SENSIRION

Handling Instructions

For SEN6x Environmental Sensor Node

The Sensirion SEN6x environmental node is a combo sensor that is based on a PM2.5 sensor, containing one or a combination of Sensirion SHT4x humidity and temperature sensor, a Sensirion SGP4x VOC sensor, a Sensirion SCD4x CO_2 sensor, a Sensirion SFA4x Formaldehyde sensor, and a Sensirion STCC4 compact CO_2 sensor. To take advantage of the outstanding performance of the SEN6x, some precautions must be taken during storage, assembly, and packaging. Therefore, please read the following instructions carefully - preferably during design-in phase and before production release of the respective device. Special attention is required regarding the exposure to volatile organic compounds, i.e., high concentration, and long exposure time to respective gases shall be avoided. Such conditions are known to occur in manufacturing environment, and/or during storage. Therefore, proper handling and choice of materials are crucial.

Key Instructions

- Handle with care to prevent mechanical and electrostatic damage.
- Avoid exposure to cleaning agents, solvents, acids, bases, or corrosives.
- Store in original, sealed packaging in a well-ventilated environment.
- Do not use polyethylene antistatic bags.
- Avoid using unqualified adhesives and encapsulants for assembly. If alternative materials must be used, test them thoroughly.

This document is applicable to all Sensirion SEN6x environmental sensor nodes.

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1 Handling

SEN6x sensors shall be handled with care. If the product is dropped on a hard surface from a height >1m the part must be discarded and replaced by a new one.

The inherent design of this component causes it to be sensitive to electrostatic discharge (ESD). To prevent ESD-induced damage and/or degradation, take customary and statutory ESD precautions when handling this product.

Special care shall be taken when handling the SEN6x with respect to the inlet filter present at the second (round) inlet. Any mechanical damage to the inlet filter will irreversibly deteriorate the durability of the SEN6x environmental node and will significantly reduce its lifetime.

Do not insert any external parts into any of the inlet or outlet openings at any stage of the handling, or storage.

2 Exposure to Chemicals

The component sensors of SEN6x are highly accurate environmental sensors and as such they are not ordinary electronic components. The openings in the SEN6x housing expose these environmental sensors to the environment and make them susceptible to pollutants. While exposing sensors to ambient environment is not critical, pollutants are known to occur in manufacturing environments and during storage.

The SEN6x shall not get in close contact with volatile chemicals such as solvents or other organic compounds. Especially high concentration, and long exposure must be avoided. Ketenes, Acetone, Ethanol, Isopropyl Alcohol, Toluene, etc. are known to cause drift of the humidity, VOC reading, and can cause damage on the SCD4x, STCC4 and SFA4x housings – irreversibly in most of the cases. Please note that such chemicals are integral parts of epoxies, glues, adhesives, etc. and outgas during baking and curing. These chemicals are also added as plasticisers into plastics, used for packaging materials, and do out-gas for some period.

Acids and bases may affect the sensors irreversibly and shall be avoided: HCl, H_2SO_4, HNO_3, NH_3, acetic acid, etc. Also oxidizing gases such as ozone (O_3), nitrogen dioxide (NO_2), and H_2O_2 in high concentration should be avoided. Organic nitrogen compounds such as amines (e.g. ethylenediamine, formamide, *etc.*) in the presence of humidity can irreversibly contaminate the sensors. Such substances can outgas from materials used for PCB and device design, for instance, conformal coatings, plastics, and rubber sealings. Please note that above examples represent an incomplete list of harmful substances.

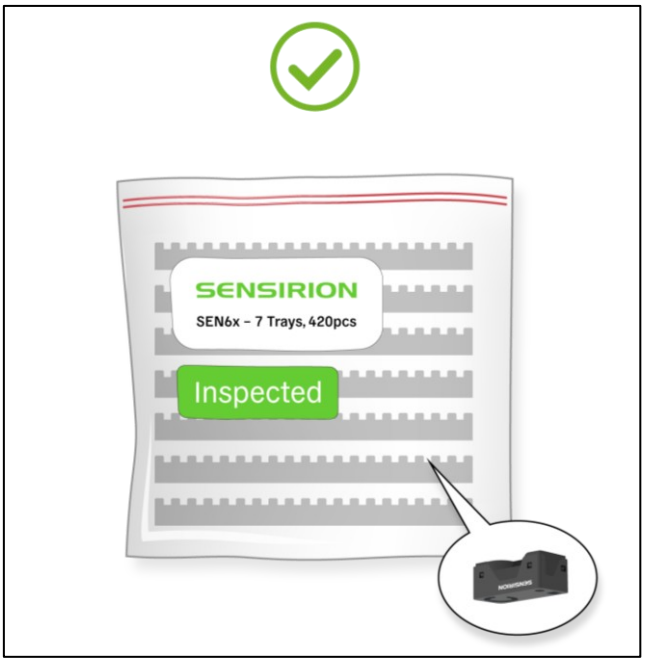
The sensor shall not get in contact with cleaning agents. Applying cleaning agents to the sensor may lead to drift of the humidity and VOC readings, or cause irreversible mechanical damage to the component sensors. Avoid strong air blasts from an air-pistol, as they can cause drift in the readings or complete breakdown of the sensors.

Ensure good ventilation (fresh air supply) to avoid high concentrations of volatile chemicals (solvents, e.g. ethanol, isopropanol, methanol, acetone, cleaning solutions, detergents…).

3 Packaging and Storage

Prior to assembly or use of the sensors it is strongly recommended to store the modules in the original, sealed packaging. In particular, it is recommended not to use any adhesive or adhesive tapes to reseal the sensor packaging after opening.

During storage, SEN6x sensors shall be oriented such that the air inlet and outlet are not facing up (to avoid particles / fibers entering the modules during storage). If the environmental nodes have been removed from their original ESD bag, they should be stored in antistatic, shielded ESD bags at normal atmospheric pressure (i.e., the bags should not be evacuated). This will help protect the sensors from electrostatic discharge and other external influences.



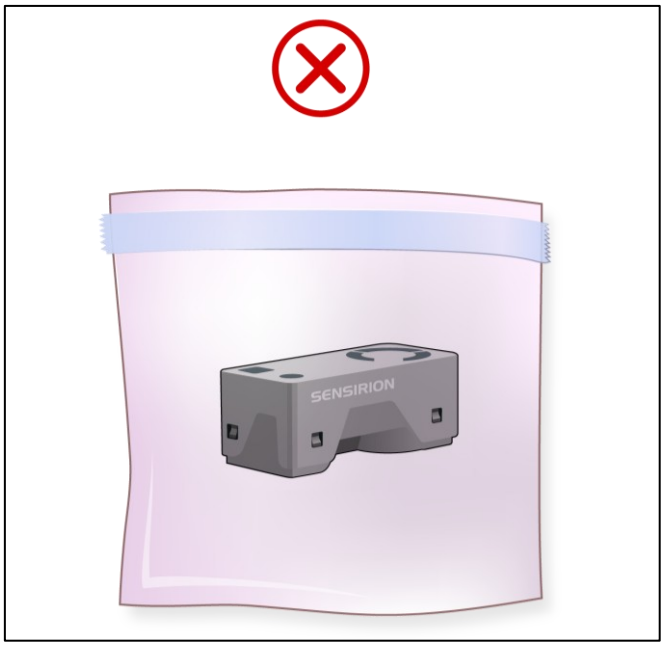
Instruction 1. Store SEN6x's in the original, sealed ESD bag. Place any additional stickers only on the exterior of the ESD bag. Within the original packaging, sensors are positioned so that the air inlet and outlet do not face upward.

Be careful about stickers present inside the packaging (e.g. on the housing of the device). Sticker size should be kept to a minimum, and the sticky side shall fully adhere onto a surface. Unless necessary, stickers should be placed only on the outside of the ESD bag.

The sensors shall always be stored in a well-ventilated environment, with temperature and relative humidity within the limits specified in the respective datasheet.

SEN6x Sensors as well as products containing SEN6x sensors shall not be packaged in outgassing plastic materials which could cause sensor pollution. Besides metal-in antistatic shielded ESD bags, paper or cardboards-based packaging, deep drawn plastic trays (PE, PET, PP) may be considered. Do not use antistatic polyethylene bags (light blue, pink or rose color); be very careful with bubble foils and foams, as they may contaminate the sensors.

Please note that many packaging materials may be provided with additives (plasticizers) which may have a polluting effect on the sensors. Generally speaking, if a material emits a strong odor, you should not use it. Additives may also be present in materials which are listed for recommended use above.



Instruction 2. Do not use polyethylene antistatic bags (light blue, pink or rose color). Do not use adhesive tapes inside packaging.

For high safety, device housing and shipment packaging must be qualified. Such a qualification test may include exposure of the final device with sensor in its shipment packaging to temperature ≥55°C for at least 168 hours. If shipping or storage conditions are expected to be harsh, the qualification test conditions for the packing material must be customized. The sensor reading then shall show no deviation against a reference compared to same measurements before the exposure.

4 Assembly

Ensure that recommendations in this application note are equally considered during repair and rework of assemblies containing sensors.

Regarding adhesives and encapsulants the material in the following tables may be used – according to respective datasheets, applied and fully cured in well-ventilated environment (fresh air supply). Materials and brands not listed in the following tables may be harmful and shall be tested carefully before applying.

Epoxy Adhesives	
Manufacturer	Product
EPO-TEK	H70E/S

Other Recommended Materials	
Manufacturer	Product
	Teflon
	PEEK
	Polycarbonate (PC)
	FR4 PCB
	Viton seals (after thermal outgassing)

Hot melts may absorb water and thus may have an impact on the humidity response time of the sensor in the device. Therefore, hot melt shall be applied sparingly.

High or low temperatures (specified in the datasheet) during the assembly process shall be avoided to prevent damage to the environmental node.

The sensor shall be mounted into the device, if possible, after all materials that are used in the assembly process have completely cured, outgassed or dried out. Otherwise ensure good ventilation (fresh air supply) in curing ovens and assembly lines.

Be particularly careful when using strong cleaning agents (e.g., detergents, alcohols, brominated or fluorinated solvents). Cleaning any part of a product might lead to a high concentration of cleaning agents on the sensor. Please remove any sensors or devices containing sensors before cleaning the production area and tools. Ensure good ventilation (fresh air supply) and that any solvents have evaporated before resuming production.

5 Application in Extreme Environments

For exposure to extreme conditions with regards to humidity and temperature please consult the datasheet of the product. Please make sure that exposure time of the sensor to the maximum range of operating conditions is limited. Limits are provided in the corresponding datasheet. Exposure to volatile organic compounds at high concentration and long exposure time is critical not only in assembly but also in the field. Such applications need to be carefully tested and qualified.

Exposure to acids (pH < 6) or bases (pH > 8) may be critical, too. Critical concentrations are typically concentrations high enough to attack polymers. Etching substances such as H_2O_2, NH_3, etc. at high concentration are also critical to the sensor. Exposure to organic nitrogen compounds such as amines can lead to irreversible drift in the sensor even at small concentrations in the ppm range and must therefore be avoided.

In general, application of Sensirion SEN6x sensors to harsh environments must be carefully tested and qualified by the user.

6 Performance Tests on SEN68

If performance tests need to be done on the SEN68 (which includes the formaldehyde sensor SFA40), the user is advised to unpack the SEN68 and wait for five days before testing, to avoid performance discrepancies of the formaldehyde measurements caused by storage effects. This step is necessary because the formaldehyde sensor is particularly sensitive to such effects. During the five days, the unpacked SEN68 should be stored in well-ventilated conditions (fresh air supply), following the specifications in the corresponding datasheet.

7 Disclaimer

The above given restrictions, recommendations, materials, etc. do not cover all possible cases and items.

The material recommendations are given regarding pollution of SHT, SGP, SCD, SFA, STCC sensors which are part of SEN6x and assume optimal processing for avoiding VOC in process – the materials were not tested regarding other properties like reliability, performance, usability, or mechanical properties. The material recommendations have been compiled with our best knowledge at the time of writing. Manufacturers may change the compounds without notice, which can lead to reduced Sensor performance due to outgassing.

This document is not to be considered complete and is subject to change without prior notice.

8 Revision History

Date	Version	Pages	Changes
09.2025	0.9	all	Pre-Release
01.2026	1.0	all	Initial Release

Important Notices

Warning, Personal Injury

Do not use this product as safety or emergency stop devices or in any other application where failure of the product could result in personal injury (including death). Do not use this product for applications other than its intended and authorized use. Before installing, handling, using or servicing this product, please consult the data sheet and application notes. Failure to comply with these instructions could result in death or serious injury.

If the Buyer purchases or uses SENSIRION products for any unintended or unauthorized application, Buyer shall defend, indemnify and hold harmless SENSIRION and its officers, employees, subsidiaries, affiliates and distributors against all claims, costs, damages and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if SENSIRION is allegedly negligent with respect to the design or the manufacture of the product.

ESD Precautions

The inherent design of this component causes it to be sensitive to electrostatic discharge (ESD). To prevent ESD-induced damage and/or degradation, take customary and statutory ESD precautions when handling this product. See application note "ESD, Latchup and EMC" for more information.

Warranty

SENSIRION solely warrants to the original purchaser of this product for a period of 12 months (one year) from the date of delivery that this product is of the quality, material and workmanship defined in SENSIRION's published specifications of the product. Within such period, if proven to be defective, SENSIRION shall as sole and exclusive remedy, in SENSIRION's discretion, repair this product or send a replacement product, free of charge to the Buyer, provided that:

- notice in writing describing the defects shall be given to SENSIRION within fourteen (14) days after their appearance;
- such defects shall be found, to SENSIRION's reasonable satisfaction, to have arisen from SENSIRION's faulty material or workmanship;
- the defective product shall be returned to SENSIRION's factory at the Buyer's expense; and
- the warranty period for any repaired or replaced product shall be limited to the unexpired portion of the original period.

The Buyer shall at its own expense arrange for any dismantling and reassembly that is necessary to repair or replace the defective product. This warranty does not apply to any product which has not been installed or used within the specifications recommended by SENSIRION. EXCEPT FOR THE WARRANTIES EXPRESSLY SET FORTH HEREIN, SENSIRION MAKES NO WARRANTIES, EITHER EXPRESS OR IMPLIED, WITH RESPECT TO THE PRODUCT. ANY AND ALL WARRANTIES, INCLUDING WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSLY EXCLUDED AND DECLINED.

SENSIRION is only liable for defects of this product arising under the conditions of operation provided for in the data sheet and proper use of the goods. SENSIRION explicitly disclaims all warranties, express or implied, if the goods are operated or stored not in accordance with the technical specifications.

SENSIRION does not assume any liability arising out of any application or use of any product or circuit and specifically disclaims any and all liability, including without limitation indirect, consequential, and incidental damages, and loss of profit. No obligation or liability shall arise or grow out of SENSIRION's rendering of technical advice, consulting, or implementation instructions or guidelines. All operating parameters, including without limitation recommended parameters, must be validated for each Buyer's applications by Buyer's technical experts. Recommended parameters can and do vary in different applications.

SENSIRION reserves the right, without further notice, (i) to change the product specifications and/or the information in this document and (ii) to improve reliability, functions and design of this product.

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