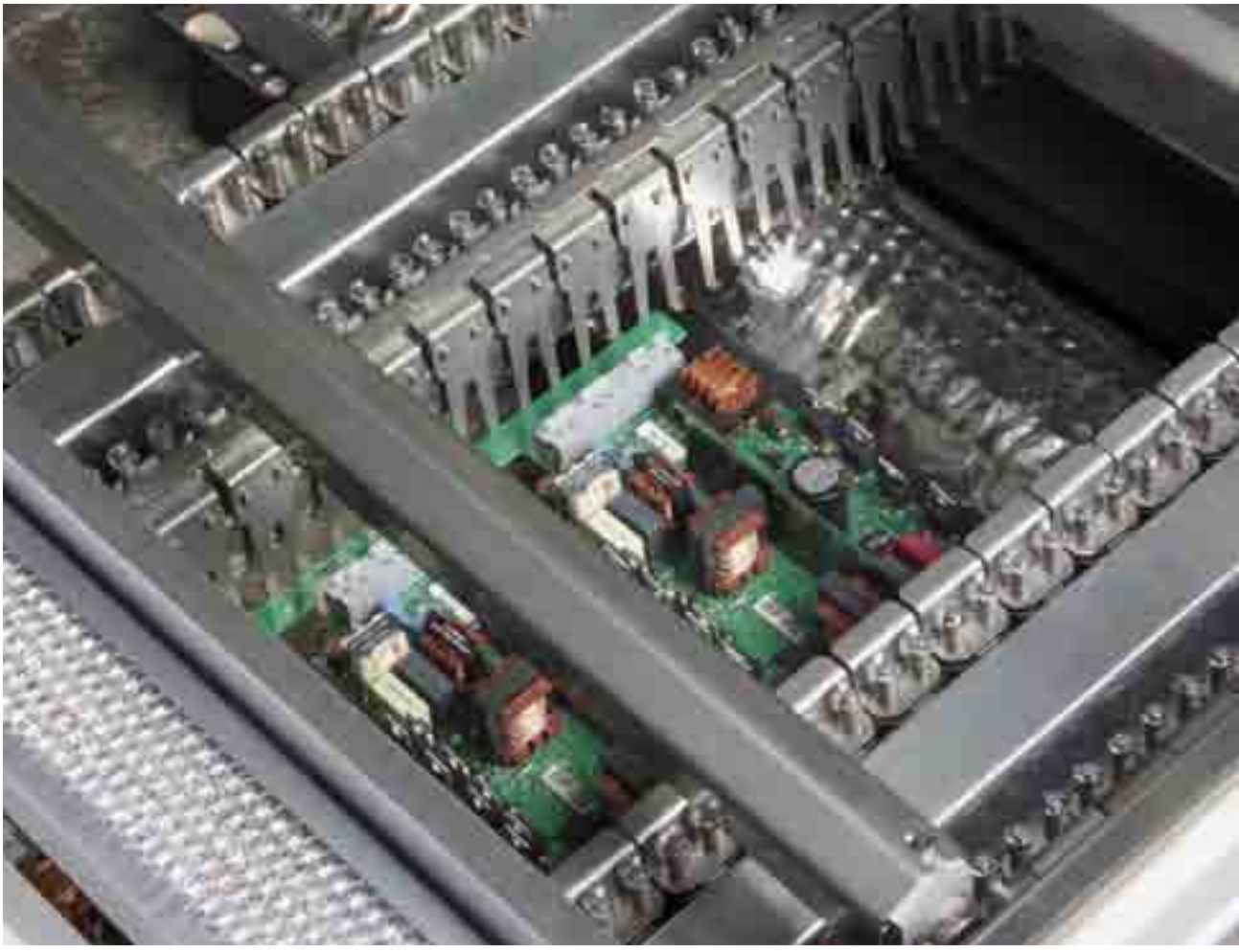


# ERSA POWERFLOW N2 - a Full Nitrogen Tunnel Wave Soldering System Specifically Designed for Lead-Free Applications

**ERSA GmbH**

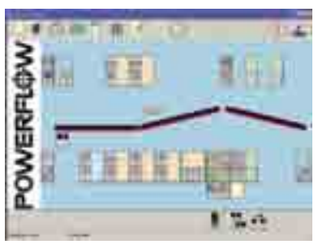
Soldering & Inspection Systems

# ERSA Wave Soldering Systems - Ensure Your Success: Flexible Preheating Concepts, High-Quality Materials and Many Years of Experience in Lead-Free Production Lines

*ERSA POWERFLOW N2 - the latest model of the ERSA POWERFLOW line, a full nitrogen tunnel wave soldering system*


In the field of wave soldering technology it is essential to differentiate between the process and the machine hardware requirements. The interaction of the parameters is many times greater in this case than it is for reflow soldering, because the equipment of the wave soldering system for lead-free solder affects all of the modules.

*State-of-the-art machine control via a completely new software and user-friendly process visualization with touchscreen operation*




**Fluxer**

Spray flux systems are currently leading-edge technology and represent the optimal solution for the lead-free process. If VOC-free, water-based fluxes are also being used, it is also essential to consider material compatibility. It can become necessary to reduce the amount of flux applied by up to 50 %.

Complementary flux nozzles, adjustable dosage and stainless steel-based materials are, of course, some of the basic features of ERSA wave soldering systems.

*Maintenance-friendly spray fluxer designed to meet highest demands in lead-free soldering*

**Preheating**

The ideal configuration of the preheating section for the lead-free soldering process depends on the PCB layout and the assembly of the particular module. The modular construction of ERSA wave soldering machines offers a selection of medium and short-wave infrared emitters as well as convection heaters.

Emitters are very effective. The shortwave units react immediately, making them highly suitable for mixed production. Convection modules basically offer the same benefits as they do for reflow soldering. They are especially suitable for the processing of heavy components that require heating on the placement side or when heat-sensitive components are being used that cannot be overheated during the preheating process. The ERSA POWERFLOW concept is particularly suited to meet this type of requirement with its individually configurable and modularly expandable preheating conception.

*Preheating section in modular design with medium and short-wave emitters and convection heaters*

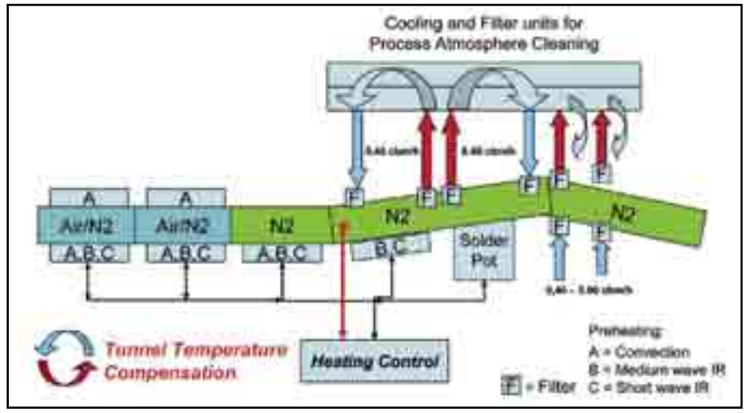
**Solder module**

Many lead-free solders are considerably more aggressive towards currently used metals and stainless steels than the established SnPb solders. This fact represents a great problem for solder modules. For this reason, the ERSA wave soldering systems are manufactured with high quality materials, the surfaces of which are additionally subjected to a multilevel treatment. This renders them passive and the solder does not react with them.

The design of the soldering nozzles has to meet changing requirements, depending on whether they are working within an $N_2$ or a normal atmosphere, with lead-free or Pb-solder. The somewhat tougher oxidised skin that forms under normal atmospheric conditions requires altered designs for the solder to flow off in the direction of transport. It is also necessary to consider the somewhat greater bridging tendency caused by the greater surface tension of the solder. Apart from the familiar PowerWave soldering nozzles, ERSA also uses other nozzle designs, depending on the process and the application.

**The essential highlights of the ERSA POWERFLOW at a glance**

- Integrated, complete lead-free capability and reliability when using VOC-free, water-based flux
- Modular, subsequently expandable housing concept
- Spray fluxers with 2-head capability, intelligent spray pattern programming
- Second foam fluxer can be optionally integrated
- Modular, flexible and individually expandable preheating concept with both convection and emitter heating systems. Variably configurable in both length and performance
- Finger or frame conveyor, also separate conveyor
- Optional full tunnelling with intelligent temperature compensation
- Multilevel, efficient process gas cleaning system
- Optional soldering angle adjustment
- Modern control concept
- Simple to operate via notebook or touch-screen




*ERSA POWERFLOW N2 function diagram: nitrogen tunnel with atmosphere cleaning and temperature compensation of the preheating length*

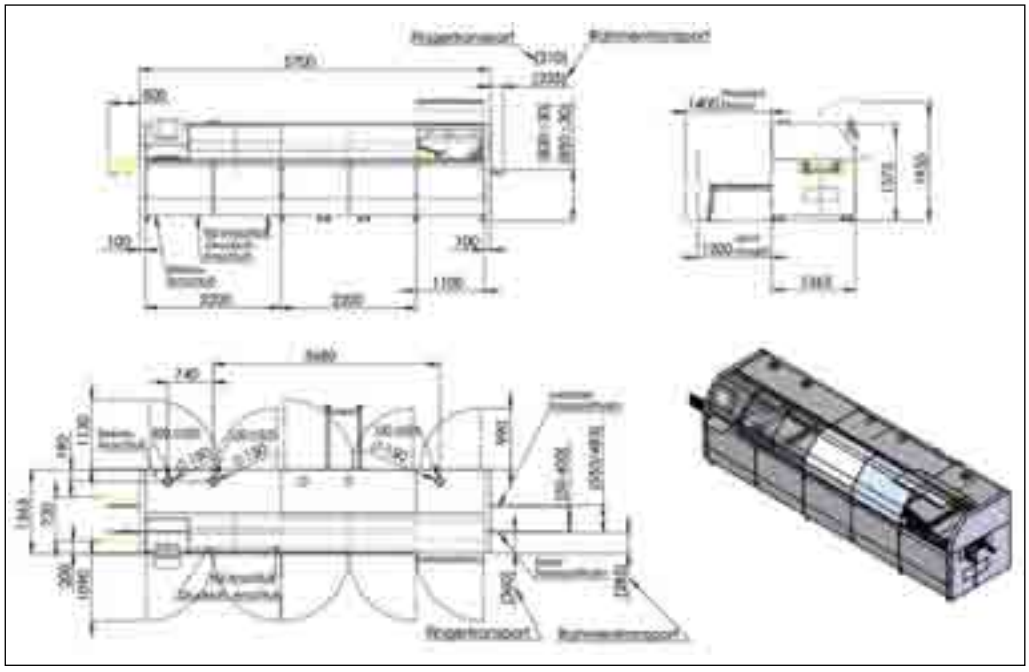
**Process gas cleaning**

A permanent difficulty of closed tunnel systems is contamination of the process zones due to flux vapors, out gassing of the base material, dusts, etc. If these contaminations precipitate onto the assemblies, then under unfavorable circumstances this could result in serious defects. A modern, future-oriented soldering system like the POWERFLOW N2 must reduce the risks of such defects. Consequently a multi-phase, process gas cleaning system was developed to handle the process gas atmosphere.

In the two preheating zones upstream from the solder aggregate, and in the soldering module, a portion of the atmosphere is constantly extracted, cleaned in a central module and then returned to the same modules. The particular feature here is that the three gas flows are not mixed in the process, and the residual oxygen content in the solder modules remains very low as a consequence. Thus contaminants are successfully removed from the process atmosphere and centrally isolated.

One side effect of the process gas cleaning is its positive contribution to the temperature compensation of the assembly temperatures, with due consideration of the temperature of the process tunnel. The permanent exchange of the atmosphere prevents the process gas atmosphere from overheating, and thus it helps stabilize thermal conditions in the tunnel. Thus the tunnel temperature compensation of the preheater works under conditions that are more constant.

*Hermetically sealed process zone offering a clear view on the PCB to be soldered*



**Dimensions (3 preheating modules):**
Length: 5,700 mm (6,425 mm incl. conveyor)
Width: 1,400 mm
Height: 1,580 mm
Weight: approx. 2,800 kg

**Dimensions (4 preheating modules):**
Length: 6,450 mm (7,175 mm incl. conveyor)
Width: 1,400 mm
Height: 1,580 mm
Weight: approx. 3,200 kg

**Paint:** RAL 7035 / 7016

**Pneumatic system:**
Pressure monitoring air pressure: min. 6 bar
Air consumption: approx. 5 - 10 m³/h

**Inert gas:**
Pressure monitoring inert gas supply: 8 bar
Recommended inert gas class: 99.999 %
$N_2$ consumption: approx. 25 m³/h

**Extraction:**
Exhaust connections: 1 x 800 m³/h and 2 x 200 m³/h

**Environmental specification (factory):**
Ambient temperature: 10 - 35 °C
Humidity: 20 - 95 % (non-condensating)
Permanent noise level: < 65 dBA

**Electrical data:**
Voltage: 3 x 230/400 V, N, PE, 5-wire-system
Power tolerance range: ± 10 %
Frequency: 50 / 60 Hz
Fuse rating: 3 x 125 A (slow blow)
Amperage: max. 114 A
Capacity: max. 79 kW

**Flux module:**
Flux storage tank: 10 l
Spray pressure: 0.9...1 bar
Flux system: 1 axis system with CAN motor

**Bottom-side preheat module:**
Type: dynamic short-wave emitter
Capacity: max. 10.4 kW (controlled)
Dimensions: length 600 mm / width 720 mm
Type: medium-wave emitter
Capacity: max. 6 kW (closed loop controlled)
Dimensions: length 600 mm / width 720 mm
Type: convection heater
Capacity: max. 10.2 kW (closed loop controlled)
Abmessungen: length 600 mm / width 720 mm

**Top-side preheat module:**
Type: convection heater
Capacity: max. 6 kW (closed loop controlled)
Abmessungen: length 600 mm / width 720 mm

**Max. preheating length:**
Standard: 1.8 m
Option: 2.4 m

**Solder module 1:**
Type: wave solder module LM 10.1
Capacity: approx. 9.2 kW
Solder volume: approx. 630 kg (when using SnPb63/37 EQ), lead-free 525 kg
Warm-up time: approx 3.5 h (250 °C)
Solder temperature: max. 330 °C
Automatic solder bar feeder

**Conveyor System:**
Type: finger-type conveyor, frame conveyor
Conveyor width: 60...400 mm
PCB length: 120...600 mm
PCB top-side clearance: max. 80 mm
Conveyor speed: 0.2...3 m/min
Conveyor angle: 7° (fixed angle)



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