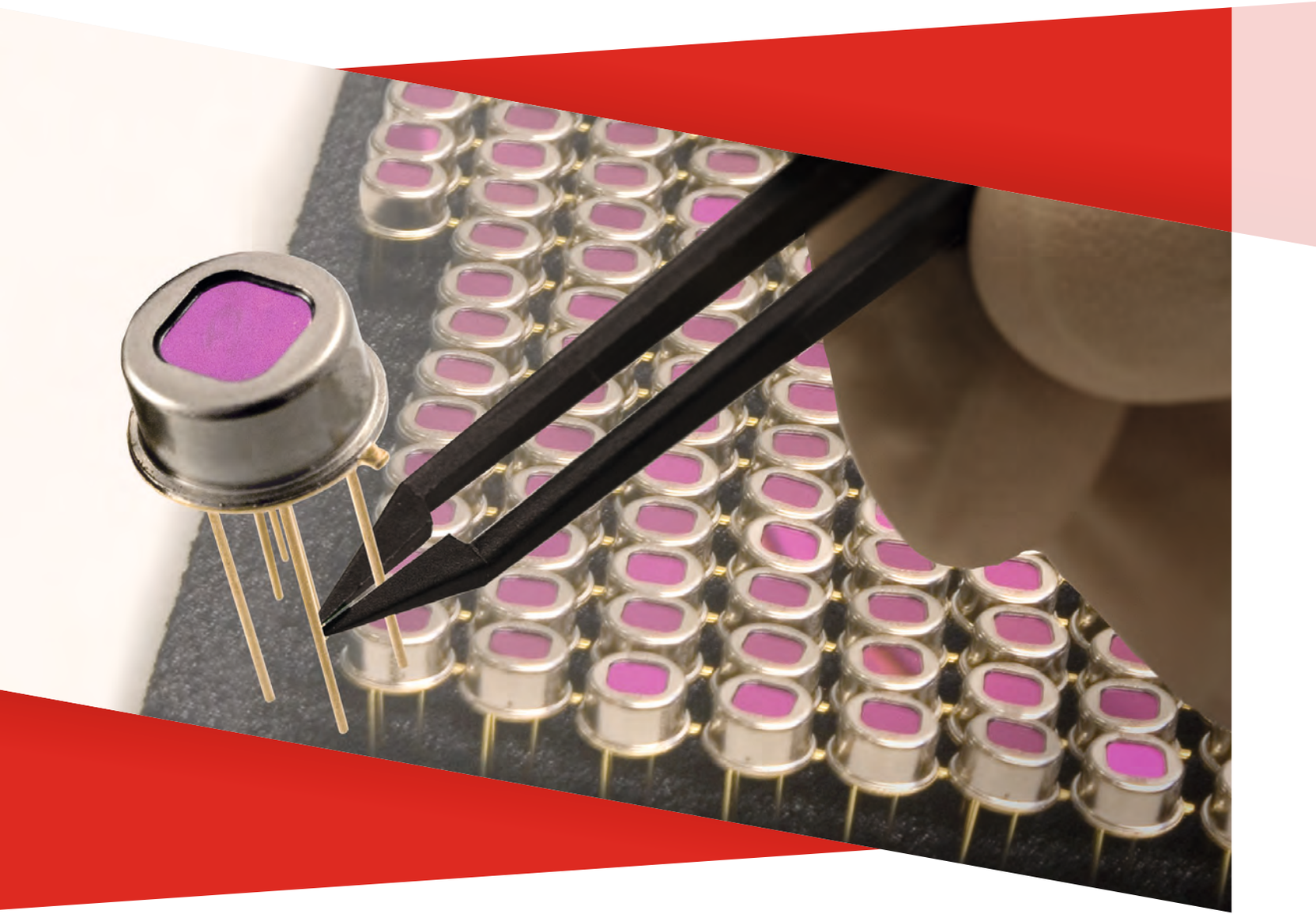
Handling Recommendations

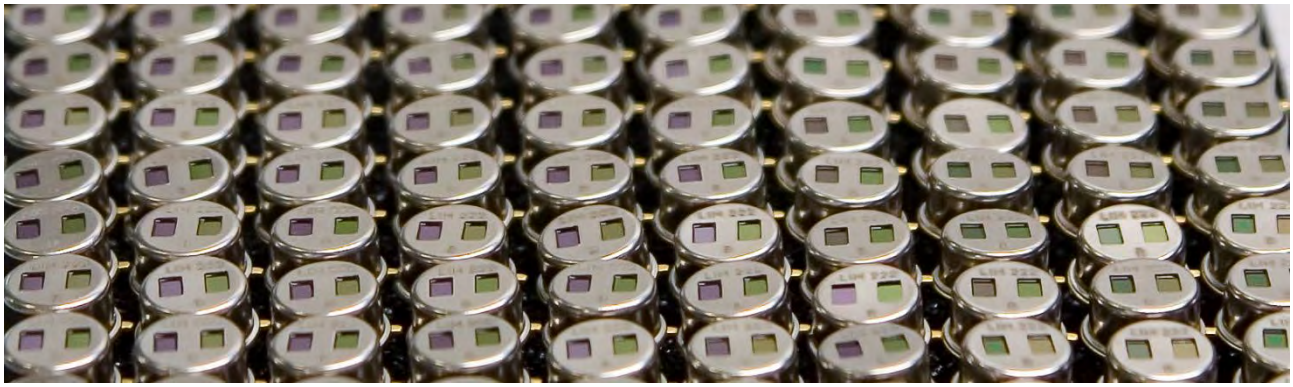
Safe transport, storage and processing of sensitive infrared detectors



Handling Recommendations

Please read before removing the detectors from the box.

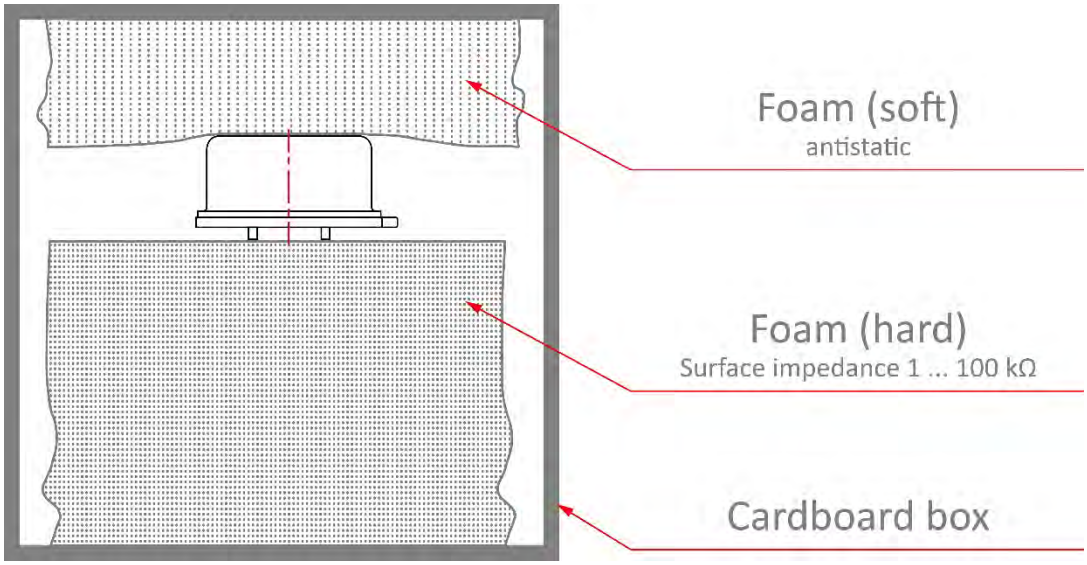
4.1 Transportation and Storage, ESD[5] Protection



Our products comply with the normal requirements for electronic components regarding transportation and storage. Protect the components especially against exceptional mechanical loads or harmful, particularly corrosive gases or vapors. The storage temperature limits specified in the data sheets must not be exceeded.

High humidity damages electronic components. For this reason, our products should not be exposed to any extreme humidity, particularly in combination with high temperatures. Store the detectors dry and at normal room temperature. Provided that our products are delivered in moisture protected packaging, they should not get damaged.

InfraTec detectors are shipped in ESD-safe packing, which contains two types of foam:



This packing is used for classic ESD protection. Otherwise, it also protects against inherent risks of pyroelectric detectors. A pyroelectric sensor element can generate a voltage of 1 kV if exposed to a temperature difference of some 10 K. In the case of an open connection configuration, which is often used for current mode detectors, high

[5] Electrostatic discharge

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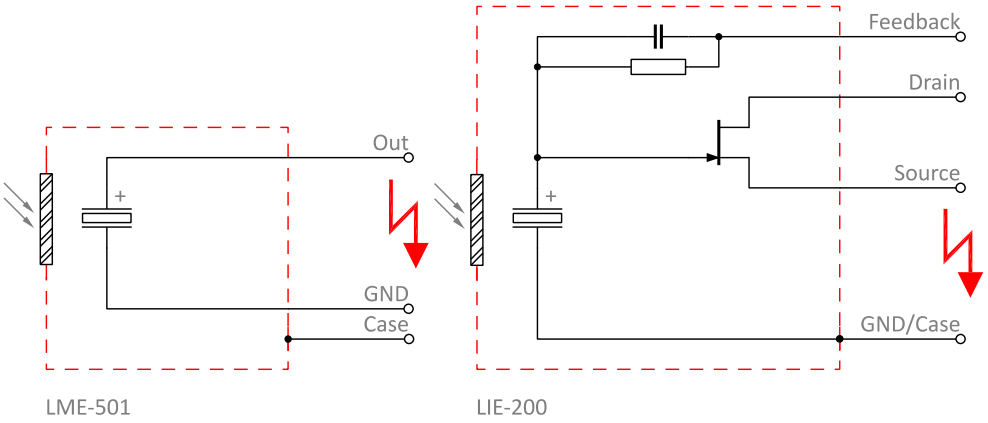
voltages might be present between the pins. Both the internally resulting charges and electrostatic discharges caused by improper handling could destroy the detector as well as the associated electronics. The conductive foam ensures gentle discharge of the charges.



Furthermore, we recommend:

- Transporting and storing the detectors in the original box until processing
- If this is not possible, short-circuit all pins for transportation and storage (< 10 MΩ)
- Process detectors in an ESD-protected production area (EPA = ESD protected area)
- Avoid rapid temperature changes > |1 K/s| of the detectors that have not yet been connected

4.2 Processing

InfraTec detectors are generally RoHS compliant wired components that are mounted using standard soldering methods. Therefore, only limits for lead-free soldering mounting methods are given below. These also apply, of course, to methods with lead-based solders, but need not be outbid at all however, because of the generally lower process temperatures. Otherwise, the temperature profile should comply with the specifications of the solder manufacturer. In the absence of such specifications, you can use relevant standards as a guideline for the process development, e.g. DIN EN 61760-1. We normally recommend using no-clean fluxes.

4.2.1 Hand Soldering

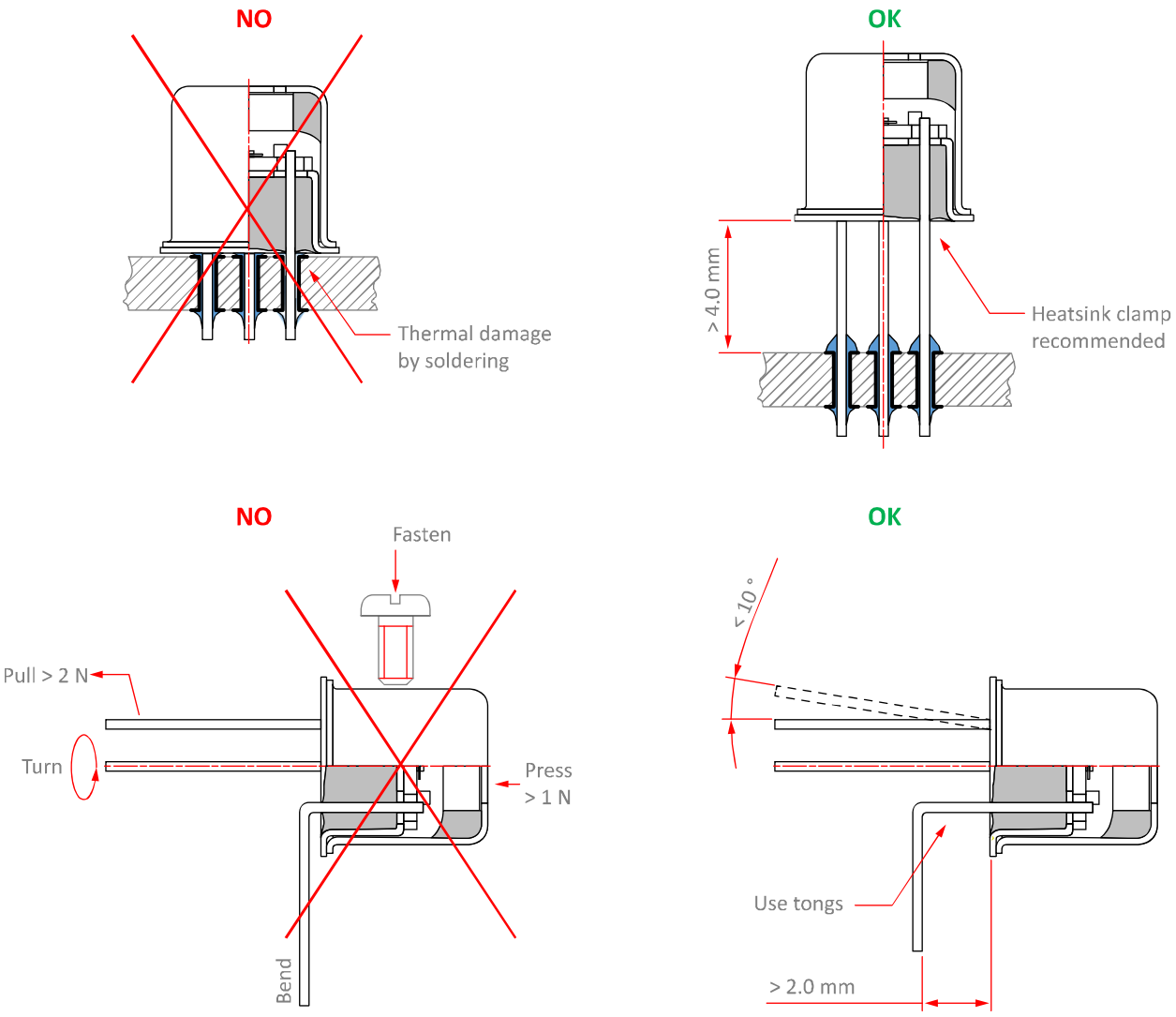
This method is used most frequently with our detectors since it involves low investment costs and appears to be easy to implement. The risks are often underestimated here.

For a safe process configuration we recommend:

- Deploying qualified and specially trained personnel
- Using temperature-controlled soldering stations
- Using solder wire with no-clean flux
- Tension-free fixing of components before soldering
- Not touching the housing of the component with the soldering tip during soldering
- Dissipating heat on the connections using flat nose pliers before the component
- Depending on the soldering tip temperature T and the distance between the soldered joint J and housing, the following maximum soldering times in s should not be exceeded under any circumstances:

L / mm	**2**	**5**	**8**
T = 245 °C	6	10	14
T = 265 °C	5	8	11
T = 300 °C	3	5	7

During the soldering assembly the greatest risks for the detector are mechanical stress and overheating. The detector must never be soldered into the printed circuit board (PCB) without any gap. The coefficient of thermal expansion is 10 times higher normal to the PCB surface than along the surface. Thus, connection pins and glass feedthroughs can be destroyed by temperature changes. We recommend a minimum distance of 4 mm between the bottom of the detector and the PCB. Connection pins should only be bent with great care to avoid any damage to the glass feedthroughs. Try to avoid bending at all if possible. The sensitive detector window must not be subjected to mechanical loads.



4.2.2 Wave Soldering

Only wave soldering, particularly double waving soldering, is suitable among the machine soldering methods. While doing so, the total contact time must not exceed 10 s, and 5 s per wave, at a maximum soldering temperature of 260 °C. The advantage compared with hand soldering is the greater process reliability by defined conditions and by minimizing operator influence.

4.2.3 Assembly with Conductive Adhesives

InfraTec detectors can also be assembled with conductive adhesives in a manual assembly process. Silver-based epoxy resins have been tried out. For this purpose, the contacts of the component as well as the pads of the circuit board must be designed for this assembly technology. Thus, tin-plated circuit boards are not suitable, whereas gold-plated connections are particularly suitable for conductive adhesion. The pins of our detectors are gold-plated and thus enable this specific assembly technique. The curing temperatures necessary for the adhesive present no problem for our products up to 120 °C at the usual curing times, provided that the instructions on temperature changes outlined above are followed.

4.2.4 Cleaning

Our detectors are packed in a clean state under cleanroom conditions. Therefore, cleaning before processing is neither necessary nor recommended. Processing should be done under the cleanest conditions possible. This includes, for example, clean workplaces and room air as well as the use of suitable gloves or fingerstalls. Fingerprints consist mainly of fats and organic acids. The soldering process should be arranged in such a way that the component does not have to be cleaned afterwards. Therefore, use no-clean flux.

If, in exceptional cases, it is necessary to clean the optical windows, you should first check what kind of contamination it is. You can normally remove loosely sticking particles by blowing them off with nitrogen (max. 2 bar). Compressed air is not suitable for this, since it contains oil in most cases. Particles that stick more firmly can be removed by carefully wiping with a Q-Tip ("lint-free cotton stick"). When doing so, no mechanical pressure should be exerted on the window. If this is not sufficient, the Q-Tip can be moistened with a 1:1 mixture consisting of isopropyl and deionized water or with isopropyl, and then the procedure should be repeated. The Q-Tip must be resistant to isopropyl. When doing this, wipe in circular movements from inside to outside. Afterwards, the Q-Tip must be disposed of, especially if the adhesive edge of the cap was touched. Repeat this procedure with a dry Q-Tip.

In some cases, the detectors are mounted with certain salt crystal windows that greatly reduce the cleanability. For instance, windows made of KBr or CsI are soluble in water. In contrast, windows made of KRS-5 are soluble in organic polar solvents and have low mechanical resistance. Materials such as CsI, ZnSe and KRS-5 are rated as hazardous substances and thus handling them comes with additional risks. Therefore, we strictly advise against cleaning these windows.

No cleaning procedure and cleaning agent may be used other than what is mentioned here.

Our experts will gladly answer your questions regarding handling.

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