Deltec®

NFP 509 – NFP 1020

Bedienungsanleitungen
und Ersatzteillisten

Operating instruction
and
Spare parts list

Modes d’emploi et listes
des pièces détachées

Istruzioni per l’uso
e lista ricambi

Deltec *Nitratfilter Typ NFP*

Deltec Nitratfilter der Reihe NFP bestehen aus einem Druckbehälter, einem Kopf mit Bajonettverschluss, Umwälzpumpe, Anschluss für Redox Elektrode, Nährlösung und Membranbeutel.
Um die hohe Leistung des NFP 1020 nutzen zu können sollte die Nährlösung mit einer Dosierpumpe zugeführt werden. Die Dosierpumpe sowie Membranbeutel gehören beim 1020 nicht zum Lieferumfang.

Biologische Nitratentfernung
Nitrat kann in einem sauerstoffarmen Milieu durch Bakterien in andere Stoffe aufgespaltet werden. Dabei entstehen Stickstoffgase und Kohlensäure, Phosphat wird unter bestimmten Bedingungen gebunden. Damit diese biologischen Vorgänge wirkungsvoll ablaufen können, müssen bestimmte Vorraussetzungen erfüllt werden.

1. anaerobe Wasserverhältnisse im Nitratfilter durch tropfenweises Zuführen von Aquariumwasser.
2. nachweisbarer Nitratgehalt im Wasser.
3. regelmäßige Versorgung des Filters mit Nährlösung.

Der Betrieb eines Nitratfilters kann jedoch auch Risiken mit sich bringen, wenn man sich nicht an die Betriebsanleitung hält.

Um Probleme zu vermeiden, und um die unbestrittenen Vorteile der Nitratentfernung richtig zu nutzen, sollte die Betriebsanleitung unbedingt beachtet werden.

Vor der Inbetriebnahme eines Nitratfilters sicherstellen, dass die aerobe Filterung des Aquariums arbeitet. Die biologischen Prozesse, die zur Entfernung von Nitrat führen, setzen bestimmte Bedingungen voraus:

- anaerobe Wasserverhältnisse im Nitratfilter
- regelmäßige und dauerhafte Versorgung mit Nährlösung

Die Zufuhr von Nährlösung kann auf verschiedene Weise erfolgen:

Über Membranbeutel (nicht NFP 1020)
Der Membranbeutel wird mit Nährlösung gefüllt und in den oberen freien Bereich des Nitratfilters gelegt. Bei NFP 512 / NFP 616 sind entsprechend mehr Beutel zu füllen. Hierbei ist darauf zu achten, dass man bei Inbetriebnahme nur ca. 50% der max. Nährlösung verwendet. Erst wenn eine deutliche Reduzierung von Nitrat am Ausgangswasser des Filters gemessen wird, kann die Nährlösungsmenge nach und nach erhöht werden.

Die Nährlösung diffundiert über einen Zeitraum von 4-5 Wochen durch die Membran in das Filterwasser und muss danach erneuert werden. Das im Beutel verbliebene Wasser ist vor dem Neubefüllen zu entfernen.
Bei Filtern mit zwei (NFP 512) oder drei (NFP 616) Beuteln ist es von Vorteil die Beutel zeitlich versetzt zu befüllen, z.B. bei zwei Beuteln einen am 1. des Monats und den zweiten am 15. des Monats.
Zur Unterscheidung sind die Beutel mit einer 0,1 und 2 gekennzeichnet.

Über eine Einwegspritze (nicht NFP 1020)
Diese Methode hat den Vorteil, dass die Versorgung mit Nährlösung gesteuert, und das Leistungspotential besser ausgenutzt werden kann.
Bei dieser Methode ist zu beachten, dass täglich die in nachstehender Tabelle aufgeführte Menge Nährlösung zugeführt wird, idealerweise aufgeteilt auf zwei Mal täglich.

Über eine Dosierpumpe
Die Versorgung durch eine Dosierpumpe hat den Vorteil, dass die täglich erforderliche Menge Nährlösung in kleinen Mengen mehrmals täglich dosiert werden kann. Diese gleichmäßige Versorgung erhöht die Leistung..

Installation
Der Aufstellort kann beliebig gewählt werden. Die Umgebungstemperatur sollte zwischen 20° und 28° C liegen. Die Wasserzufuhr kann über eine separate kleine Aquariumpumpe oder über einen Bypass von der Hauptpumpe erfolgen. Die Pumpe bzw. der Bypass ist mit einem geeigneten Schlauch mit dem Microfilter (26) oder dem Absperrhahn (10 (nur NFP 509) zu verbinden. Der Ablauf (17) ist mit einem Schlauch in die Filteranlage zu führen.

Nach erfolgreicher Installation ist der Filter auf ev. Undichtigkeiten und festen Sitz aller Verbindungen zu prüfen.

Inbetriebnahme
Nachstehendes gilt für alle Deltec Nitratfilter.
Das Ziel ist, im Nitratfilter in relativ kurzer Zeit möglichst viele anaerobe Bakterien zu kultivieren. Um das zu erreichen muss das Wasser im Nitratfilter einen sehr geringen Sauerstoffgehalt haben, d.h. nach der Einlaufphase einen Redoxwert von ca. -150mV. Durch eine geringe Wasserversorgung des Filters mit Aquariumwasser von zunächst 1 Tropfen alle zwei Sekunden sinkt der Redoxwert im Filter. Die wenigen vorhandenen anaeroben Bakterien veratmen den im Wasser gelösten Sauerstoff und reduzieren so den Redoxwert. Entsprechend der zunächst geringen Bakteriendichte darf bei Inbetriebnahme auch nur eine reduzierte Menge Nährlösung (max.50%) zugegeben werden. Nach einigen Tagen wird am auslaufenden Wasser des Nitratfilters eine hohe Konzentration von Nitrit (NO^2) und ev. sogar erhöhte Nitratwerte (NO^3) gemessen.
Erst wenn Nitrit (NO^2) im ablaufenden Filterwasser nicht mehr messbar und die Nitratwerte stark reduziert sind, kann die Wasserzufuhr und die Menge der Nährlösung in kleinen Schritten erhöht werden.

Durch tägliche Messungen die Nitrit und Nitratwerte kontrollieren.
Steigen die Werte wieder, ist zuviel Sauerstoff durch die Wasserzufuhr in den Filter gelangt, die Wassermenge ist wieder zu reduzieren.
Ist die Menge der Nährlösung, im Verhältnis zur anaeroben Bakterienmenge, zu groß, kann es zur Trübung des Aquariumwassers kommen. Im Extremfall kann es zu einem Sauerstoff Defizit im Aquariumwasser kommen. In einem solchen Fall die Wasserzufuhr zum Nitratfilter abstellen und Maßnahmen zur Erhöhung des Sauerstoffgehaltes im Aquarium treffen (z.B. starkes Belüften, Teilwasserwechsel oder andere geeignete Maßnahmen.
Danach den Nitratfilter mit reduzierter Nährlösungsmenge wieder in Betrieb nehmen.
Beides, Wasserdurchfluss und Nährstoffmenge müssen immer im richtigen Verhältnis zur Bakterienmenge im Nitratfilter stehen. Deshalb darf jede Erhöhung nur in kleinen Schritten vorgenommen werden.
Hilfreich zum erreichen des richtigen Redoxwertes (ca. -150mV) ist ein Redox Messgerät.

Automatische Steuerung
Durch ein Redox Steuergerät in Kombination mit einem Seewasserfesten Magnetventil kann die Wasserzufuhr und damit der Redoxwert automatisch geregelt werden. Dazu wird zwischen Absperrhahn (10) und dem Nitratfilter ein passendes T-Stück mit einem zweiten Absperrhahn montiert. Der Ausgang des Magnetventils wird mit dem zweiten, neu montierten, Absperrhahn verbunden. Den Eingang des Magnetventils mit dem Eingang des Absperrhahns (10) verbinden.

1 schließen Sie die Wasserzufuhr an den Microfilter (26) oder bei dem NFP 509 an den Absperrhahn (10) an.
2 füllen Sie den Filter mit Aquariumwasser.
3 in die dafür vorgesehene Verschraubung (15) (den roten Stopfen (14) entfernen) installieren Sie die Redox Messelektrode.
4 stellen Sie den Absperrhahn (10) auf ca.1 Tropfen pro Sekunden ein.
5 starten Sie die Zirkulationspumpe.

Das Kabel des Magnetventils mit einem Stecker versehen (nur vom Fachmann auszuführen) und Stecker in das Redoxgerät stecken.

Betrieb
Das Redox Steuergerät ist auf ca. -150 mV einzustellen. Wenn dieser Wert im Filter erreicht ist, öffnet das Magnetventil und führt dem Filter zusätzlich Wasser zu. Die Tropfgeschwindigkeit sollte im Anfang nicht mehr als 2-3 Tropfen pro Sekunde betragen und ist über den zweiten (Magnetventil) Absperrhahn einzustellen.
Durch die zusätzliche Wassermenge steigt der Redoxwert wieder gegen plus.

Da die Redoxsteuerung im deltec ***Nitratfilter*** ein sehr träger Prozess ist, schwankt der Redoxwert im oberen und unteren Bereich, er sollte aber nicht außerhalb von -100 mV bis -200 mV liegen.

Wartung
Während des Betriebes eines Nitratfilters bilden sich Ablagerungen durch tote Bakterien. Diese Ablagerungen können im Extremfall den Filter verstopfen.
Bei der Reinigung des Filters darauf achten, dass das alte Filterwasser wieder verwendet wird. Die Filterpatrone in Seewasser vorsichtig ausdrücken, Pumpe und Leitungen reinigen. Nach Zusammenbau des Filters das alte Filterwasser wieder verwenden und das fehlende Wasser mit Aquariumwasser ersetzen. Besser ist jedoch vor der Reinigung ablaufendes Filterwasser zu sammeln und es anstelle von frischem Aquariumwasser zu verwenden. Die Tropfgeschwindigkeit für ca. 24 Std. auf ca. 1 Tropfen/ sec. Reduzieren.

Technische Daten

Typ	Maße (l/b/h)	für Aquarien bis	Membran-beutel	tägliche Nährlösungsmenge mit Einwegspritze oder Dosierpumpe
NFP 509	225x170x560mm	800 Liter	1	8 ml
NFP 512	300x220x580mm	1600 Liter	2	16 ml
NFP 616	325x265x580mm	4000 Liter	3	40 ml
NFP 1020	390x310x1010mm	10000 Liter	0	100 ml

Die genannten Filterleistungen sind Annäherungswerte und können von Aquarium zu Aquarium anders sein. Erfahrungsgemäß ist die tatsächliche Nitratentfernung größer als sie sich rein rechnerisch aus dem Betrieb des Nitratfilters ergibt. Vermutlich wirkt das Gesamtsystem durch die aus dem Filter ausgeschwemmten Bakterien zusätzlich als Nitratfilter.

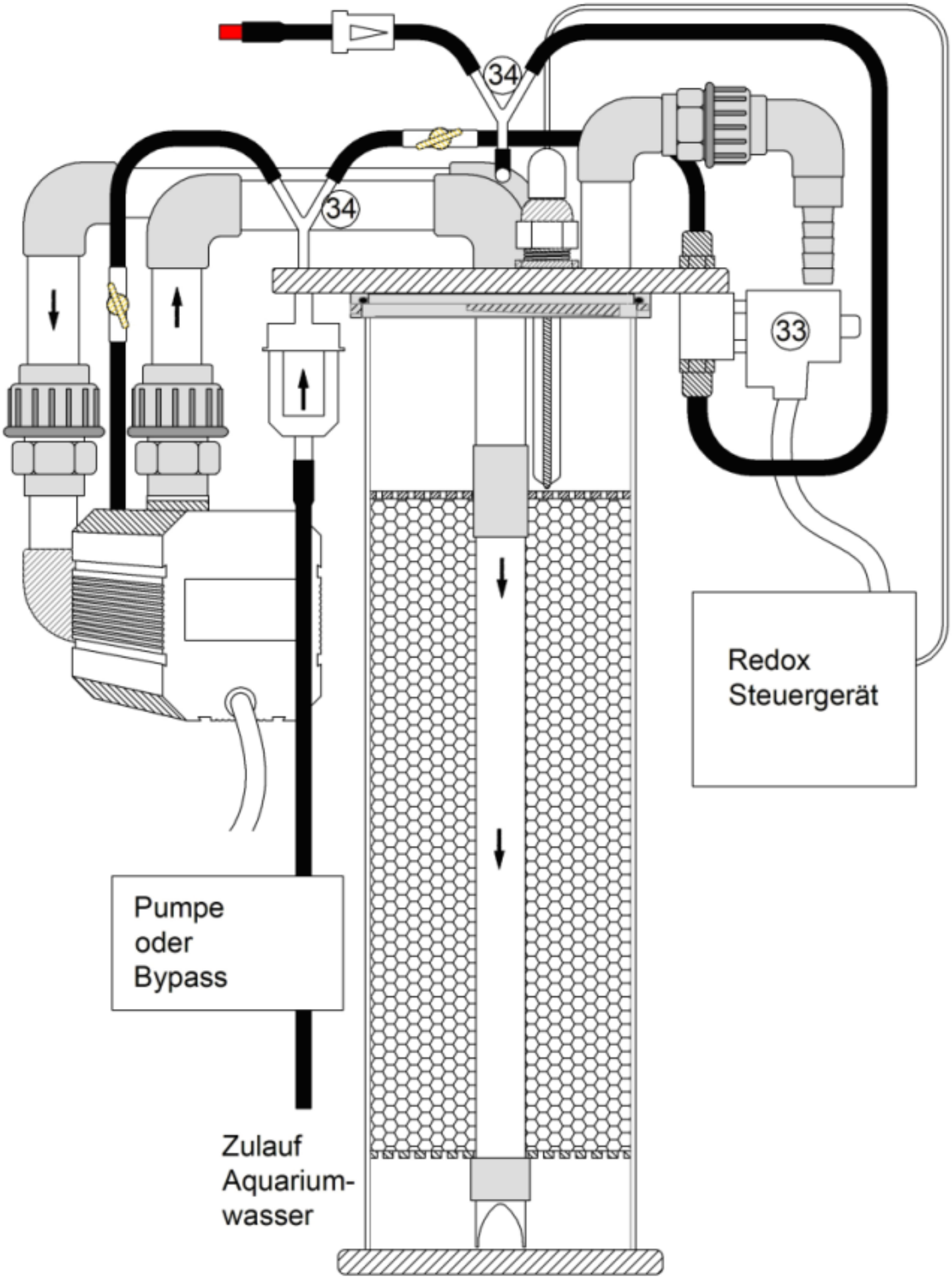
Sicherheitshinweise
Sollte der deltec ***Nitratfilter*** über einen längeren Zeitraum nicht betrieben werden, dann muss bei der Neuinbetriebnahme wie bei der Erstinbetriebnahme verfahren werden. Das gilt auch nach einer Behandlung mit Medikamenten, wobei zu beachten ist, dass die biologische Funktion des aeroben Filters zunächst wieder hergestellt sein muss.

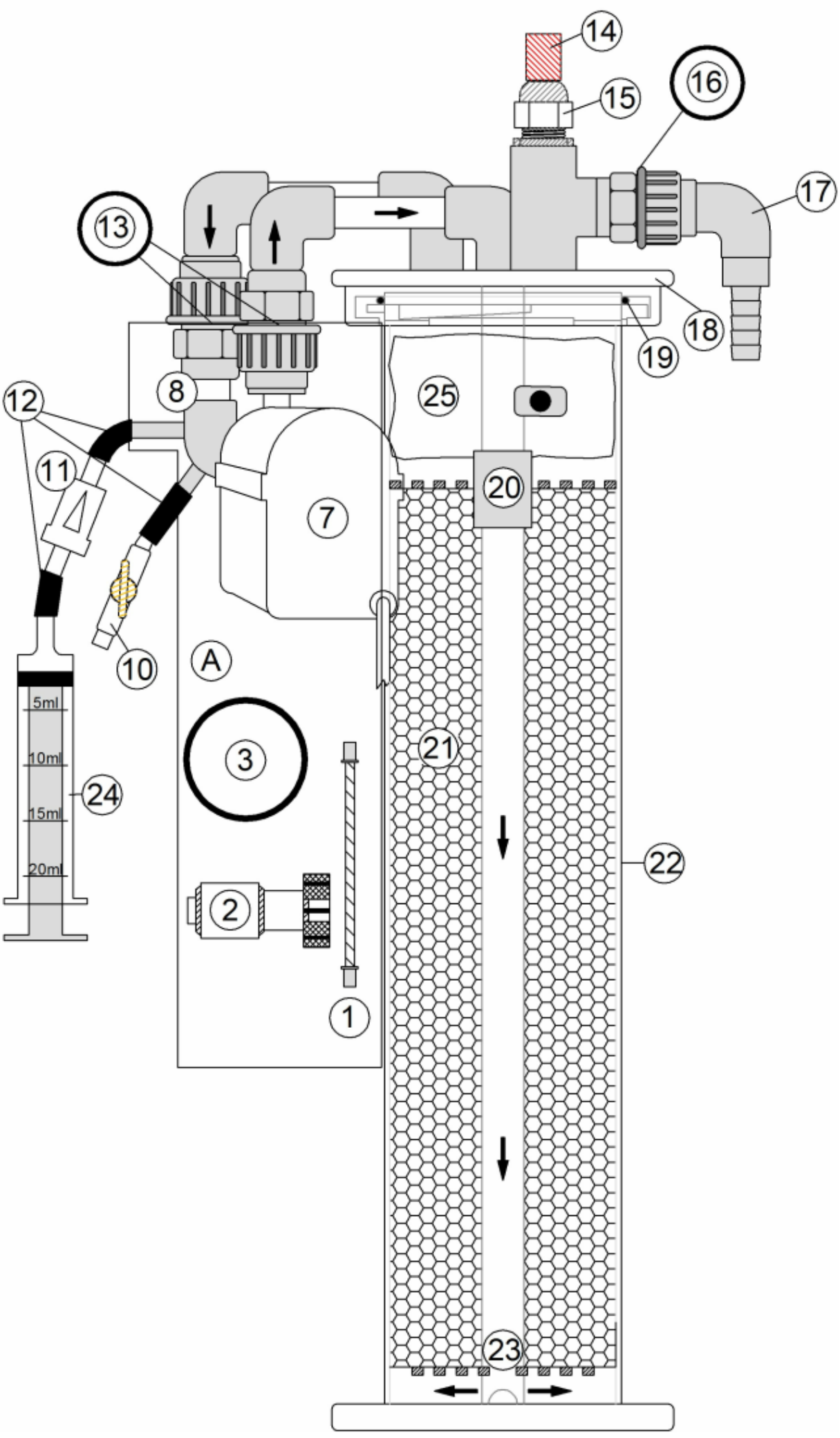
Die Tropfgeschwindigkeit ist täglich zu kontrollieren und gegebenenfalls neu zu regulieren.

Nitratfilter nur mit deltec *Nährlösung* beschicken, wenn der aerobe Filter gut eingelaufen ist und Nitrat nachgewiesen wurde.

Während der Einlaufzeit des Filters niemals zuviel Wasser und/oder Nährlösung zuführen. Es können unerwünschte, teilweise schädliche Reaktionen stattfinden.

Model NFP 616 mit redox Steuerung

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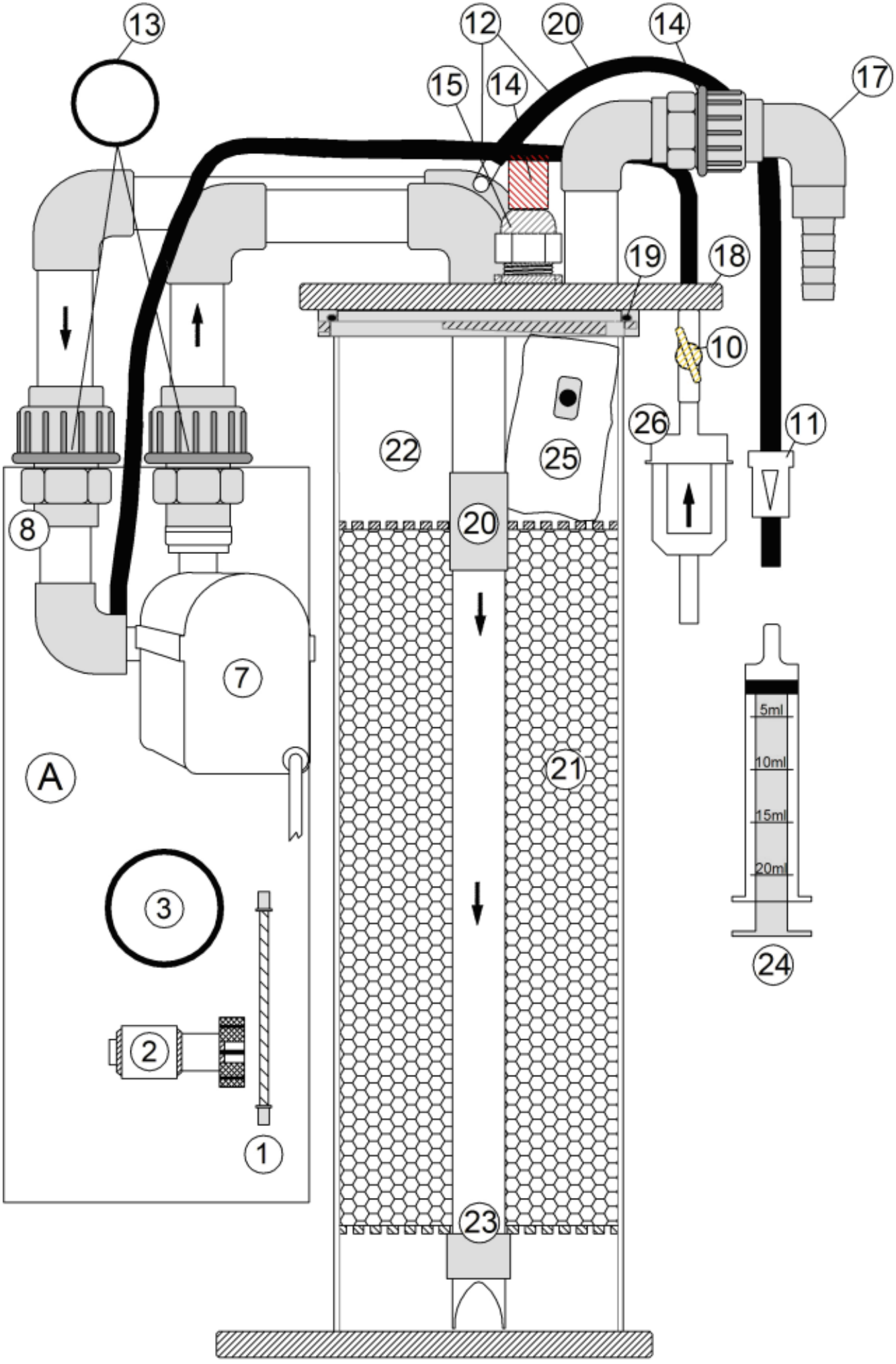
Ersatzteilliste NFP 509

Nr.	Art. Nr.	Bezeichnung	
	64300000	NFP 509	
A	87161000	Pumpe mit Verrohrung	
1	69544000	Welle mit Lager	
2	69356000	Laufeinheit	
3	69511000	O-Ring Pumpe	
4	XXXXXX		
5	XXXXXX		
6	XXXXXX		
7	69501000	Stator	
8	87157700	Saug / Druckleitung	
9	XXXXXX		
10	93010010	Mini Regulierventil	
11	87140000	Rückschlagventil	
12	61751075	Siliokonschlauch	
13	93040400	O-Ring Verschraubung 16 mm	
14	65900000	Stopfen rot	
15	65904000	Verschraubung PG 13,5	
16	93041400	O-Ring Verschraubung 20 mm	
17	64300400	Auslaß	
18	64300200	Deckel	
19	10400360	O-Ring Bajonett	
20	87157800	Siebplatte	
21	64300300	DLS Patrone	
22	87169000	Grundgerät	
23	64300900	Innenrohr mit Siebplatte	
24	64310000	Dosierspritze 20ml	
25	64054000	Membranbeutel	
33	64049000	Magnetventil	
34	64311000	Y - Stück	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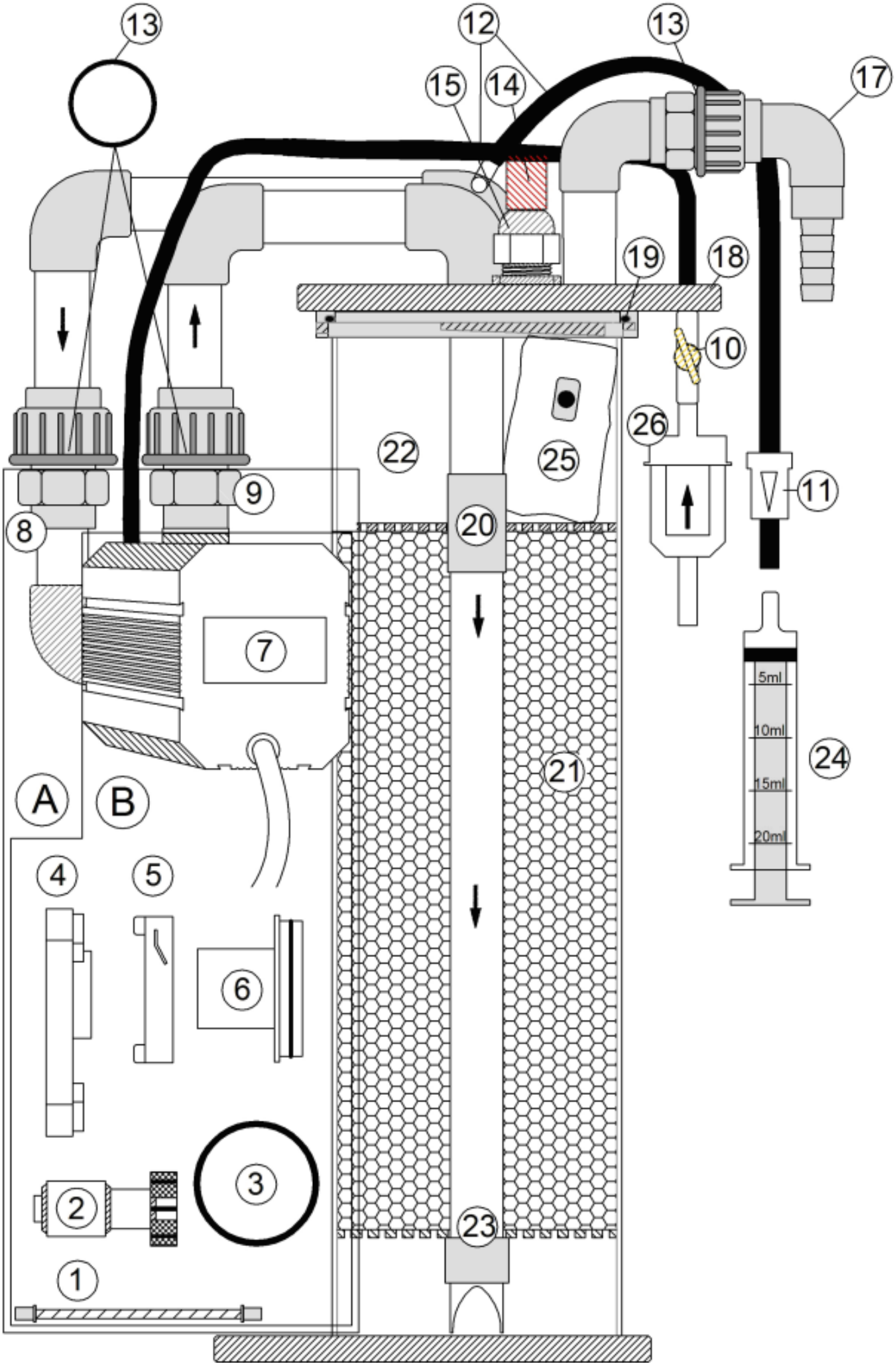
Ersatzteilliste NFP 512

Nr.	Art. Nr.	Bezeichnung	
	64301000	NFP 512	
A	87149000	Pumpe mit Verrohrung	
1	69545000	Welle mit Lager	
2	69352000	Laufeinheit	
3	69511000	O-Ring Pumpe	
4	XXXXXX		
5	XXXXXX		
6	XXXXXX		
7	69502000	Stator	
8	87306000	Saug / Druckleitung	
9	XXXXXX		
10	93010010	Mini Regulierventil	
11	87140000	Rückschlagventil	
12	61751075	Siliokonschlauch	
13	93041400	O-Ring Verschraubung 20 mm	
14	65900000	Stopfen rot	
15	65904000	Verschraubung PG 13,5	
16	XXXXXX		
17	64300400	Auslaß	
18	64301300	Deckel	
19	10400700	O-Ring Bajonett	
20	64301600	Siebplatte	
21	64301300	DLS Patrone	
22	64301100	Grundgerät	
23	64301900	Innenrohr mit Siebplatte	
24	64310000	Dosierspritze 20ml	
25	64054000	Membranbeutel	
26	64056000	Micro Filter	
33	64049000	Magnetventil	
34	64311000	Y - Stück	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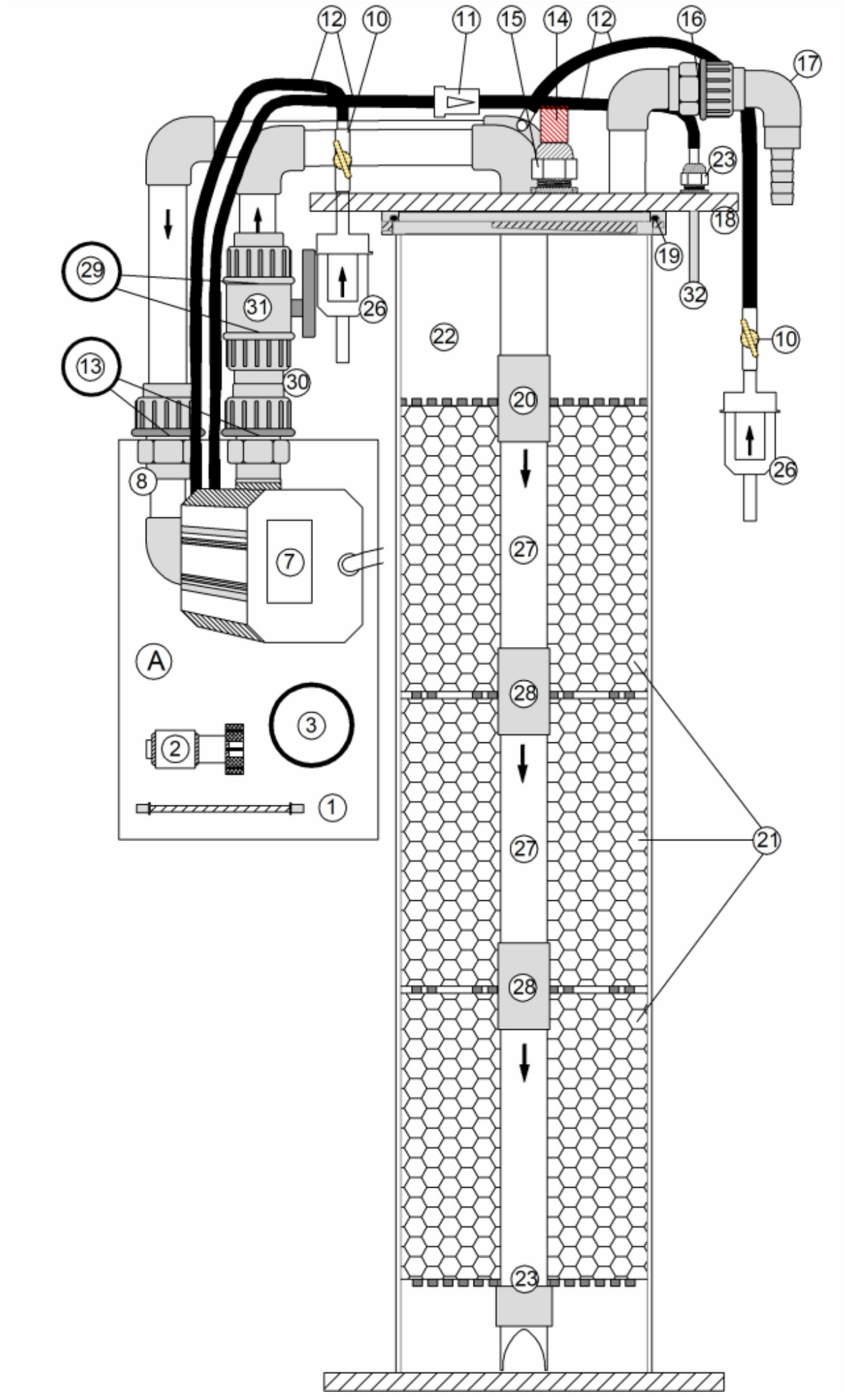
Ersatzteilliste NFP 616

Nr.	Art. Nr.	Bezeichnung	
	64302000	NFP 616	
A	87152000	Pumpe mit Punkt 1-9	
B	69303000	Pumpe mit Punkt 1-7	
1	69546000	Welle mit Lager	
2	69353000	Laufeinheit	
3	69513000	O-Ring Pumpe	
4	69530000	Frontplatte	
5	69527000	Bajonett Pumpe	
6	69526000	Front Lagerplatte	
7	69508000	Stator	
8	87326000	Saugleitung	
9	87327000	Druckleitung	
10	93010010	Mini Regulierventil	
11	87140000	Rückschlagventil	
12	61751075	Siliokonschlauch	
13	93041400	O-Ring Verschraubung 20 mm	
14	65900000	Stopfen rot	
15	65904000	Verschraubung PG 13,5	
16	XXXXXX		
17	64300400	Auslaß	
18	64302300	Deckel	
19	10400400	O-Ring Bajonett	
20	87323000	Siebplatte	
21	64302300	DLS Patrone	
22	86002100	Grundgerät	
23	64302900	Innenrohr mit Siebplatte	
24	64310000	Dosierspritze 20ml	
25	64054000	Membranbeutel	
26	64056000	Micro Filter	
33	64049000	Magnetventil	
34	64311000	Y - Stück	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NFP 1020

Nr.	Art. Nr.	Bezeichnung	
	64303000	NFP 1020	
A	87158000	Pumpe mit Verrohrung	
1	89130000	Welle mit Lager	
2	89036000	Laufeinheit	
3	10501700	O-Ring Pumpe	
4	XXXXXX		
5	XXXXXX		
6	XXXXXX		
7	69704100	Stator	
8	64303500	Saugleitung	
9	XXXXXX		
10	93010010	Mini Regulierventil	
11	87140000	Rückschlagventil	
12	61751075	Siliokonschlauch	
13	93042400	O-Ring Verschraubung 25 mm	
14	65900000	Stopfen rot	
15	65904000	Verschraubung PG 13,5	
16	93041400	O-Ring Verschraubung 20 mm	
17	64303400	Auslaß	
18	64303300	Deckel	
19	10400430	O-Ring Bajonett	
20	87343000	Siebplatte	
21	64303300	DLS Patrone	
22	86005100	Grundgerät	
23	64303900	Innenrohr mit Siebplatte	
24	XXXXXX		
25	XXXXXX		
26	64056000	Micro Filter	
27	64303910	Innenrohr	
28	64303920	Siebplatte mit Bohrung	
29	93402300	O-Ring Kugelhahn 25	
30	87365000	Verbindungsstück	
31	93402300	Kugelhahn ohne Mutter	
32	64303930	Anschlussrohr	
33	64049000	Magnetventil	
34	64311000	Y – Stück	

The NFP Range of Denitrification Reactors.

Suitable for installation in a cabinet for systems with or without a sump.
Designed for use in freshwater or saltwater aquariums and ponds.

MODEL	MINIMUM / MAXIMUM SUITABLE TANK SIZE			MAXIMUM FLOW RATE / HOUR			MEDIA	DAILY FOOD
	LITRES	GALLONS	US GALLONS	LITRES	GALLONS	US GALLONS	VOLUME	VOLUME
NFP 509	200 / 1000	45/220	50/250	1.5	0.22	0.26	2lt	8ml (1 bag)
NFP 512	800 / 2000	175/440	200/500	3.0	0.44	0.5	4lt	16ml (2 bag)
NFP 616	1500 / 5000	350/1100	400/1300	7.5	1.1	1.3	10lt	40ml
NFP 1020	5000 / 15000	1100/3300	1300/4000	22.5	3.3	3.8	25lt	100ml

Note that the flow rates shown above maximum rates and are only achievable when the reactor has been fully matured for over 3 months and is operated in full automatic mode with a water temperature of 20-30 C.

OPERATING INSTRUCTIONS

Great time and effort was taken when creating this new family of nitrate filters to overcome the problems that are commonly found with similar products on the market and to make the units as simple and effective as possible – however be aware that these filters work on natural biological processes which involve the growth of a stable colony of denitrifying bacteria and therefore a certain amount of patience and understanding is required.

Features of the new reactor are:

- Ease of cleaning via fully removable lid.
- Large bore exit pipes that will not block.
- Special media that will not choke up with dead bacteria.
- Pressurised operation possible for flexibility of reactor positioning.
- Recirculation system to ensure an even distribution of nitrate and food to the bacteria.
- Can be operated in manual, semi-automatic and fully automatic mode.

What is denitrification and how does it work?

Within the aquarium, fish and uneaten food produce waste which breaks down to form AMMONIA (NH4). Aerobic bacteria within the filtration system of the tank then oxidise the ammonia first to NITRITE (NO2) and then further to NITRATE (NO3). This series of processes is continuous and ultimately leads to a build up of nitrate in the aquarium which can only be reduced without a nitrate filter by either large regular water changes, heavy aquatic planting or by a reductive process whereby the oxygen from the nitrate molecules is utilised by anaerobic bacteria to convert it to NITROGEN GAS (N2).

The natural reduction of nitrate to nitrogen gas will only occur if there is an area within your system with a very low oxygen level that will allow anaerobic bacteria to exist in sufficient quantities to handle the waste that is being produced by your tank's inhabitants, such as within live rock or in a deep sand bed. Where this does not exist it is necessary to create such an environment and this is where the NFP denitrification reactors come in to play.

The Deltec NFP Reactors offer a large surface area on which millions of anaerobic bacteria can colonise, a system of recirculation of the water to ensure that the nitrate is easily available to all of the bacteria and a way of introducing a carbon based food, (alcohol) to feed the bacteria which allows them to multiply and to remove the nitrate from the water column.

Daily feeding of the anaerobic bacteria.

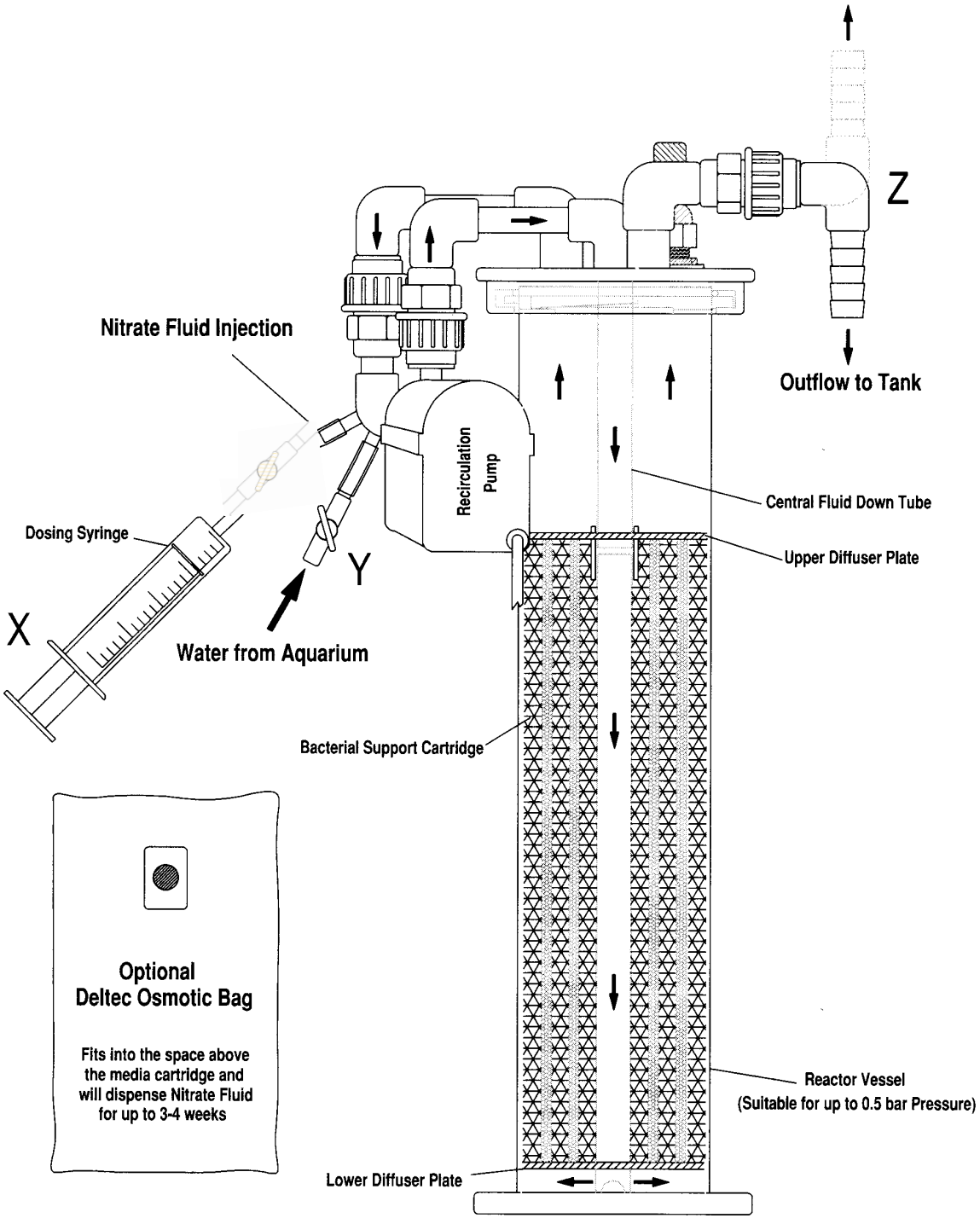
During the operation of the filter it is necessary every day to provide a carbon based food for the anaerobic bacteria which is usually supplied in the form of alcohol. We recommended that you use Deltec Nitrate Fluid, which is a special blend of alcohols and other solutions and is supplied with the smaller units or available as a consumable product from your retailer.

For the larger models the rate of consumption of the Nitrate Fluid may become cost prohibitive and for these units it may be more economically viable to use a mixture of Vodka and RO water as a substitute. The Vodka should be mixed with RO water in a ratio of 1 part of Vodka to 3 parts of RO water.

Deltec NFP Denitration Reactors

AppliesTo Models - NFP 509, NFP 512, NFP 616, NFP 1020

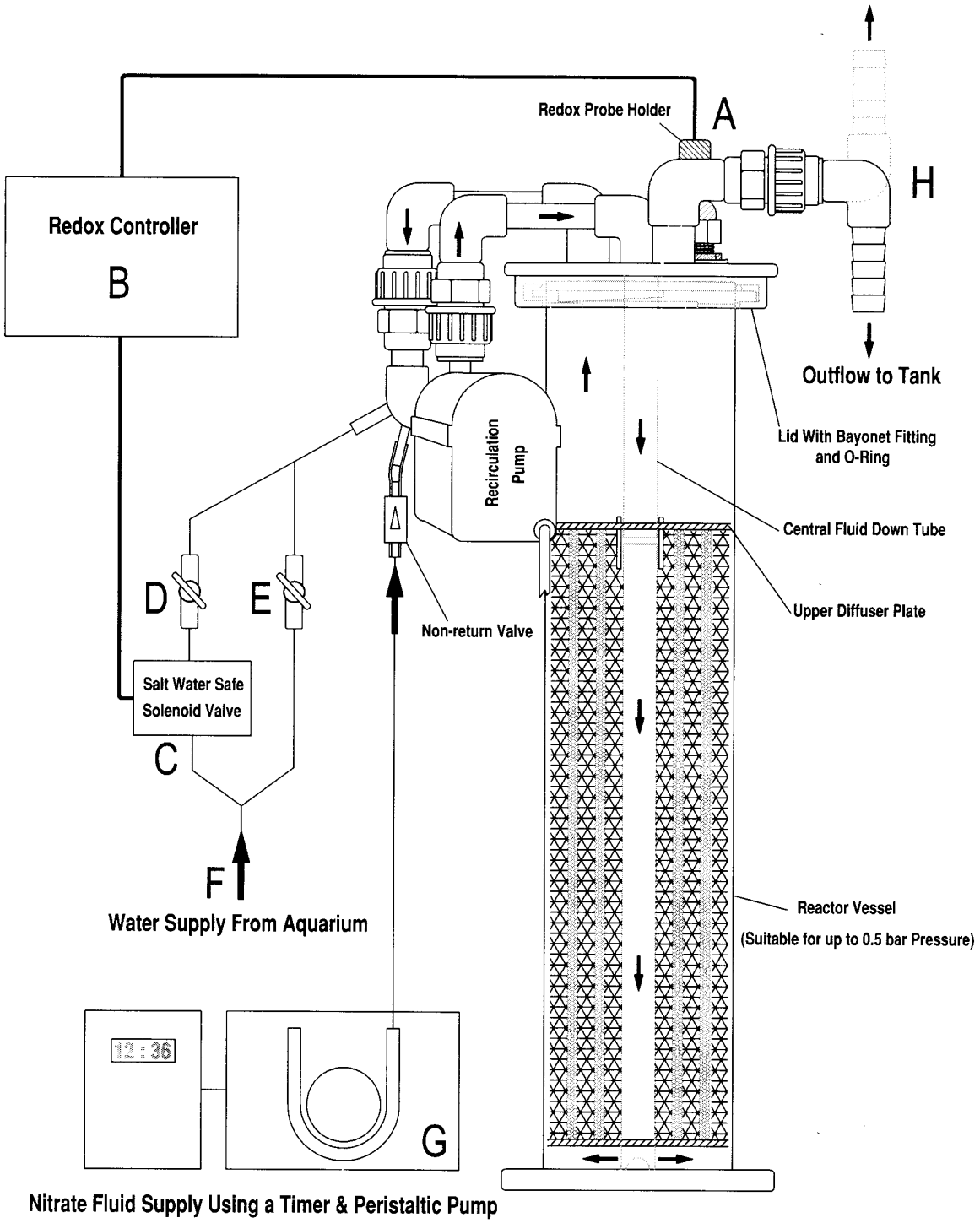
Diagram For Manual Control



Deltec NFP Denitration Reactors

Applies To Models - NFP 509, NFP 512, NFP 616, NFP 1020

Diagram For Fully Automatic Control



MANUAL METHOD OF OPERATION

The NFP reactors can either be operated manually, semi automatically or fully automatically

This will depend on the application and level of sophistication that you want to go to. The first part of these instructions describes the operation of the unit without the need for any supplementary equipment other than a reliable high sensitivity nitrate test kit which is not supplied with the unit.

We would generally recommend that you only follow the MANUAL OPERATION method for the smaller reactors; however the principles are valid for all models.

1 – Assemble and connect the unit as shown on the diagram for manual operation and position it in a cabinet or in an area where there is easy access. Note that the lid for the reactor unscrews in an anti-clockwise direction. Be careful not to over tighten the lid when reassembling. The outlet pipe can be directed downwards or upwards depending on where the unit is situated in relation to the tank or sump.

2 – Establish a method of feeding the reactor with water from the aquarium such as:

Pressure feed: Use a suitable pump or power head to take water directly from the aquarium or sump and return water directly back to the aquarium / sump. This allows remote positioning of the unit at any height or in the cabinet below the aquarium. Ensure that connections and hoses from the power head to the unit are suitable for the pressure developed.

Gravity feed: The unit can be operated on a siphon from the tank and into a sump thus negating the requirement for a separate power head or pump.

Sumpless operation: Note that as the reactor is capable of withstanding pressures of up to 0.5 bars that it is possible to install the unit below the tank in a cabinet and to pump the water down, through and back up to the aquarium.

IMPORTANT POINT: always ensure that if you feed from the aquarium down to a sump that you fit the system with a siphon break to prevent the continued siphoning of the contents of the tank in the case of a power failure.

IMPORTANT POINT: when using the reactor under pressure or below the aquarium never remove the redox probe holder or remove the reactor lid without draining part of the water off first and switching off the pump.

3 – Fill the reactor with water from the aquarium. To speed up the initial seeding of the filter we suggest at this stage for you to add a commercial bacterial culture such as Rowa*Bac* or simply to squeeze the water from a filter sponge or similar taken from an established biological filter into the reactor chamber.

4 - Close the lid of the reactor and turn on the water feed supply using tap 'Y' to ensure that the chamber is completely full of water and that the system of feed and return is operational and has no leaks.

Ensure that if the reactor is mounted below the water level that the feed and return pipes are securely fastened to prevent one coming loose and allowing the tank to siphon out.

5 – Turn on the recirculation pump to circulate water around the reactor and once again check for any leaks.

You are now ready to start maturing the bacterial filter media.

5 – Shut off the water supply to the reactor using tap 'Y' and leave it like this for 3 days to allow the oxygen in the water to be used up and to allow growth of the anaerobic bacteria.

Feeding the system: The bacteria within the reactor must be supplied with a carbon based food, (Deltec Nitrate Fluid), on a daily basis throughout the duration of the reactor's use. To make this possible when using the manual method, Deltec supply you with a plastic syringe 'X' which should be first filled with Deltec Nitrate Fluid and then fitted to the end of the non return valve at the inlet to the recirculation pump.

The amount of Nitrate Fluid to add to the reactor will depend on a number of factors such as the flow rate and the level of nitrate in the water. When first starting the system we recommend that 4ml of Nitrate Fluid should be added for each litre of biological media within the reaction chamber over a period of 24 hours, (detailed in table).

For the purpose of these instructions we will use the NFP509 which has a reactor media volume of approximately 2lt.

On days 1 – 3 whilst the water flow rate is switched off it is necessary to add 8ml of Nitrate each day. This should be added in 2 doses of 4 ml, one in the morning and one in the evening.

7 – On day 4 open up the tap 'Y' very carefully until you achieve 1 drip every 3 seconds and wait for a further day before testing the outlet water. Continue to feed the unit morning and evening with the same volume of Nitrate Fluid as was used for the first 3 days.

8 – Day 5 – check the water coming out of the reactor at 'Z' for nitrate level using a reliable nitrate test kit. If the reading from the water is zero then increase the flow rate by no more than 1/3 of its current rate to one drip every 2 seconds and wait for 2-3 days for the level to drop back to zero. Continue to feed everyday with the starting volume of Nitrate Fluid.

If the reading still shows that there is nitrate coming from the reactor then wait another day and another day until you achieve a zero reading before increasing the flow rate. Continue to feed the unit morning and evening as on the first 3 days and wait until the reading drops to zero.

Initially, whilst there is still oxygen present at sufficient levels within the reactor, aerobic bacteria may grow within the media converting any ammonia in the water to nitrite or nitrate. This may show as a slightly elevated nitrate or nitrite level coming out of the reactor compared with that of the water going in.

Note: Large incremental jumps in flow rate especially at this stage can crash the growing bacterial culture within the reactor by the introduction of too much oxygen which will raise the redox and will slow down the maturation period.

9 – Gradually, in stages which will take 2-6 days between changes. it should be possible to slowly increase the drip rate from the reactor by 20-30% at each step, then to wait for the reading to come down to zero before increasing the flow again. The ultimate goal is to turn the volume of water in the tank through the reactor once every 14 days as a maximum and once every 28 days as a minimum. At this flow rate it will be possible to keep the nitrate levels fully under control.

Increasing the amount of food: As you increase the water flow rate through the reactor it will also be necessary to gradually increase the amount of food that is dosed every day. This is the tricky part and it will require a little trial and error by the user to learn how much extra to add as you increase the flow rate.

By the time the reactor is running at maximum capacity it will be necessary to be adding about 25% more food than was being added during the initial stages which for the example for the NFP509 means up to 11ml per day. If due to the size or your tank relative to the reactor you do not need to achieve maximum capacity then it is possible to just continue at the initial feed rate.

Be careful not to overdo the additions of the food as this will tend to reduce the redox to below 200 and can often be seen as cloudiness in the tank.

If not enough food is added you will find that it will not be possible to increase the flow rate further as there will be insufficient food to support a large enough bacterial colony to achieve a zero nitrate reading for the set flow.

10 - Once the system is running in a stable manner at a flow rate which gives you sufficient volume from the reactor to turn the volume of the tank over every 14-28 days then continue to feed morning and night at that set volume to maintain the nitrate level in the system.

See the paragraph at the end of the section on fully automatic operation on what to do when the level of nitrate in your system gets down to zero.

SEMI-AUTOMATIC METHOD OF OPERATION

For those people who do not want to inject the unit on a daily basis

If you want to have a semi automatic method of operating the filter without going to full automation then there are two possible methods.

1 – Use of Deltec Osmotic Nitrate Bags.

2 – Use of a peristaltic pump to supply the Nitrate fluid.

DELTEC NITRATE BAGS

These special bags operate using the principle of osmosis through a semi permeable membrane. The bags are refillable and hold 250ml of Nitrate Fluid which they release slowly over 4 -5 weeks through the bag walls which are made of a semi permeable membrane material. This gradual release supplies the bacteria with food continuously without any further requirements for daily injections.

The Nitrate bags fit into the reactor body in the space above the bacterial media. The number of bags that are required will depend on the size of the reactor and the size of the system on which it is being used.

A single bag will release about 50ml of Nitrate Fluid per week or 7ml per day which makes it ideal for the NFP509. Two bags will release 14ml per day; 3 bags – 21ml and so on.

Use of the Nitrate Bags

Each membrane bag is fitted with a bung which is removable for filling with the Nitrate Fluid. Fill the bag with 250ml of fluid, replace the bung and place the bag within the reactor body in the space above the bacterial media. Refit the lid of the reactor.

If you are using more than 1 bag then remember to mark each bag so that you know when each needs to be refilled.

Follow steps 1-10 as shown in the manual instructions.

From step 6 onwards it is obviously not necessary to use the injection system any longer as the semi-permeable bags will carry out the function of feeding the Nitrate Fluid to the bacteria.

There is normally sufficient Nitrate Fluid in the system to last for 5 weeks however we recommend that you empty and refill the bags after 4 weeks to ensure that the bacteria do not run out of food.

Obviously with this method the reactor is supplied with food at a constant rate which can not be varied other than by adding an additional bag. As the feeding rate will determine the amount of bacteria in the system and therefore the final water flow through the reactor then this method will not allow the reactor to reach its maximum possible capacity.

Note that at the end of the 4 weeks that the bag will still be full of water as only the alcohol is allowed to pass through the membrane and into the reactor. Empty this water away and refill the bag with fresh solution.

To refill the bag, first switch off the recirculation pump and nip the water supply by folding over the feed pipe or switching off the feed pump. Remove the Nitrate Bag, empty and replace its contents then return it full to the reactor. Take this opportunity to clean the build up of bacteria from the outlet pipe and lid.

When you are changing over the bag it is important to ensure that you do not waste too much reactor water during the change over as this will need to be replaced with fresh tank water which will have a higher redox. After refitting the lid, allowing it to refill and then switching on the recirculation pump we would recommend that you turn feed water supply back off for a couple of hours to allow the redox to fall again allowing for the replaced water.

USE OF A PERISTALTIC PUMP TO SUPPLY THE NITRATE FLUID

As with the Nitrate Bags, this method automates the feeding process but does not control the redox or water flow rate and is an intermediate step towards full automation of the system.

For this method you will require a dosing pump with a flow rate that is suitable for the amount of food that you are required to add on a daily basis. You will also require a digital plug timer that it is possible to control down to second intervals.

Connect the peristaltic pump to the non return valve as shown on the fully-automatic diagram. Note that some cheaper pumps do not automatically seal when the pump switches off and therefore if the pump is mounted above the reactor it can allow siphoning of the food into the reactor even if it is switched off. Always use the non return valve or the water can back siphon. Always read the operating instructions for the pump that you chose for the task.

If your reactor requires 8ml of food per day then we would recommend that you feed it as 2 doses of 4ml or ideally 4 doses of 2ml per day; the ability to do this will depend on the volume capacity of your peristaltic pump. As the feeding requirement increases then simply increase the duration each day that the pump is set to dose the reactor with Nitrate Fluid.

Follow steps 1-10 as shown in the manual instructions.

From step 6 onwards it is obviously not necessary to use the injection system any longer as the peristaltic pump will replace this function and will carry out the feeding of the Nitrate Fluid to the bacteria.

FULLY-AUTOMATIC METHOD OF OPERATION

This method is suitable for all sizes of reactor and is covered by a separate diagram which is attached.

For this method you will require the following items of equipment;

1 – The NFP Nitrate Reactor.
2 – A redox controller, probe and calibration solutions.
3 – A solenoid valve which is suitable for salt water (can be ordered with your Deltec reactor).
4 – A peristaltic pump and timer, (timer capable of controlling down to second intervals), to supply the Nitrate Fluid.

Operation of the NFP reactor follows the same principles as has already been explained in the first two sections. These should be read and understood before moving on.

Supply of Nitrate Fluid to the Nitrate Reactor.

Either of the two methods described under 'Semi-Automatic Method of Operation' for feeding the reactor with nitrate fluid can be used however for optimum output or with the larger reactors it will be necessary to use the peristaltic pump option.

The same ratio of daily Nitrate Fluid addition to media area applies as in the manual section and an indicative starting level for each reactor is given in the table at the top of the introduction page.

Supply of water to the Nitrate Reactor

This is where the fully automatic operation of the Nitrate Reactors varies from the other two methods described.

With this method we use a controller 'B' and probe 'A' to ensure that the redox within the unit is maintained at the correct level of oxygenation, or deoxygenation, for the denitrification process to operate at its optimum level.

As we can see from the diagram there are two feeds to the reactor, both with control taps 'D' & 'E'. The supply for these two feeds can come from a common pump which can be split with a T or Y connector at 'F'.

One of the water feeds is fitted with a solenoid 'C' which will be actuated by the redox controller to switch the flow off and on. This solenoid must be salt water safe if used on a saltwater tank and not one of the general units used for CO2 or fresh water. The special solenoid can be ordered at the time of ordering the Nitrate Reactor.

The redox controller and probe must be calibrated prior to use and will require regular recalibration as they tend to drift with time towards a more positive value. Note that it can take several days for a new probe to settle down and to start reading the correct value when first installed and calibrated.

Operating the Fully-Automatic System

1 - Fill and check the reactor as described earlier, fit the redox probe and controller, switch on the recirculation pump and then close off both water feeds for 3 days.

2 – From day 1; set the timer on the peristaltic pump 'G' to supply the correct dose of Nitrate Fluid as shown in the table for the particular model of reactor. Add this volume split into 2 or 4 doses over the period of the day controlled by the digital timer.

3 – After 3 days open tap 'E' gradually until you achieve 1 drip every 3 seconds and then follow the instructions for testing and adjusting the water flow over a period of days and weeks as described in the manual operation section.

At this initial stage the only tap that will be adjusted will be tap 'E'. We will start to use the second water feed through the solenoid and tap 'D' once the reactor starts to mature by a couple of weeks.

The redox in the unit will start off at a positive value and will slowly move to zero and then to a negative reading as the oxygen in the system is used up by the bacterial culture. Remember that we want to control the redox at about minus 170mv.

4 - Now that the reactor has been running for a few weeks and the redox has fallen we can start to use the redox controller to add more water to the system to increase the flow through the reactor when required which will maintain the redox at the optimal level for denitrification.

When the redox level reaches minus 170mv the controller should be set to activate the solenoid. This will allow additional water into the reactor which will subsequently reduce the redox and will switch the solenoid off again.

To ensure that the volume of water that we add via this secondary water supply is not too high, thus bringing the redox down too far, we set tap 'D' so that there is only a low flow rate going into the reactor. The rate of flow will depend on the size of the reactor, in the order of drips for the small reactors and a slow dribble for the larger ones. It is better to control in regular small stages than to add the water in one large amount and to drop the redox down too far below its optimal level.

Note that the redox will fall every time you add food to the system therefore small regular doses will give a more stable reactor.

Balancing and optimising the Reactor

Once the reactor has been running for several weeks we will find that the flow rate through the reactor has increased many fold and the nitrate level with in the aquarium or system is starting to fall.

At this point we have 3 controls to adjust to optimise the performance of the reactor.

1 - The Nitrate Fluid (food) volume.
2 - The main water flow.
3 - The secondary redox controlled water flow.

All 3 are in equilibrium and if we adjust one then we must adjust the others to bring it back into balance.

- If we increase the volume of Nitrate Fluid then the amount of bacteria within the reactor will be allowed to increase and the redox level will fall, (become more minus). At this point the redox controller will open up the solenoid valve to allow more water through tap 'D' to bring the redox back to below 170mv. If we find that the redox still stays high or that the solenoid is open all the time then we should increase the flow rate through tap 'E' to bring the system back into balance.

- If we increase the flow rate through the main water supply tap 'E' by too much then we will see that the redox will start to rise, (less negative), and the solenoid will not open at all. At this point we must increase the amount of Nitrate Fluid supplied to bring the system back into balance or reduce the flow rate through tap 'E' back to a level that the existing food and bacterial level will support.

Once the nitrate has been reduced to zero

This section is relevant to all methods of operation

Once the nitrate level within your system is under control you will not require the same amount of denitrification however each day there will be nitrate added to your aquarium from your fishes and food. At this stage you should run the filter at a tick over level, (unless it is being used on a system with a heavy load that requires the unit to continue to run at its optimum flow).

It will be necessary to reduce the amount of water passing through the reactor and at the same time the amount of food.

For the manual injection system, reduce the volume of Nitrate Fluid that is injected by 10% each time in a series of steps and reduce the flow rate by the same amount. Nitrate bags can be partially filled and operated for the same 4 week period and the peristaltic pump can simply operate for a shorter period of time each day.

Monitor the nitrate from the reactor to ensure that it is still maintaining a zero reading from the outlet and if not then and slowly reduce the flow rate until it is in balance with the volume of nitrate food that is being added. Keep on reducing the feed rate and flow until you start to see nitrate appearing in the tank. This is just below your equilibrium level for your system.

Rebalance the reactor at this point and try to maintain your nitrate level at 1-2 mg/lt and certainly less then 10 mg/lt. If the nitrate remains at zero then it may be necessary to reduce the feeding and flow further until a low level appears found in your system. If this level starts to rise then you need to increase the flow and feeding accordingly.

It is possible to just switch off the reactor however you will need to go through the maturation period again once the nitrate level rises with time. Another benefit of maintaining the operation of the nitrate filter is that the bacteria release trace elements back into the water which can be beneficial especially to corals.

SIMPLE TROUBLESHOOTING GUIDE

Q. - MY TANK HAS STARTED TO GO CLOUDY .

A. - You are introducing too much Nitrate Fluid into the system without sufficient bacteria in the reactor. Cut back on the feeding and it will clear.

Q. - THERE IS MORE NITRATE COMING OUT THAN IS GOING IN.

A. - The filter still contains oxygen and is acting as an aerobic filter. Wait for a few more days and retest.

Q. - THERE IS A SMELL OF ROTTEN EGGS COMING FROM THE UNIT.

A. - The redox on the unit is too low. Reduce the amount of feeding or increase the flow rate.

Q. - THE pH IS LOW COMING OUT OF THE UNIT.

A. - This is normal. Aerate the water coming out of the reactor or run it through some coral gravel.

Q. – THE FLOW RATE OUT OF THE REACTOR IS REDUCING.

A. – Check that the outlet from the reactor is clean and has not started to block up with dead bacteria.

Q. – MY INITIAL REDOX READING SHOWS A STRANGE LEVEL

A. – It can take 5-6 days for a new redox probe to settle down and to give the correct reading.

Q. - IN FULLY AUTOMATIC MODE IT IS BECOMING DIFICULT TO MAINTAIN ZERO NITRATE AT THE OUTLET.

A. – Recalibrate your redox probe as it has probably drifted more positive and is opening the solenoid too early.

MAINTENANCE

Your reactor will require regular cleaning maintenance due to the build up of dead bacteria and the closer you run the unit towards its maximum capacity the more regularly it will require cleaning.

1 - If the lid and pipes become blocked then remove the lid and thoroughly clean all the surfaces, pipes and the pump.

When you reassemble the unit remember to try to waste as little water from the reactor as possible as this will have to be made up with tank water which will be at a higher redox and will take a while to rebalance. After cleaning switch the water feed to the reactor off for a few hours to assist this process.

2. – Eventually even the media within the reactor will become so chocked up with dead bacteria that it will be necessary to clean this out too.

Empty the water from the reactor into a bucket and remove the cartridge from the chamber. Scrape off as much dead bacteria as possible and if necessary wash it in the water that you have just removed.

NEVER WASH THE FILTER IN FRESH WATER FROM THE TAP

Re-roll up the media and return it to the canister before carefully decanting the saved water from the bucket back in. Reassemble the rest of the unit and place it back into service.

After a major clean like this we would recommend that you reduce shut off the flow for a day then build it back up over a week or so to its original level

Filtre à nitrate Deltec type NFP **FR**

Les filtres à nitrate Deltec de la gamme NFP sont constitués d'une chambre de pression, d'une tête avec une fermeture à baïonnette, d'une pompe de circulation, d'un raccord pour une électrode redox, d'un bouillon nutritif et d'un sachet à membrane.
Afin de pouvoir exploiter la grande puissance du NFP 1020, il est recommandé d'injecter le bouillon nutritif au moyen d'une pompe de dosage. Cette pompe ainsi que le sachet à membrane 1020 ne sont pas fournis avec le filtre.

Elimination biologique du nitrate
Des bactéries peuvent décomposer le nitrate en d'autres substances dans un milieu pauvre en oxygène. Ce processus entraîne la libération de gaz d'azote et de dioxyde de carbone, tandis que le phosphate est lié dans certaines conditions. Afin que ces processus biologiques puissent se dérouler efficacement, il faut que certaines conditions préalables soient réunies :

4. des conditions aquatiques anaérobies dans le filtre à nitrate grâce à une arrivée goutte à goutte d'eau d'aquarium.
5. une teneur en nitrate décelable dans l'eau.
6. une alimentation régulière du filtre en bouillon nutritif.

L'utilisation d'un filtre à nitrate peut toutefois comporter certains risques si le présent mode d'emploi n'est pas respecté.

Pour éviter certains problèmes ainsi que pour bien tirer profit des avantages incontestés de l'élimination du nitrate, il est recommandé de respecter strictement le mode d'emploi.

S'assurer avant la mise en service d'un filtre à nitrate que la filtration aérobie de l'aquarium fonctionne. Les processus biologiques qui aboutissent à l'élimination du nitrate impliquent des conditions spécifiques :

- des conditions aquatiques anaérobies dans le filtre à nitrate
- une alimentation régulière et durable en bouillon nutritif

L'arrivée de bouillon nutritif peut être assurée de diverses manières :

Via le sachet à membrane (ne s'applique pas au NFP 1020)
Le sachet à membrane est rempli de bouillon nutritif puis placé dans la partie supérieure libre du filtre à nitrate. Pour le NFP 512 / NFP 616, le nombre de sachets à remplir est plus élevé.
Veiller ce faisant à n'utiliser qu'environ la moitié (50%) de la quantité maximum de bouillon nutritif lors de la mise en marche. Ce n'est que lorsqu'une réduction sensible du nitrate est mesurée à la sortie d'eau du filtre qu'il est possible d'augmenter peu à peu la quantité de bouillon nutritif.

Le bouillon nutritif se diffuse sur une période de quatre à cinq semaines à travers la membrane dans l'eau du filtre et doit être ensuite renouvelé. Enlever également l'eau résiduelle dans le sachet avant de remplir à nouveau ce dernier.
Pour les filtres avec deux (NFP 512) ou trois (NFP 616) sachets, mieux vaut remplir les sachets en observant un certain décalage, par exemple s'il y a deux sachets, le premier sera rempli le premier du mois et le deuxième le 15 de ce même mois.
Pour éviter de confondre les sachets, les marquer en écrivant dessus 0, 1 et 2.

Via une seringue jetable (ne s'applique pas au NFP 1020)
Cette méthode a l'avantage que l'alimentation en bouillon nutritif peut être contrôlée et le potentiel de puissance mieux exploité.
Il ne faut pas oublier, avec cette méthode, que la quantité de bouillon nutritif indiquée dans le tableau ci-dessous doit être injectée quotidiennement, en deux fois si possible.

Via une pompe de dosage
L'alimentation par une pompe de dosage présente l'avantage que la quantité quotidiennement nécessaire de bouillon nutritif peut être dosée plusieurs fois par jour. Cette alimentation régulière permet d'accroître la puissance.

Installation
Le filtre peut être monté dans n'importe quel endroit. La température ambiante devrait se situer entre 20° et 28° C. L'arrivée d'eau peut être assurée via une petite pompe d'aquarium séparée ou via une dérivation depuis la pompe principale. Relier la pompe voire la dérivation au microfiltre (26) ou au robinet d'arrêt (10 (uniquement pour le NFP 509) au moyen d'un flexible approprié. L'écoulement (17) est assuré par un flexible dans l'installation filtrante.

Une fois l'installation terminée, vérifier si le filtre présente d'éventuels défauts d'étanchéité et si toutes les connexions du filtre sont bien fixées.

Mise en service
Les points ci-dessous sont valables pour tous les filtres à nitrate Deltec.
L'objectif est de cultiver un nombre aussi grand que possible de bactéries anaérobies dans le filtre à nitrate dans un laps de temps relativement court. Pour y arriver, l'eau dans le filtre à nitrate doit posséder une teneur en oxygène très faible, ce qui devrait correspondre à une valeur Redox d'environ -150mV après la phase de démarrage.
Une arrivée lente d'eau d'aquarium dans le filtre de l'ordre de une goutte toutes les deux secondes environ réduit la valeur Redox dans le filtre. Les quelques bactéries anaérobies existantes absorbent l'oxygène dissous dans l'eau, diminuant ainsi la valeur Redox. Etant donné la densité bactérienne faible au départ, il n'est permis d'ajouter qu'une quantité réduite de bouillon nutritif (50% maximum) au départ lors de la mise en service. Au bout de quelques jours, on mesure à la sortie de l'eau du filtre à nitrate une concentration

élevée de nitrite (NO^2) ainsi qu'éventuellement aussi des valeurs de nitrate importantes (NO^3).
Il n'est possible d'augmenter l'arrivée d'eau et la quantité de bouillon nutritif par petites étapes que lorsque plus aucun nitrite (NO^2) n'est décelable dans l'eau du filtre qui sort et que les valeurs de nitrate sont fortement réduites.
Des mesures quotidiennes permettent de surveiller le nitrite et les valeurs de nitrate. Si ces valeurs remontent, cela signifie qu'une quantité trop importante d'oxygène pénètre dans le filtre avec l'eau amenée. Il faut alors réduire à nouveau la quantité d'eau.
Une quantité trop importante de bouillon nutritif par rapport à la quantité de bactéries anaérobies entraîne une turbidité de l'eau d'aquarium. Au pire, cela peut aboutir à un déficit d'oxygène dans l'eau d'aquarium. Si cela se produit, fermer l'arrivée d'eau vers le filtre à nitrate et prendre des mesures pour accroître la teneur en oxygène dans l'aquarium (ventiler, changer une partie de l'eau ou adopter d'autres mesures appropriées).
Ceci fait, remettre en marche le filtre à nitrate avec une quantité réduite de bouillon nutritif.
Il est impératif que l'écoulement d'eau et la quantité de bouillon nutritif soient proportionnels à la quantité de bactéries dans le filtre à nitrate. C'est la raison pour laquelle chaque augmentation (d'eau ou de bouillon) ne doit se faire que par petites étapes.
Il est utile d'employer un appareil de mesure Redox pour atteindre la bonne valeur Redox (env. -150mV).

Commande automatique
Un appareil de commande Redox associé à une électrovanne résistante à l'eau de mer permet de réguler automatiquement l'arrivée d'eau et par conséquent la valeur Redox. Monter pour ce faire entre le robinet d'arrêt (10) et le filtre à nitrate une pièce en T appropriée avec un deuxième robinet d'arrêt. La sortie de l'électrovanne est reliée à un deuxième robinet d'arrêt nouvellement monté. Relier l'entrée de l'électrovanne avec l'entrée du robinet d'arrêt (10).

6 Coupez l'arrivée d'eau sur le microfiltre (26) ou, si vous utilisez le NFP 509, sur le robinet d'arrêt (10).
7 Remplissez le filtre d'eau d'aquarium.
8 Installez l'électrode de mesure Redox dans le raccord à vis (15) prévu à cet effet (enlevez le bouchon rouge (14)).
9 Réglez le robinet d'arrêt (10) sur un débit d'environ une goutte par seconde.
10 Mettez la pompe de circulation en marche.

Equiper le câble de l'électrovanne d'un connecteur (confier cette opération uniquement à une personne qualifiée) puis ficher ce connecteur dans l'appareil Redox.

Fonctionnement
Régler l'appareil de commande Redox sur environ -150 mV. Lorsque cette valeur est atteinte dans le filtre, l'électrovanne s'ouvre et injecte une quantité d'eau supplémentaire dans le filtre. La vitesse d'égouttement ne devrait pas être supérieure à deux ou trois gouttes par seconde au départ et sera réglée via le deuxième robinet d'arrêt (électrovanne). Grâce à cette quantité d'eau supplémentaire, la valeur Redox remonte vers des valeurs positives.

Etant donné que la régulation Redox dans le ***filtre à nitrate*** Deltec est un processus très lent, la valeur Redox oscille dans la plage supérieure et inférieure, mais ne devrait pas se situer hors des seuils compris entre -100 mV et -200 mV.

Maintenance
Pendant que le filtre à nitrate fonctionne, les bactéries mortes forment des dépôts qui, dans certaines situations extrêmes, peuvent boucher le filtre.
Veiller lors du nettoyage du filtre à réutiliser l'eau du filtre usagée. Presser avec précaution la cartouche filtrante dans l'eau de mer, nettoyer la pompe et les câbles. Après avoir remonté le filtre, réutiliser l'eau usagée et remplacer l'eau manquante par de l'eau d'aquarium. Mieux vaut toutefois récupérer l'eau du filtre qui est sortie avant le nettoyage et l'utiliser au lieu d'avoir recours à de l'eau fraiche d'aquarium. Réduire la vitesse d'égouttement pendant 24 h environ à une goutte/seconde.

Caractéristiques techniques

Type	Dimensions (long./larg./haut.)	Pour des aquariums d'une capacité maximum de	Sachet à membrane	Quantité de bouillon nutritif injectée quotidiennement avec seringue jetable ou pompe de dosage
NFP 509	225x170x560mm	800 litres	1	8 ml
NFP 512	300x220x580mm	1600 litres	2	16 ml
NFP 616	325x265x580mm	4000 litres	3	40 ml
NFP 1020	390x310x1010mm	10000 litres	0	100 ml

Les puissances de filtration indiquées sont des valeurs approximatives qui peuvent, par conséquent, différer d'un aquarium à l'autre. D'après notre expérience, le taux d'élimination proprement dit de nitrate est supérieur à celui découlant mathématiquement de l'utilisation du filtre à nitrate. Il est probable que l'ensemble du système fonctionne également comme un filtre à nitrate en raison des bactéries chassées du filtre par l'eau.

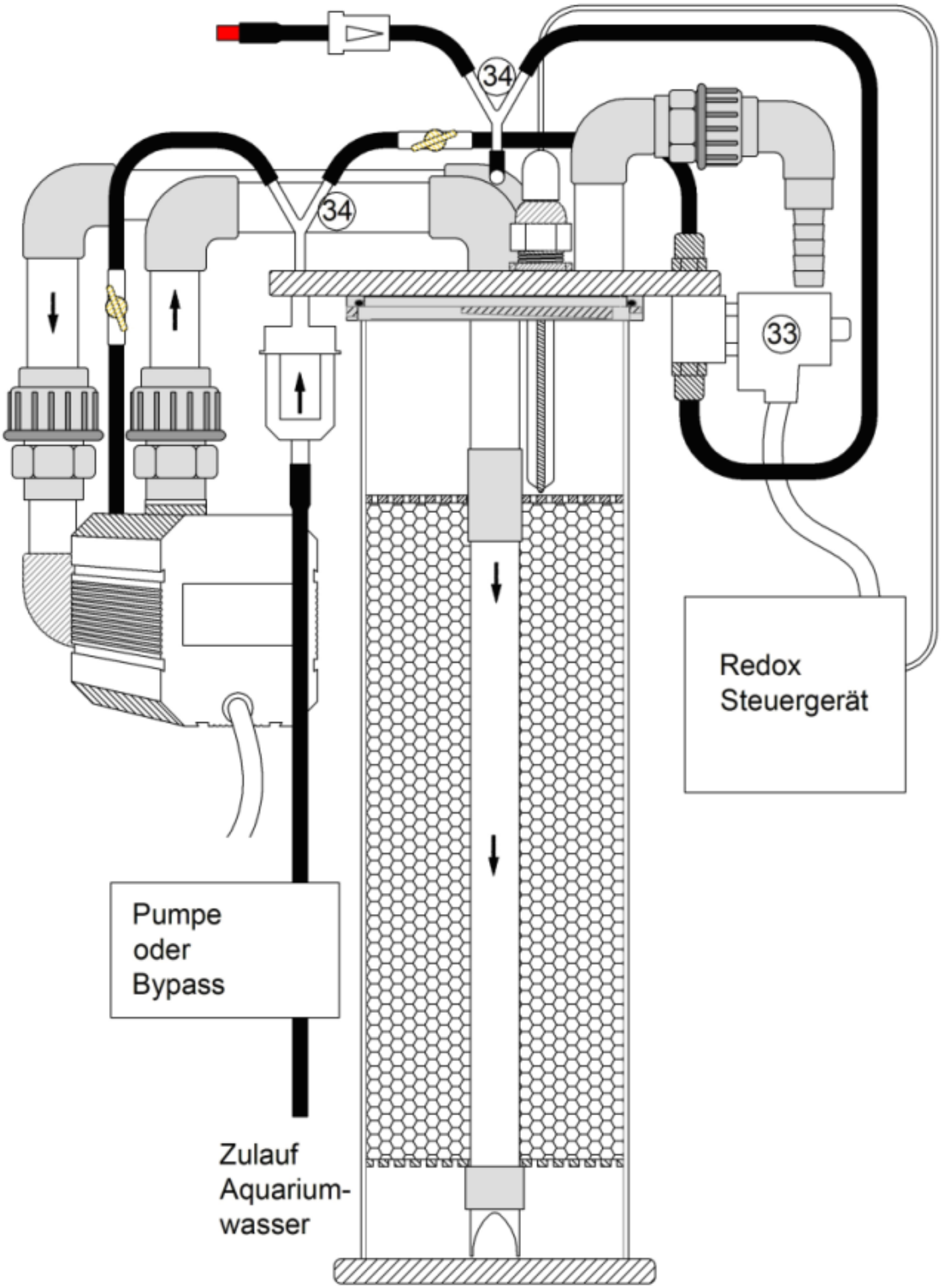
Consignes de sécurité
Si le ***filtre à nitrate*** DELTEO n'est pas utilisé pendant une longue période, procéder alors au moment de la remise en marche comme s'il s'agissait de la première mise en service. Cela est également valable après un traitement avec des médicaments mais il ne faut pas oublier ici que la fonction biologique du filtre aérobie doit d'abord être rétablie.

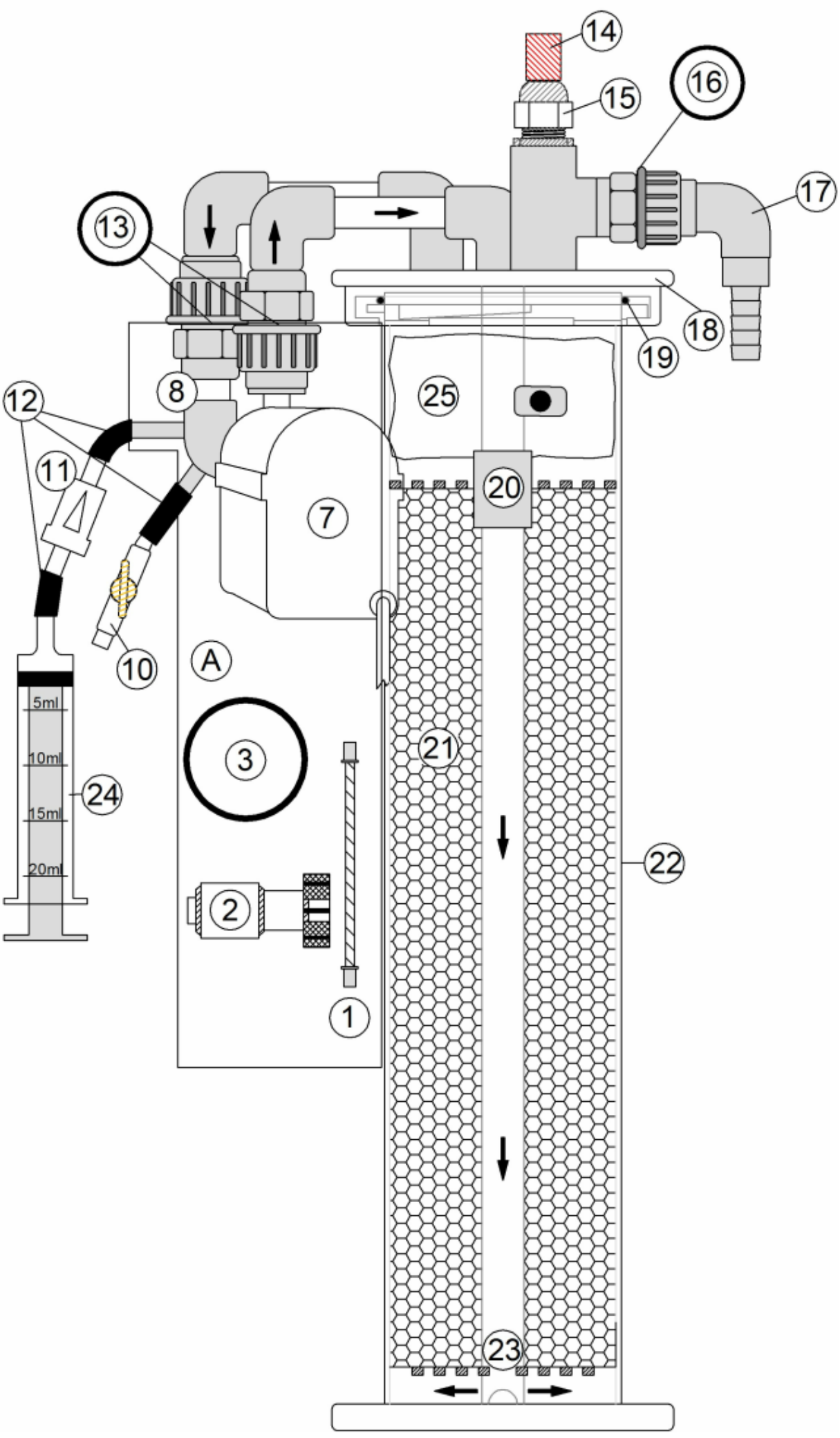
Contrôler tous les jours la vitesse d'égouttement et la réguler à nouveau si nécessaire.

N'injecter du *bouillon nutritif* DELTEO dans le filtre que lorsque le filtre aérobie a bien démarré et que la présence de nitrate a été décelée.

Pendant la durée de démarrage du filtre, ne jamais injecter une quantité trop importante d'eau et/ou de bouillon nutritif. Des réactions indésirables, voire parfois nocives, peuvent se produire.

Modèle NFP 616 avec commande Redox

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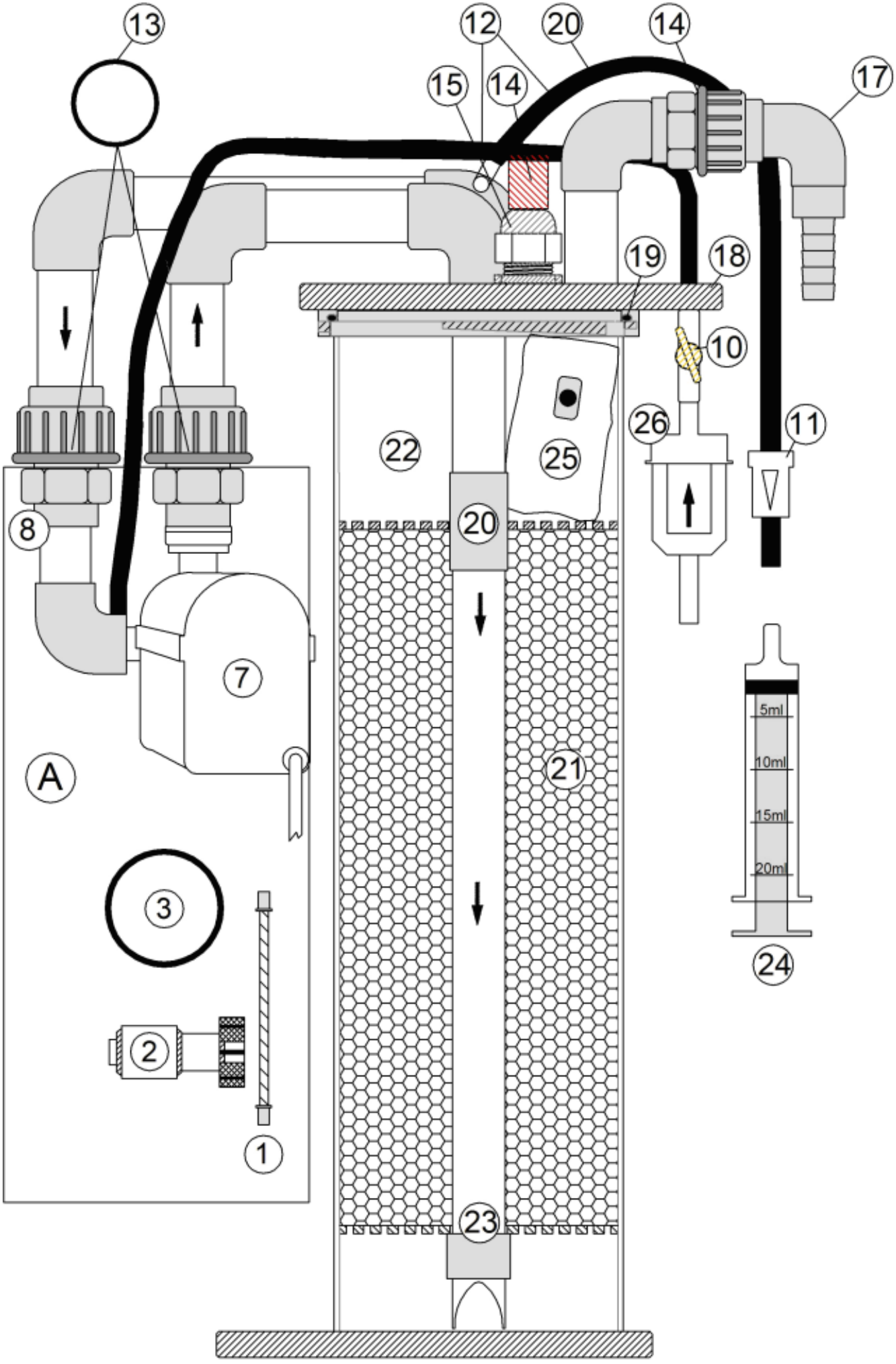
Liste des pièces détachées du NFP 509

N°	Référence	Désignation	
	64300000	NFP 509	
A	87161000	Pompe avec tubulure	
1	69544000	Arbre avec palier	
2	69356000	Unité de roulement	
3	69511000	Joint torique de pompe	
4	XXXXXX		
5	XXXXXX		
6	XXXXXX		
7	69501000	Stator	
8	87157700	Conduite d’aspiration / de refoulement	
9	XXXXXX		
10	93010010	Mini-soupape régulatrice	
11	87140000	Soupape d’arrêt anti-retour	
12	61751075	Tuyau en silicone	
13	93040400	Joint torique du raccord à vis 16 mm	
14	65900000	Bouchon rouge	
15	65904000	Raccord à vis PG 13,5	
16	93041400	Joint torique du raccord à vis 20 mm	
17	64300400	Sortie	
18	64300200	Couvercle	
19	10400360	Joint torique à baïonnette	
20	87157800	Plaque perforée	
21	64300300	Cartouche DLS	
22	87169000	Appareil de base	
23	64300900	Tube intérieur avec plaque perforée	
24	64310000	Seringue de dosage 20ml	
25	64054000	Sachet à membrane	
33	64049000	Electrovanne	
34	64311000	Pièce en Y	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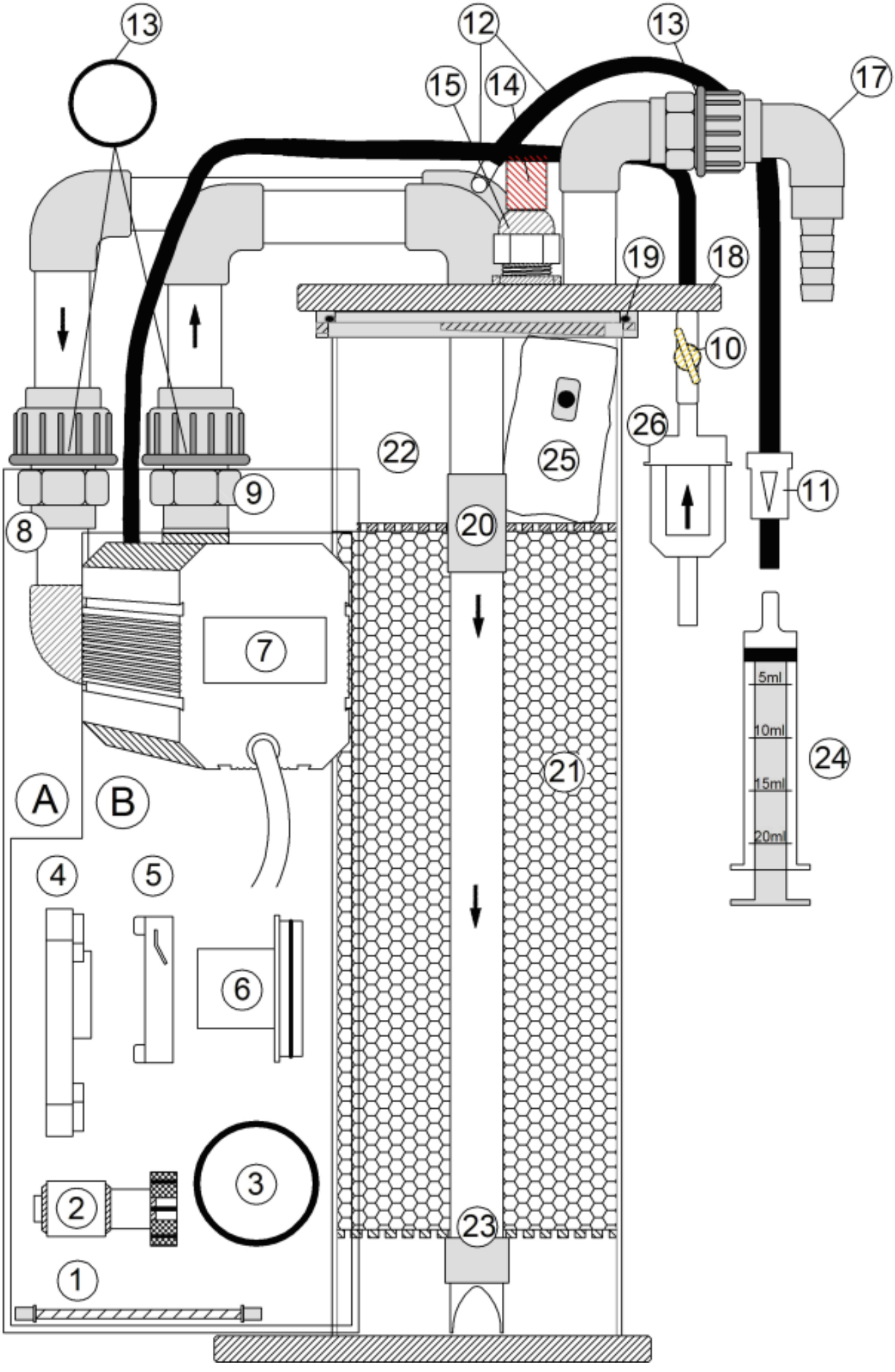
Liste des pièces détachées du NFP 512

N°	Référence	Désignation	
	64301000	NFP 512	
A	87149000	Pompe avec tubulure	
1	69545000	Arbre avec palier	
2	69352000	Unité de roulement	
3	69511000	Joint torique de pompe	
4	XXXXXX		
5	XXXXXX		
6	XXXXXX		
7	69502000	Stator	
8	87306000	Conduite d’aspiration / de refoulement	
9	XXXXXX		
10	93010010	Mini-soupape régulatrice	
11	87140000	Soupape d’arrêt anti-retour	
12	61751075	Tuyau en silicone	
13	93041400	Joint torique du raccord à vis 20 mm	
14	65900000	Bouchon rouge	
15	65904000	Raccord à vis PG 13,5	
16	XXXXXX		
17	64300400	Sortie	
18	64301300	Couvercle	
19	10400700	Joint torique à baïonnette	
20	64301600	Plaque perforée	
21	64301300	Cartouche DLS	
22	64301100	Appareil de base	
23	64301900	Tube intérieur avec plaque perforée	
24	64310000	Seringue de dosage 20ml	
25	64054000	Sachet à membrane	
26	64056000	Microfiltre	
33	64049000	Electrovanne	
34	64311000	Pièce en Y	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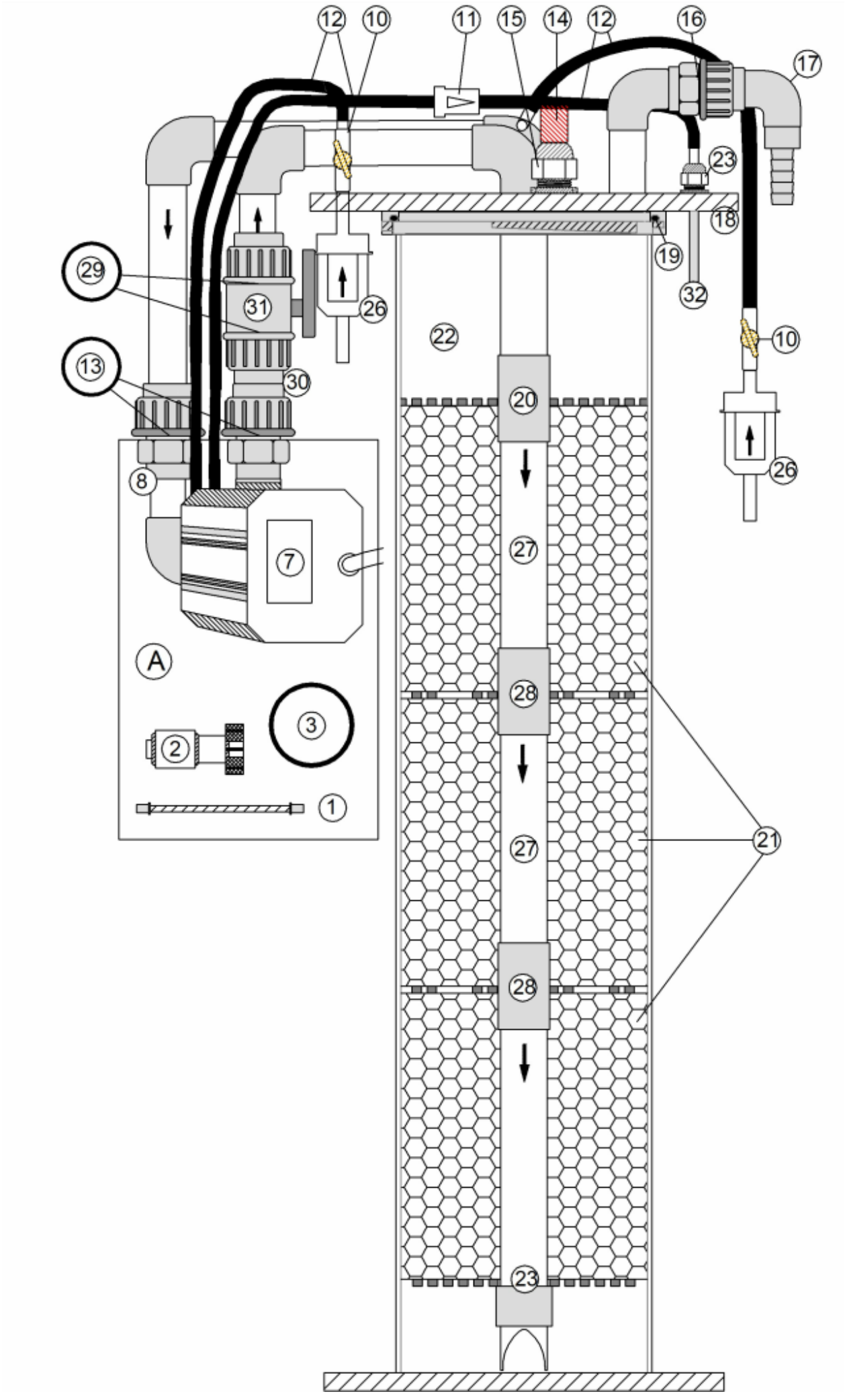
Liste des pièces détachées du NFP 616

N°	Référence	Désignation	
	64302000	NFP 616	
A	87152000	Pompe avec points 1-9	
B	69303000	Pompe avec points 1-7	
1	69546000	Arbre avec palier	
2	69353000	Unité de roulement	
3	69513000	Joint torique de pompe	
4	69530000	Plaque avant	
5	69527000	Baïonnette de pompe	
6	69526000	Façade de la plaque d’appui	
7	69508000	Stator	
8	87326000	Conduite d’aspiration	
9	87327000	Conduite de refoulement	
10	93010010	Mini-soupape régulatrice	
11	87140000	Soupape d’arrêt anti-retour	
12	61751075	Tuyau en silicone	
13	93041400	Joint torique du raccord à vis 20 mm	
14	65900000	Bouchon rouge	
15	65904000	Raccord à vis PG 13,5	
16	XXXXXX		
17	64300400	Sortie	
18	64302300	Couvercle	
19	10400400	Joint torique à baïonnette	
20	87323000	Plaque perforée	
21	64302300	Cartouche DLS	
22	86002100	Appareil de base	
23	64302900	Tube intérieur avec plaque perforée	
24	64310000	Seringue de dosage 20ml	
25	64054000	Sachet à membrane	
26	64056000	Microfiltre	
33	64049000	Electrovanne	
34	64311000	Pièce en Y	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Liste des pièces détachées du NFP 1020

N°	Référence	Désignation	
	64303000	NFP 1020	
A	87158000	Pompe avec tubulure	
1	89130000	Arbre avec palier	
2	89036000	Unité de roulement	
3	10501700	Joint torique de pompe	
4	XXXXXX		
5	XXXXXX		
6	XXXXXX		
7	69704100	Stator	
8	64303500	Conduite d’aspiration	
9	XXXXXX		
10	93010010	Mini-soupape régulatrice	
11	87140000	Soupape d’arrêt anti-retour	
12	61751075	Tuyau en silicone	
13	93042400	Joint torique du raccord à vis 25 mm	
14	65900000	Bouchon rouge	
15	65904000	Raccord à vis PG 13,5	
16	93041400	Joint torique du raccord à vis 20 mm	
17	64303400	Sortie	
18	64303300	Couvercle	
19	10400430	Joint torique à baïonnette	
20	87343000	Plaque perforée	
21	64303300	Cartouche DLS	
22	86005100	Appareil de base	
23	64303900	Tube intérieur avec plaque perforée	
24	XXXXXX		
25	XXXXXX		
26	64056000	Microfiltre	
27	64303910	Tube intérieur	
28	64303920	Plaque perforée avec perçage	
29	93402300	Joint torique du robinet à boisseau sphérique 25	
30	87365000	Elément de raccord	
31	93402300	Robinet à boisseau sphérique sans écrou	
32	64303930	Tube de raccordement	
33	64049000	Electrovanne	
34	64311000	Pièce en Y	

Filtri denitratori serie *NFP* IT

I filtri denitratori Deltec della serie NFP sono costituiti da un contenitore a pressione, una testata con chiusura a baionetta, pompa di circolazione, collegamento all'elettrodo Redox, soluzione nutriente e sacchetto a membrana. Per sfruttare l'elevata prestazione dell'NFP 1020 occorre introdurre la soluzione nutritiva mediante pompa dosatrice. Nel filtro NFP 1020 la pompa dosatrice, così come già il sacchetto a membrana, non è inclusa nella fornitura.

Eliminazione biologica dei nitrati
In un ambiente povero di ossigeno alcuni batteri possono ridurre i nitrati in altre sostanze. In questo processo si formano gas azotati e acido carbonico e in presenza di alcune condizioni vengono legati i fosfati. Per assicurare l'efficace svolgimento di questi processi biologici devono essere soddisfatti determinati prerequisiti:
1. ambiente acquatico anaerobico nel filtro denitratore mediante aggiunta di acqua dell'acquario "goccia a goccia";
2. contenuto di nitrati misurabile nell'acqua dell'acquario;
3. regolare immissione di soluzione nutritiva nel filtro.

Il funzionamento del filtro denitratore può, tuttavia, implicare alcuni rischi, se non si rispettano le istruzioni per l'uso.
Per evitare problemi e sfruttare al meglio gli indiscussi vantaggi che l'eliminazione dei nitrati comporta, è assolutamente necessario rispettare tutte le indicazioni.

Prima di mettere in funzione il filtro denitratore assicurarsi del buon funzionamento del filtro aerobico dell'acquario. I processi biologici che portano all'eliminazione dei nitrati esigono i seguenti requisiti:

- condizioni anaerobiche nel filtro denitratore;
- apporto regolare e costante di soluzione nutritiva.

L'apporto di soluzione nutritiva può avvenire in forme diverse:

Mediante sacchetto a membrana (tranne NFP 1020)
Il sacchetto a membrana viene riempito di soluzione nutritiva e posto nel vano superiore del filtro denitratore. Nei modelli NFP 512 / NFP 616 i sacchetti da riempire sono più di uno.
Per la messa in servizio fare attenzione ad utilizzare solo circa il 50% della quantità massima di soluzione nutritiva. Solo quando si misura una netta riduzione dei nitrati nell'acqua in uscita dal filtro, la quantità di soluzione nutritiva può essere pian piano aumentata.

Attraverso la membrana la soluzione nutritiva si diffonde nell'acqua del filtro in un periodo di 4-5 settimane dopo cui deve essere rinnovata. L'acqua che rimane nel sacchetto deve essere eliminata prima del nuovo riempimento.
Se vengono utilizzati due (NFP 512) o tre sacchetti (NFP 616) è vantaggioso alternare il loro riempimento, p.es. uno il primo del mese, l'altro 15 del mese. Per distinguerli, i sacchetti sono contrassegnati con i numeri 0, 1 e 2.

Mediante siringa a un senso (tranne NFP 1020)
Questo metodo ha il vantaggio di controllare l'apporto di soluzione nutritiva e quindi di sfruttare meglio il potenziale di resa. Utilizzando questo metodo è necessario fare attenzione affinché l'aggiunta giornaliera di soluzione nutritiva sia conforme alla tabella seguente. Ideale sarebbe suddividerla in due somministrazioni giornaliere.

Mediante pompa dosatrice
L'apporto mediante pompa dosatrice offre il vantaggio di poter somministrare giornalmente la quantità necessaria di soluzione nutritiva in piccole dosi più volte al giorno. Tale apporto regolare aumenta la resa.

Installazione
La posizione dell'apparecchio può essere scelta a piacere. La temperatura ambiente deve essere compresa tra 20° e 28° C. L'acqua in entrata può essere portata da una piccola pompa separata o mediante bypass dalla pompa principale. La pompa o il bypass devono essere collegati tramite tubo idoneo al microfiltro (26) o al rubinetto (10 - solo nel caso di NFP 509). Lo scarico (17) viene condotto nel sistema filtro mediante un tubo.

Dopo l'installazione controllare la tenuta del filtro e tutti i collegamenti.

Messa in funzione
Le seguenti istruzioni valgono per tutti i filtri denitratori Deltec.
Lo scopo è coltivare nel filtro denitratore la maggiore quantità possibile di batteri anaerobi nel minor tempo. Per questo l'acqua nel filtro denitratore deve avere un contenuto di ossigeno molto ridotto ovvero, dopo la fase di entrata, un valore redox di circa 150mV.
Mediante un lento apporto di acqua del filtro, pari ad una goccia ogni due secondi, il valore redox nel filtro diminuisce. I pochi batteri anaerobi presenti decompongono l'ossigeno disciolto nell'acqua riducendo il valore redox. Vista la ridotta densità di batteri iniziale, durante la messa in funzione anche la quantità di soluzione nutritiva somministrata deve essere ridotta (max.50%). Dopo alcuni giorni nell'acqua in uscita dal filtro si misura una maggiore concentrazione di nitriti (NO^2) ed eventualmente anche un valore aumentato di nitrati (NO^3).
Solo quando i nitriti (NO^2) nell'acqua in uscita dal filtro non sono più misurabili e il valore di nitrati è fortemente ridotto, si può aumentare poco alla volta l'apporto di acqua e la quantità di soluzione nutritiva.
I valori di nitriti e nitrati devono essere controllati giornalmente tramite misurazione.
Se i valori tornano ad aumentare, significa che nel filtro arriva troppo ossigeno, quindi deve essere di nuovo ridotta la quantità d'acqua in entrata.
Se la quantità di soluzione nutritiva è eccessiva in rapporto alla quantità di batteri anaerobi, l'acqua dell'acquario si può intorbidire. In caso estremo si può arrivare ad una carenza di ossigeno in acquario. In tal caso occorre interrompere l'apporto di acqua al filtro denitratore e prendere misure per aumentare il contenuto di ossigeno nell'acquario (p.es. mediante aerazione, cambio d'acqua parziale o altre misure adeguate).

In seguito rimettere in funzione il filtro denitratore con soluzione nutritiva ridotta.
L'apporto di acqua e di soluzione nutritiva devono sempre essere entrambi nel giusto rapporto in relazione alla quantità di batteri presenti nel filtro denitratore. Per questo ogni aumento deve essere fatto a piccoli passi.
Un misuratore redox è sicuramente utile per raggiungere il valore redox ideale (ca. -150mV).

Controllo automatico
E' possibile regolare automaticamente l'apporto di acqua, e quindi il valore redox, mediante un regolatore redox in combinazione con una elettrovalvola resistente all'acqua marina. A questo scopo montare tra il rubinetto (10) e il filtro denitratore un raccordo a T passante con un secondo rubinetto. Collegare l'uscita dell'elettrovalvola al secondo rubinetto. Collegare l'ingresso dell'elettrovalvola all'entrata del rubinetto (10).

1 Collegare il flusso d'acqua al microfiltro (26) o, nel modello NFP 509, al rubinetto (10).
2 Riempire il filtro con acqua dell'acquario.
3 Installare l'elettrodo redox nell'apposito collegamento a vite (15) predisposto a questo scopo (rimuovere il tappo rosso (14)).
4 Impostare il rubinetto di intercettazione (10) a circa 1 goccia al secondo.
5 Avviare la pompa di circolazione.

Dotare il cavo della valvola elettromagnetica di spina (l'operazione deve essere eseguita da un tecnico) e inserire la spina nel misuratore Redox.

Funzionamento
Impostare l'apparecchio di controllo Redox a ca. -150 mV. Quando nel filtro si raggiunge questo valore, la valvola elettromagnetica si apre e porta altra acqua nel filtro. All'inizio la velocità di flusso a goccia non deve superare le 2-3 gocce al secondo, da regolare attraverso il secondo rubinetto (valvola elettromagnetica). Aumentando la quantità di acqua, il valore Redox torna a muoversi verso il campo positivo.
Siccome il controllo Redox nel Filtro denitratore Delteo è un processo molto lungo, il potenziale Redox oscilla nel campo superiore ed inferiore, deve però rimanere entro il campo tra -100 mV e -200 mV.

Manutenzione
Durante il funzionamento nel filtro denitratore si formano depositi costituiti da batteri morti, che in casi estremi possono ostruire il filtro. Durante la pulizia assicurarsi che l'acqua di filtraggio vecchia venga riutilizzata. Estrarre con cautela, premendo, la cartuccia del filtro nell'acqua marina, quindi pulire la pompa e i tubi. Dopo aver ricomposto il filtro riutilizzare l'acqua vecchia del filtro e rabboccare con acqua dell'acquario. La cosa migliore è raccogliere l'acqua in uscita dal filtro prima di procedere alla pulizia per poi utilizzarla al posto di acqua nuova. Ridurre la velocità di flusso a ca. 1 goccia/secondo per ca. 24 ore.

Dati tecnici

Modello	Dimensioni (lung/larg/h)	Per acquari fino a	Sacco membrana	Quantità di soluzione nutritiva giornaliera mediante siringa o pompa dosatrice
NFP 509	225x170x560mm	800 litri	1	8 ml
NFP 512	300x220x580mm	1600 litri	2	16 ml
NFP 616	325x265x580mm	4000 litri	3	40 ml
NFP 1020	390x310x1010mm	10000 litri	0	100 ml

I dati citati sulla resa del filtro sono indicativi e possono variare da acquario ad acquario. Secondo l'esperienza, l'eliminazione di nitrati è maggiore rispetto al puro calcolo basato sul funzionamento del filtro denitratore. Probabilmente l'intero sistema funge da filtro denitratore aggiuntivo grazie ai batteri che fuoriescono dal filtro denitratore vero e proprio.

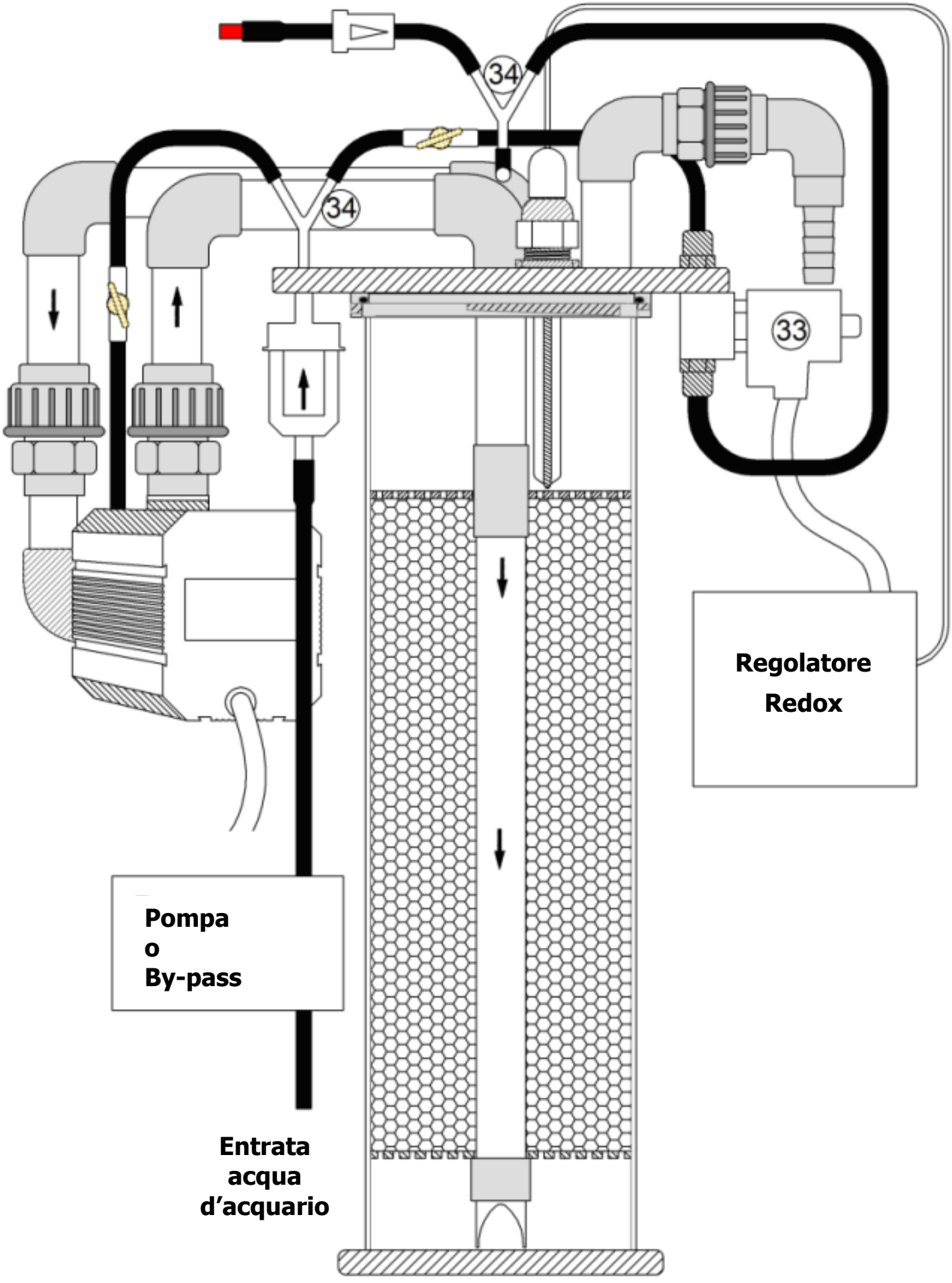
Norme di sicurezza
Dopo un lungo periodo di inattività il Delteo ***Filtro denitratore*** deve essere rimesso in funzione come la prima volta. Lo stesso dicasi dopo un trattamento con medicinali; in questo caso assicurarsi prima che la funzione biologica del filtro aerobico dell'acquario sia ripristinata.

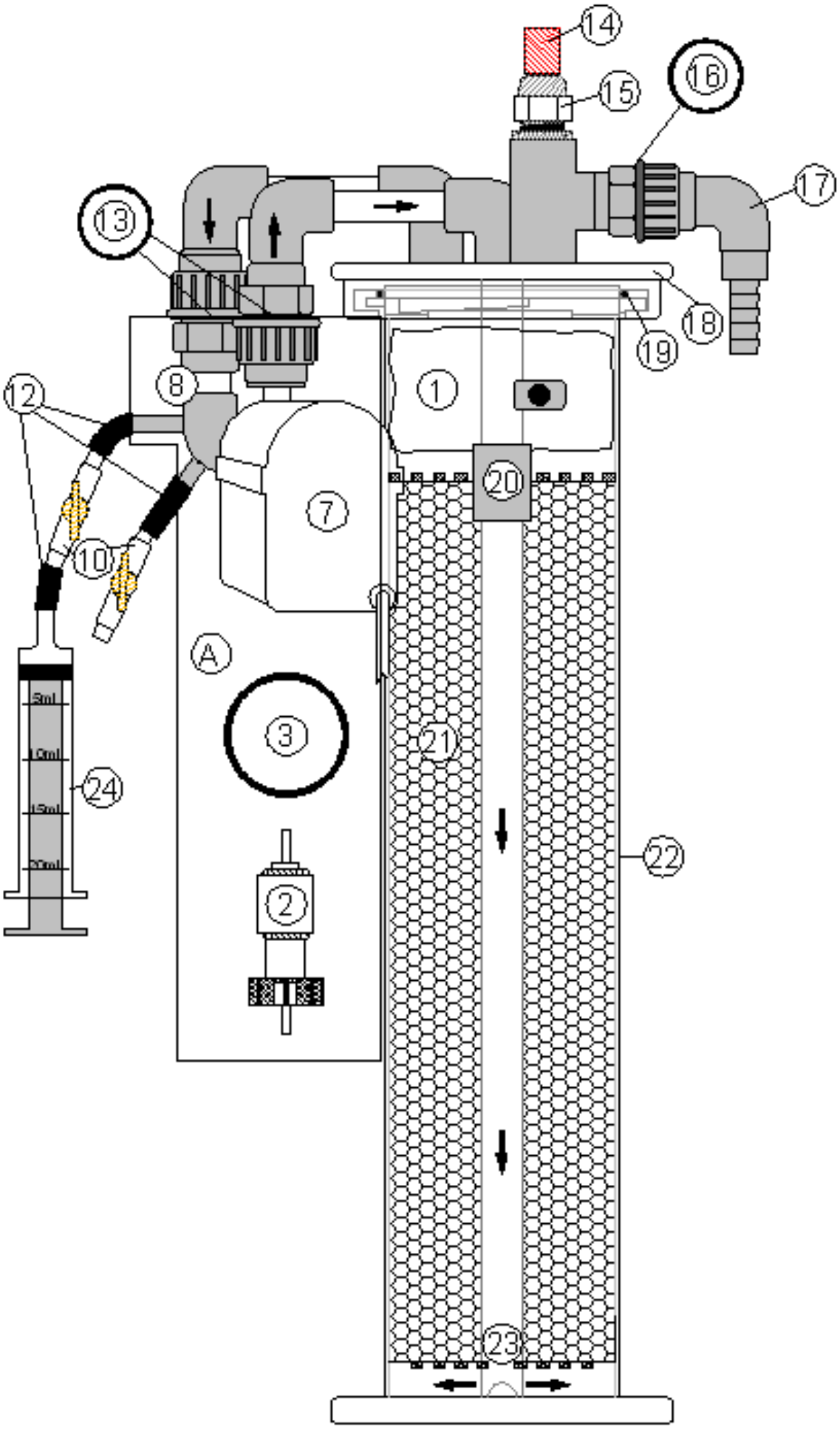
La velocità di flusso deve essere controllata giornalmente ed eventualmente reimpostata.

Alimentare il filtro denitratore solo con Delteo ***Soluzione nutritiva***, quando il filtro aerobico è ben avviato e i nitrati sono rilevabili.

Durante il periodo di attivazione del filtro evitare apporti eccessivi di acqua e/o soluzione nutritiva, che potrebbero provocare reazioni indesiderate e dannose.

Modello NFP 616 con controllo redox

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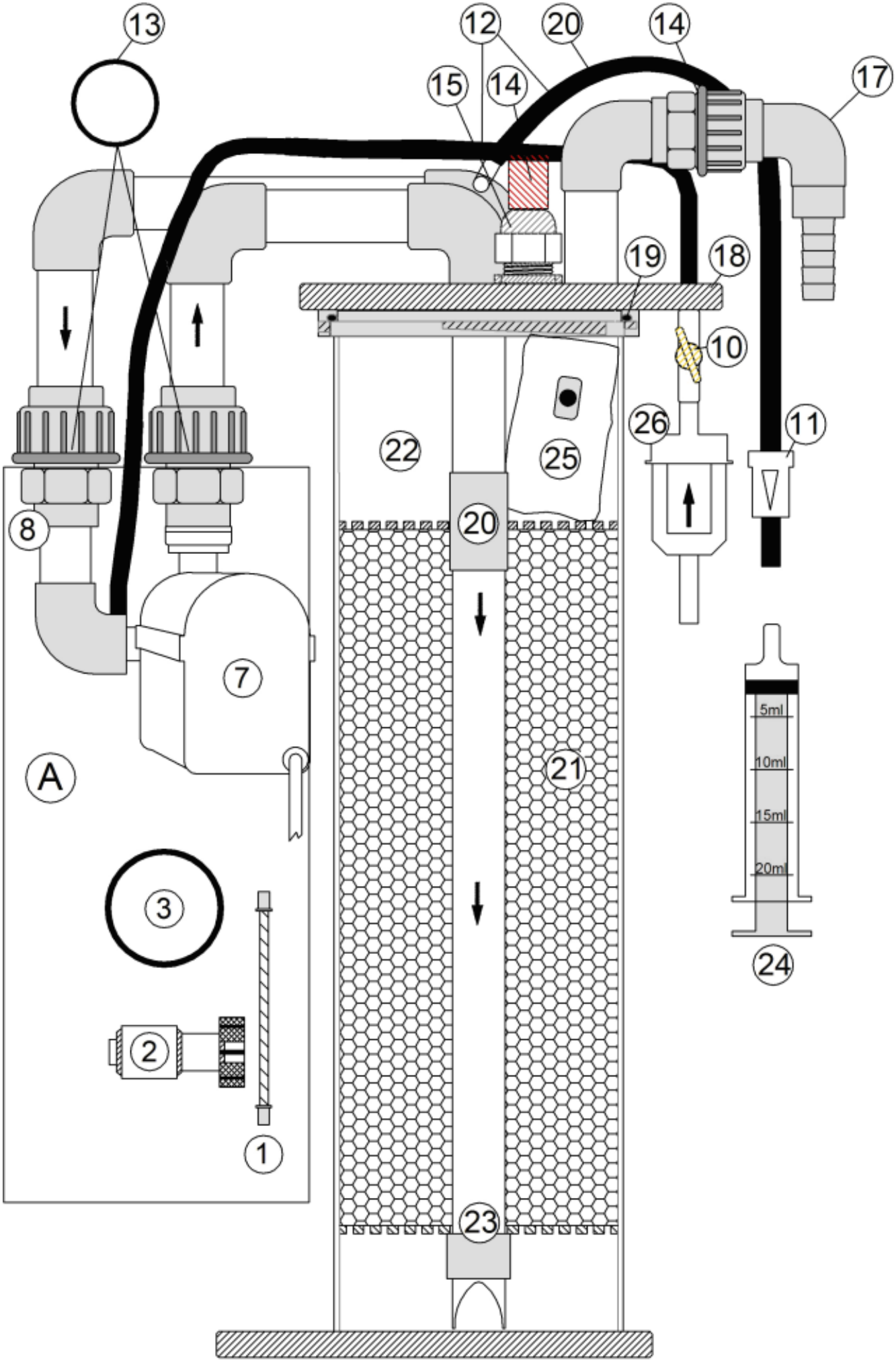
Lista ricambi NFP 509

Nr.	Art. Nr.	Descrizione	
	64300000	NFP 509	
A	87161000	Pompe con predisposizione tubi	
1	69544000	Albero con cuscinetto	
2	69356000	Girante	
3	69511000	Pompa O-Ring	
4	XXXXXX		
5	XXXXXX		
6	XXXXXX		
7	69501000	Statore	
8	87157700	Tubazioni aspirazione/scarico	
9	XXXXXX		
10	93010010	Mini valvola di regolazione	
11	XXXXXX		
12	61751075	Tubi di silicone	
13	93040400	Collegamento a vite O-Ring 16 mm	
14	65900000	Tappo rosso	
15	65904000	Collegamento a vite PG 13,5	
16	93041400	Collegamento a vite O-Ring 20 mm	
17	64300400	Scarico	
18	64300200	Coperchio	
19	10400360	Baionetta O-Ring	
20	87157800	Griglia	
21	64300300	Ricarica DLS	
22	87169000	Apparecchio base	
23	64300900	Tubo interno con griglia	
24	64310000	Siringa dosatrice 20ml	
25	64054000	Sacchetto membrana	
33	64049000	Elettrovalvola	
34	64311000	Collegamento a Y	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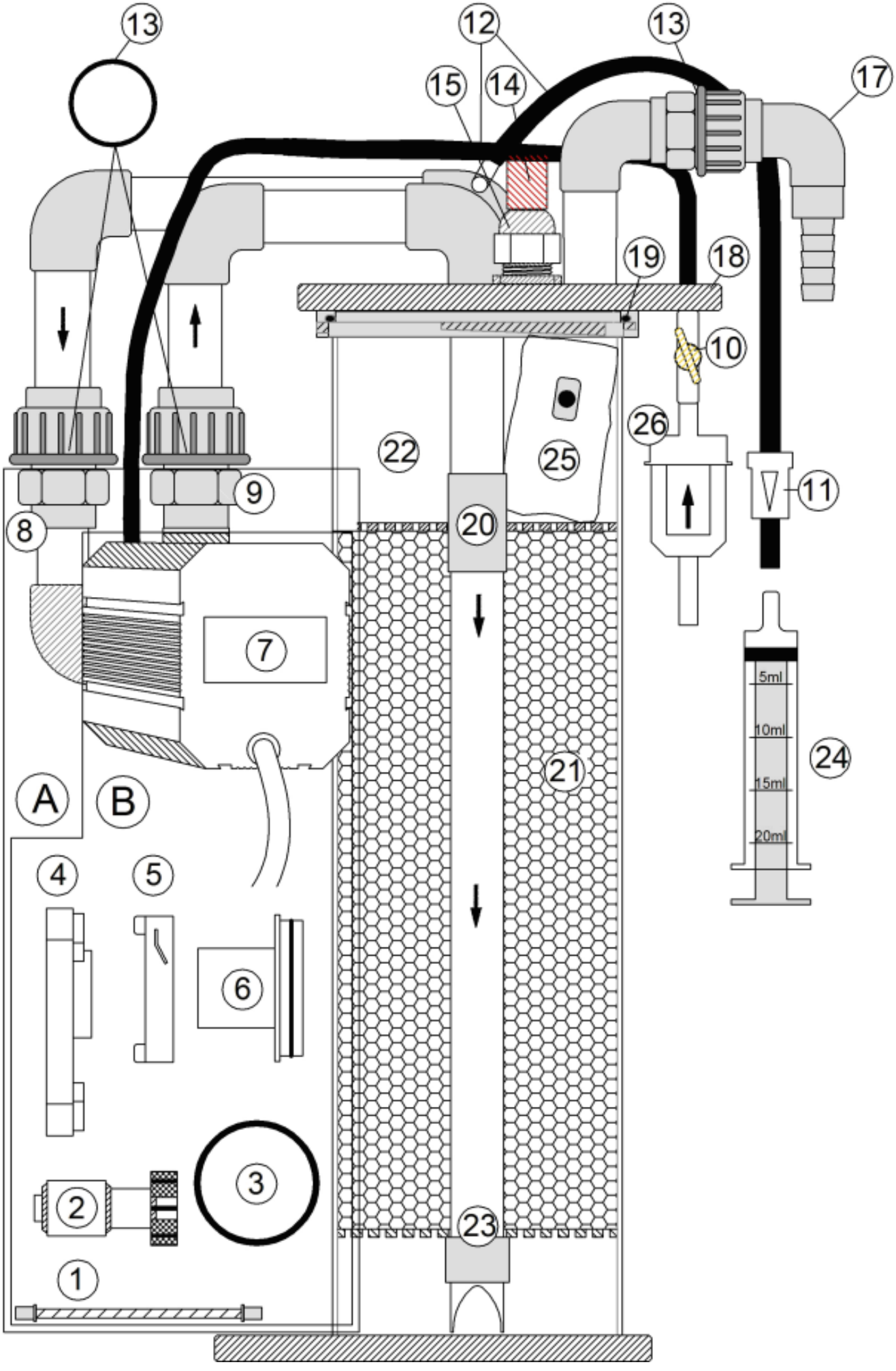
Lista ricambi NFP 512

Nr.	Art. Nr.	Descrizione	
	64301000	NFP 512	
A	87149000	Pompa con tubi	
1	69545000	Albero con cuscinetto	
2	69352000	Girante	
3	69511000	Pompa O-Ring	
4	XXXXXX		
5	XXXXXX		
6	XXXXXX		
7	69502000	Statore	
8	87306000	Tubazioni aspirazione/scarico	
9	XXXXXX		
10	93010010	Mini valvola di regolazione	
11	87140000	Valvola di non ritorno	
12	61751075	Tubo di silicone	
13	93041400	Collegamento a vite O-Ring 20 mm	
14	65900000	Tappo rosso	
15	65904000	Collegamento a vite PG 13,5	
16	XXXXXX		
17	64300400	Scarico	
18	64301300	Coperchio	
19	10400700	Baionetta O-Ring	
20	64301600	Griglia	
21	64301300	Ricarica DLS	
22	64301100	Apparecchio base	
23	64301900	Tubo interno con griglia	
24	64310000	Siringa dosatrice 20ml	
25	64054000	Sacchetto membrana	
26	64056000	Micro Filtro	
33	64049000	Elettrovalvola	
34	64311000	Raccordo a Y	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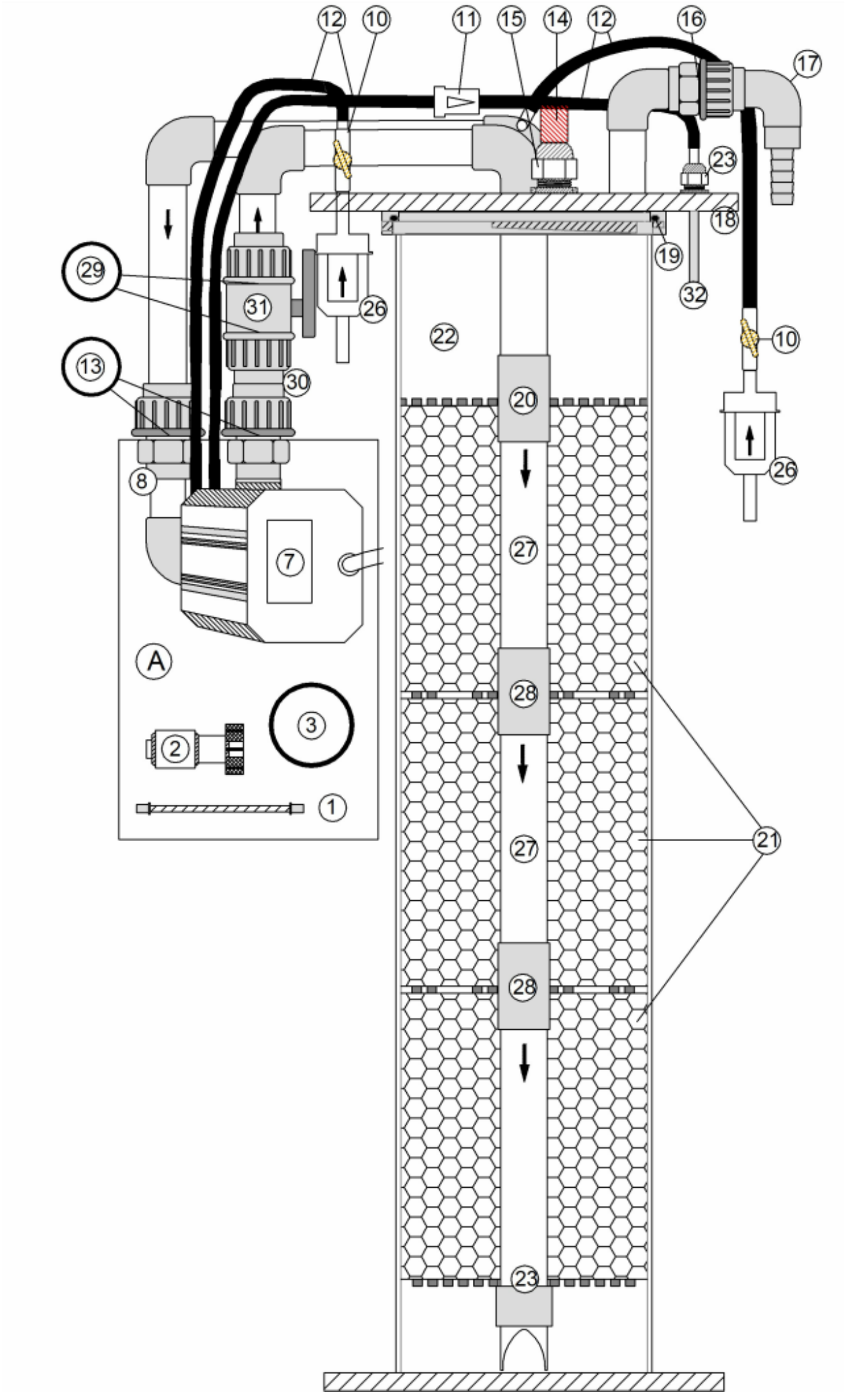
19
18
10
26
22
25
11
9
8
20
7
5ml
10ml
15ml
20ml
24
21
A
B
4
5
6
3
2
23
1

Lista ricambi NFP 616

Nr.	Art. Nr.	Descrizione	
	64302000	NFP 616	
A	87152000	Pompa con punti 1-9	
B	69303000	Pompa con punti 1-7	
1	69546000	Albero con cuscinetto	
2	69353000	Girante	
3	69513000	Pompa O-Ring	
4	69530000	Lastra anteriore	
5	69527000	Pompa a baionetta	
6	69526000	Lastra cuscinetto anteriore	
7	69508000	Statore	
8	87326000	Tubo d'aspirazione	
9	87327000	Tubo d'uscita	
10	93010010	Mini valvola di regolazione	
11	87140000	Valvola di non ritorno	
12	61751075	Tubo silicone	
13	93041400	Collegamento O-Ring 20 mm	
14	65900000	Tappo rosso	
15	65904000	Collegamento a vite PG 13,5	
16	XXXXXX		
17	64300400	Scarico	
18	64302300	Coperchio	
19	10400400	Baionetta O-Ring	
20	87323000	Griglia	
21	64302300	Ricarica DLS	
22	86002100	Apparecchio base	
23	64302900	Tubo interno con griglia	
24	64310000	Siringa dosatrice 20ml	
25	64054000	Sacco membrana	
26	64056000	Micro Filtro	
33	64049000	Elettrovalvola	
34	64311000	Raccordo a Y	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A
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21
1
28
23

NFP 1020

Nr.	Art. Nr.	Descrizione	
	64303000	NFP 1020	
A	87158000	Pompe e tubi	
1	89130000	Albero con cuscinetto	
2	89036000	Girante	
3	10501700	Pompa O-Ring	
4	XXXXXX		
5	XXXXXX		
6	XXXXXX		
7	69704100	Statore	
8	64303500	Tubi d'aspirazione	
9	XXXXXX		
10	93010010	Mini valvola di regolazione	
11	87140000	Valvola di non ritorno	
12	61751075	Tubo di silicone	
13	93042400	Collegamento a vite O-Ring 25 mm	
14	65900000	Tappo rosso	
15	65904000	Collegamento a vite PG 13,5	
16	93041400	Collegamento a vite O-Ring 20 mm	
17	64303400	Scarico	
18	64303300	Coperchio	
19	10400430	Baionetta O-Ring	
20	87343000	Griglia	
21	64303300	Ricarica DLS	
22	86005100	Apparecchio base	
23	64303900	Tubo interno con griglia	
24	XXXXXX		
25	XXXXXX		
26	64056000	Micro Filtro	
27	64303910	Tubo interno	
28	64303920	Griglia con foro	
29	93402300	O-Ring rubinetto 25	
30	87365000	raccordo	
31	93402300	rubinetto a sfera senza dado	
32	64303930	tubo di collegamento	
33	64049000	Elettrovalvola	
34	64311000	Raccordo a Y	

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