RENAL CARE

SURDIAL™ X

SYSTEM FOR HD-HDF-HF

NIPRO

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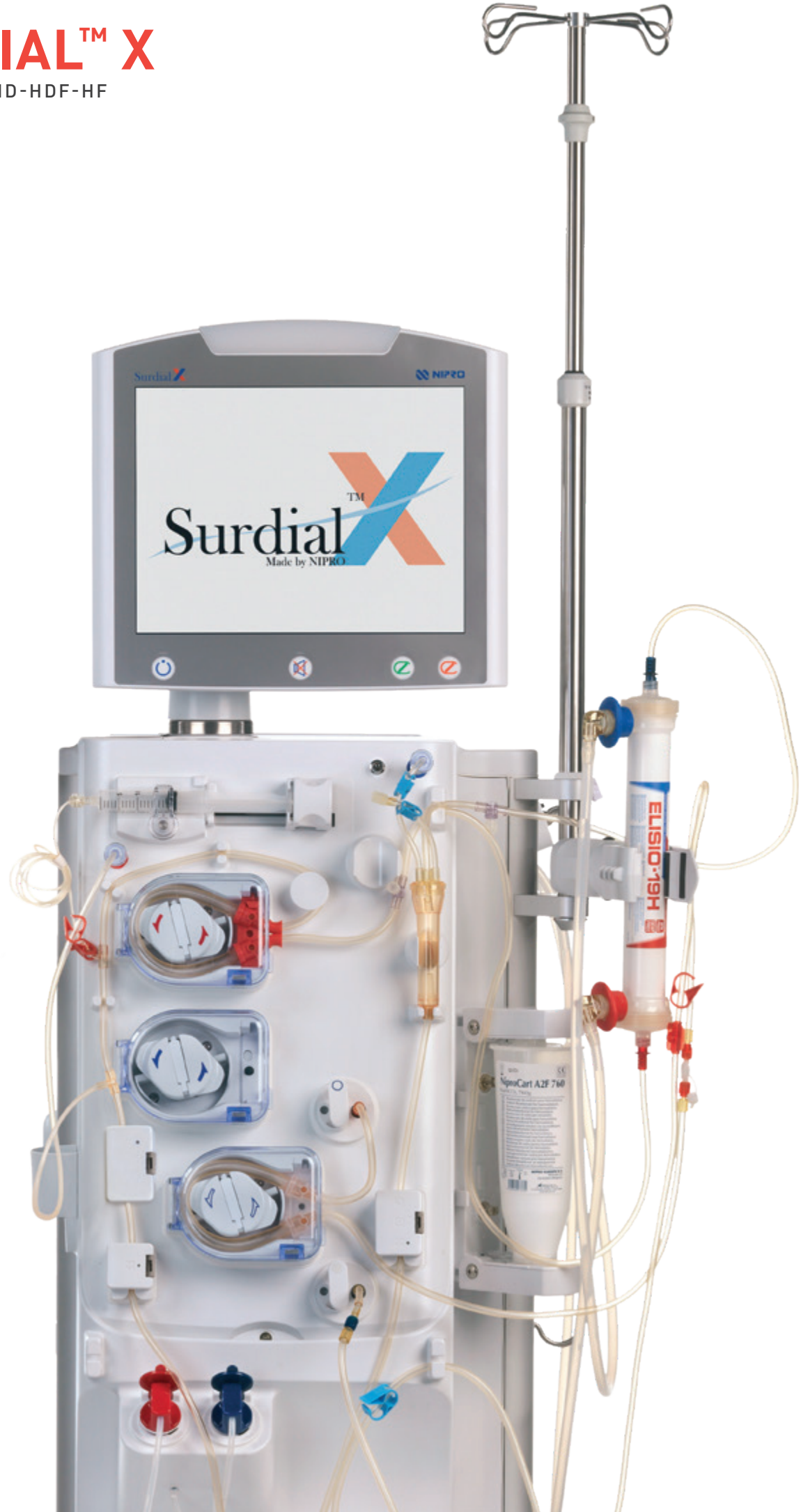

A CLEAR VIEW OF THE FUTURE

The demand for modern dialysis machines is becoming increasingly complex: on one hand, they are required to perform constantly evolving therapies, while ensuring maximum safety and efficiency. On the other hand, systems should be easy to operate and offer users the greatest possible flexibility.

Since its introduction on to the market, Surdial X has mastered this balance between

- Treatment quality
- Usability
- Economics
- Safety.

From the operator's point of view, Surdial X represents an ideal co-worker:

- Reliable and inexhaustible
- Engineered with all technicalities required

At the same time, our patients can trust the system's ability to set up treatments exactly tailored to the prescriptions of nephrologists.

Inspired by this success and committed to continuously innovating our products, we further improved Surdial X with the introduction of its second generation. We proudly introduced a new system with:

- Enhanced features
- Optimized resource utilization
- Facilitated maintenance

We invite you to discover our second generation Surdial X in the following pages.

OUTSTANDING FLEXIBILITY

Surdial X can be paired with different pump configurations to fulfill the requirements of different institutions: from large hospitals to small dialysis centers.

Thanks to its **high-end 3-pump configuration**, Surdial X can manage various treatment modes:

- **HD** (double or single needle)
- **HDF** (online double or single needle, both with pre- or post-dilution)
- **HF** (pre- or post-dilution)

The newly introduced **Max Sub Function** helps to reach the highest possible substitution volume for each patient with minimal alarms and nurse interventions.

DIALYZER	QB	UF	SUBS	CONV	TMP	Min (l)	Max (l)
Elisio 17H	351	2,3	26,7	27,1	253,1	20,8	31,7
Elisio 19H	355	2,3	28,2	30,5	251,9	17,4	33,4
Elisio 21H	357	2,4	28,1	30,6	258,3	17,7	36,2
Elisio 25H	390	2,9	31,7	34,5	263,0	30,5	32,2

Results collected from 184 treatments administered in 2016 in Spain under normal conditions.

In addition to Max Sub Function, we improved upon two key functions, keeping patient safety and costs in mind:

Dialysate Infusion Function (DIF), which allows for DIF priming and quick bolus in case of sudden urgency during treatment.

DIF Reinfusion, which now allows a full HD treatment without the use of separate saline bags, further optimizing the cost of therapy.

The advanced programs of Surdial X are designed for settings adapted to the needs of the patients. It is possible to set customized bicarbonate, sodium, and UF profiles, before or during treatment, according to the physician's prescriptions.

SURDIAL X IS A UNIT DESIGNED FOR INDIVIDUALLY OPTIMIZED TREATMENTS

3-PUMP SYSTEM

Located on the front of the unit in order to properly manage various treatment modalities: HD, HF, and HDF, according to patient conditions and medical indications.

ONLINE HDF

Surdial X permits the online preparation of substitution fluid, thus avoiding the need for a bag. This saves operators time, while saving centers on costs.

DIALYSATE INFUSION FUNCTION

The user can perform DIF priming, reinfusion, and rapid bolus administration all while working online, even on single-pump HD machines without the need of saline bags.

DOSE DETECTOR FUNCTION

The machine integrates an innovative dose detector and provides a complete range of values for Kt, Kt/V single pool and double pool, clearance, and urea reduction rate.

READY FOR CONTINUOUS TREATMENTS

Thanks to the sustained low efficiency dialysis function, Surdial X can efficiently support acute continuous treatments.

MAX SUB FUNCTION

Allows for higher substitute volumes in post-dilution HDF, thereby reducing nurse interventions. The function calculates the highest possible substitution rate for each patient, based on a TMP control system.

EASY HANDLING

Even the most innovative machine may not represent an advantage if it is too complex to operate. For this reason, the technology of Surdial X offers the following advantages:

- Easy to operate
- Intuitive user interface
- 15" high-sensitivity touch screen
- Full text guidance
- Machine-assisted loading pump segments

Surdial X reinforces safety by ensuring quick access to information:

- Control buttons grouped in logical areas
- "Help" screens available
- "Dashboard" screen with quick and clear overview of the treatment status

Easy handling and quick access to information ultimately translate to safer administrations.

Safety also comes in the form of security, knowing the correct treatment is paired with the correct patient. Surdial X ensures that "tailor made" dialysis treatments are facilitated by a patient card. Each patient will have an unique patient card with predefined settings for their treatment.

The card is designed to facilitate the quick and safe setup of treatment parameters. Surdial X can be connected to the local network, allowing for the direct transmission of patient data to the clinic's server.

SURDIAL X IS AN ADVANCED SYSTEM FOR IMMEDIATE USE

LAN CONNECTIVITY

Permits a straightforward transmission of patient data to the clinic's data management software.

PATIENT CARD

Allows patients to hold his/her own settings for treatment, maximizing safety and speed of operation.

MACHINE-ASSISTED INSERTION OF THE PUMP SEGMENTS

Auto-loading clips reduce the time needed for each unit's preparation. At the end of treatment, clips are automatically ejected and can easily be removed.

AUTOMATIC SELECTION OF THE TREATMENT MODE

Depending on the blood lines being inserted into the machine, the system automatically sets the correct treatment mode.

15" TOUCH SCREEN INTERFACE

Improved hight-sensitivity screen for optimized usability and visibility in any condition.

SYSTEM INTERFACE WITH DASHBOARD VIEW

The status of treatment is constantly under control with a dedicated, clear, and easy to read screen.

REDUCED WASTE

NO LONGER A NEED FOR SALINE BAGS

Surdial X can operate **fully online,** not only in HDF, but also in HD mode, thanks to its DIF function. This means that the dialysis center can perform complete treatments without the need for saline bags. Zero consumption also translates to zero costs associated with the purchase, consumption, storage, and disposal of saline bags.

LOW WATER AND ENERGY REQUIREMENTS

The most advanced engineering solutions provided by Surdial X means an extremely **limited consumption of water and energy.** This has an immediate tangible effect on the financials of clinics and, at the same time, represents an important advantage for the environment in which we live.

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ronment

LIMITED DISINFECTANT CONSUMPTION

After each treatment, Surdial X can be disinfected with a small volume of acid concentrate which is **4 to 8 times less** than any other dialysis machine currently on the market. This limits the need for disinfectant procurement and, consequently, reduces the discarding of its canisters.

SHORT DISINFECTION TIME

The disinfection time can be **as short as 29 minutes** in HD version and still maintain the highest recommended efficiency standards. This enables more operations to proceed, thus saving time and improving work conditions for nurses by minimizing the resources needed for machine disinfection.

PRIORITIZED SAFETY

We designed Surdial X to **actively and passively manage** patient safety. During treatment, Surdial X software closely monitors all settings and gives immediate visual and audible warnings if any deviations are detected. Other measures, such as clips and connection points, secure bloodlines in place and enable users to quickly check that lines are correctly inserted and to instantly troubleshoot problems.

The **Clean Treatment Start (CTS)** function allows the UF pump to remove priming solution from the bloodlines, without delivering it to the patient during the connection phase and without the need of extra drain bags.

Particular attention is also given to **leakage detection**. New dedicated sensors, including one added below the pump area, control the integrity of both extracorporeal and hydraulic circuits, as well as the solidity of the endotoxin filters, whose action is fundamental in the case of online HD or HDF.

SURDIAL X IS DESIGNED TO PROTECT PATIENTS ENTRUSTED IN ITS CARE

BLOOD PRESSURE MONITORING

During treatment, the status of the patient's pressure is kept under permanent monitoring, allowing for immediate support in case of need. Furthermore, the measurements can be linked to treatment conditions and may help reduce the risk of hypotension.

CLEAN TREATMENT START (CTS)

Priming solution from the bloodlines can be removed without delivering it to the patient during the connection phase and without the need to discard it into an external drain bag.

DIALYZER LEAKAGE CONTROL

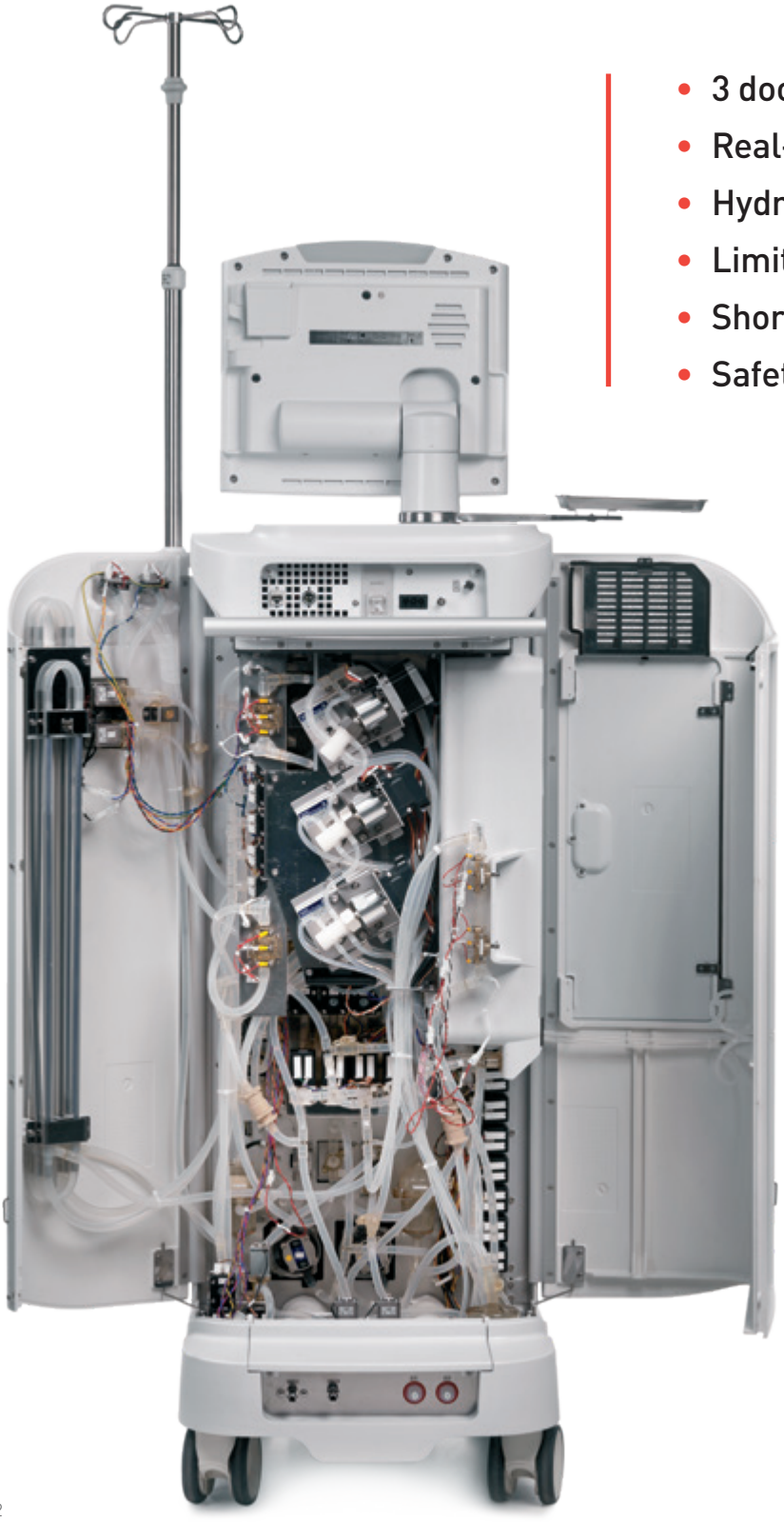
With DIF function, the control of possible leakages is also extended to the dialyzer to maximize the safety of the patient.

BLOOD VOLUME MONITOR (BVM)

The BVM function measures the relative change of hemoglobin concentration during the dialysis session. It helps in the prevention of hypotensive episodes.

EXCEPTIONAL RELIABILITY

Some things are worth keeping. Surdial X kept its **well-designed general blood circuit layout**, as well as its **compact footprint and slim design**. This translates to more room in the ward for both patient and operator.



- 3 doors for easy accessibility
- Real-time flow charts
- Hydraulic efficiently designed
- Limited disinfectant consumption
- Short disinfection time
- Safety Inspection once every 24 months

SURDIAL X INTEGRATES THE HIGHEST TECHNOLOGIES TO SIMPLIFY ITS MAINTENANCE

MULTIPLE ACCESS DOORS

Large doors permit access to the hydraulic system and electronic parts, allowing for easy maintenance by technicians.

SAFETY INSPECTION, ONCE EVERY TWO YEARS

Safety inspection on the unit can be conducted one time every 2 years, which minimizes the interruption of the clinic's normal workflow, benefitting both users and patients.

REAL-TIME FLOW CHARTS

Before, during, and after treatment, the user can rely on flow charts that map hydraulics. This further facilitates decisions for technician.

HYDRAULIC CIRCUIT LEAKAGE CONTROL

New detectors, including one placed on the front of the machine, monitor possible leakages in the circuits and the endotoxin filters area.

CLOSE CIRCUIT TEST

Both patients and operators can rely on a comprehensive surveillance system whose checks and parameters can be adjusted during therapy.

COMPLETE PRODUCT OFFER

Nipro is a world leading producer of disposable equipment for dialysis and dialysis-related treatments. With over 30 years of continuous research and development, we continue to innovate products that reflect the needs of customers, always committed to the highest quality standards. In addition to our Surdial X dialysis machine, Nipro's renal product range covers you from start to finish: filters, AV needles, HD catheters, hemostatic bandages, blood tubing sets, concentrates, and water treatment systems.

WATER TREATMENT SYSTEMS

We manufacture water treatment systems for dialysis centers to ensure the safest water quality in large and small centers, as well as for individual units. We also offer reverse osmosis and hot water sanitization systems for renal and medical applications.

SOLUTIONS

Our offer includes liquid and dry renal solutions to prepare more than 200 million liters of dialysate fluid in centers. A full range of formulas, dilutions, and containers are produced to meet the specific demands of dialysis units and address patient needs in any country.

VASCULAR ACCESS

We offer a complete set of AV needles and catheters for smooth penetration of the skin, thereby reducing pain and improving patient comfort. Our BIOHOLE range is specifically designed to support the buttonhole technique. Our vascular access portfolio is made complete with dressings and a full range of HD catheters for short or long term use.

BLOOD TUBING SETS

We manufacture blood tubing sets in many configurations and specifications to meet the needs of our user and patients, all designed to enhance safety and efficiency. Our sets also provide centers with a flexible solution, as they can be made to fit all types of dialyzers and dialysis equipment..

DIALYZERS

Our filters are well known for their superior removal of high molecular weight uremic toxins, while simultaneously ensuring high biocompatibility and limiting albumin leakage. Our product range includes three families of dialyzers: Sureflux (Cellulose triacetate membrane), Elisio (Polynephron membrane), and the newly introduced Solacea (Asymmetric Triacetate membrane). Equipped with Bisphenol A (BPA)-free fibers, housing, and headers, Nipro dialyzers are both patient and eco-friendly.

TECHNICAL SPECIFICATIONS

MEASUREMENTS

Unit size	Height: - 1625 mm (without IV pole) - 1745 to 1995 mm (with IV pole) Width: 480 mm (monitor: 390 mm) Depth: 895 mm 4 castors and 2 brakes
Unit mass	Approx. 120 kg (dry mass)

PROTECTION

Protection class and grade	Class I Type B applied part (cuff for BPM: type BF applied part)
Protection against water penetration	Drip proof machine IPX1 (all panels closed)

DIALYSATE FLOW

Dialysate flow	Min: 100 ml/min Max: 800 ml/min	100 ml/min step linked with blood flow

UF CONTROL

UF control method	Sealed volume control method using piston pump	
Setting range	0.00, 0.10-4.00 l/h	0.01 l/h step

BLOOD PUMP, S/N DOUBLE PUMP, ON-LINE HDF PUMP

Blood pump method	2 rollers (auto space adjustment method)
Rotation direction	Counterclockwise rotation
Flow range	Normal tube: 10 to 600 ml/min - Normal tube: exclusive circuit Ø 8.00 x Ø 12.00 ± 0.15 mm - Obtaining maximum flow may be impossible due to fatigue of the rolling tube

HEPARIN PUMP

1-tube method	10, 20, 30 ml syringe
Injection direction	Leftward, only facing the equipment front side
Flow setting	0.0 to 10.0 ml/h
Overload detection	Discharge pressure 1200 ± 50 mmHg

Nipro Renal Care is part of Nipro Corporation Japan, a leading global healthcare company established in 1954. With over 29.000 employees worldwide, Nipro serves the Medical Device, Pharmaceutical, and Pharmaceutical Packaging industries.

Nipro Renal Care is a global market leader with over 5 decades providing renal solutions for dialysis and dialysis-related treatment. We specialize in developing dialysis machines, water treatment systems, and a comprehensive portfolio of disposable medical equipment.

In order to address the needs of patients, healthcare professionals, and procurement managers alike, Nipro Renal Care is driven by innovation and patient safety to offer the highest quality products that optimize time, effort, and costs.

BECAUSE EVERY LIFE DESERVES AFFORDABLE CARE

www.nipro-group.com/en-en/our-company/our-locations

Please contact your local representative for more information.

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