

Pump for Sea Lice and Plankton
Max. depth: 100 m

Model 23.586

Manual

KC Denmark A/S

Research Equipment
Limnology • Oceanography • Hydrobiology

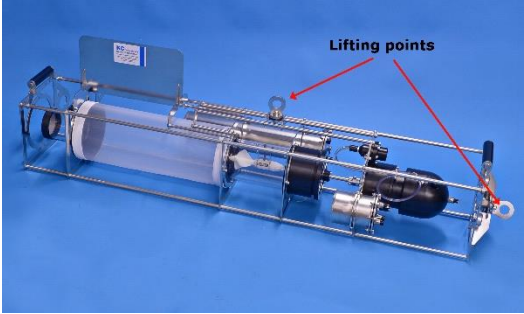


Pump for Sea Lice and Plankton

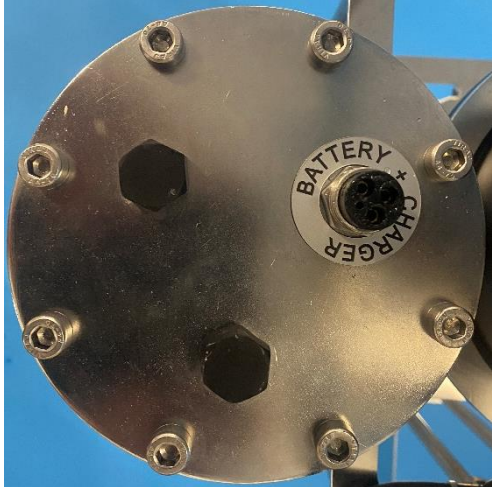
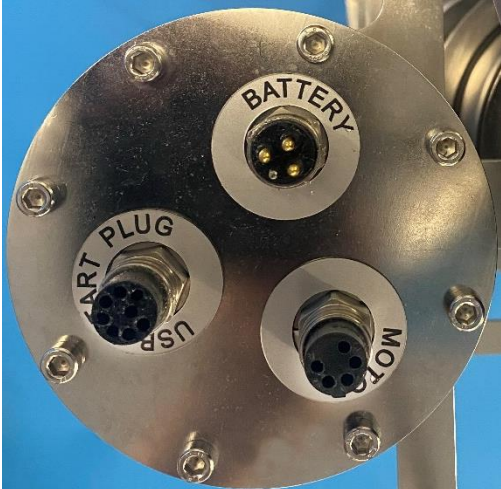
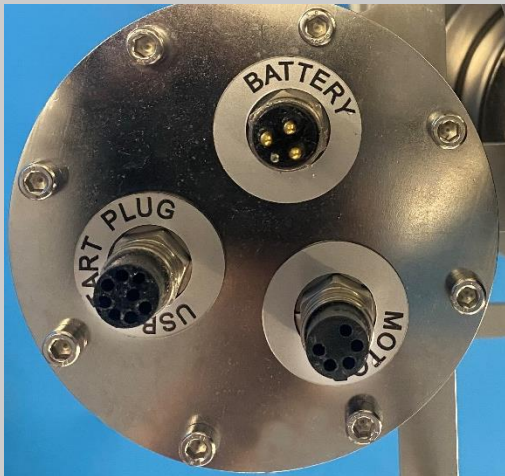
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Deploy the pump into the water before it gets started. Operating in dry condition may damage the pump.

If using the pump in salt water, it is very important to rinse the pump, the net bag and the flow meter by pumping fresh water for a few minutes.

Maximum depth: 100 m.

Item	Description	
	<p>The pump can be operated in horizontal as well as vertical position.</p> <p><i>Attach a steel wire or rope to one of the lifting points.</i></p>	
	<p>Main parts of the pump:</p> <ol style="list-style-type: none"> 1. Motor 2. Pressure compensation for the motor 3. Cylinder for time lapse trigger 4. Battery cylinder 5. Propeller/honeycomb for the pump 6. Flow meter for measuring water flow 7. The net bag, filtration area 3000 cm² 8. Collecting bottle 9. Fin for stabilizing in water streams 10. Lifting point for horizontal use 11. Lifting point for vertical use 12. 4 pcs of zinc anodes 	
	 <p>Caution</p> <p>It is highly recommended, that the pump isn't exposed to direct sunlight for a longer period. The battery cylinder and the motor will accommodate the heat. Battery's life will decrease and the Fluorinert in the pump's house may expand, so it can break the membrane for the pressure compensation (2).</p>	

Preparing the pump		
1	<ol style="list-style-type: none"> 1. Always grease the connectors with Molykote, see pg. 12-15. 2. Connect the charger to ensure the battery is fully charged. Allow up to 10 hours of charging. 3. The charger has a built-in circuit to prevent overcharging the battery. 4. The battery charger is useable for a main voltage between 100 and 240 V AC. 	
2	When charging has finished, disconnect the charger.	
3	<p>The laptop comes with a cable including USB/SubConn connectors. Connect the cable to "USB/Start plug" on the small cylinder on the pump.</p> <p>Insert values for the time lapse trigger as described on pg. 6-9.</p>	
4	<p>Once you have programmed the timer, disconnect the USB cable.</p> <p>The SubConn connectors have various numbers of pins, so they cannot be attached in a wrong way.</p> <p>Insert the cable from the motor to "Motor" on the cylinder.</p> <p>Insert the cable from battery cylinder to "Battery" on the cylinder.</p>	

5	Note the setting of the flow meter. The flow meter's read-out is not resettable.	
6	<p>When you are ready to deploy the pump, insert the 8-pins programming plug into the "USB Start plug" on the cylinder.</p> <p>Once the plug is inserted, the actual programming cycle will start within 1 min.</p> <p>It is possible implementing a longer delay in the program so that the pump first starts pumping after a set amount of time.</p>	
7	<p>When the pump is retrieved back on deck, you can empty the collecting bottle.</p> <p>Loosen the wing nuts and remove the bottle.</p>	

Determination of pumped volume		
8	<p>Formula for calculating the pumped volume: <i>Indicated number of revolutions x 0,3 x opening area (m²) x 1000 = water volume (L).</i></p> <p>The tube has an inner diameter of 85 mm, i.e. the opening area is 0,00567 m².</p> <p>Example: If the number of revolutions associated with a pump session is 500 (noted from the digital flow meter counter), the water volume passed through the pump is:</p> <p>Volume = 500 x 0,3 x 0,00567 m² x 1000 = 850 L</p>	

If more convenient, you can download a spreadsheet [here](#) or using the QR code below. It has a simple, intuitive design for calculating the water flow in L corresponding to the actual read-out of the flow meter. for 3 different options as follows:


1. Our standard 85 mm tube (23.095) with built-in flow meter
2. Individual input of diameter for a plankton net
3. Typing in height and width in cm for a square or rectangular design



Conversion tabel of counters numbers to liters												
KC Denmark 23.095 standard flow meter with honeycomb in 85mm tube												
6	Counter start	10000										
7	Counter finish	21000										
8	Difference	11000										
9	Total	11000 L/min										
Calculation of liters according to the diameter of the circle												
14	Diameter of the circle	30 cm										
15	Counter start	10000										
16	Counter finish	21000										
17	Difference	11000										
18	Radius	15 cm										
19	Area	0.707 m ²										
20	Total	11000 L/min										
Calculation of liters in relation to the size of a square												
26	a x height	15 cm										
27	b x width	21 cm										
28	Counter start	10000										
29	Counter finish	21000										
30	Difference	11000										
31	Area	0.315 m ²										
32	Total	11000 L/min										



Programming of the KC Sea Lice Pump



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SeaLice Pump Setup

Date/Time Y:M:D:H:m:s

2022
5
27
13
43
35

	Year	Month	Day	Hour	Run Min
Sample 1 Start	2022	5	24	10	1
Sample 2 Start	2022	5	24	10	1
Sample 3 Start	2022	5	24	10	1
Sample 4 Start	2022	5	24	10	1
Sample 5 Start	2022	5	24	10	1
Sample 6 Start	2022	5	24	10	1

	Year	Month	Day	Hour	Run Min
Sample 7 Start	2022	5	24	10	1
Sample 8 Start	2022	5	24	10	1
Sample 9 Start	2022	5	24	10	1
Sample 10 Start	2022	5	24	10	1
Sample 11 Start	2022	5	24	10	1
Sample 12 Start	2022	5	24	10	1

Save Data

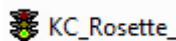
Sample Setup


Copy Date 1 to 2 > 12

Setup

1 USB connection

1. Connect KC System to tablet, battery is not needed.
2. Run KC program on tablet desktop





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SeaLice Pump Setup

Date/Time Y:M:D:H:m:s

2022
5
27
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	Year	Month	Day	Hour	Run Min
Sample 1 Start	2022	5	24	10	1
Sample 2 Start	2022	5	24	10	1
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Sample 5 Start	2022	5	24	10	1
Sample 6 Start	2022	5	24	10	1

	Year	Month	Day	Hour	Run Min
Sample 7 Start	2022	5	24	10	1
Sample 8 Start	2022	5	24	10	1
Sample 9 Start	2022	5	24	10	1
Sample 10 Start	2022	5	24	10	1
Sample 11 Start	2022	5	24	10	1
Sample 12 Start	2022	5	24	10	1

Save Data

Sample Setup

Copy Date 1 to 2 > 12

Setup



Oceanography · Limnology · Hydrobiology

SeaLice Pump Setup

Date/Time Y:M:D:H:m:s

test
te
te
te
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te

Save Data

Sample Setup

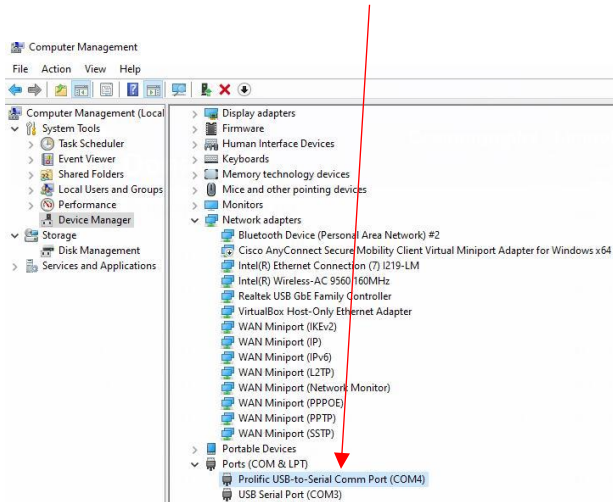
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Setup

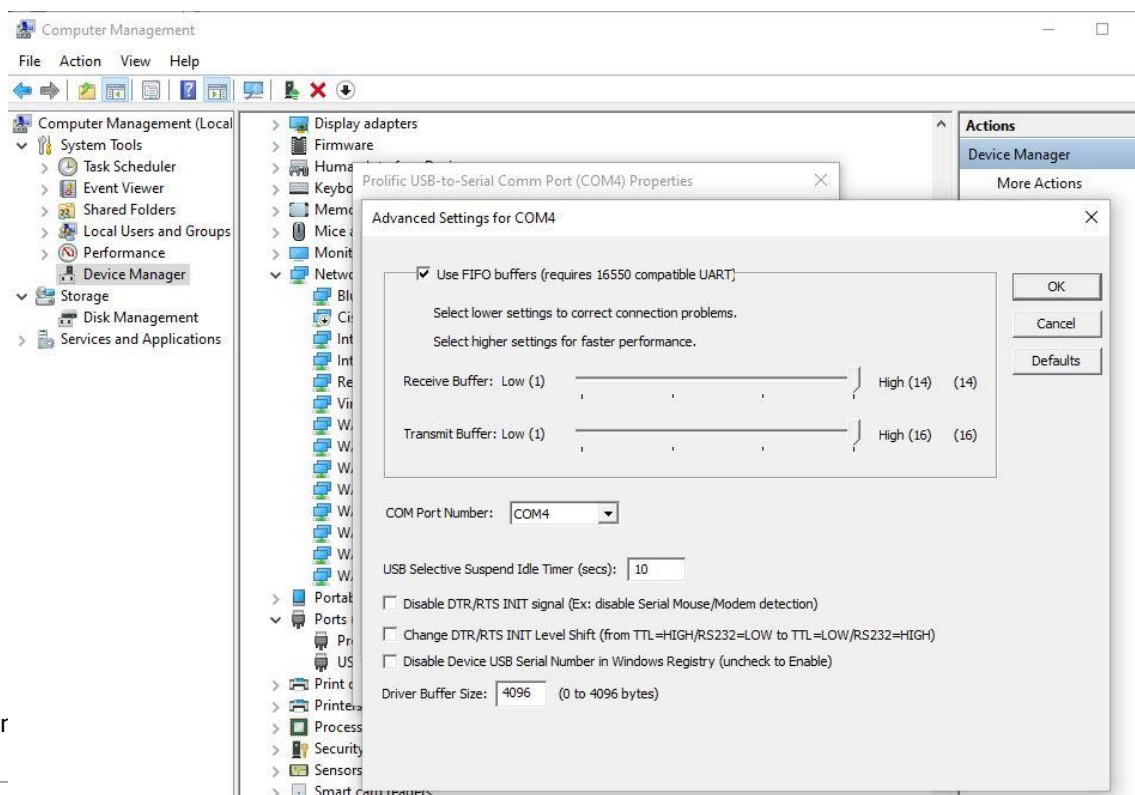
If connection is ok there should be readable values, if no connection there will be some text.

If no connection follow this guide:

1. Disconnect usb cable and battery supply if connected.
2. Close Program on tablet.
3. Connect usb cable in tablet and KC timer, the battery is not needed.
4. Press on the KC icon on tablet.
5. If still no connection check com port in Windows "Device Manager" there must be a COM port named Prolific (COM4).



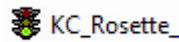
6. If there is a a COM port named Prolific (COM?) but the COM? is not COM4.
 - Open Prolific (COM?) settings.
 - Select port settings.
 - Select Advanced.
 - Change COM Port Number to COM4, and press ok.
 - Close all windows and try to connect again.



2 Programming

1. Connect KC System to tablet, battery is not needed.

2. Run KC program on tablet desktop



	Year	Month	Day	Hour	Run Min
Sample 1 Start	2022	5	24	10	1
Sample 2 Start	2022	5	24	10	1
Sample 3 Start	2022	5	24	10	1
Sample 4 Start	2022	5	24	10	1
Sample 5 Start	2022	5	24	10	1
Sample 6 Start	2022	5	24	10	1

	Year	Month	Day	Hour	Run Min
Sample 7 Start	2022	5	24	10	1
Sample 8 Start	2022	5	24	10	1
Sample 9 Start	2022	5	24	10	1
Sample 10 Start	2022	5	24	10	1
Sample 11 Start	2022	5	24	10	1
Sample 12 Start	2022	5	24	10	1

Buttons: Save Data, Sample Setup, Copy Date 1 to 2 > 12, Setup

Here each sample can be programmed.

1. Sample 1 Date: Is the first sample after power on.

Case 1.

If Sample 1 Date is "2022,05,24,10", The pump will start 10 o'clock date 2022.05.24, if the date is passed it will start with the wake-up interval.

When programming is finished, press button "Save Data"

Save Data

3 System Setup

	Year	Month	Day	Hour	Run Min
Sample 1 Start	2022	5	24	10	1
Sample 2 Start	2022	5	24	10	1
Sample 3 Start	2022	5	24	10	1
Sample 4 Start	2022	5	24	10	1
Sample 5 Start	2022	5	24	10	1
Sample 6 Start	2022	5	24	10	1

	Year	Month	Day	Hour	Run Min
Sample 7 Start	2022	5	24	10	1
Sample 8 Start	2022	5	24	10	1
Sample 9 Start	2022	5	24	10	1
Sample 10 Start	2022	5	24	10	1
Sample 11 Start	2022	5	24	10	1
Sample 12 Start	2022	5	24	10	1

WakeUp Interval: 2 Minutes

CountVal: 0

Act Date/Time: 2022 5 27 13 48 24

New Date/Time: 2022 5 27 13 48 00 [Set New Time]

By pressing setup button, the “General Setup” Page is opened. Test start of pump will only work with a special connector (optional).

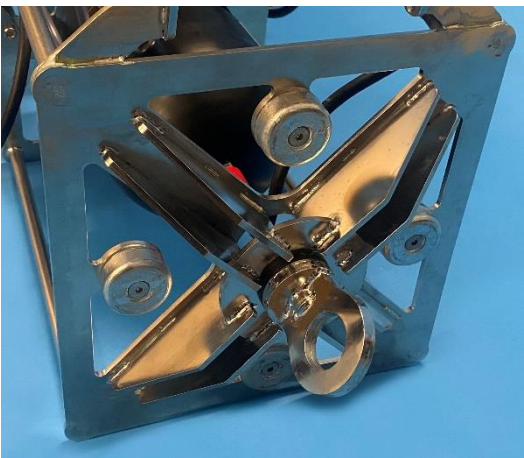

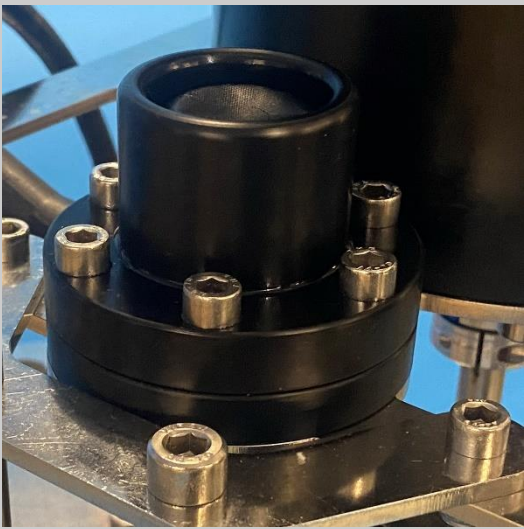

On this page time and wake-up interval can be set.

Wake-up interval is the time interval where the controller is checking if the programmed sample time is reached, in the meantime the controller is in deep sleep to save power. Typical setting is approx. min. 2 min.

4 Known Issues

4.1 Restart of USB Communication with windows 10/11

If the connection has been lost and the program shows not connected, with windows 10/11, it's necessary to restart the program to open the connection again.

	Maintenance	
10	<p>The 4 zinc anodes on top will prevent corrosion if the pump is used in salt water.</p> <p>Replace the anodes (order no. 28.102) once the material erodes.</p>	
11	<p> Caution</p> <p>The pressure compensation, 2, will compensate the overpressure during the deployment. It is important, to rinse the membrane A regularly with fresh water.</p> <p>To extend life of the membrane please don't expose it to direct sunlight for a long time.</p> <p>The motor and the pressure compensation contain Fluorinert FC-770 liquid. If you need to add extra liquid, please contact KC Denmark A/S for more information.</p>	
12	<p>The pump:</p> <p>It is very important to rinse the pump and the flow meter by pumping fresh water for a few minutes. Also, flush on the outer side of the pump.</p>	
13	<p>The flow meter:</p> <p>After use, you must clean the flow meter with fresh water and washing out any polluted or salt water from the gear counter assembly. Otherwise, a residue of salt or dirt can be built up and avoid a smooth running and poor performance.</p>	

14	<p>The net bag and collecting bottle: Give the plankton net bag proper care and maintenance. Do not let particulate matter dry on the net because it can significantly reduce size of mesh apertures and increase frequency of clogging. Wash the net and collection bucket thoroughly with freshwater after each use. Periodically clean with a lukewarm soap solution. Do not use alcohol for cleaning acrylic parts.</p> <p>It is also advisable to let the net air-dry after cleaning.</p> <p>Nylon net material is susceptible to deterioration from abrasion and sunlight. Protect it against unnecessary wear and store it in the dark.</p> <p>Repair small flakes or damages by lubricating a regular PVC glue on the fabric and cover the damaged area with a piece of plankton cloth.</p>	
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SubConn®

Handling instructions

Follow these instructions carefully to ensure correct use of your SubConn® connectors.

Handling

- Connectors must be greased with Molykote 44 Medium before every mating
- Always grease O-rings on BH, BCR and FCR connectors with Molykote 111
- Disconnect by pulling straight out, not at an angle
- Do not pull on the cable and avoid sharp bends at cable entry
- When using a bulkhead connector, ensure that there are no angular loads
- Make sure to apply the recommended torque when tightening bulkhead nuts
- SubConn® connectors should not be exposed to extended periods of heat or direct sunlight. If a connector becomes very dry, it should be soaked in fresh water before use

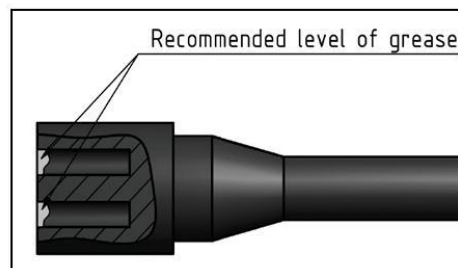
Scan to access
SubConn® greasing
and cleaning
instruction videos



Greasing products

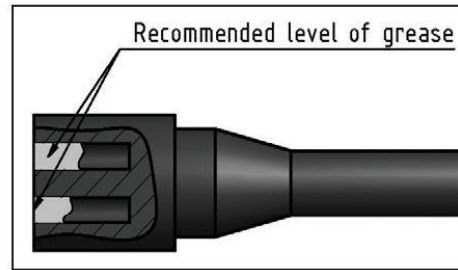
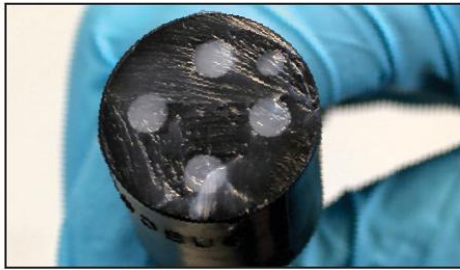


Greasing and mating above water (dry mate)



- Connectors must be greased with Molykote 44 Medium before every mating
- A layer of grease corresponding to a minimum of 1/10 of the socket depth should be applied to the female connector
- The inner edge of all sockets should be completely covered, and a thin transparent layer of grease left visible on the face of the connector
- After greasing, fully mate the male and female connector in order to secure optimal distribution of grease on all pins and in the sockets
- To confirm that grease has been sufficiently applied, de-mate and check for grease on every male pin. Then re-mate the connector

Greasing and mating under water (wet mate)



- Connectors must be greased with Molykote 44 Medium before every mating
- A layer of grease corresponding to approximately 1/3 of a socket depth should be applied to the female connector
- All sockets should be completely sealed, and a transparent layer of grease left visible on the face of the connector
- After greasing, fully mate the male and female connector and remove any excess grease from the connector joint

Cleaning products



- * General cleaning and removal of any accumulated sand or mud on a connector should be performed using spray based contact cleaner (isopropyl alcohol)
- New grease must be applied again prior to mating

Use of Loctite

- Always use Loctite 5910 to lock non-metallic (PEEK) connectors
- For locking metallic connectors, the use of Loctite 243 is recommended



COAX connector

- Only grease the rubber parts - do not grease coax pin and socket
- Do not mate under water. To be used with locking sleeves only

Bulkhead Connectors - Tightening force

Type	Material	Rec. Torque - Nm
3/8" - 24 UNF	Brass, aluminium	4.0
	Stainless steel, titanium	6.0
	PEEK	2.0
7/16" - 20 UNF	Brass, aluminium	10.0
	Stainless steel, titanium	14.0
	PEEK	4.2
1/2" - 20 UNF	Brass, aluminium	15.0
	Stainless steel, titanium	21.0
	PEEK	5.2
5/8" - 18 UNF	Brass, aluminium	29.0
	Stainless steel, titanium	41.0
	PEEK	10.0
3/4" - 16 UNF	Brass, aluminium	44.0
	Stainless steel, titanium	63.0
	PEEK	15.0
7/8" - 14 UNF	Brass, aluminium	60.0
	Stainless steel, titanium	80.0
	PEEK	20.0
1" - 14 UNF	Brass, aluminium	75.0
	Stainless steel, titanium	100.0
	PEEK	25.0

Recommended oil for pressure balanced systems

- MacArtney recommend DC-200/350 or PMX-200/350 in oil compensated systems

11-2018

Specifications

Max. depth:	100 m
Orientation:	Vertical or horizontal
Power supply, cylinder with Ni-MH batteries:	24 V DC
Motor:	800 rpm.
Capacity:	300 L/min., less if the net bag gets clogged
Operating time, fully charged battery:	Approx. 3 hours
Rechargeable battery with SubConn connector	
Digital flow meter with honeycomb	
Collecting bottle:	Capacity 1 L
Time lapse trigger:	Standard delivery comes with a laptop with preinstalled software
Net bag:	Filtration area: 3000 cm ² . Standard delivery has a mesh size of 140 µm, other sizes on request
Rack:	Made of AISI 316 stainless steel with a finish of electropolish
Height:	1620 mm
Footprint, incl. battery and steering fin:	500 x 510 mm
Weight:	46,5 kg

Rev.: June 28, 2023 - lkj

KC **Denmark A/S**

Research Equipment
Limnology • Oceanography • Hydrobiology

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