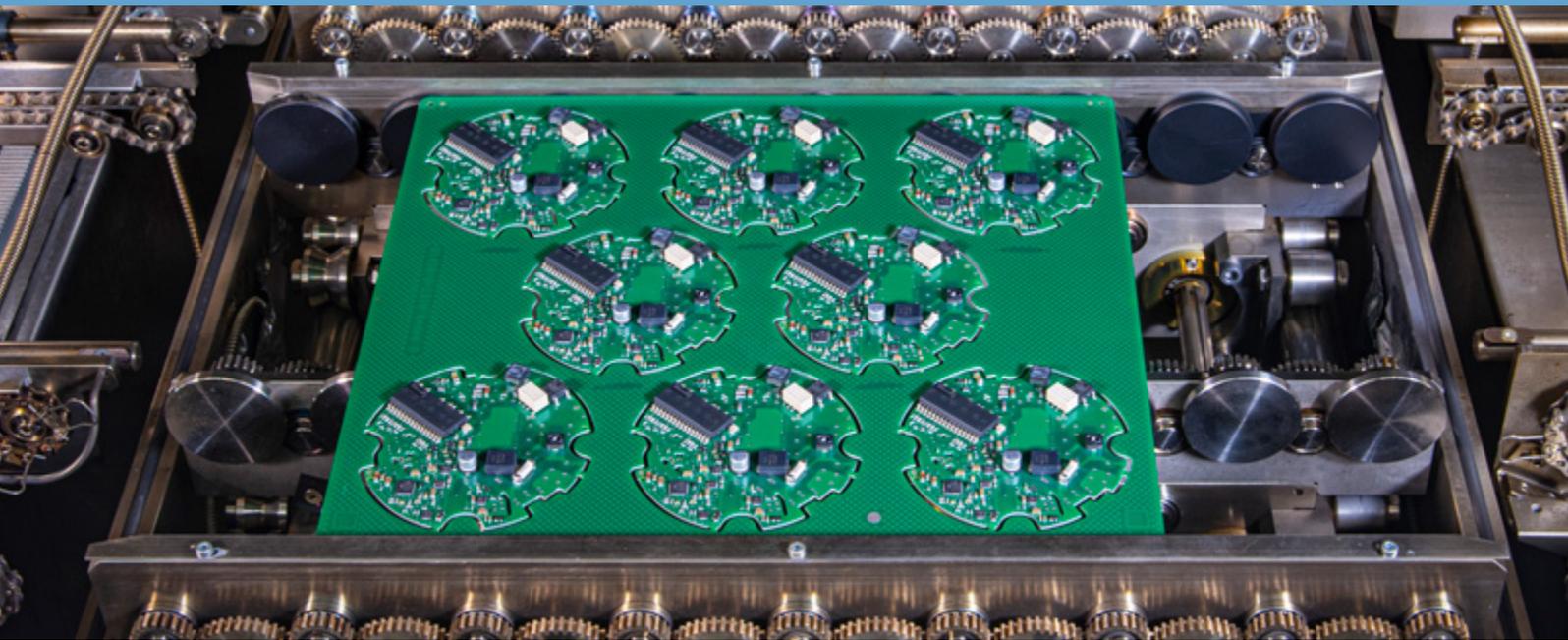


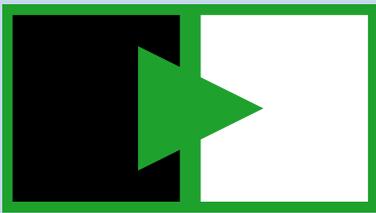
# Ersa EXOS<sup>®</sup>

## Inline reflow soldering with vacuum



# How to avoid voids?

## Ersa EXOS® 10/26



### IPC-HERMES-9852

The global standard for "M2M" in SMT assembly



#### Highlights EXOS® 10/26

- 4-part conveyor (infeed, preheating and peak, vacuum, cooling zone) also as dual track
- Perfect synchronisation of the assemblies and transitions thanks to sensor-monitored conveyor, no external infeed module required
- Maintenance-friendly and lubricant-free roller conveyor in the vacuum module
- Optimum access to the vacuum chamber through lifting unit from above
- Optimum temperature profiles through medium-wave emitters in the vacuum module
- Maximum machine availability thanks to fast removal of the conveyor unit in the vacuum module
- Part-integrated vacuum pump on separate module carrier for easy and fast maintenance
- Innovative cleaning system SMART ELEMENTS®

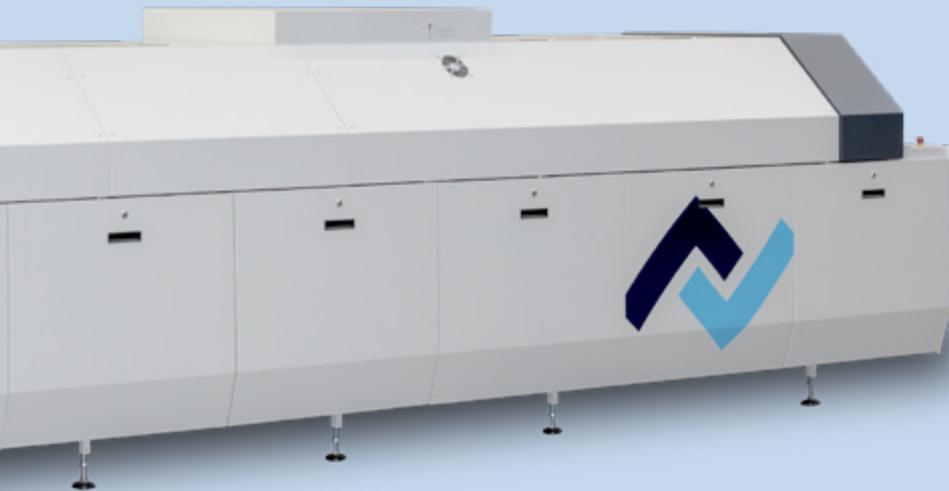
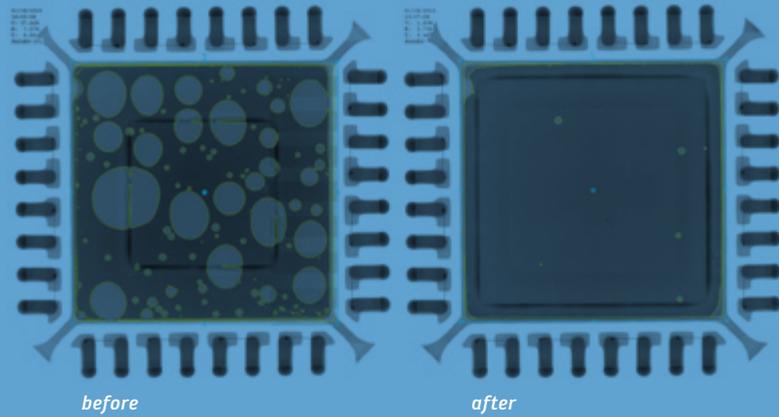
Convection reflow soldering is the preferred connection method worldwide for the surface mounting of electronic assemblies. This is the only method – combined with component development – that guarantees the unstoppable growth of integration density in mobile devices among others. Yet a transformation from THT components to the SMT world is increasingly taking place in classic areas such as power electronics, too.

#### The void-free challenge

One challenge with SMD solder joints is "voids" – air pockets which form in the solder joint when the solder paste is remelted. Depending on size

and position, they reduce the cross-section of the joint, which leads to a significant reduction in heat dissipation in the case of BTC power semiconductors or LEDs.

This results in the risk of thermal overload of the component, leading to its failure in the worst case. From a pore share of as little as three to five percent, heat dissipation is influenced to such an extent that thermal resistance is increased and "hotspots" develop. To prevent this, the void rate in the solder joints must be reduced to an absolute minimum in order to ensure a low reproducible level in series production.



#### Basic configuration

- 22 heating zones
- 1 vacuum module
- 4 cooling zones
- Adjustable & programmable fan speed (heating and cooling zone)
- Energy consumption management
- Automatic chain lubrication
- 100 % tested process tunnel (gas-tight)
- Heating and cooling modules can be pulled out without tools

The void rate can be reduced by creating a vacuum at precisely the moment the solder starts to flow, for example. In an attempt to equalize the pressure, the voids move to the vacuum area and thus leave the solder joints.

#### Safe pore-free solder connections

Calls for pore-free solder connections by the electronics industry – especially for power electronics and high-reliability technology – are becoming ever louder. System supplier Erska is answering these calls with the EXOS® 10/26, a convection reflow soldering system with 22 heating and 4 cooling zones as well

as a vacuum chamber after the peak zone, with which the void rate can be reduced by an impressive 99 %.

#### Intelligent features: Reliability and economy in series production

The new Erska reflow soldering system can produce “void-free” extremely cost-efficiently thanks to intelligent features. Thus for LED assemblies produced on the EXOS® the void rate can be reduced from 8.5 % (largest individual void: 2.2 %) previously to 0.5 % (largest individual void: 0.3 %).

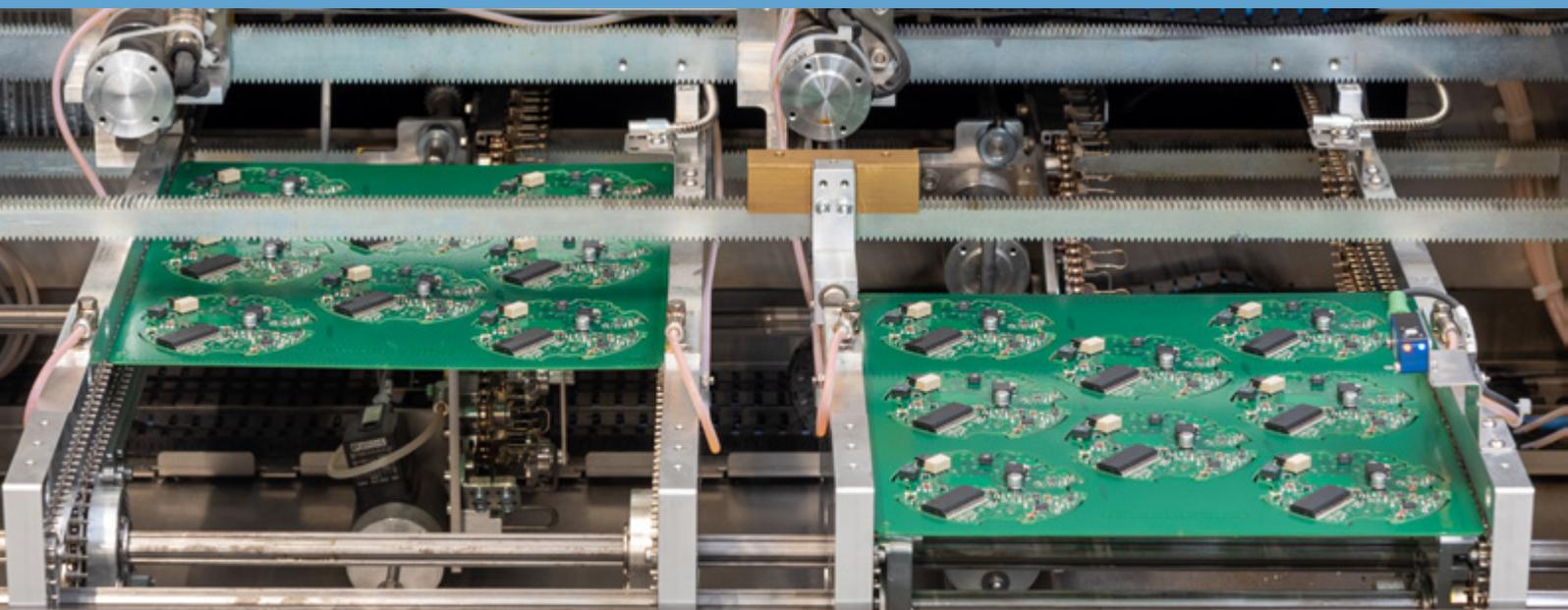
In addition to its process reliability, the maintenance friendliness of the

system is particularly impressive, since it provides calculable added values for the customer.

There are three expansion levels available for the EXOS® for energy-efficient cooling (maximum of four cooling zones top and bottom), so that optimum cooling gradients can always be set, no matter the requirements.

# Safe processes, maximum throughput

## Minimum footprint thanks to innovative conveyor system

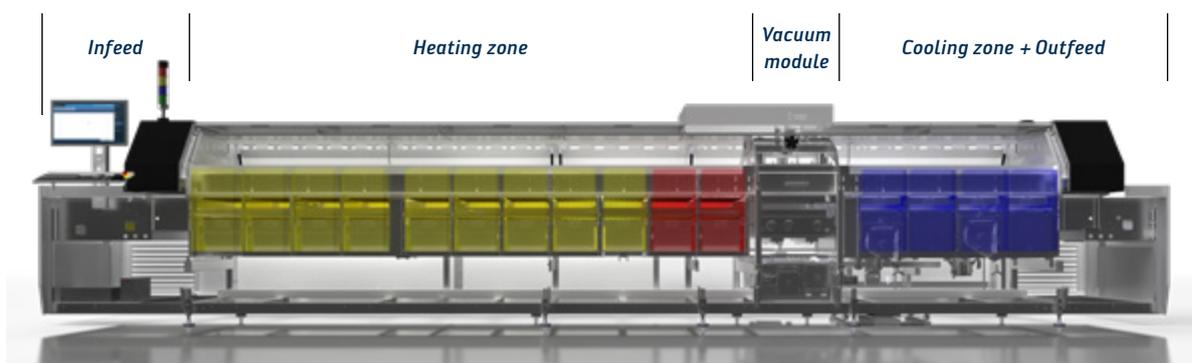


*Dual track with synchronisation in the infeed for maximum throughput and process reliability.*

One highlight of the modular EXOS® is the conveyor system divided into four segments – infeed, preheating zone with peak zone, vacuum module and cooling zone, each of which has its own conveyor. There is no need for an external infeed module thanks to the separate conveyor in the infeed area. The optional dual track conveyor (PCB size with

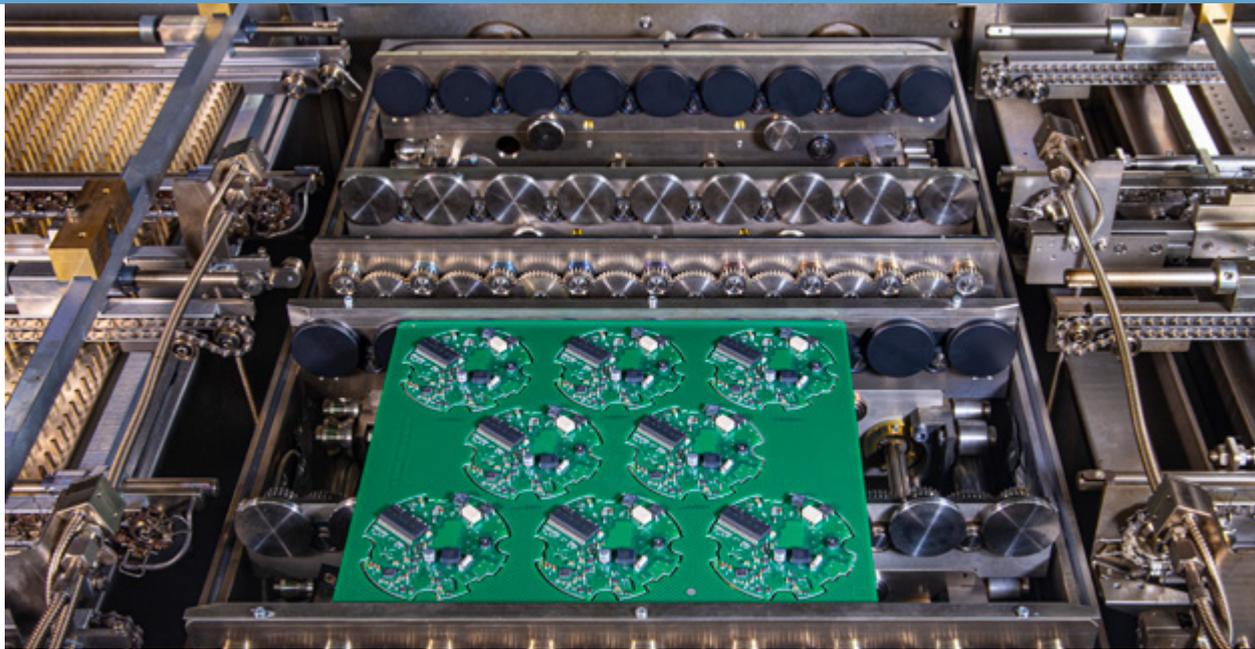
dual track up to 400 x 280 mm) makes maximum throughput possible with optimum PCB guidance, perfect synchronisation and ideal transitions. The integrated infeed module guarantees simultaneous loading of the EXOS® with assemblies on both tracks so that they arrive in the vacuum chamber at the same time. Thanks to the dual-speed

option in the cooling module, the assemblies leave the system at an even lower temperature, so that waiting times before further processing can be dispensed with. There are different chain types available for conveying, so that different requirements concerning edge support and weight of the assemblies can be realized.



# Roller conveyor

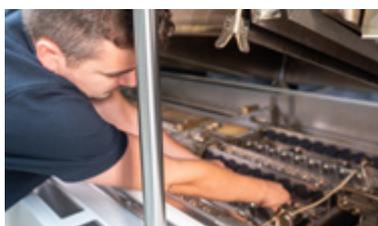
Maximum assembly quality and machine availability



*Lubricant-free roller conveyor with center support in the vacuum chamber.*

The vacuum chamber relies on a sturdy, easily exchangeable roller conveyor that works without lubricant. On the one hand, an extremely low-maintenance type of conveyor. On the other, no danger of lubricant precipitation on the assembly during the vacuum process, significantly increasing assembly quality.

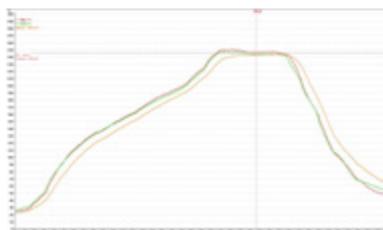
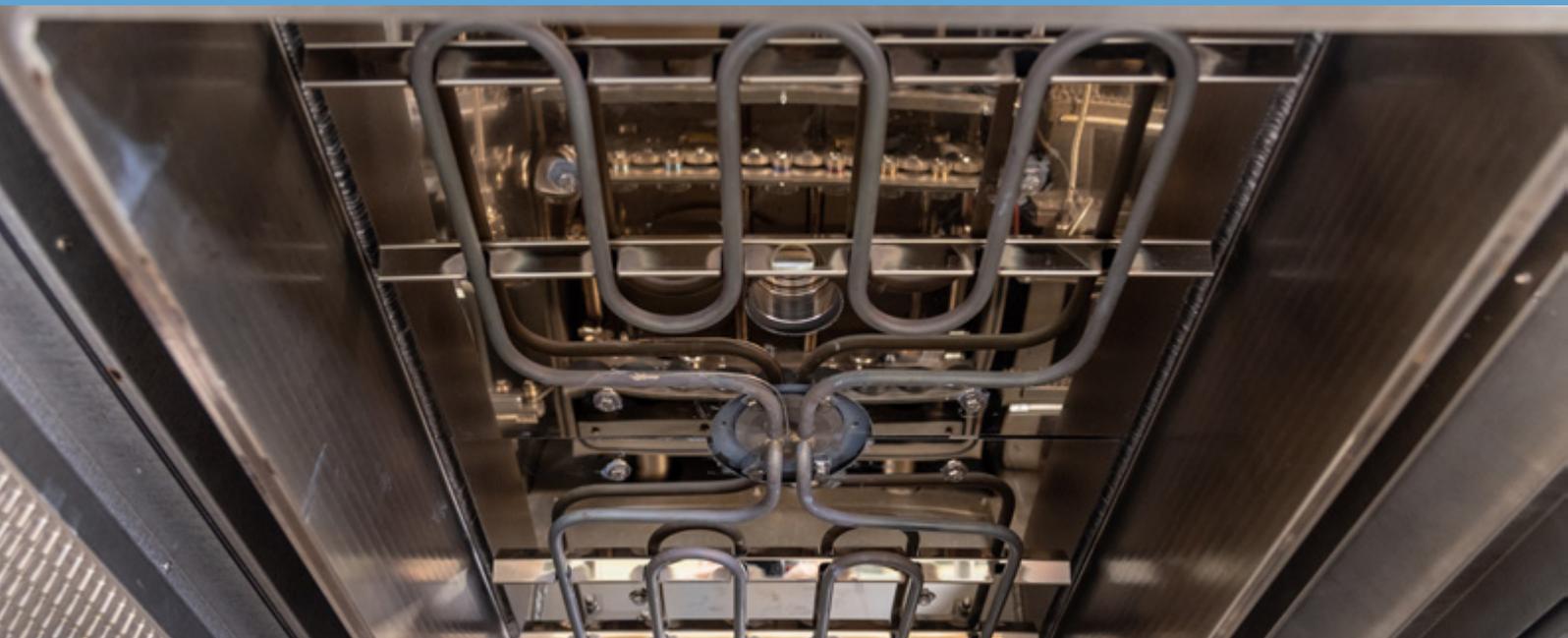
In addition, the roller conveyor can be exchanged quickly and easily. For this purpose, Erska uses quick-release locks which allow conveyor rails and center support to be replaced within seconds.



*Fast conveyor removal.*

# Medium-wave emitters

## Optimum temperature profiles with vacuum process



*Temperature profile with vacuum process – the EXOS® provides maximum flexibility in profile design.*

With reflow systems, the efficiency of heat transfer has a decisive influence on all quality, productivity and operating cost aspects, which directly influence profitability. Heat transfer in the EXOS® guarantees a minimum  $\Delta T$  with the least possible energy consumption. To achieve this, the tried-and-trusted Ersa Multijet convection technology has been further developed and improved. It offers the smallest  $\Delta T$  in the cross profile available on the market over the entire working width and thus achieves a completely new performance level – one of the measurable advantages of this innovative heating system.

The vacuum chamber has its own medium-wave emitter heating which provides a constant temperature profile. In addition, there are heated plates on the chamber walls to stabilize the assembly temperature. This prevents a drop in assembly temperature during the vacuum process and the liquidus of the joint required for void reduction is reliably maintained. During heating design the Ersä engineers took special care to minimize the thermal load on the machine components.

# Vacuum module

## Maximum reliability and maintenance friendliness

*Vacuum unit  
semi-integrated  
in the back of  
the machine.*



The vacuum parameters such as the target pressure level and the holding time of the target pressure level can be controlled separately and can thus be integrated on an assembly-specific basis in the reflow process. Sensors monitor the infeed and discharge area of the vacuum chamber and thus guarantee maximum process reliability. Since the drives for opening and closing the chambers are housed in the upper section of the process tunnel, they are easily accessible for maintenance work.

Half of the entire vacuum unit with pump, filters and valves has been integrated in the EXOS® machine

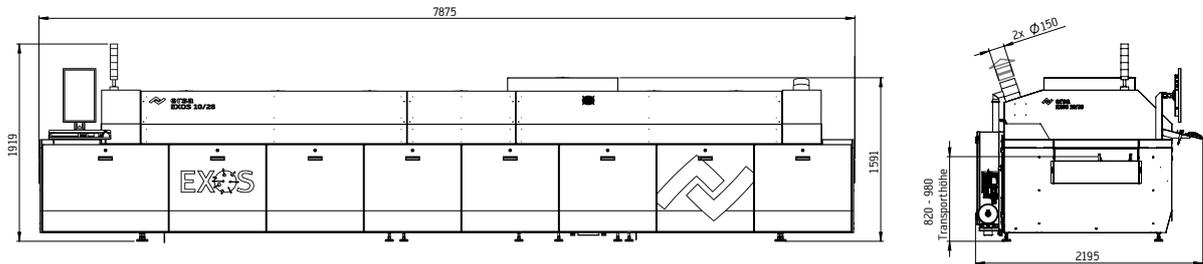
frame, so that no additional footprint is required here. Nevertheless, maintenance work takes place outside the production line, since the complete unit is mounted on a separate module that can be moved easily out of the line thanks to quick-release locks. Downtimes are to the absolute minimum necessary and machine availability is increased respectively, since all components can be reached easily and conveniently this way.

### Highlights vacuum module

- Maintenance-friendly and lubricant-free roller conveyor in the vacuum module
- Optimum access to the vacuum chamber from above
- Optimum temperature profiles through medium-wave emitters in the vacuum module
- Maximum machine availability thanks to fast removal of the conveyor unit in the vacuum module

# EXOS® 10/26

## Technical Data



### Dimensions (Basic machine)

Length:	7,875 mm
Width:	2,195 mm
Height:	1,919 mm
Weight with options:	approx. 5,000 kg
Paint:	RAL 7035/7016

### Conveyor system

Working width:	60 – 630 mm
Working width (PCB center support):	100 – 630 mm
PCB length (vacuum chamber):	120 – 400 mm
Board clearance (standard):	±35 mm
Center support:	15 mm (pin height)
Conveyor speed:	20 – 200 cm/min
Conveyor height from floor:	820 – 980 mm
Pin-and-chain conveyor:	5 mm edge clearance

### Process zone

Infeed:	1,011 mm
Heating zone:	4,545.5 mm
Vacuum zone:	558 mm
Cooling zone:	2,273 mm
Outfeed:	730 mm
Process chamber width:	approx. 910 mm

### Heating system:

Convection share (except vacuum chamber):	100 %
Gas flow/module:	500 m <sup>3</sup> /h adjustable, Multijet
Convection modules:	11 top; 11 bottom
Preheating:	9 top; 9 bottom
Soldering zone:	2 top; 2 bottom
Heating system	2x regulated
vacuum chamber:	1x controlled

### Vacuum chamber:

Chamber volume:	approx. 110 l
Pump performance:	5.3 kW
Final pressure:	up to 10 mbar

### Electrical data

Power:	5-wire-system, 3x 400V, N, PE
Power tolerance range:	±10 %
Frequency:	50/60 Hz
Max. fuse rating:	3x 125 A
Nominal rating:	118 – 150 kW
Reduced rating:	69 kW
Continuous rating for operation:	approx. 14– 25 kW

### Safety devices

1x main switch
4x emergency-stop buttons
2x exhaust monitors

### Exhaust rating:

Exhaust stacks:	2 stacks, 150 mm (6") Ø each
Exhaust volume per stack:	400 m <sup>3</sup> /h
Exhaust monitoring per stack:	integrated

### Noise level:

Permanent noise level:	< 70 dB (A)
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### America

Kurtz Ersä, Inc.  
usa@kurtzersa.com

### Mexico

Kurtz Ersä México, S.A. de C.V.  
info-kmx@kurtzersa.com

### Asia

Kurtz Ersä Asia Ltd.  
asia@kurtzersa.com

### China

Ersä Shanghai  
info-esh@kurtzersa.com

### Vietnam

Kurtz Ersä Vietnam Company Limited  
info-kev@kurtzersa.com

### France

Kurtz Ersä France  
kefrance@kurtzersa.com

Ersä GmbH | Leonhard-Karl-Str. 24  
97877 Wertheim/Germany

Tel. +49 9342 800-0  
info@ersa.de | www.ersa.com

 **kurtz ersa**