

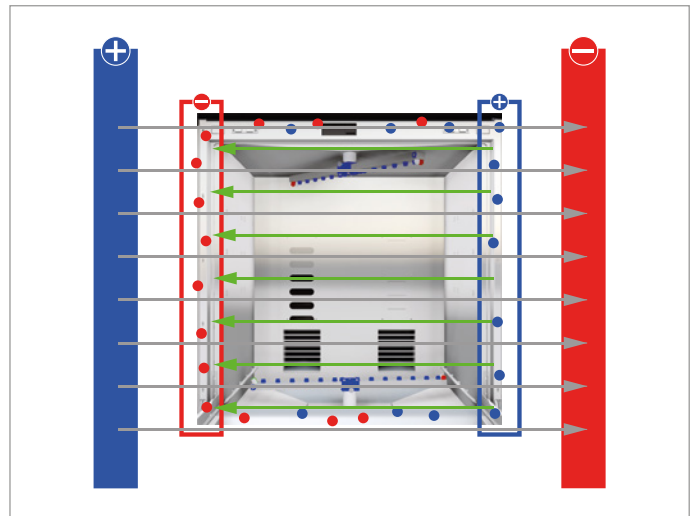


## ESD protection of the kolb cleaning systems

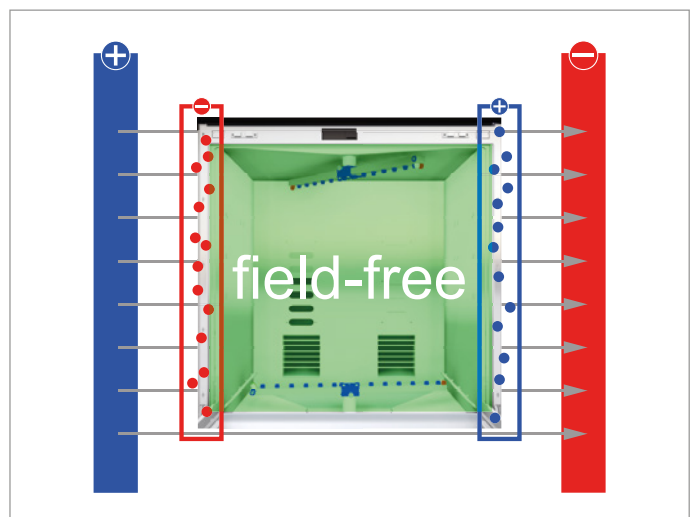
In all kolb PCBA cleaning systems, the cleaning good is placed in an ESD-safe manner as standard.

**Basic information on ESD:** Electrostatic discharge (ESD) can cause damage, especially to sensitive electronic components. Static charge can accumulate on surfaces of objects when there is an exchange of electrical charges between surfaces of two objects that touch, rub against, or are detached from each other, e.g. as is the case when foil is peeled off. One object is charged positively and the other negatively. People can be charged up to 35,000 volts, depending on the environmental conditions.

**The Faraday cage:** A shell of an electrical conductor (e.g. wire mesh or sheet metal) closed on all sides acts as an electrical shield against electrostatic discharges insofar as their contents do not come into contact with the shell itself (Faraday cage). If an electric field builds up between the positive pole and the negative pole, the negatively charged electrons of the shell migrate to the side of the positive pole. As a result, a charge shift occurs within the shell, which generates an electric field in the shell that acts in exactly the opposite direction to the external electric field (Fig. 1). As a result, the effects of the fields in the envelope cancel each other out exactly, and the interior is shielded means field-free (Fig. 2).



(Fig. 1)



(Fig. 2)

**ESD protective measures during handling:** Permanent grounding of working personnel in ESD areas by means of grounding straps, ESD clothing, ESD gloves and antistatic safety shoes as well as further measures such as antistatic work surfaces, floor coverings or conductive covers of office furniture are basic requirements for ESD-protected production.

**Possibilities of static charges:** But even in an electronics cleaning system with a closed metal chamber, static charge can still occur, especially due to the drying process. Humidity control is known to be an active measure against electrostatic discharge. Once an optimum humidity level is reached - typically between 40 and 60 % relative humidity - this is sufficient to discharge electrostatic charges into the air without danger. However, as soon as the humidity drops below 40 % during the drying phase while micro-particles can be introduced into the chamber by blowers, the possibility of static charging increases significantly.



# kolb information



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**ESD protection measures in kolb PCBA cleaning systems:** To shield against electrostatic fields within the cleaning chambers of kolb systems, ESD-sensitive electronic cleaning goods are therefore accommodated in special **kolb** metal washing frames (Fig. 3) or **kolb** metal washing baskets (Fig. 4). These fixtures also make use of Faraday's principle by shielding the cleaning products from electrostatic fields as a closed unit. Special ESD earthing of the wash baskets or frames themselves, which are held in pull-outs, is not necessary as they are already protected by the Faraday cage ESD function.

**This means that in kolb cleaning systems the products are continuously ESD-protected through all process steps.**

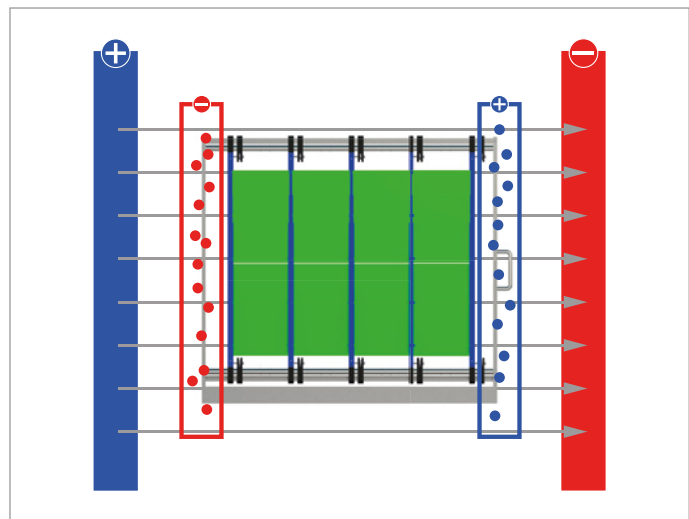
For further handling, such as manual loading and unloading of the cleaning goods, all relevant **kolb** systems have an ESD grounding connection box as standard.

In the standard version of the systems, the double-wall airlock door, the control panel incl. switching elements, lid, side panels and collecting tray are not ESD-compliant, as these do not come into contact with the cleaning goods at any time. Static charging or contact with ESD-sensitive electronic components can thus be ruled out. The airlock door (used only for heat decoupling of the process chamber against contact) is located in door garage during loading and unloading and during the process contact of the cleaning good with the door is not possible.

On customer request, the following option can be ordered:

**kolb-ESD machine covering Part. No.: 0905xxx-xxESD**

- all side panels ESD dischargeable
- Cover ESD dischargeable
- Corner bars ESD dischargeable
- Construction according to DIN EN 61340-5-1
- Leakage resistance  $10^3$  to  $10^7 \Omega$
- ESD protocol



(Fig. 3)



(Fig. 4)