



THERMAL SYSTEMS

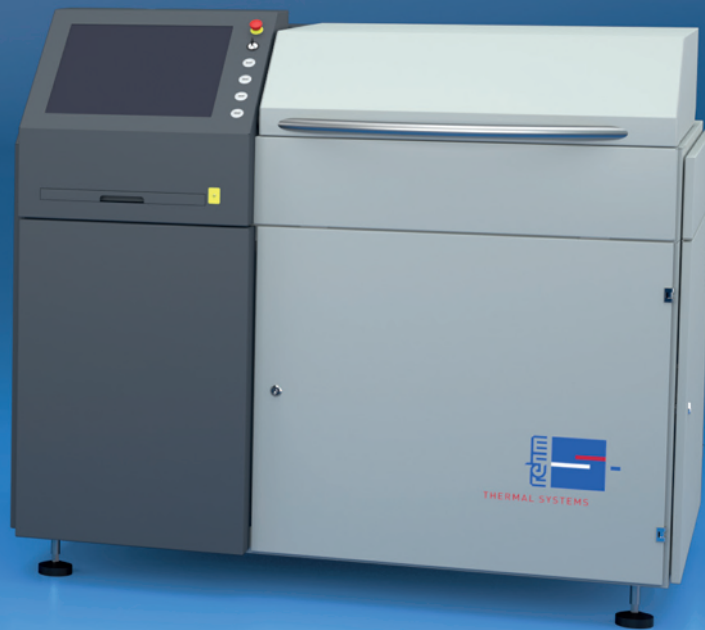
Contact Soldering with and without vacuum

Ideal for a great variety of applications

真空/非真空接触式焊接系统

适用于多种行业应用

up to
400 °C



Nexus
Contact Soldering



Contact Soldering

Reliable and flexible

Void-free soldering with vacuum Ideal for a great variety of applications

无空洞真空焊接工艺 适用于多种行业应用

The Nexus guarantees high-quality results with a reflow process using contact heat in a vacuum. It thus meets the highest requirements of power electronics, in the advanced packaging and semiconductor area.

The Nexus contact soldering system is best suited for void-free soldering of different devices (e.g. IGBT) on DCB substrates. The combining of materials that are normally highly dissimilar takes place in the vacuum at a reduced pressure at temperatures up to 400 °C. The reduced pressure thereby helps to minimise oxidation on the components and on the solder itself. The transfer of heat is via heat contact surfaces or optional by radiation. The Nexus system is predominantly used in small and medium production lines as well as in the field of laboratory.

Nexus设备采用接触式加热和真空处理技术，确保实现最佳焊接效果，由此满足电力电子行业在先进封装和半导体技术领域的最高要求。

Nexus接触式焊接系统尤其适合于DCB基板上不同设备（例如IGBT）的无空洞焊接。高度相异的材料在真空低压以及高达400 °C的温度下相结合。此外，真空环境还有助于最大程度防止元器件和焊料氧化。热传导通过隔热垫和热辐射完成。Nexus系列主要用于中小型生产线以及实验室领域。

Reliable contact soldering

The Nexus makes it possible!

可靠的接触焊 Nexus以行践言

The Rehm Thermal Systems vacuum soldering oven is exceptionally well suited for production facilities which pursue flux-free and void-free soldering in various inert gases (N₂, H₂, N₂/H₂ 95/5).

锐德热力系统真空炉十分适合于在各种惰性气体 (N₂、H₂、N₂ / H₂ 95/5) 中追求无需助焊剂和真空焊接的生产设备。

The use of lead-free and lead-containing pastes and pre-forms with/without flux is also possible. Miniaturization in the fields of advanced packaging and semiconductors can be further developed by means of vacuum technology.

锡膏与焊料片有铅/无铅均可，也可采用无助焊剂方式。真空有助于推动先进封装与半导体技术的微型化发展。



> Oxide and void-free joint surface between chip and interconnected device

芯片与元件之间的焊点无空洞无氧化

> Integrated or separate cleaning and de-scaling processes

集成或独立式清洗和除垢

> Simple profiling and fast heating and cooling rates

轻松设置温度曲线，快速加热和冷却

> Assembly under high level of vacuum

制程环境高度真空

> Integration of drying and degassing processes

集成干燥和排气制程

> Optimum dispersal of waste heat

优化散热，满足功率器件需求

Benefits for flexible processes

Nexus at a glance

Nexus系统概览

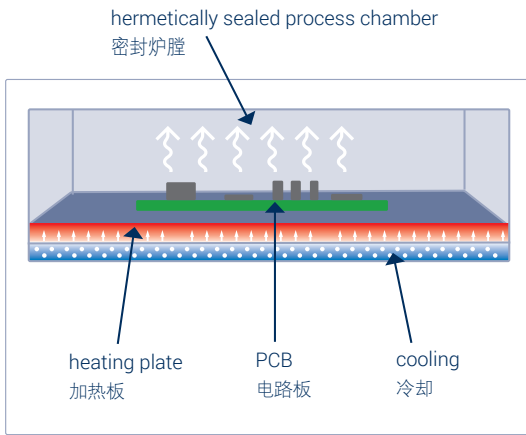
- › Heating and cooling on a usable area of 500 mm x 500 mm
- › Clearance of 100 mm above heating plate
- › Max. operating temperature 400 °C*
- › Heating rate max. 150 K/min*, cooling rate max. 180 K/min*
- › Vacuum up to 1mbar (optional 0,1 mbar)
- › Fluxless activation with different gases possible
- › One gas line for N₂ with pressure regulator and gas monitoring; proportional valve
- › Each gas supply line is equipped with a switch to save purging gas while the machine is not in use
- › The vacuum system can be equipped with adjustable flow ratios. The volumetric flow rate for process gases is adjustable and controlled by a proportional valve.
- › Fluxless operation with 100 % nitrogen, forming gas, formic acid or up to 100 % hydrogen
- › Formic acid bubbler with fill level compensation to keep the saturation always at the same level (saturation level of N₂ depends on the fill level of the bubbler)
- › Optional Residue Management System for use with solder paste
- › 组合式加热/冷却板，可用面积500 mm x 500 mm
- › 加热板上方面距100mm
- › 加热板工作温度可高达400°C
- › 加热速率约150 K/min，最高冷却速率180 K/min
- › 真空可达1mbar（可选0.1mbar）
- › 可在多种制程气体下实现无助焊剂焊接
- › 配备带压力调节器和气体监测功能的N2气体管线；进气口通过质量-流量控制器进行控制
- › 每条供气管线均配备开关，设备停用时可节省制程气体
- › 真空速率可调；制程气体的体积流速可通过质量-流量控制器进行调节和控制
- › 可在混合气体、甲酸或高达100%氢气环境下进行无助焊剂焊接
- › 带液位补偿功能的甲酸器，确保饱和度稳定（如果液位不受控/不平衡，N2饱和度将发生波动）
- › 针对使用焊膏的应用，提供残渣管理系统选项

* related to contact plate

The image displays three overlapping screenshots of the Nexus control interface. The top screenshot shows a main menu with 10 numbered buttons (1-10) and a 'Program menu' button. The middle screenshot shows a detailed view for 'Step 6' under the 'Temperature' section, including a table of parameters for steps 1 through 8. The bottom screenshot shows a detailed view for 'Cooling' with a table of parameters for steps 1 through 8.

Parameter	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8
Active	✓	✓	✓	✓	✓	✓	✓	✓
State	30	30	10	10	10	30	30	30
Actual [°C]	34.3	46.8	192	200	240.2	249.9	106.4	103.8
Set internal [°C]	50	50	192	200	240	250	90	100
Set [°C]	85	100	192	200	240	250	90	100
Gradient [K/min]	120	60	120	120	120	120	120	120
Rel+ [K]	10	10	10	10	10	10	10	10
Rel- [K]	0	10	0	0	0	0	0	0
Y [%]	0	0	0	0	0	0	0	0
Y Max [%]	100	100	100	100	100	100	100	100

Parameter	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8
Active	✓	✓	✓	✓	✓	✓	✓	✓
State	30	30	10	10	10	30	30	30
Blow off [°C]	34.3	46.8	192	200	240.2	249.9	106.4	103.8
Duration Stop [s]	50	50	192	200	240	250	90	100
Duration Wait [s]	85	100	192	200	240	250	90	100
Duration Cool [s]	120	60	120	120	120	120	120	120
Pulses count [K]	10	10	10	10	10	10	10	10
Pulses actual [K]	0	10	0	10	0	10	10	10
Feed line [%]	0	0	0	0.97	0	4.2	0.4	0
Return [%]	100	100	100	100	100	100	100	100



The vacuum soldering process generates temperatures of up to 400 °C and is an ideal solution for void-free and flux-free applications. The Nexus not only provides your manufacturing operation with advantages for the soldering process, but rather for bonding processes as well.

真空焊接制程可提供最高400°C的焊接温度，是无空洞和无助焊剂焊接应用的最理想解决方案。无论是焊接制程还是粘合制程，Nexus设备都能够为您的生产应用提供无与伦比的多种优势。

direct 
heat transfer

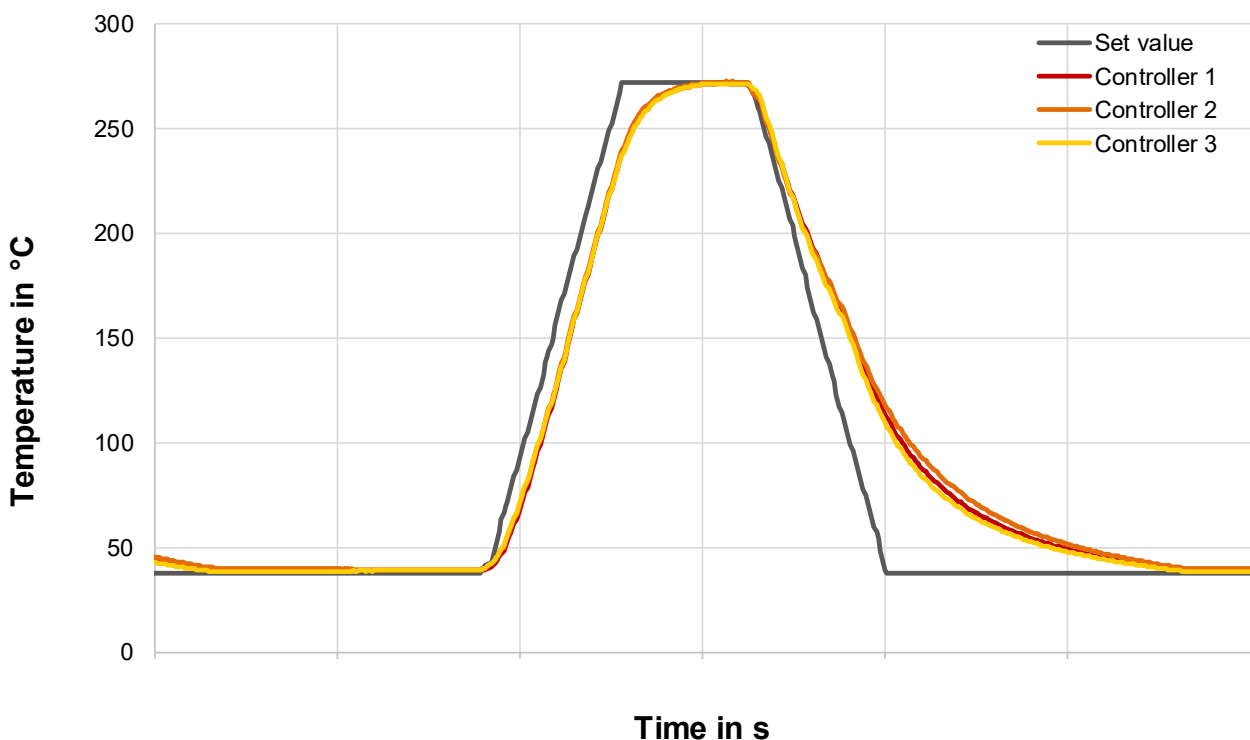
Heating and cooling Satilnatil | 加热和冷却

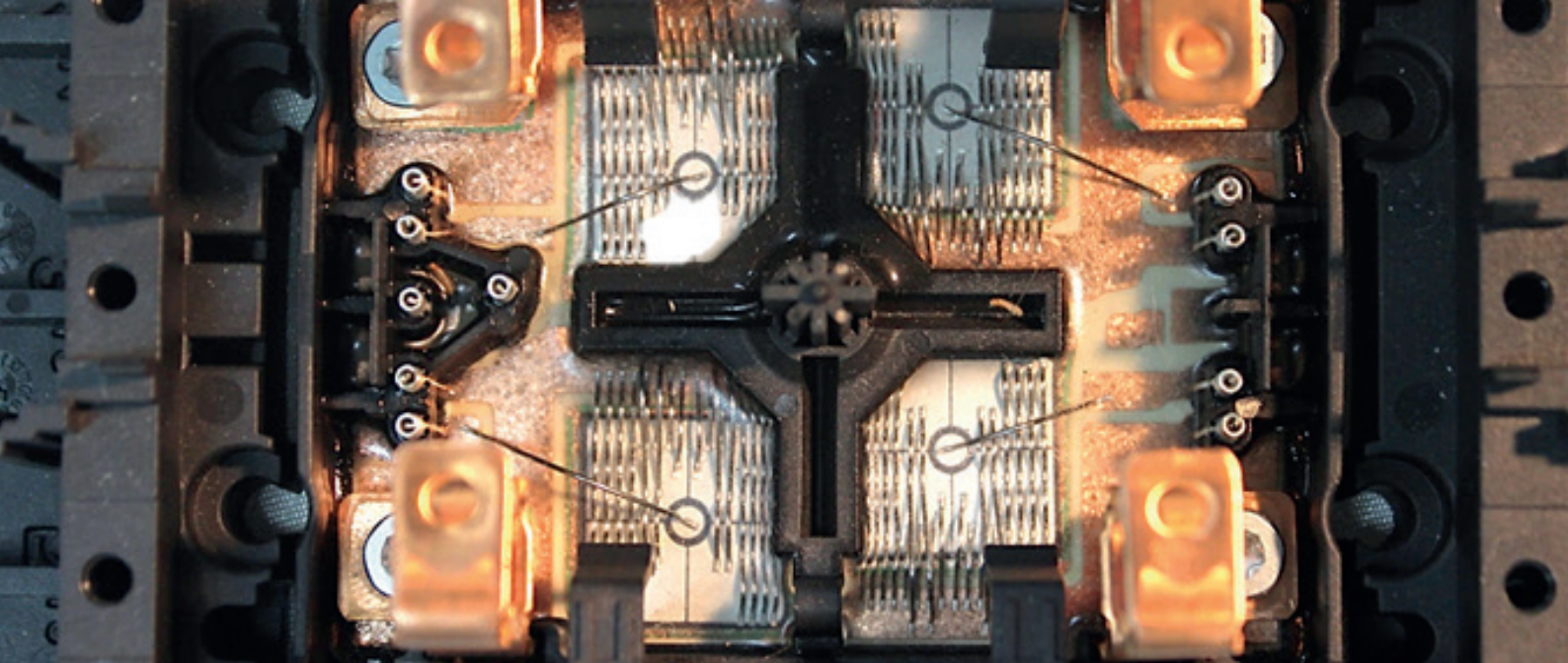
A major benefit of the Nexus contact soldering system is that the heating or cooling gradient can be predefined based on predetermined parameters. The gradients can be preset as required. Within these specification limits, the temperature is adjusted automatically by the Nexus so that these limit values are not exceeded. This eliminates the possibility of a malfunction of the assembly to be soldered.

Nexus接触焊接系统的主要优点是可以根据预定参数预定义加热或冷却梯度。可以根据需要预先设置渐变。在这些规格限制内，Nexus会自动调整温度，以免超出这些限制值。这消除了待焊接组件发生故障的可能性。

The heating output of the Nexus has been designed for a uniform heating process when fully loaded with high-mass assemblies meaning that short cycle times are also no problem. Sensor components determine and verify the temperatures recorded on the goods carrier support.

Nexus的加热输出设计为在满载高质量组件的情况下实现均匀的加热过程，这意味着较短的循环时间也不成问题。传感器组件确定并验证在货物支架上记录的温度。



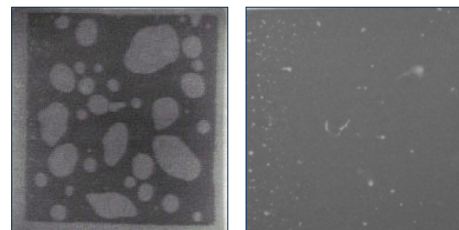


Reliable vacuum processes for improved quality

可靠真空制程，提升焊接质量

Increased productivity and quality advantages can be achieved in the production of power electronics by means of vacuum soldering. Vacuum provides for oxide-free processes as well as improved wetting, and thus for more effectively filled solder joints. Beyond this, vacuum drastically reduces the number of voids in solder joints and supports processes such as plasma cleaning and gas exchange for advanced packaging. Temperatures of up to 400 °C are possible with Nexus.

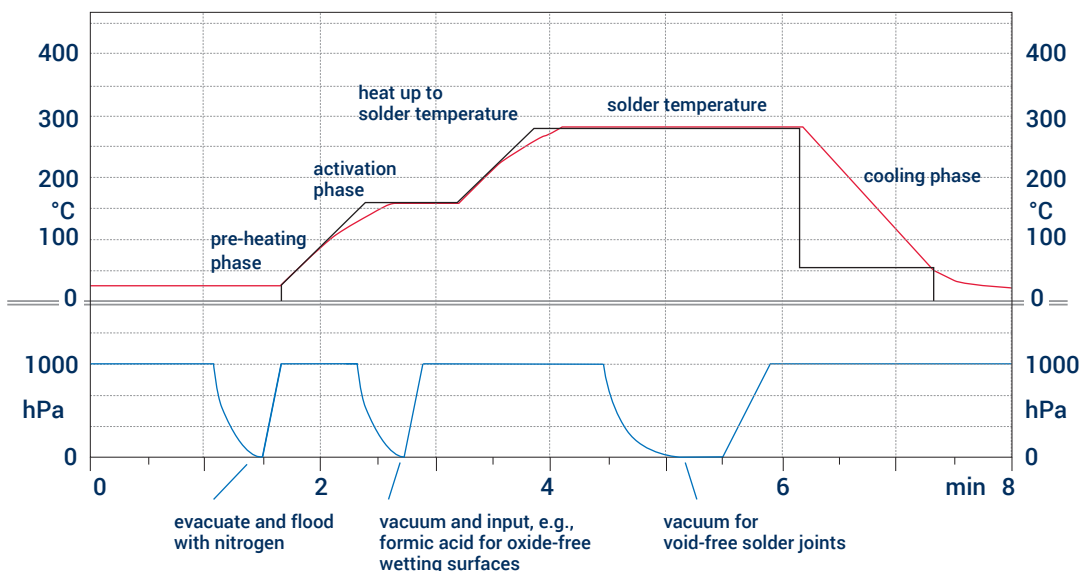
在电力电子元器件生产中，真空焊接工艺可帮助客户显著提升生产效率 and 产品质量。真空环境可确保实现无氧化焊接，改善湿润性能，获得更饱和的焊点，还能够显著降低焊点空洞率，并支持先进封装领域中的等离子清洗和换气等工艺。Nexus设备最高焊接温度可达到400 °C。

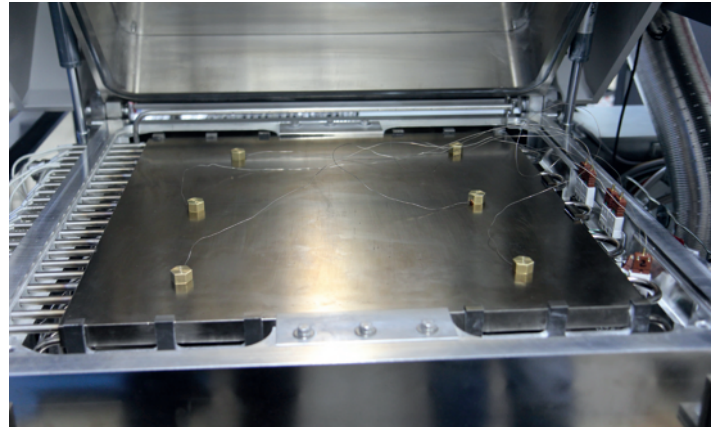


without vacuum

with vacuum

Example vacuum heating process | 真空加热过程示例



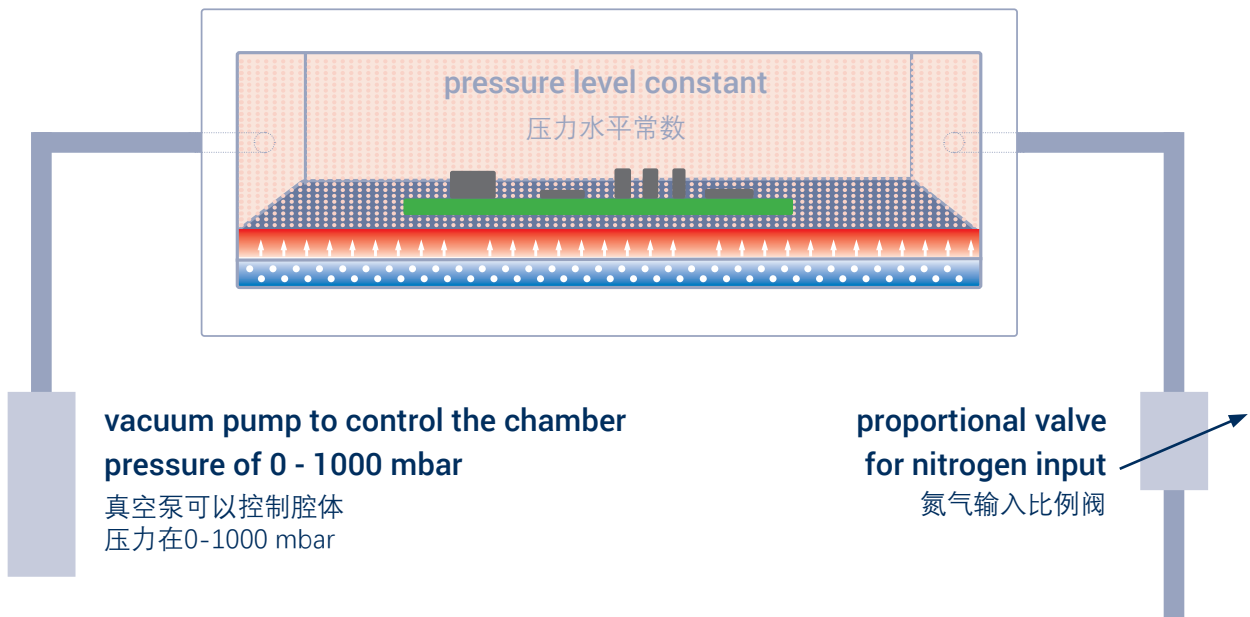


Controlled chamber pressure | 控制腔体压力

A controlled gas sampling system via a vacuum pump from the process chamber prevents overpressure during controlled flushing via a separate proportional valve for feeding into the process chamber; thus each pressure level can be set as required using a software programme.

可控制采样系统经由真空泵从真空腔内取样，通过比例阀控制注入气体的流量以防止气体注入时产生过压；因此，可以使用软件程序根据需要设置每个压力级别。

controlled chamber pressure with nitrogen atmosphere
在氮气气氛下控制真空腔压力



Various media for a wide range of requirements and demands

各种介质

广泛适用于各种需求

Depending on the process temperature and the desired oxide freedom, the use of different process media is possible.
根据工艺温度和所需的氧化物自由度，可以使用不同的工艺介质。

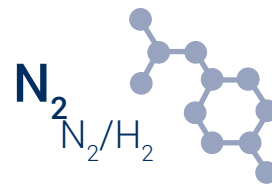
Inert gases and forming gas | 惰性气体与混合气体

Nitrogen (N_2) is typically used to protect against oxidation. In combination with 5 % hydrogen, the forming gas is also used for reducing oxides; no special safeguards are necessary within this mixing ratio.

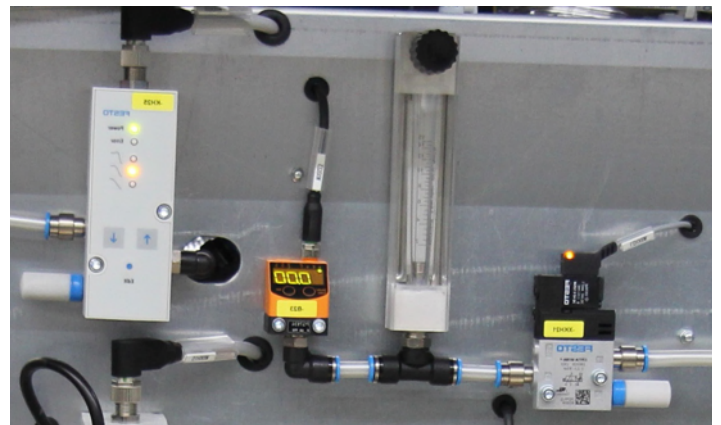
混合气体也用于与5%的氢气混合使用，以减少氧化物，在此混合比例内，无需采取特殊措施。

Forming gases with a hydrogen content from 5 % to 100 % need necessarily appropriate safeguards and are used only at 280 °C or higher. Depending on the process temperature, the use of formic acid can be beneficial.

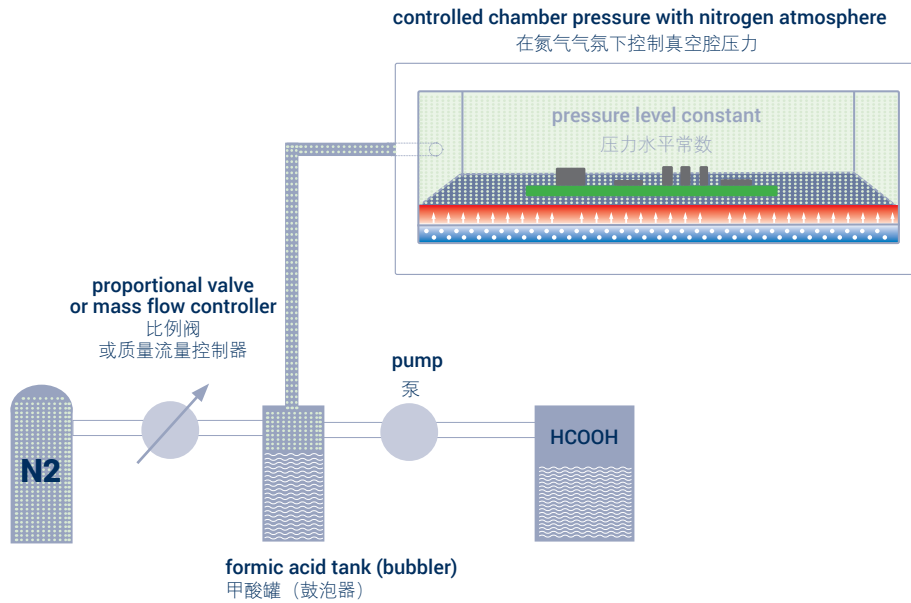
5%至100%氢含量的混合气体可能需要更高等级的防护装置，并且只能在280°C或更高温度下使用。根据工艺温度的不同，使用甲酸有益于工艺。



Activation (Gas)	Investment	Wetting
Nitrogen N_2	■	■
Forming gas N_2/H_2 (95 %/5 %)	■■	■■
Hydrogen H_2 100 %	■■■	■■■■
Formic acid $HCOOH$	■■■	■■■



Formic acid tank (bubbler) | 甲酸罐 (鼓泡器)

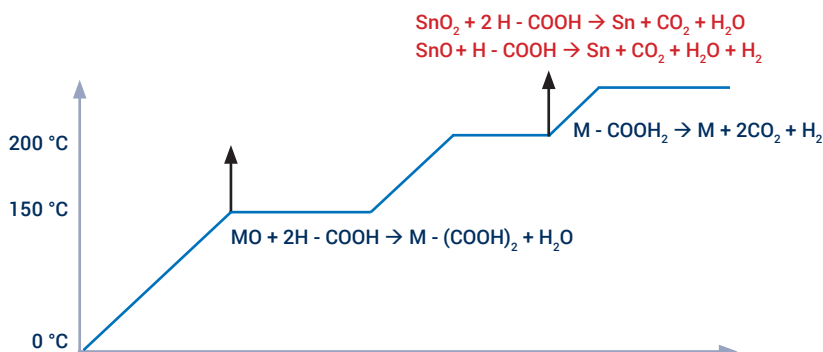


To achieve a stable, reliable, flux-free soldering process, the inert carrier gas (N₂) is enriched with formic acid (HCOOH) and transferred into the process chamber. So that the “saturation” of the carrier gas with formic acid remains constant, it is necessary to keep the parameters constant while the liquid formic acid is flowing through. These include the flow velocity, flow rate, temperature and the filling capacity of the formic acid tank (bubbler). Thanks to today’s control engineering, the nitrogen flow rate can be monitored easily and reliably. Unlike the fill level of formic acid in conventional bubbler solutions which must be manually refilled with acid – taking into account the protective measures for employees – and here are subject to a greater fluctuation in the filling capacity. This is not the case for this new generation of bubblers which monitor and readjusts the fill level. This allows a stable process, and also increases the safety of employees, because original containers (standard 10 l) with formic acid can be inserted into the housing of the bubbler without decanting. To make the device even safer, the housing is monitored and equipped with its own suction system.

为了实现稳定、可靠、无助焊剂的焊接制程，惰性载气 (N₂) 中将注入甲酸 (HCOOH)，并将其输送到制程腔体内。为确保含有甲酸的载体的“饱和度”保持恒定，当甲酸液体流过时，参数必须保持恒定。这些参数包括甲酸罐 (起泡器) 的流速、流量、温度和填充容量等。得益于当今的控制技术，氮气流速可轻而易举地、稳定地得到监控，而传统起泡器对于甲酸液位的控制完全达不到该程度。这些传统起泡器需要手动加酸，同时员工必须采用合适的安全防范措施，并且加酸量不稳定，波动范围较大。对于监视和重新调整填充水平的新一代起泡器而言，情况并非如此。由于可以将带有甲酸的原始容器 (标准10升) 不倾倒地插入起泡器的壳体中，因此可以实现稳定的过程，并还可以提高员工的安全性。为了使设备更加安全，需要对外壳进行监控并配备其自己的抽吸系统。

The removal of the oxides on metals with formic acid is performed using a two-step process; the schematic sequence of this process can be seen in the following diagram. During the first step, so-called formates of the metal are formed and the formates are decomposed (Cu) or vaporised (SnO, SnO₂) at approx. 200 °C. The H⁺ formed during the second step supports oxide removal as well as the molten solder from the melting temperature in the reductive environment. This allows for a highly wettable surface on copper and other metals. The application is suitable from process temperatures upwards of 200 °C.

使用甲酸去除金属上的氧化物的过程分两步进行：这个过程的原理图顺序如下图所示。在第一步中，下图显示了此过程的示意性顺序。在第一步过程中，形成了所谓的金属甲酸盐，并且甲酸盐在大约300°C下分解 (Cu) 或汽化 (SnO, SnO₂)。200°C。第二部分中形成的H⁺有助于还原性环境中的熔融温度除去氧化物和熔融焊料。这样可以在铜和其他金属上形成高度可润湿的表面。该应用适用于200°C以上的制程温度。



Data and facts:

Detail information on the Nexus

Nexus系统参数

Heating plate | 加热板

- › Heating/cooling plate programmable with closed loop control
 - › Equipped with an integrated thermocouple to check the temperature profile of the heating plate
 - › Temperature uniformity on the heating plate within +/-2 K
 - › Heating/cooling plate with a usable area of 500 mm x 500 mm
 - › Max. operating temperature 400 °C *
 - › Heating rate max. 150 K/min *, cooling rate max. 180 K/min *
- › 采用闭环控制的可编程加热/冷却板
 - › 内置温度分析器，可用于检查加热板的温度曲线
 - › 加热板的均温性：+/-2 K
 - › 加热/冷却板可用面积为500 mm x 500 mm
 - › 加热板工作温度可高达400 °C
 - › 加热速率约150 K/min，最高冷却速率180 K/min

* related to contact plate

Software | 软件

- › USB port and Ethernet port for connectivity and remote control
 - › Windows 7 for HMI and B&R PLC for machine control
 - › Up to 100 steps per recipe
 - › Number of recipes is not limited
 - › Traceability and MES connectivity available
 - › Each step can be filled in with a predetermined pressure, temperature, heating/cooling rate or holding time. Furthermore it is possible to work in each step alternatively with nitrogen, forming gas and formic acid.
 - › Graphic display of temperature values and pressures on the monitor for process control
 - › Programmable times per step range from 1 s to 1 hour
- › 配备用于连接和远程控制的USB端口和以太网端口
 - › HMI采用Windows10操作系统，配备B&R PLC控制器
 - › 每套方案可支持多达100步
 - › 方案数量无限制
 - › 可追溯性和MES连接
 - › 通过编程在预定时间内以可调速率达到预定压力及温度，并且可在预定的时间内交替使用氮气，生成气体和甲酸。
 - › 监测屏幕实时绘制温度曲线，便于用户参考
 - › 每步时长可编程设置：1s到1小时

Vacuum process | 真空制程

- › Vacuum pump alternatively up to 2 mbar or 0,1 mbar
 - › Pressure sensor readout recorded with internal software
- › 可选高性能真空泵高达2mbar或0.1mbar
 - › 内置软件记录压力传感器读数

Process chamber | 炉膛

- › Chamber with viewing window for camera (available as an option)
 - › Operation from front side
 - › Residual oxygen analyzer
- › 带观测窗的炉膛外壳(可选)
 - › 正面操作
 - › 含氧气分析仪

Datas | 数据

COOLING WATER | 冷却水

Cooling system for connection to an open water cooling system or domestic water supply 10-15 SLM cooling water flow
冷却系统可采用开放式水冷系统 或10-15 SLM国内标准供水

DIMENSION | 尺寸

Length 1617 mm, Width 1194 mm, Height 1336 mm
长 1617mm, 宽 1194mm, 高 1336mm

WEIGHT | 重量

680 kg

ELECTRICAL CONNECTION | 电气连接

3 x 400V +/-5 % 50Hz TN-C-S

On-site service

We are there for you worldwide.

本地服务

锐德全球服务中心随时随地为您提供专业支持

The quality levels of our systems are of the highest order. We aim to maintain this high level in our service activities as well. From Blaubeuren via Georgia and Pribor to Szendehely or from Dongguan to Guadalajara – we are there to help for all questions related to sales and service. Anywhere in the world!

Need special advice on our systems, something fitted or a spare part? Our responsibility does not end with the sale! We remain in close contact with our clients and suppliers after they have invested in a Rehm system and make every effort to keep our response times short. We make sure we keep to delivery deadlines, installations and service inspections. And we are also available at any time for questions about applications – ensuring that your production runs smoothly.

锐德追求卓越的产品质量，也致力于提供优质的客户服务。从布劳博伊伦到乔治亚到普日博尔再到森代海伊，或者从东莞到瓜达拉哈拉——我们立志完善销售和服务网络。竭诚为您提供覆盖全球的专业支持！

对于锐德系统、装配或配件，您有什么需要特别咨询的吗？我们的责任不仅仅止步于销售，在购买锐德的产品后，我们还将与您保持最紧密的联系，快速及时地响应您的所有需求。我们将以最大努力确保按时交付，执行最高标准的安装和维护服务。此外，我们的专家全天候24小时为您服务，可以随时为您的应用提供支持，确保生产顺利进行。



Your service contact person

服务中心联络方式

Service-Center:

服务中心：

Mon - Thurs 07:00 – 16:30

Fri 07:00 – 12:15

service@rehm-group.com

24h-Service-Hotline:

24小时服务热线：

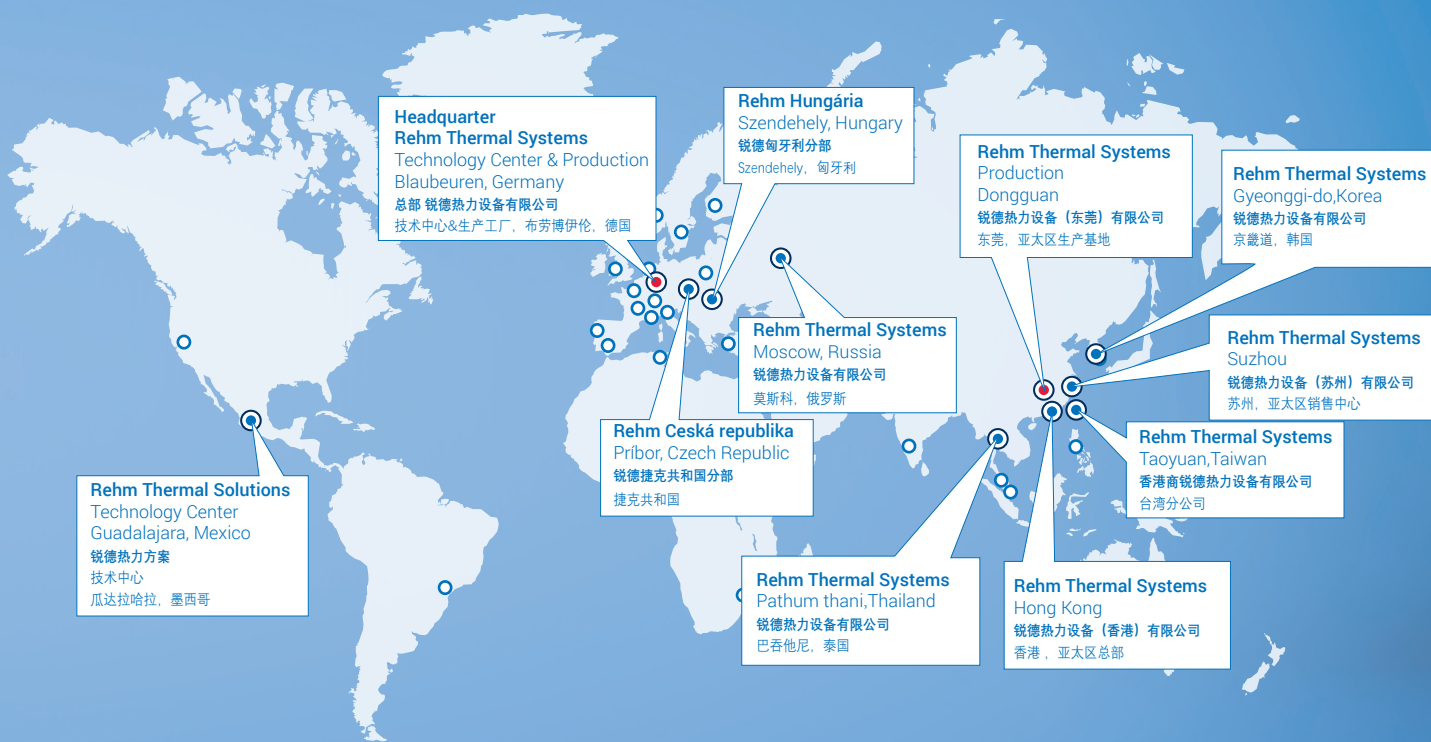
Germany: +49 (0) 7344 - 9606 511

China: +86 769 8328 0260

Service Hotline 400 - 812 8069



THERMAL SYSTEMS



Rehm Worldwide 锐德全球

As a leading manufacturer of innovative thermal system solutions, we have customers on every continent. With our own locations in Europe, America and Asia, as well as 26 agencies in 24 countries, we are able to serve the international markets quickly.

作为世界领先的创新型热力系统解决方案制造商, 我们的客户遍布全球每一块大陆。锐德在欧洲、美洲、亚洲均设立了技术中心和生产工厂, 同时还在24个国家和地区拥有26家代理商, 能够快速响应国际市场的各种需求, 为客户提供最出色的现场服务。

- 分公司
- 生产基地
- 服务支持

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