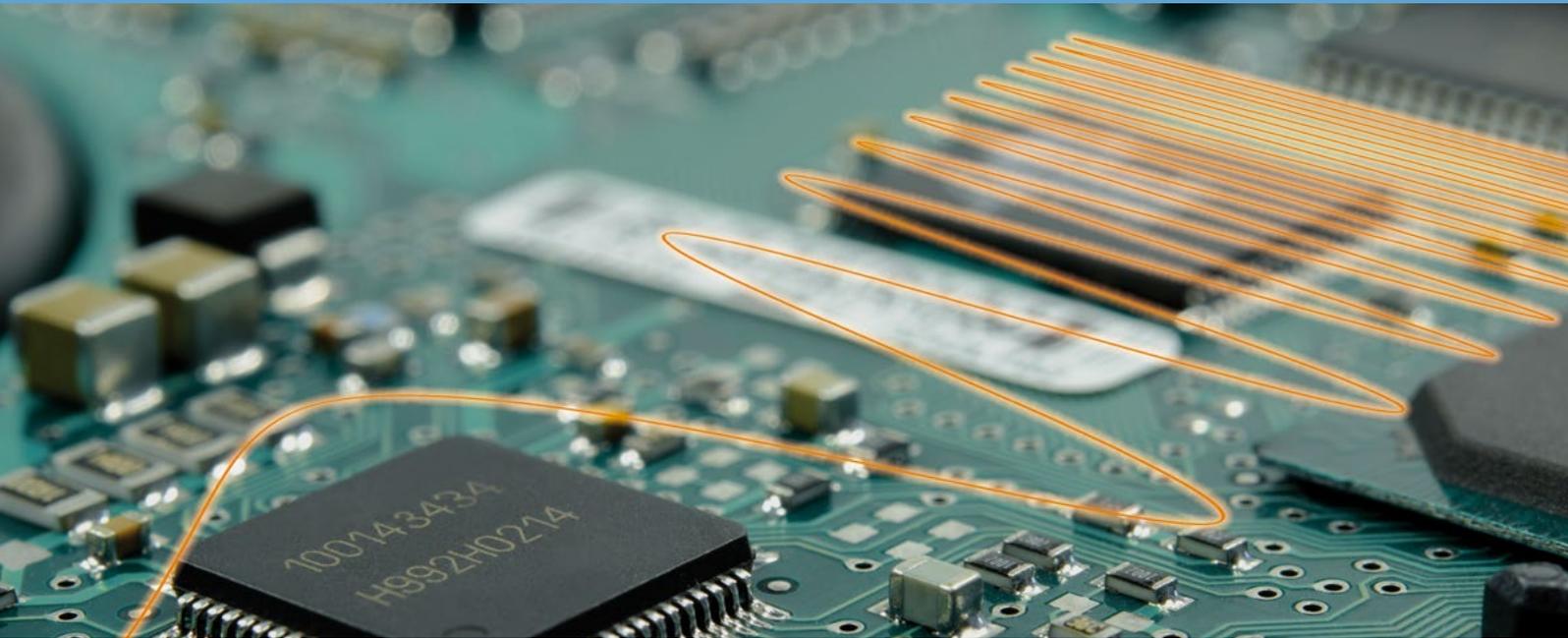


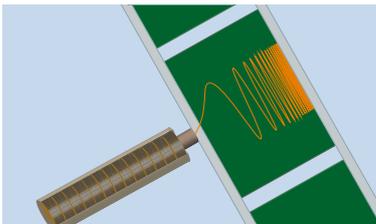
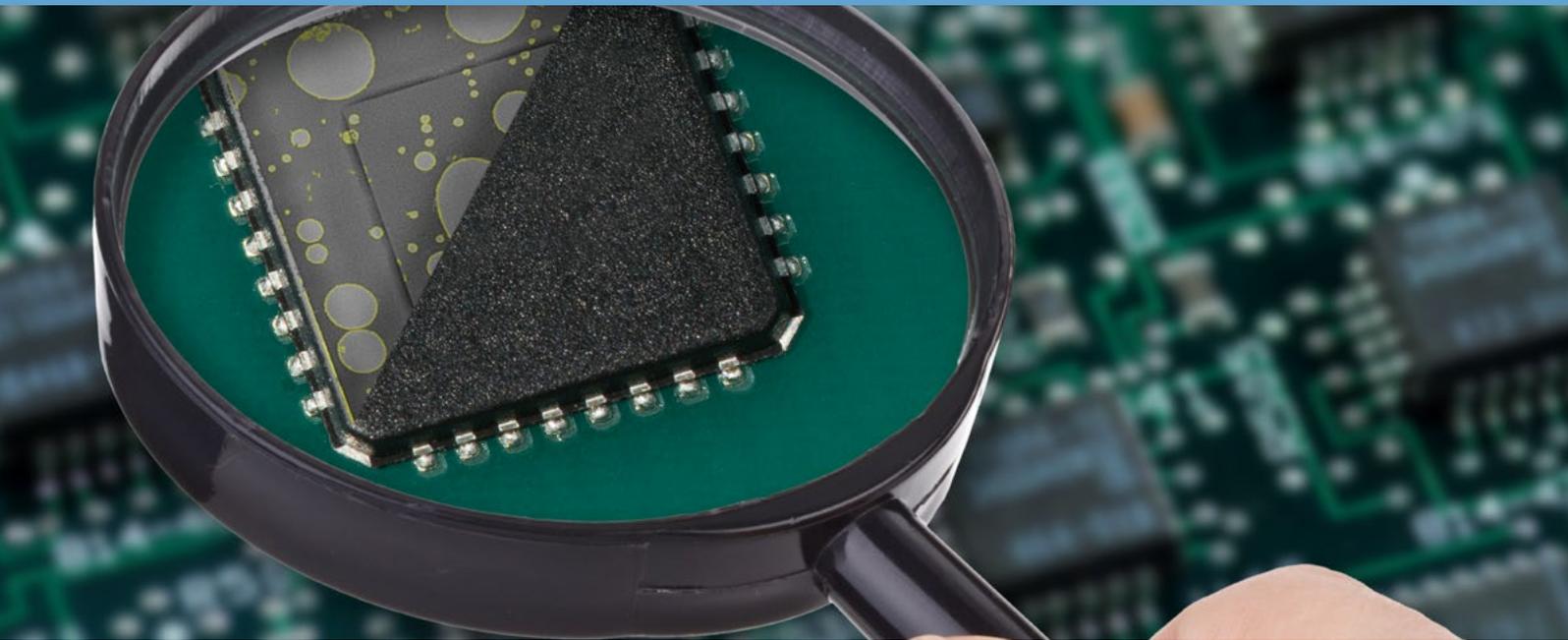
Kurtz Ersä VOIDLESS Technology

Precise piezo technology for void minimization
in reflow and rework soldering



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Precise piezo technology for void minimization in reflow and rework soldering



VOIDLESS process with piezo technology



Sinussweep to minimize void



QFN soldered without VOID-LESS-Technology

When Jacques and Pierre Curie discovered the piezo effect in 1880, they could not imagine what technological importance their discovery would have one day. As a matter of fact, piezo technology today is a common place item. Piezo transducers, being highly dynamic, powerful and providing highest precision, are found in numerous areas of technology. In nano-positioning of microscope lenses, as actuators elements for thread control in the textile machinery industry, in valve technology and in adaptive systems in aerospace- and space technology as well as in the automotive industry – without any doubt at all, the piezo technology is a very essential component in our technological progress.

Causes for voiding are manifold: They will start with the selection of the solder paste, but they are also dependent

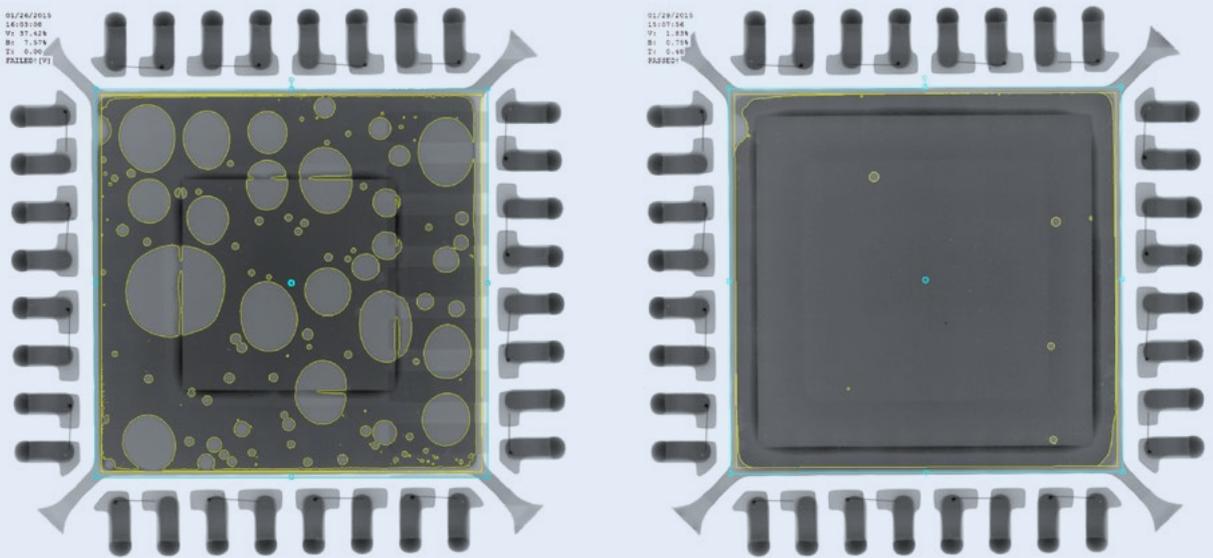
on the surface of the printed circuit board and the components specified and used. Essential for the reduction of air enclosures in the solder connections is the correct process control in the reflow system. Kurtz Ersä's engineers have developed a voidless module which can be installed in the Hot-flow 3/20 reflow system. It is based on piezo technology.

Today more than ever is it of importance in electronic manufacturing to achieve soldering results which satisfy the highest quality requirements: Because of the continuously growing trend towards miniaturization of power components, the loss-free thermal conductivity of the soldered connection of SMT components is gaining in importance. The absence of voids in power electronics is becoming a central issue. Voids being generated during

Kurtz Ersa VOIDLESS Technology

void reduction up to 98 %!

Voids in a solder joint



MLF with voids and voidless after rework process with vibration stimulation

the soldering process impede an effective thermal transfer and can therefore lead to thermal damages to power components right up to a complete failure of the full assembly.

This development is a universal technique to reduce voids in the liquid solder between component and PCB by applying a mechanic sinusoidal actuation. Primarily the PCB is stimulated by a longitudinal wave with an amplitude of less than 10 μm on the PCB level.

Substantially reduced proportion of voids

Minimizing voids ensures, aside from an improved thermal stability, reliable soldered connections. With the VOIDLESS module, designed for the HOT-FLOW 3/20 reflow system, it is possible to reach a far greater rate in reduction of voids than with alternative systems.

In addition, the voidless module is suitable for inline operation and does not require any additional maintenance.

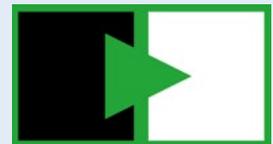
The voidless technology can also be integrated into the rework process. When performing rework on a board assembly, an individual component - such as a QFN, MLF or BTC - will be de-soldered, and a new component, printed with paste, is fully automatically placed. The soldering process with a rework system equipped with the voidless technology takes place analog to the process in a reflow unit.

Highlights

- inline reflow soldering process
- short cycle times
- low investment
- no additional maintenance
- function easy to switch on/off
- void reduction up to 98 %
- stressless

Kurtz Erska HOTFLOW 3/20 VOIDLESS

Highest voidlessness while retaining throughput rates, an ideal energy balance, optimized process control and highest machine availability.



The Hermes Standard
for "M-to-M" in SMT Assembly

The **HOTFLOW 3/20 VOIDLESS** unifies the proven reflow technology with the innovative and patented **VOIDLESS technology**. The **VOIDLESS module** can be switched on and off as needed providing our customers with the highest flexibility in the production process.

Sinusoidal actuation for increased absence of voids

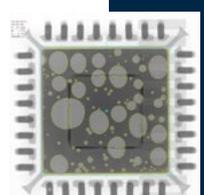
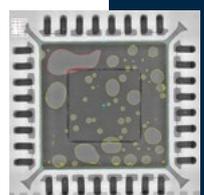
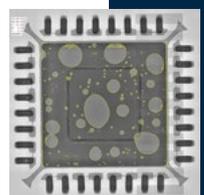
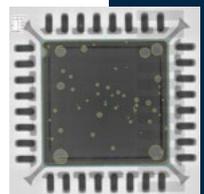
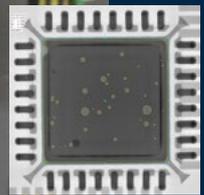
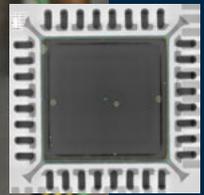
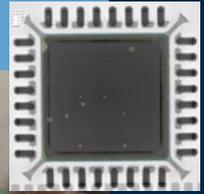
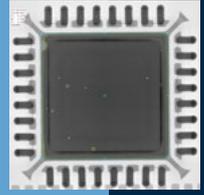
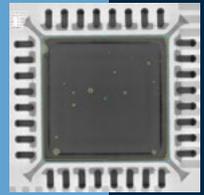
The voidless module is installed in an existing **HOTFLOW 3/20**, as an addition to the existing peak zones. Thus, it is ensured that temperatures required to melt the solder paste to form a solder joint on a high mass component is achieved at all times. Only a few seconds are sufficient to reduce the void rate by up to 98% when compared to a standard reflow soldering

process. This specially developed process is based on a sinusoidal actuation of the PCB substrate. Primarily the PCB is stimulated by a longitudinal wave with amplitude of less than 10 μm on the PCB level. During this sinusoidal actuation of the PCB in a defined frequency range, the self-resonances of this area are stimulated regardless of the PCB layout. The low starting frequency of the sweep stimulation ensures a gentle, homogeneous propagation of the vibrations in the PCB, without damaging the molecule chains (e.g. in FR-4).

The intensification of the frequency causes a stiffening of the PCB substrate, an increase in the elastic modules and, because of the reduced damping factor, an improved energy transmission of the liquid

solder. Thereby areas with a low density, so called voids, are moved out of the solder joint by the vibration. Since a sinusoidal actuation of the PCB in a defined frequency range is actuated over the complete spectrum of this range, all the self-resonances of the PCB in this frequency range are stimulated, too. By this, the liquid solder is stimulated repeatedly by the vibration propagation in a relative shearing motion leading to a reduction of voids in the solder joint. The sweep stimulation onto the components is absorbed mostly by the liquid solder, which protects the components from damage caused by any vibration transfer.

Kurtz Ersa HOTFLOW 3/20 VOIDLESS VOIDLESS at line speed

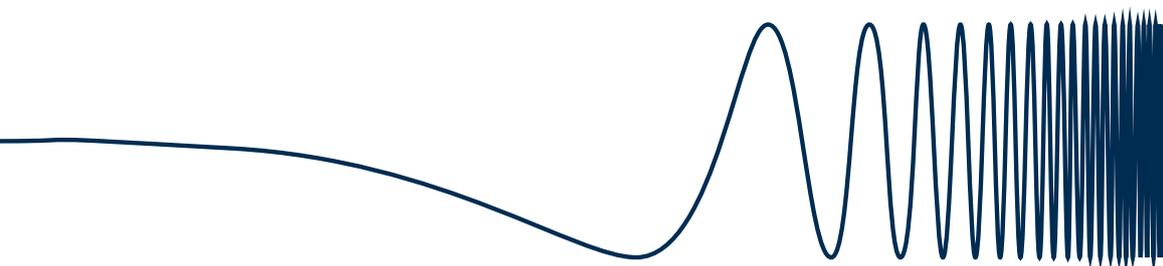


Positive side effects of the sweep stimulation are the centering of the components on the pad and an optimized spreading of the solder on the pad. Delamination or popcorn effects of components housings do not occur during the Ersa voidless process.

In addition, no further specifications concerning components or MSL (moisture sensitivity level) are needed as they are for alternative processes.

Highlights

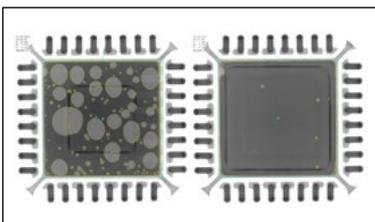
- inline reflow soldering process
- short cycle times
- low investment
- no additional maintenance
- function easy to switch on/off
- void reduction up to 98 %
- stressless



HOW TO AVOID VOIDS? – HOTFLOW VOIDLESS!

Kurtz Ersa HR 600/2 VOIDLESS

Voidless PCB rework



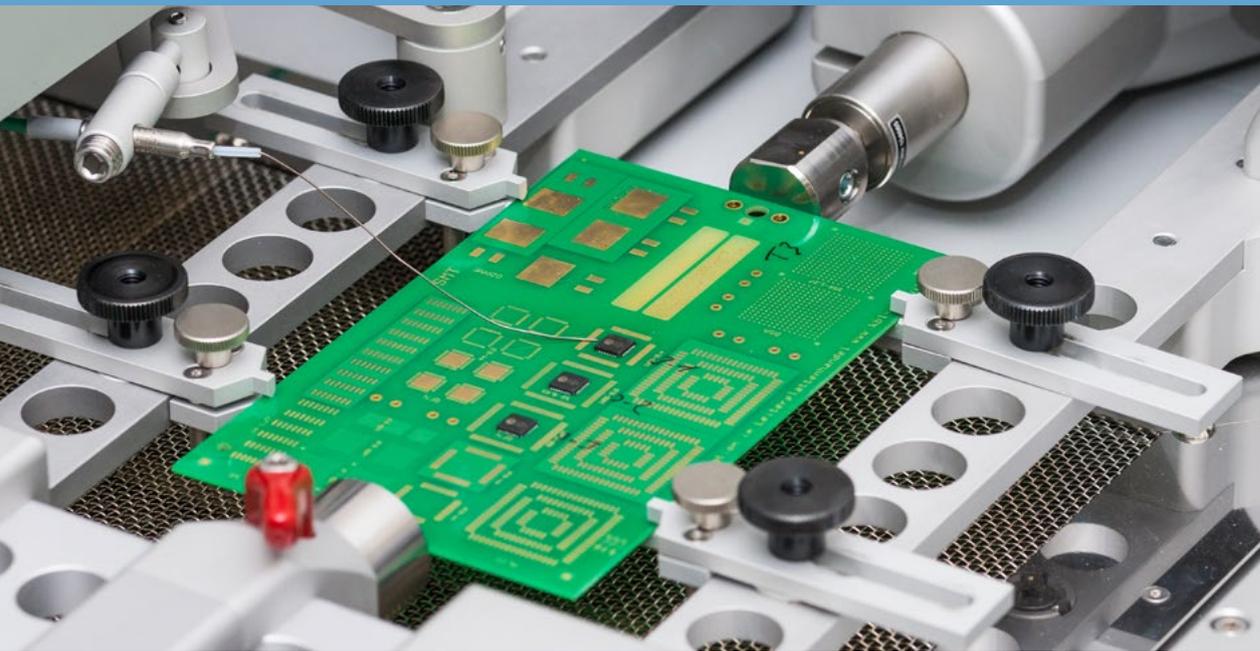
*MLF with voids
and voidless after
rework process
with vibration
stimulation*

In modern electronic manufacturing many components with hidden solder joints, bottom terminal components (BTC) are in use. During reflow processes, it is possible that gases are trapped within cavities in the solder joint. These so-called voids in the soldering connection can lead to technical defects of the component during its lifetime, especially in power electronics.

Ersa introduces with the HR 600/2 VOIDLESS a concept study, based on the regular hybrid rework systems HR 600/2. Void build up in the solder joint can be reduced below a critical limit of 2% with this technology, during rework.

The HR 600/2 VOIDLESS automatically desolders components like BGA, MLF or SMT-power device in general. New components, printed with solder paste, are automatically placed onto the PCB and soldered. During the soldering process, the PCB is stimulated with vibration.

For this, a frequency generator supplies a low frequency oscillation. Via an amplifier, this signal is transmitted to an active piezo element (piezo actor). This actor injects an associated sweep stimulation longitudinal into the PCB substrate (vibration). In result, a relative movement between substrate and component is taking place.

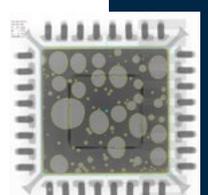
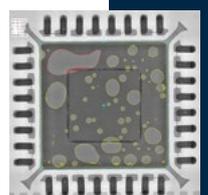
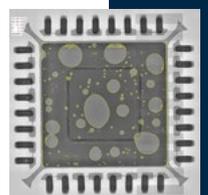
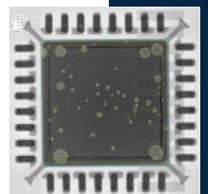
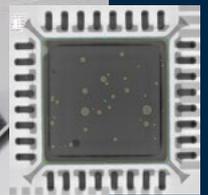
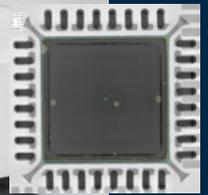
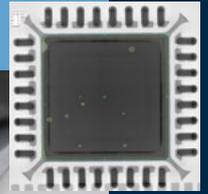
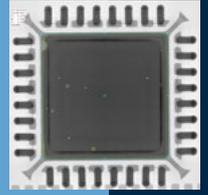
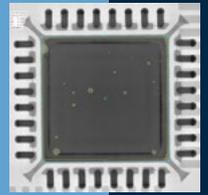
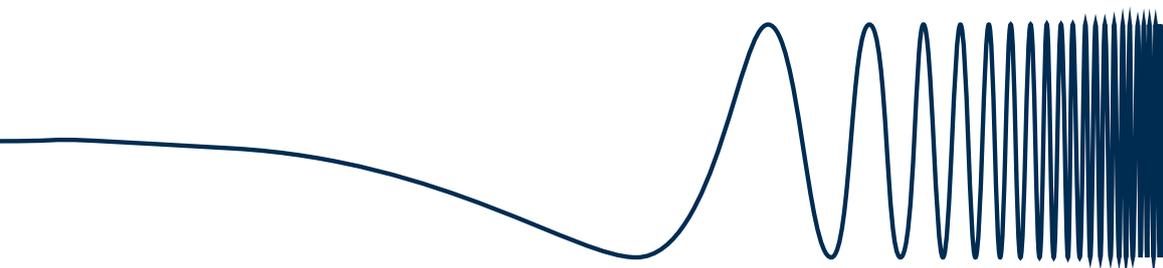


Enclosed gases under the component can escape from underneath the component.

After this treatment, the solder joint features a significantly reduced void rate. If x-ray analysis is indicating a high void rate on electronic assemblies, a selective reflow process with HR 600/2 VOIDLESS will lead to a clear reduction of voids.

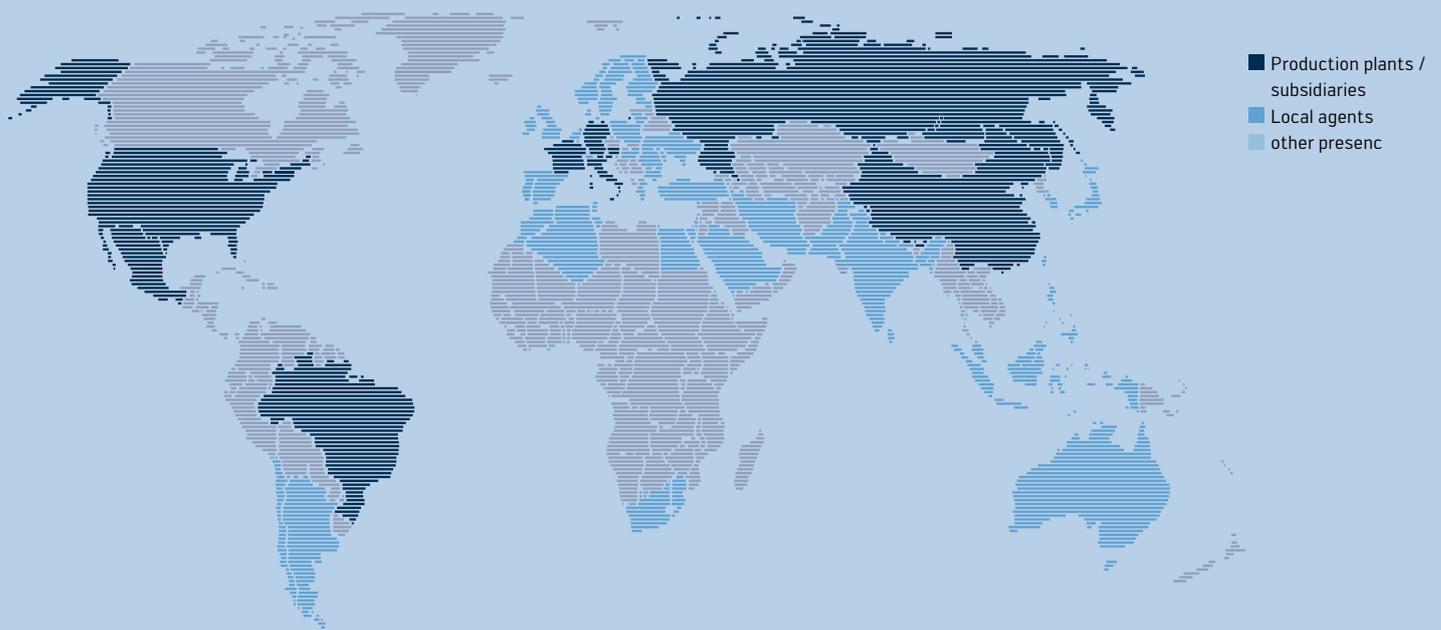
Highlights

- based on HR 600/2 Hybrid Rework System
- void reduction on components with hidden solder joints
- adjustable vibration-process time, adjustable intensity
- subsequent void reduction possible



HOW TO AVOID VOIDS? – Ersat HR 600 VOIDLESS!

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