



sixsenso
• SENSE DIFFERENT •

SX-CON
SMART SAMPLER CONCENTRATOR
USER'S MANUAL



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1. Introduction

This manual presents all the information required for the installation, the operation and the maintenance of the SX-CON device.

The technical specifications regarding this product and the following information are liable to change without prior notice.





2. Precautions of use and recommendations

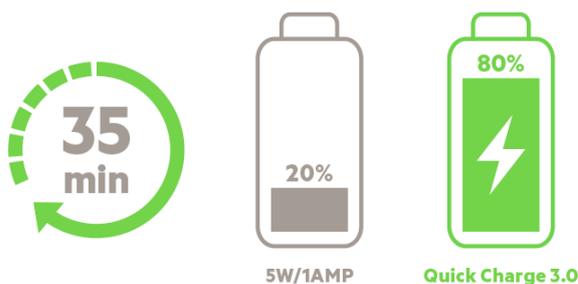
This user's manual must be read carefully before operating the SX-CON.

Sixsenso Technologies is not responsible for any damage or injury that may occur as a result of operating the instrument in a different way to that stated in this document.

If there is any doubt or concern about the safety of the equipment, please contact the manufacturer.

2.1. Rechargeable battery performance

The equipment is internally powered by a battery supplying 24V VDC at 10-24W/max.65W. This enables the capability of the SX-Con to operate outdoors with high autonomy.



The battery has an autonomy of 8 hours in continuous operation.

It is recommended to charge the battery by means of its external panel micro-USB panel connector after operations.

To recharge the battery, plug the micro-USB cable to the micro-USB panel connector of the SX-CON and the other side to 220VAC station. It can be charged from 20% to 80% in 25 minutes. It can be full charged overnight and be ready for next day operations at full battery.

2.2. Rechargeable battery warning

Although this equipment is 24 VDC powered integrated into an IP65 enclosure, which enable complete isolation from external liquids and powder, it is important for all users to be aware of the potential hazard of using liquids close to a power supply.

When the device is charging the battery, it is recommended to avoid performing water filtration and liquids manipulation.



It is also recommended for the daily use of the device to start operations once the battery is full charged and plug it for charging once the daily operations have finished.



Please screw the cap protection of the micro-USB to avoid put it in contact with water during operations.

If any liquids are spilled accidentally in the charger micro-USB panel connector, disconnect immediately the instrument from the main power supply (remove the power cord from the AC power supply) and clean the equipment and the surrounding area.

Do not reconnect the equipment until it has been fully inspected.

2.3. Safety instructions

Please don't drop or immerse in water to prevent damage to the device.

Do not expose to high temperatures or flammable gas.

Do not remove the housing.

Do not bypass contacts as this may cause short-circuits damaging the device.

2.4. Risk of finger trapping



A risk of finger trapping in the suitcase lid exists if it is not properly operated. Make sure that the device is in a flat surface when the user is operating it.



2.5. Warranty

Sixsenso Technologies certifies that this product is free of defects at the time of shipment.

Please contact Sixsenso or distributor with any malfunction or defect at the earliest.

This warranty is limited to a period of one (1) year and it does not apply to the following parts: tubes and filters (which are consumables) and the battery.

The manufacturer is not liable for personal injury or property damage due to improper use.

Product modifications, repair by unauthorised personnel or improper use (the equipment has not been installed, operated or maintained according to the instructions described in this user manual) will void the warranty.

2.6. Manufacturer information

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2.7. Technical support

First, read this user manual very carefully. If you cannot solve the problem after having used this manual, please contact the nearest distributor's office or Sixsenso technologies' Customer Support located in Spain (see the address above).



3. Description of the SX-CON

3.1. Product overview

Sixsenso aims to change how microbiological water quality is monitored worldwide bringing the lab to the origin of water contamination by rapid microorganism monitoring tools.

SX-CON is a smart sampler and microorganism concentrator module which can rapidly filtrate large volume of water samples (in the order of litres) and elute them in a few millilitres reservoir, providing an increasing concentration factor of some orders of magnitude, depending on the application. It is designed to be portable (with large battery autonomy) and robust to use in the most challenging outdoors' environmental conditions or simply operating in the laboratory.

Combine SX-CON with several microbiological assessment techniques and methods in order to decrease time to result, increase their representativeness and enhance their sensitivity,

including, Lateral Flow Device (LFD) assays, Defined Substrate Technology (DST) based assays, Nanoparticles-based assays, Antigen-based assays, rRNA-based assays, culture and PCR assays. It has been proven to be suitable for virus, gram negative and gram positive bacteria, and phytoplankton concentration, in fresh water, brackish water and sea water. It has direct application in bathing and recreational waters, ports and harbours water, ballast water IMO-D2 regulation compliance, waste water, regenerated waters, irrigation waters, industrial water and beverage quality control.

SX-CON provides large volume water filtration through highly efficient cell trap filters to increase the representativity of microbiological analysis. Large volume processing followed by an efficient elution procedure provides very high concentrator factors.

Enhance your microbiological assessment by a rapid on-site pre-concentration step and avoid long time-consuming replication or pre-enrichment steps by a rapid on-site concentrator module.



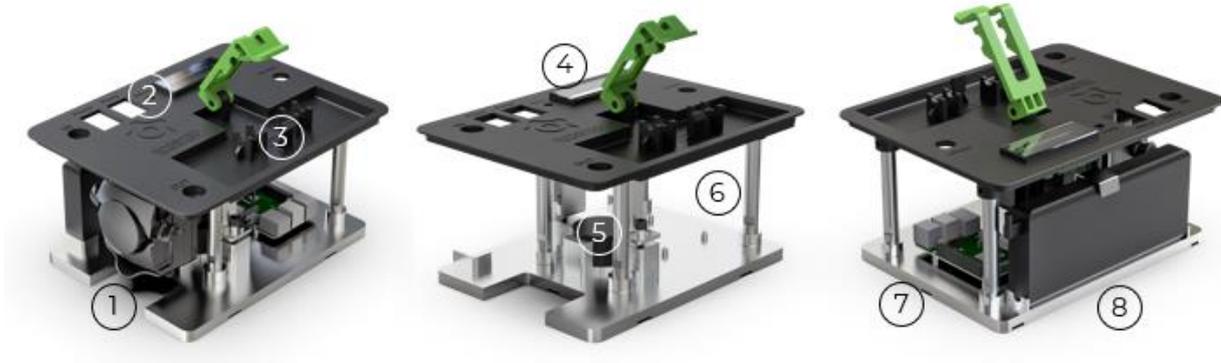
In summary, SX-CON samples and filtrates large volumes of water and elute them in a few mils and on-site to easily increase the assay's sensitivity and sample representativeness reaching target microorganism concentration levels required for your application in a few minutes.

3.2. Specifications

Peristaltic pump performance Power consumption Flow rate Internal Diameter (ID) tubing	<i>10-24 W.</i> <i>200 ml/min @100 rpm.</i> <i>From ID 2.4 to 8.0 mm (ID 8mm by default)</i>
Power characteristics Internal rechargeable battery Charger power requirement Quick Charger 3.0  Capacity Autonomy Micro-USB Input NB DC socket Output	<i>Lithium ion battery</i> <i>100-230V, <2A, 50-60Hz</i> <i>From 20% to 80% charge in 35 minutes</i> <i>20100mAh (3,7V) / 73Wh</i> <i>8 hours - continuous operation</i> <i>5-12 VDC max 18W for battery charging</i> <i>24 VDC/10-24W. (65W at max)</i>
Operating Conditions Utilisation Ambient Temperature Range Max Temp rise inside motor Max Relative Humidity	<i>Indoor and Outdoor</i> <i>0º to 45ºC</i> <i>80º</i> <i>90%</i>
Dimensions and mass Dimensions Mass	<i>26,5 x 24,5 x 17 cm</i> <i>4,9 Kg</i>
IP rating lid closed/open	<i>IP68 / IP65</i>



3.3. Internal features



1	<i>Integrated 24 W peristaltic pump</i>
2	<i>LED status signal</i>
3	<i>Celltrap filter holder</i>
4	<i>LCD Display 2x16 pixels</i>
5	<i>Internal vibration absorber</i>
6	<i>Internal aluminium pillars</i>
7	<i>Anti-condensation drainage holes</i>
8	<i>Battery power bank with external Micro-USB battery charger</i>



3.4. SX-CON kit - Disposables

SX-CON uses sterilized disposables to avoid cross contamination between processed samples.

Multi-use of disposables could be suitable for evaluation purposes.

It is not recommendable to reuse the disposables of the SX-CON kit. However, the user can decide to reuse some of them in some controlled environment, for example the syringes and valves which are less exposed to retain microorganisms than filters.

	<p><i>3x Luer lock 3-port valves</i></p>
	<p><i>1x tubing kit</i></p>
	<p><i>2x Luer lock 5 ml syringes (one with elution buffer)</i></p>
	<p><i>1x Celltrap filter (Hollow fibre membrane)</i></p>

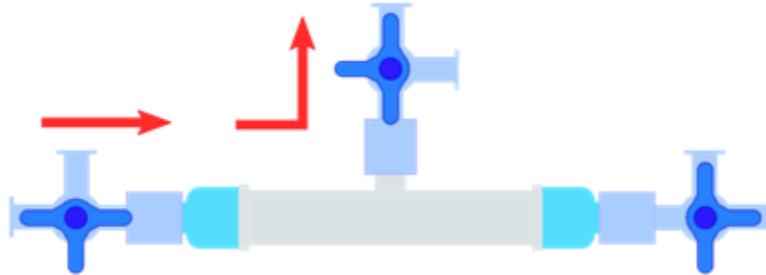
4. Instructions for use

The SX-CON operates in two sequential modes 1) Filtration (Sampling) and 2) Elution, corresponding to the two processes for trapping and recover target microorganisms from water sample.

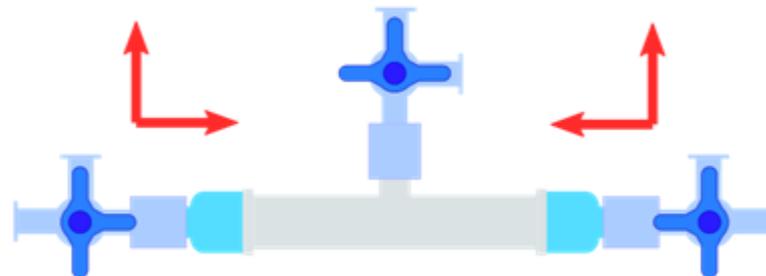
Configure the 3-port valves in the position accordingly to the process to perform as it is shown in next figure (Red lines indicates the sample flow) :



Configuration 1: Filtration



Configuration 2: Elution



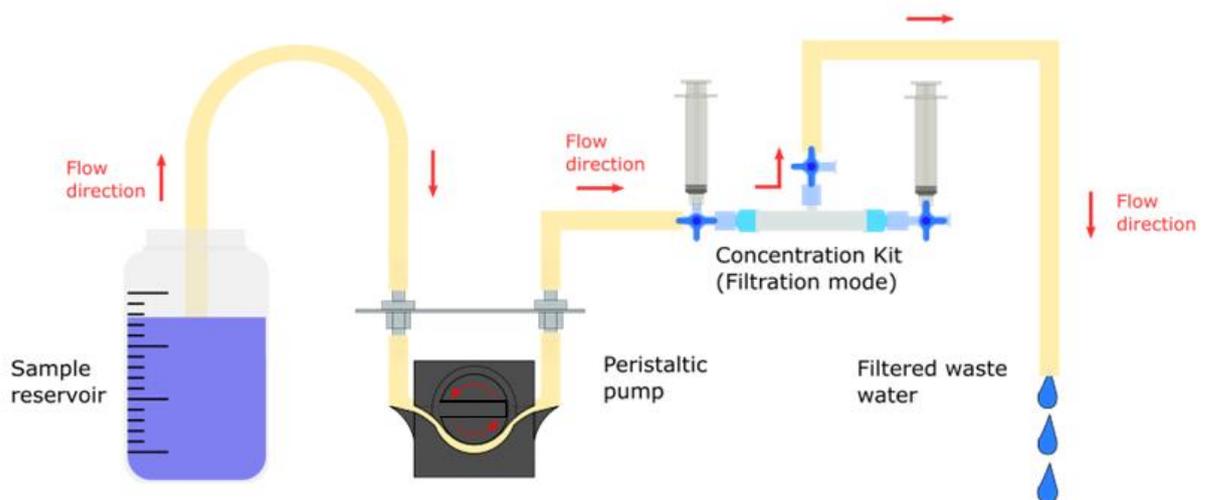


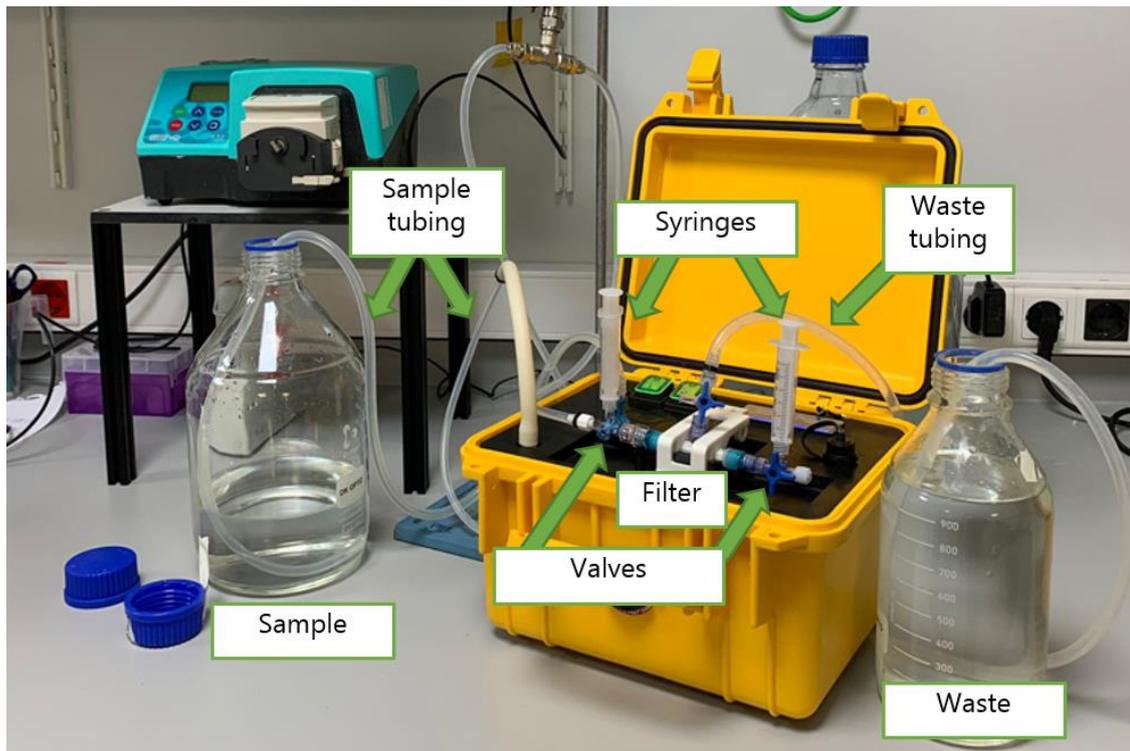
4.1. Filtration step: Trapping microorganisms

- Switch on the Power button.

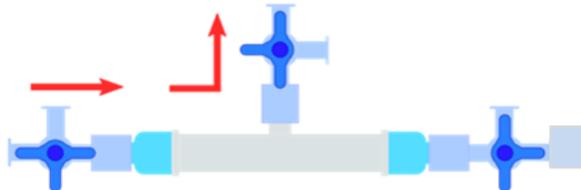
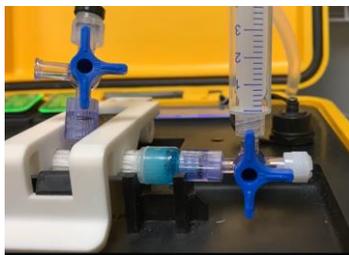


- Plug the Concentration kit in the SX-CON, including filters, syringes and valves, and connect the tubing from the SX-CON to the sample and to the waste as it is shown in the following diagram and picture:





- Set up the valves in "Filtration Mode".



Warning: An incorrect positioning of the valves when activating the pump can close the sample flow, increasing the pressure in the tube until it violently comes out of its connector splashing water.

- Switch on the Pump button to start sampling and filtration.



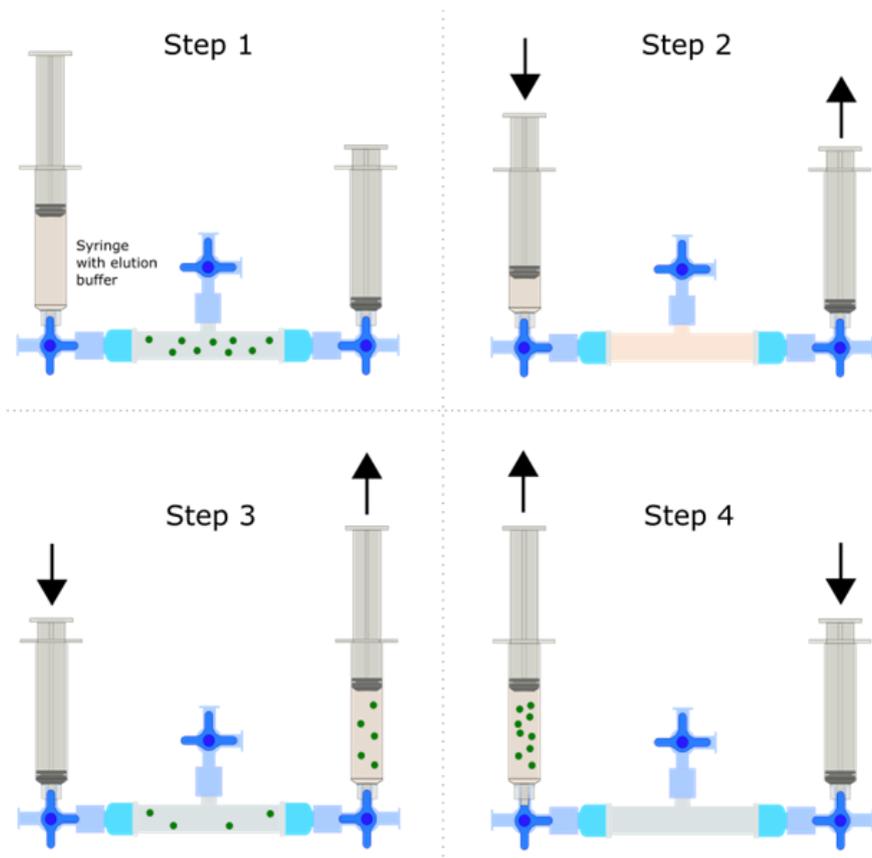
- Switch off the filtration button when all sample has been filtered.



4.2. Elution step: Microorganism recovery

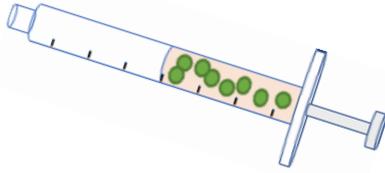
Once the sample is filtrated, the elution step recovers the microorganism from the filter for testing.

- Set up the valves in “Elution Mode”.
- Two syringes are used to pass 5 mL of elution buffer back and forth the filter membrane from one syringe to the other.
- *N.B. 5mL is optimum, volume should be optimised for end user application. Buffers, Filters are compatible with all common buffers, choice used should be selected for end user need, call Sixsenso for advice if in doubt.*





- **The concentrated sample is ready for testing.**



Concentrated sample containing target microorganisms. The concentrator factor C-Factor obtained would depend mostly on the filtered sample volume which can range from x10 to x1000 filtering sampling volumes from 100mls to 3 liters.

5. Maintenance

5.1. Maintenance of the tubes and connectors

If necessary, the tubes can be cleaned by circulating a cleaning solution (bleach or other). The tubes then need to be rinsed with clear water.

It is recommended to use always the same tubing models, same part numbers. The use of different internal diameter tubing can affect in the flow rate and pressure of the system and minimize its performance.

The internal tubes of both the peristaltic pumps are wearing parts and need to be replaced when they are worn out by an authorized personnel.

The part numbers of the tubes are listed in the table below:

- **Tubing of internal SX-CON's pump.**
Part Number: 25000.124 Pharmaline ID Ø 8.0 mm x 2.4 mm wall x single length
- **Tubing connecting SX-CON's OUTPUT with Filter:**
Part Number: 25000.130 – 25K Innovaprene ID Ø 6.4 mm x 2.4 mm wall x single length



5.1. Maintenance of the battery

The internal battery must be charged for 4 hours, every 4 months, even if the appliance is not used. If the battery is not charged on a regular basis, irreversible damages may occur.



6. Elimination



The equipment is covered by separate collection according to the directive on waste electrical and electronic equipment (WEEE) 2012/19/UE.

7. Applications

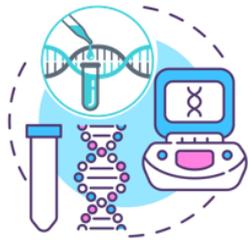
It has direct application in bathing and recreational waters, ports and harbours water, ballast water IMO-D2 regulation compliance, waste water, regenerated waters, irrigation waters, industrial water and beverage quality control.





8. Assay compatibility

Perform an **onsite smart sampling concentrating** your water sample before use it in your microbiological assessment assay.



PCR assays

rRNA probes based assays

NASBA based assays



Dip strip assays

Lateral Flow Devices (LFD)

SPR-AuNP
Nanoparticles-based assays



Culture assays

Antibody-based assays

Defined Substrate
Technology based assays

Decrease **time to result**, increase **representativeness** and enhance the **sensitivity** of your assay.

