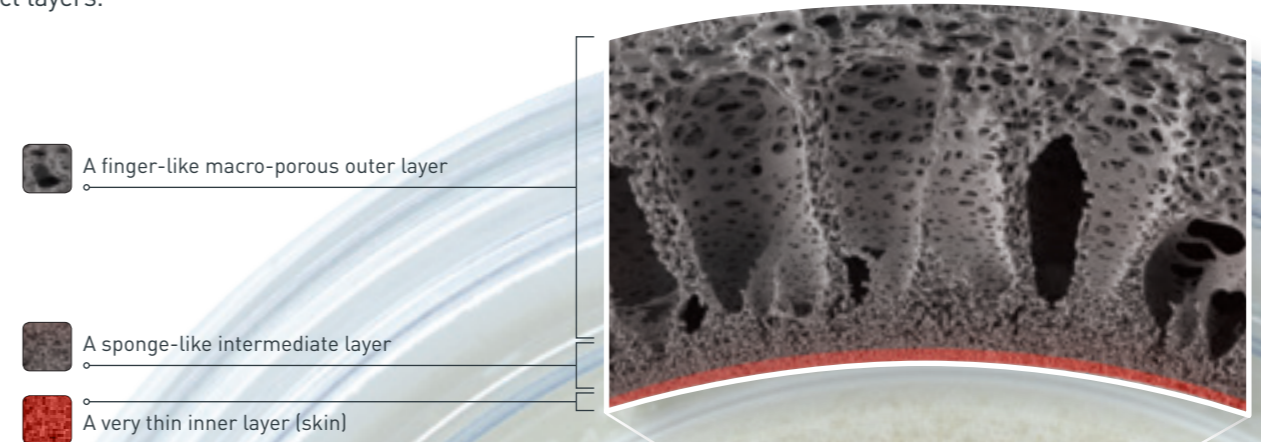
By expanding the range of solutes removed in dialysis, while retaining selectivity towards albumin and other essential proteins, the **Theranova** dialyzer is coming a step closer to the natural kidney.^{4,5}

† Large middle molecules: > 25 kDa - < 60 kDa

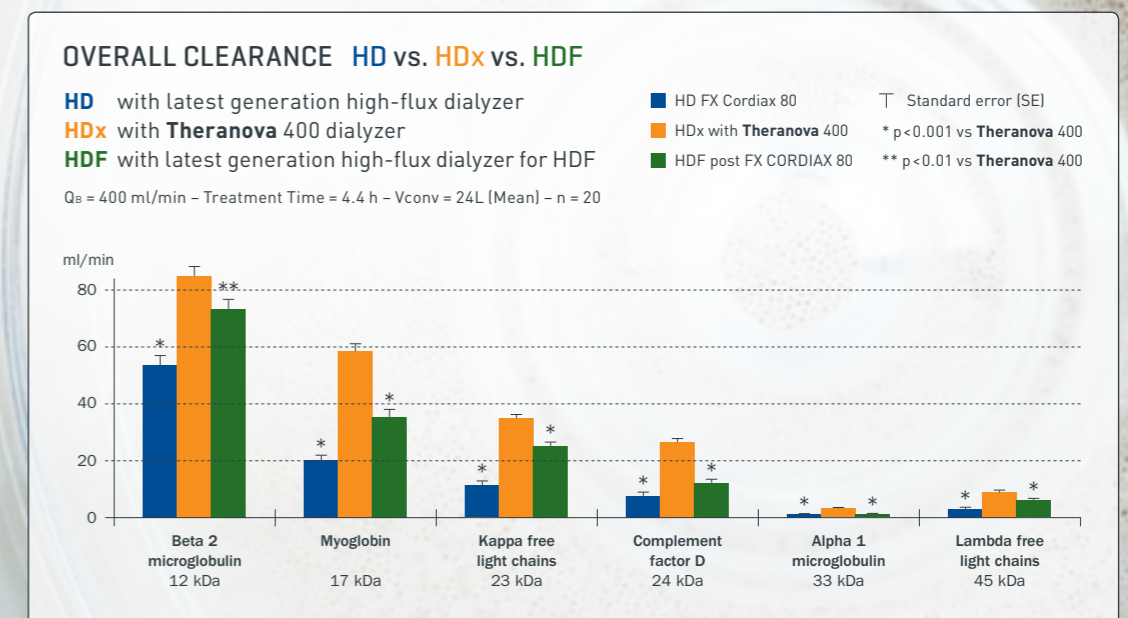
*** Do not use Theranova dialyzers in HDF or HF mode**

NEW INNOVATIVE MEMBRANE

The membrane cross-sectional structure is asymmetric and characterized by three distinct layers.



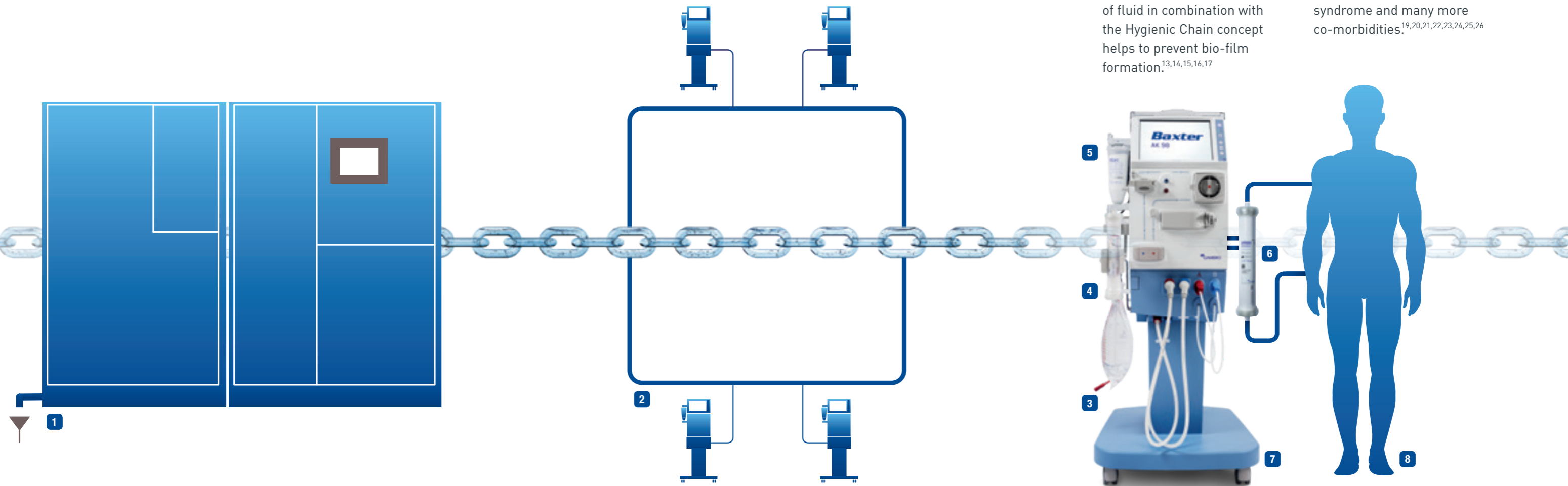
THE **THERANOVA** DIALYZER EFFECTIVELY TARGETS MIDDLE MOLECULES, IN AN EQUIVALENT WAY TO HDF IN HIGH CONVECTIVE VOLUME MODE¹⁰



OBTAINING PURE FLUID FROM TAP TO NEEDLE

The **AK 98** system is a key link in the hygienic chain concept

Water and fluid purity are essential in order to achieve quality dialysis treatments^{13,14,15,16,17} and improve¹⁸ patient outcomes. Maintaining fluid purity means attending to the entire chain of components and processes involved within HD – from tap to needle. We ensure this through our Hygienic Chain concept.



1. CENTRAL WATER PLANT

Reverse osmosis water production systems such as the **CWP 800** system help you deliver liquid purity through automated thermal disinfection technology.

2. DISTRIBUTION LOOP

A proactive disinfection regime of the loop, supply lines and dialysis machines is essential in limiting biofilm formation.^{27,28,29}

3. PVC FREE **SOFTPAC** AND **SOFTPAC** CITRATE

A citrate-containing, acetate-free concentrate for hemodialysis and hemodiafiltration treatments. Citrate provides buffering capacity to the patient. In addition, citrate is a well-known antioxidant and anticoagulant with potential benefits in dialysis to reduce inflammation, a risk factor for cardiovascular disease.³⁰

4. **CLEANCART**

With **CleanCart A** and **CleanCart C** cartridges, regular dialysis machine maintenance and disinfection assure proper dialysis machine function and may require less intensive machine operation from clinical staff.

5. **BICART** CARTRIDGE

Use of **BiCart** cartridge vs liquid bicarbonate minimizes the risk of microbial contamination and growth which is essential to ensure ultrapure dialysis fluid quality.^{31,32,33,34,35}

6. ULTRAFILTERS

Ensure that purified water feeds your machines interior and dialysis fluids, helping achieve sterile substitution and disinfection fluids.

7. THE **AK 98** SYSTEM

The **AK 98** system has been designed with a compact fluid pathway that eliminates dead spaces and recirculation of fluids. This minimal volume of fluid in combination with the Hygienic Chain concept helps to prevent bio-film formation.^{13,14,15,16,17}

8. PATIENTS

The use of ultrapure dialysis fluid has advantages linked with a decline in malnutrition, atherosclerotic cardiovascular disease, carpal tunnel syndrome and many more co-morbidities.^{19,20,21,22,23,24,25,26}

FULLY INTEGRATED SOLUTIONS

Solutions to keep you on your path to target

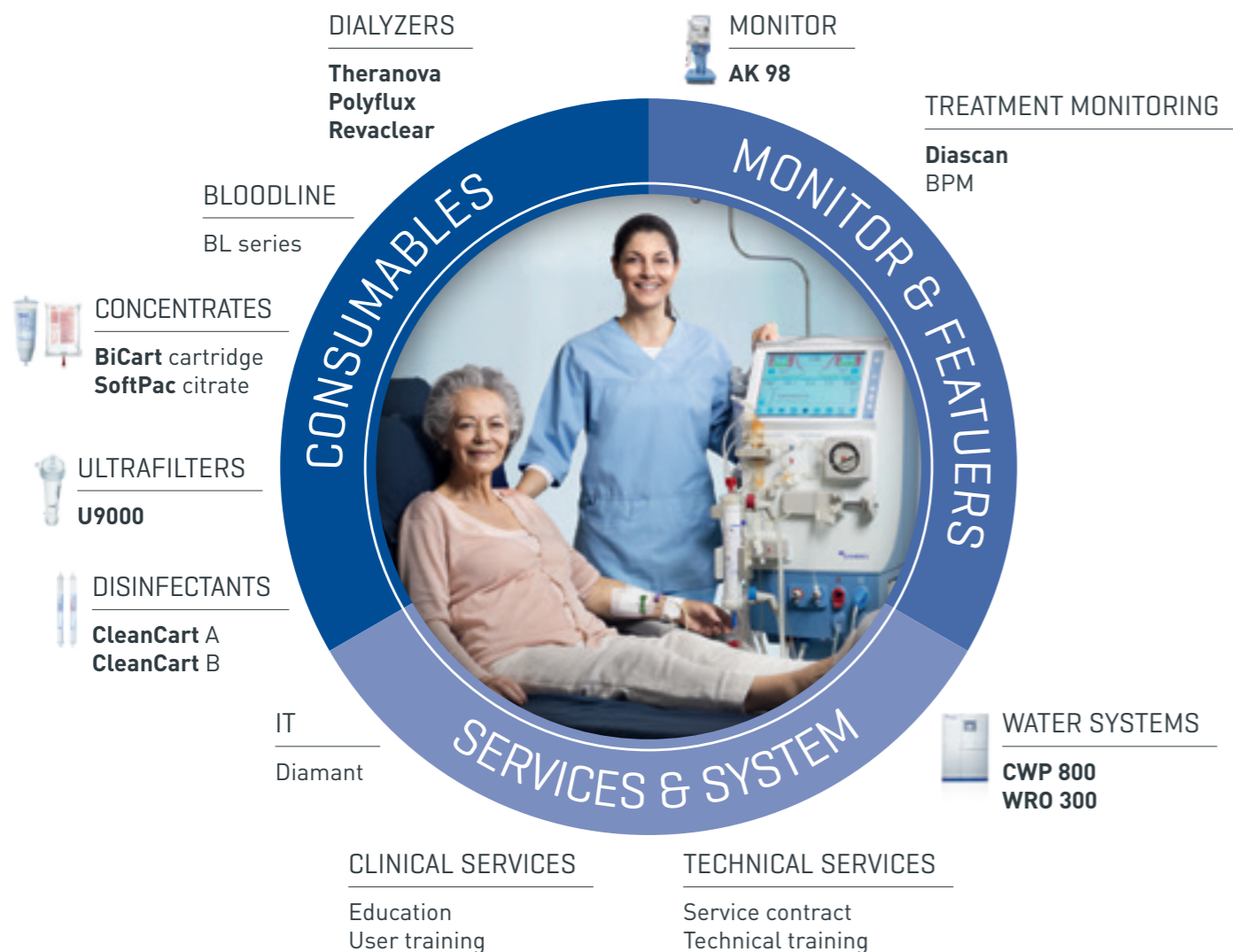
By combining monitors, features, consumables and services, into integrated treatment options, we aim to help healthcare professionals improving quality-of-life, and treatment outcomes, for their patients, all while improving their operational efficiency.

Our range of treatment options consider everything from patient's clinical needs to the governmental and economic factors at work in a particular region. This is the Baxter integrated treatment options approach to renal solutions.

This is how we are **Making Possible Personal**.

The **AK 98** system is a crucial part of our integrated treatment options and in combination with our consumables and services helps healthcare professionals improve quality-of-life and prognoses for their patients, while maintaining operational efficiency.

YOUR TOTAL SOLUTION



DISCOVER THE BENEFITS OF AN INTEGRATED HD SYSTEM

Reaching your targets is highly dependent on how well your dialysis monitor integrates with your consumables (dialyzers, blood lines etc.), procedures and other systems in your clinic. By fully integrating your **AK 98** system with our portfolio of products you can maximise your treatment potential.

For more detailed information on the product below, please refer to the dedicated brochures and datasheets for the products in question.

CONSUMABLES

BLOOD LINES

Biocompatible and ergonomic blood tubing systems

High-quality blood tubing sets will help to meet your individual clinic and patient needs with safe and simple blood control.

- An electronic barcode for online data management for complete traceability.
- Color-coded connectors ensure that a patient's blood never comes in contact with chemical dyes or colorants
- Secure pressure transducer connections with a two-membrane protector



THE **SOFTPAC** CITRATE

SoftPac solution in combination with **BiCart** cartridge is a convenient and easy way to handle concentrate

The **SoftPac** Citrate is an acid-concentrate dialysis solution giving clinics a closed hygienic system free from bacterial endotoxin for the **AK 98** system.^{34,35,37,38,39,40,41,42}



THE **BICART** CARTRIDGE

The multi-purpose bicarbonate cartridge **BiCart** cartridges provide sufficient bicarbonate for the majority of your in-center treatment needs.³⁶

- Small, convenient and light cartridge available in different sizes
- Minimizes the risk of microbial contamination and growth which is essential to ensure ultrapure dialysis fluid quality.^{29,30,31,32,33}



HDx THERAPY

Enabled by the **Theranova*** dialyzer.

HDx (Expanded hemodialysis therapy) is allowed by the **AK 98** system and the **Theranova** dialyzer to give you HDF performance in regards to the removal of middle molecules, as simple as HD.



Disclaimer: *In vitro* data cannot be extrapolated to the clinical setting.

***Do not use Theranova dialyzers for HDF or HF mode**

REFERENCES

1. Held PJ, et al. *Kidney Int* 1996; 50:550-556.
2. KDOQI Clinical Practice Guidelines, *Am J Kidney Dis* 2006; 48 (Suppl.1); S2-S90.
3. Tattersall J et al. *Nephrol Dial Transplant* 2007; 22 (Suppl.2) :ii5-ii2.
4. Alexander H, Kirsch et al. *Nephrol Dial Transplant* (2017) 32: 165-172.
5. Boschetti-de-Fierro A, et al. MCO membranes: Enhanced Selectivity in High-Flux Class. *Scientific Reports* (2015); 5: 18448.
6. Krause B, et al. Highly selective membranes for blood purification. *Euromembrane Congress 2015*, Abstract E139.
7. Schepers E, et al. Assessment of the association between increasing membrane pore size and endotoxin permeability using a novel experimental dialysis simulation set-up. *BMC Nephrology*, 2018; 19:1.
8. Krause B, et al. Polymeric Membranes for Medical Applications. *Chemie Ingenieur Technik* (2003); 75 (11): 1725-1732.
9. Ronco C, et al. Evolution of synthetic membranes for blood purification. *Nephrology, Dialysis and Transplantation* (2003); 18 (Suppl.7): 10-20.
10. Nilsson LG, Beck W and Bosch J. Data on File. White Paper May 2013 (USMP/MG3/140052).
11. Lorenzina A, et al. Quantification of Internal Filtration in Hollow Fiber Hemodialyzers with Medium Cut-Off Membrane. *Blood Purif* 2018;46:196-204.
12. Baxter. *Theranova 400/500 Instructions For Use*. N50 648 rev 003, 2017-05-29.
13. Bolasco P, et al. *Microbiological Surveillance and State of the Art Technological Strategies for the Prevention of Dialysis Water Pollution*. Int. J. Environ. Res. Public Health 2012, 9, 2758-2771.
14. Baxter data on file. R. Nystrand. Water system information document 130501 Gambro ver short.pdf Water Systems for Production of Water for Dilution of Haemodialysis Concentrates: Long time follow-up of Microbiological Quality in Gambro CWP 100 WRO H Systems Microbiologist, Bio-TeQ Nystrand Consulting, 2011.
15. Baxter data on file. R. Nystrand Water system total heat disinfection 130502 Gambro ver short.pdf Water Systems for Production of Water for Dilution of Haemodialysis Concentrates: Long time follow-up of Microbiological Quality in Gambro CWP 100 WRO ROHH Systems with total heat disinfection, Bio-TeQ Nystrand Consulting, 2011.
16. MICROBIOLOGICAL EVALUATION OF THE EFFICIENCY OF HOT RO WATER ONLY USED TO DISINFECT HEMODIALYSIS WATER DISTRIBUTION LOOP IN OPERATION FOR 5 YEARS, European renal Association, A. Ragon et al. EDTA(1).pdf. *Clin Kidney J* 2011, 4, Suppl 2 Abstracts of the ERA-EDTA Prague.
17. Susantitaphong P, et al. Effect of ultrapure dialysate on markers of inflammation, oxidative stress, nutrition and anemia parameters: a meta-analysis. *Nephrol Dial Transplant*. 2013; 28:438-446.
18. Glorieux G, et al. Dialysis water and fluid purity: more than endotoxin. *Nephrol Dial Transplant* (2012) 27: 4010-4021.
19. Hasegawa T et al. Dialysis fluid endotoxin level and mortality in maintenance hemodialysis: a nationwide cohort study. *Am J Kidney Dis* 2015;65:899-904.
20. Asci G et al and the The impact of membrane permeability and dialysate purity on cardiovascular outcomes. *J Am Soc Nephrol* 2013;24:1014-1023.
21. Lederer S. R., Schiff, H. Nephron. Ultrapure Dialysis fluid lowers the cardiovascular morbidity in patients on maintenance Hemodialysis by reducing continuous microinflammation. 2002; 91: 452-455.
22. Schiff H, et al. Effects of ultrapure dialysis fluid on nutritional status and inflammatory parameters. *Nephrol Dial Transplant* 2001; 16:1863-1869.
23. Schiff H, et al. Ultrapure dialysis fluid slows loss of residual renal function in new dialysis patients. *Nephrol Dial Transplant*. 2002a; 17:1814-1818.
24. Oka Y, et al. Lowering of oxidative stress in hemodialysis patients by dialysate cleaning: in relation to arteriosclerosis. *Ther Apher Dial*. 2004; 8:313-319.
25. Baz M, et al. Using ultrapure water in hemodialysis delays carpal tunnel syndrome. *Int J Artif Organs*. 1991; 14:681-685.
26. Bolasco P, et al. The evolution of technological strategies in the prevention of dialysis water pollution: *Blood Purif*. 2012;34:238-245.
27. Capelli G, Ballestri M, Perrone S, Ciuffreda A, Inguaggiato P, Albertazzi A. Biofilms invade nephrology: Effects in hemodialysis.; *Blood Purif* 2000; 18: 224-230.
28. Amore A, Cirina P, Bonaudo R et al. Bicarbonate dialysis, unlike acetate-free biofiltration, triggers mediators of inflammation and apoptosis in endothelial and smooth muscle cells. *J Nephrol* 2006;19(1):57-64.
29. Ward RA. *Sem Dialysis* 2004; 17:489-497.
30. Ebben P. *James Trans Am Soc Artif Organs* vol. XXXIII 1987.
31. Lonnemann G. *Blood Purif* 2004; 22:124-129.
32. Gordon S. et al, Pyrogenic Reactions in Patients Receiving Conventional, High-Efficiency, or High-Flux Hemodialysis Treatment with BiCarbonate Dialysate Containing High Concentration of Bacteria and Endotoxin *J. Am. Soc. Nephrol.* 1992;2:1436-1444.
33. Helmut Schiff, High-Flux Dialyzers, Backfiltration, and Dialysis Fluid Quality, Department of Internal Medicine, University Hospital Munich, Campus Innestadt, Munich Germany, 2011. *Seminars in Dialysis – 2011 Editorial* 1-4.
34. Grundström G, Christensson A, Alquist M et al. Replacement of acetate with citrate in dialysis fluid: a randomized clinical trial of short term safety and fluid biocompatibility. *BMC Nephrology* 2013, 14:216.
35. Bryland A, Wieslander A, Carlsson O et al. Citrate treatment reduces endothelial death and inflammation under hyperglycaemic conditions. *Diab Vasc Dis Res* 2012;9(1):42-51.
36. Internally calculated using the concentrate calculator by GAMBRO.
37. Huang S, Sandholm K, Jonsson N et al. Low concentrations of citrate reduce complement and granulocyte activation in vitro in human blood. *Clin Kidney J* (2015) 8: 31-37.
38. Guido G, Loiacono E, Serriello I et al. Citrate-based dialysis buffers are more biocompatible in comparison to standard bicarbonate buffers and could prevent the progression of dialysis vasculopathy. *Nephrol Dial Transplant* 2013;28 (suppl1):i490.
39. Matsuyama K, Tomo T, Kadota J. Acetate-free blood purification can impact improved nutritional status in hemodialysis patients. *J Artif Organs* 2011;14(2):112-9.
40. Daimon S, Dan K, Kawano M. Comparison of acetate-free citrate hemodialysis and bicarbonate hemodialysis regarding the effect of intra-dialysis hypotension and post-dialysis malaise. *Ther Apher Dial* 2011;15(5):460-5.
41. Kuragano T, Kida A, Furuta M et al. Effects of acetate-free citrate-containing dialysate on metabolic acidosis, anemia, and malnutrition in hemodialysis patients. *Artif Organs* 2012;36(3):282-90.
42. Sands JJ, Kotanko P, Segal JH et al. Effects of citrate acid concentrate on heparin N requirements and hemodialysis adequacy: a multicenter, prospective noninferiority trial. *Blood Purif* 2012;33(1-3):199-204.

For safe and proper use of products mentioned herein, please refer to the Operators Manual or Instructions for Use

Baxter, Gambro, AK 98, BiCart, CleanCart, CWP 800, Diascan, Polyflux, Revaclear, SoftPac, Theranova and U9000 are trademarks of Baxter International Inc. or its subsidiaries.

Diamant is a trademark of Diasoft.

Cordiox is a trademark of Fresenius Medical Care Deutschland GmbH.

EUMP/MG208/16-0004(1)

MANUFACTURER
Gambro Lundia AB,
PO Box 10101
SE- 22010 Lund
Sweden

renalcare.baxter.com

Baxter Healthcare Corporation
One Baxter Parkway
Deerfield, IL 60015
USA
1-800-422-9837