AUTOMATION

baumann

Depaneling System for PCBs
- offline, - inline, - integrated

baumann

rout|box

Depaneling System made by Baumann

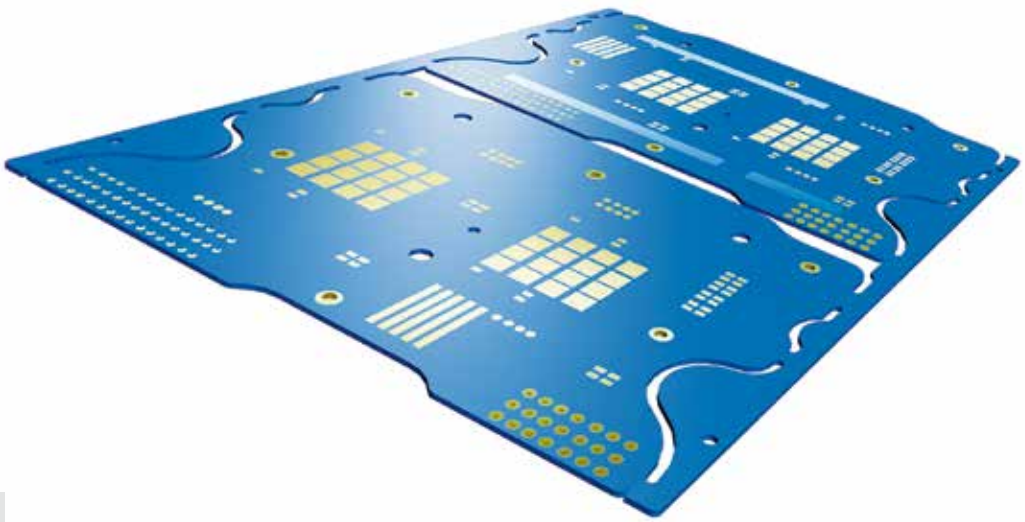
– in other words a reliable and accurate system for quick, low-stress depaneling of PCBs for electronic assemblies, thus guaranteeing the highest product quality. Manufactured to the latest machinery directives and guidelines for the manufacture of electronic components (SMEMA, ESD), the rout|box is an extremely versatile solution with various cell configurations and integrated modules, that is also outstanding in terms of cleanliness. A specially developed high-performance extraction unit keeps the PCB clean and free of all but the smallest particles.

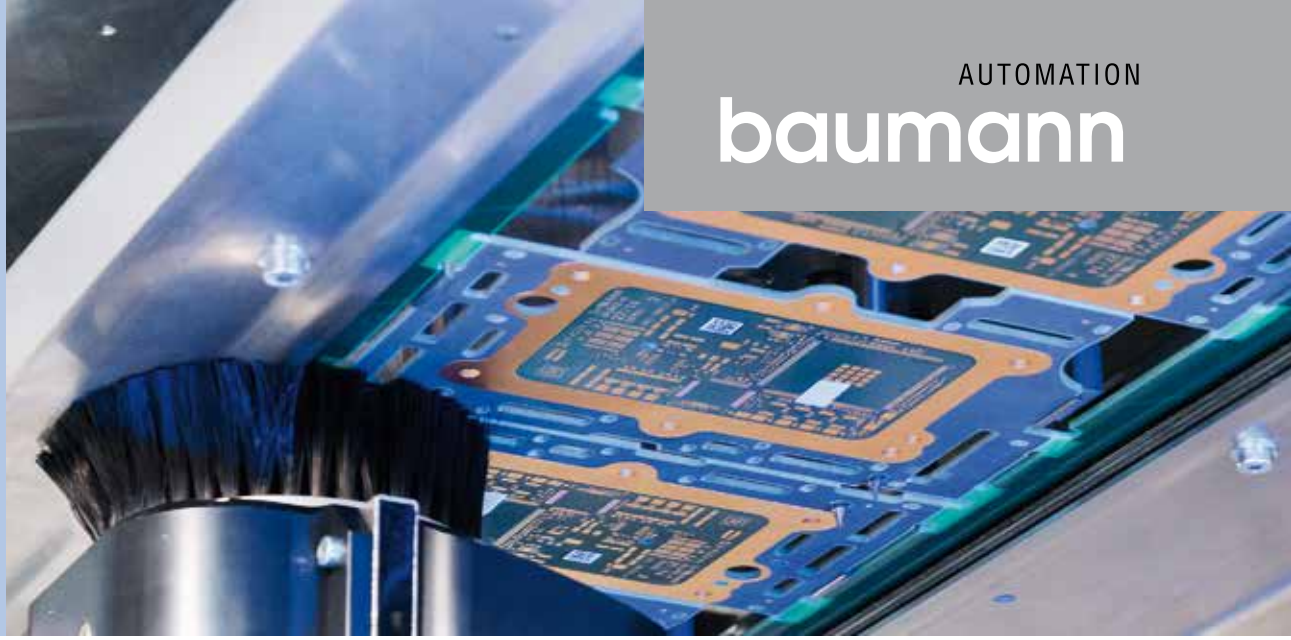
The PCB depaneling is done with a milling tool. The fixing of the panel works from above with a clamping device. A 60,000 rpm milling spindle runs on a high-precision triple-axis servo drive system beneath the PCBs. The individual PCBs are clamped in position during the milling process by grippers and then – depending on the rout|box version – discharged individually or as a group.

Coded variant sets enable quick and simple product changeover. The machine recognises the current set and selects the corresponding milling program automatically. The milling tool diameter is checked at the same time.

PCB formats

PCB length	460 mm
PCB width	460 (230) mm
PCB thickness	0.4 bis 3.2 mm
Max. PCB weight (panel)	10 kg
Max. PCB weight (PCB)	2 kg
Component height at spindle side	18 mm
Component height at gripper side	40 mm





The tool is automatically checked for crack after each milling operation to ensure maximum process reliability. An automatic tool changer enables a number of tools to be stored in the magazine. Continuous displacement of the milling tool helps to extend its service life considerably. Tools are changed out according to individually configurable parameters. Milling contours are generated using data transferred from the CAD in combination with tool parameters.

The user-friendly mobile touch-panel complete with specially developed software has been designed in accordance with ergonomic principles. Each rout|box comes with Ethernet interfaces to connect peripheral equipment and host PCs (MES).

General system features

- Efficient extraction for minimal residual particles
- Ethernet interfaces for connecting peripheral equipment and host PCs (MES)
- Extremely user friendly thanks the mobile touch-panel
- Automatic milling tool changeover
- Monitoring of milling tool crack
- Simple product changeover due to coded variant sets
- Robust cell concept in accordance with the proven Baumann standard

Technical data

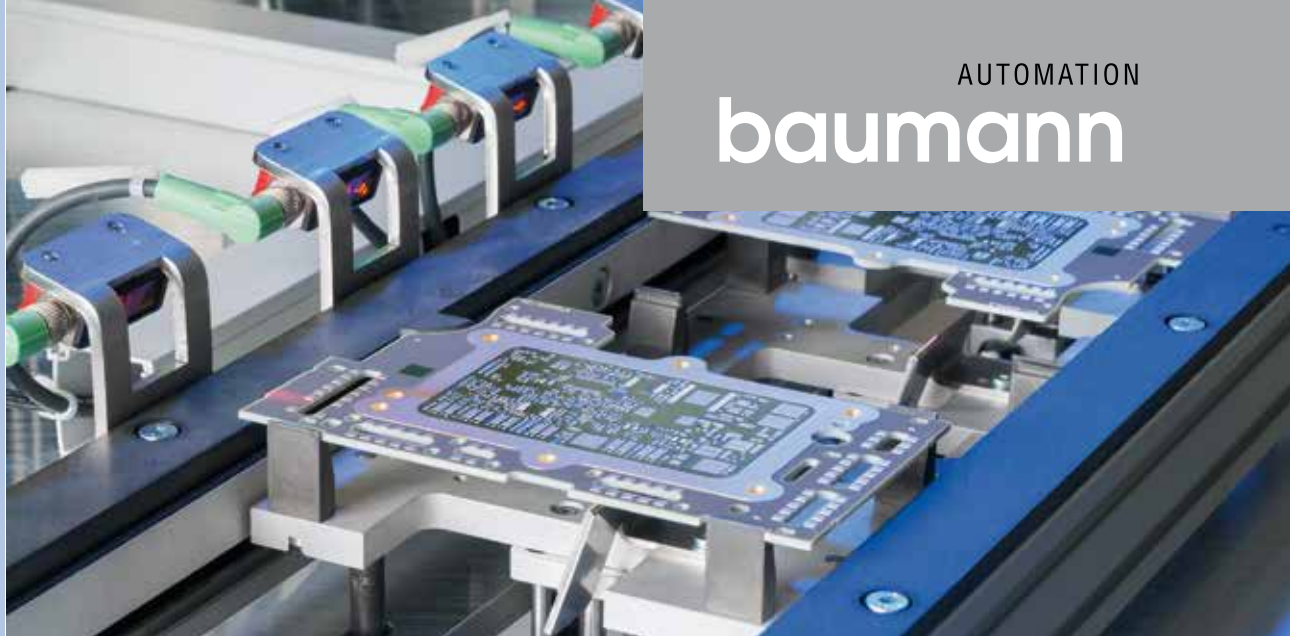
Axis speeds	up to 1000 mm/s
Positioning accuracy	± 0.01 mm
Repeat accuracy	± 0.003 mm depending on handling
Cutting speed	up to 1.6 m/min
Milling tool speed	up to 60,000 rpm
Cutting accuracy	± 0.10 mm with Vision System ± 0.15 mm without Vision System
Milling tool	from below
Noise level	69 db (A)

rout|box offline

The offline version of the rout|box is designed in accordance with the principles of lean automation. It is ideal for fast product change-over and smaller batch sizes. Due to the highly compact design, the rout|box offline fits seamlessly into existing production facilities. The core process is fully automated and guarantees optimum depaneling results. Only loading is carried out manually, thus maximising flexibility.

Lean automation concept

A two-drawer system facilitates panel loading and unloading of the singulated PCBs and edge trimmings. The loading and unloading drawers are not coupled to the actual production process. This means loading and unloading can be carried out while milling, thus speeding up the cycle time compared to conventional systems. The drawers open and close automatically.

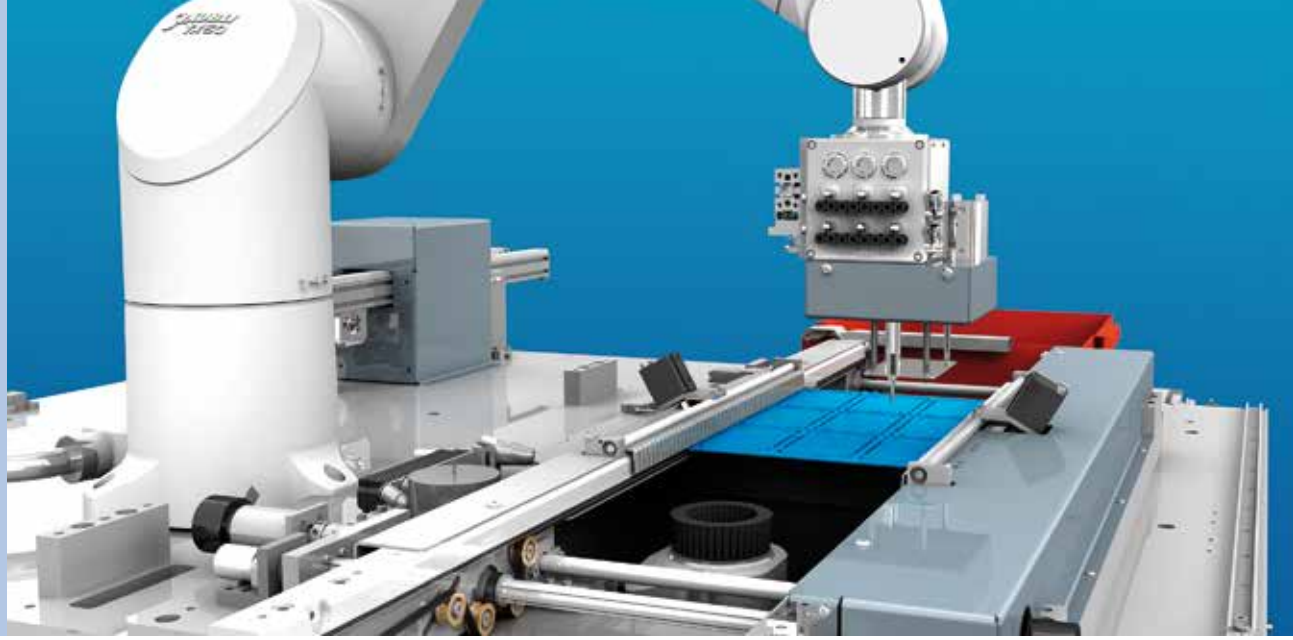


rout|box inline

The core process and basic design of the rout|box inline are identical to the proven offline version. However, in this case, the PCBs are supplied fully automatically using conveyor belts and/or magazines. PCB handling can be tailored to meet every demand and facilitates individual drop-off of singulated PCBs. Waste trimmings are disposed of automatically in a container provided for this purpose. Workpiece carriers, trays or belt systems can be used to transport the finished components.

Modular and flexible

The cell‘s open architecture and modular design allow the material infeed and outfeed to be positioned on either side of the rout|box inline in different running directions. This allows this version of the Baumann depanelizer to be integrated into a production line with a continuous material flow.

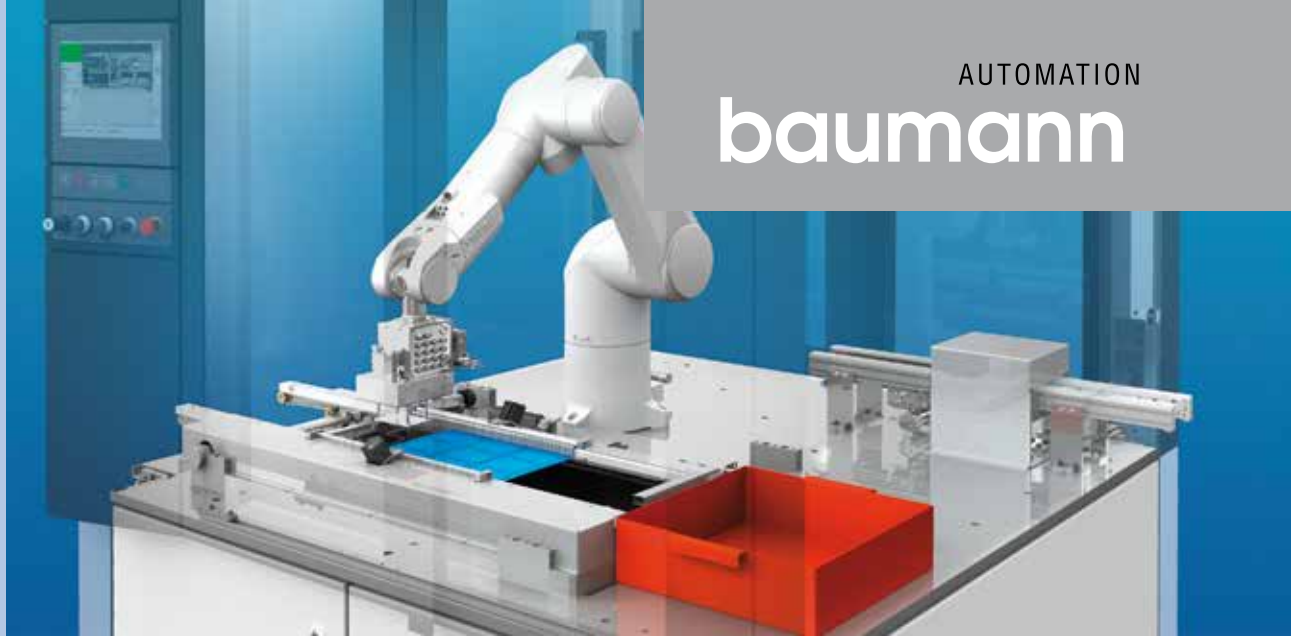


rout|box integrated

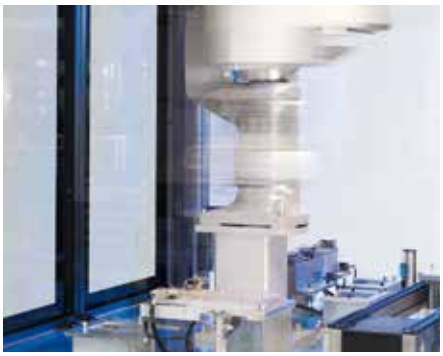
With this specific version, the milling module from the rout|box is integrated into another Baumann robot cell, e.g. a ro|box or a feed|box. The basic design of the core milling process is nevertheless the same. The integrated version ensures an almost unlimited range of further processing options for PCBs. This is guaranteed through proven handling techniques using 4, 5 or 6-axis industrial robots. There are also a number of different ways to feed the panels into the system.

The robot gripper essentially takes over the handling of the individual PCBs. A wide range of additional assembly or test procedures can be installed after the singulation process. These include marking, optical inspections, electrical testing, assembly mounting using adhesive bonding or press-fitting, packaging, etc. Utilisation of the single gripper robot also enables automatic gripper changeover, thus enhancing the system's versatility. By combining the depaneling system with various process modules, the rout|box integrated offers a production cell whose compact design optimises available space like no other solution.

Integrating various



processes



The majority of assembly lines and production cells require the implementation of special processes. Baumann is a specialist in the integration of specific production processes into production and assembly lines in terms of control, operation and safety. When acting as the general contractor, Baumann Automation is fully responsible for all hardware and software supplied. The automation expert also prepares all the necessary documents and certificates for the required European CE Declaration of Conformity. Thanks to the complete package provided by Baumann, customers receive comprehensive, yet flexible and cost-effective industrial solutions from a single source.

Testing
PALLETISING
Optical inspection
assembly
pick and place
ELECTRICAL TESTING
PRESS FITTING
Image processing
Marking
DISPENSING
LABELLING
Bending
Feeding
Unloading
Bonding
Loading
Data gathering
Packaging

Overview of routlbox products

	routlbox offline Manual drawer loading for lean production	rout|box inline Automatic loading and unloading within the production line	routlbox integrated Singulation process integrated in customised handling and assembly cell
Standard cell sizes	1750 x 1000 x 2200 mm	1750 x 1000 x 2200 mm	1000 x 1500 mm to 2000 x 2000 mm
Standard PCB sizes	460 x 460 mm	460 x 460 mm	460 x 230 mm
PCB handling			
Axis system, X/Z	O	O	
Axis system, X/Y/Z		(O)	(O)
4 and 6-axis robots			O
PCB supply			
Drawer	O	(O)	(O)
Conveyor belt		O	O
Magazine		O	O
Workpiece carriers/Trays		O	O
PCB drop-off			
Drawer	O	(O)	(O)
Conveyor belt		O	O
Workpiece carriers/Trays		O	O
Options			
Component identification, DMC reader	O	O	O
Host PC connection, MES	O	O	O
Fiducial marker detection	O	O	O
Path correction with camera system	O	O	O
Ionising unit	O	O	O
Industrial suction unit	O	O	O
Image processing, optical inspections	O	O	O
Automatic gripper changing systems	O	(O)	O
Integrated assembly processes			O
Integrated test systems			O

O = optional
(O) = after prior agreement

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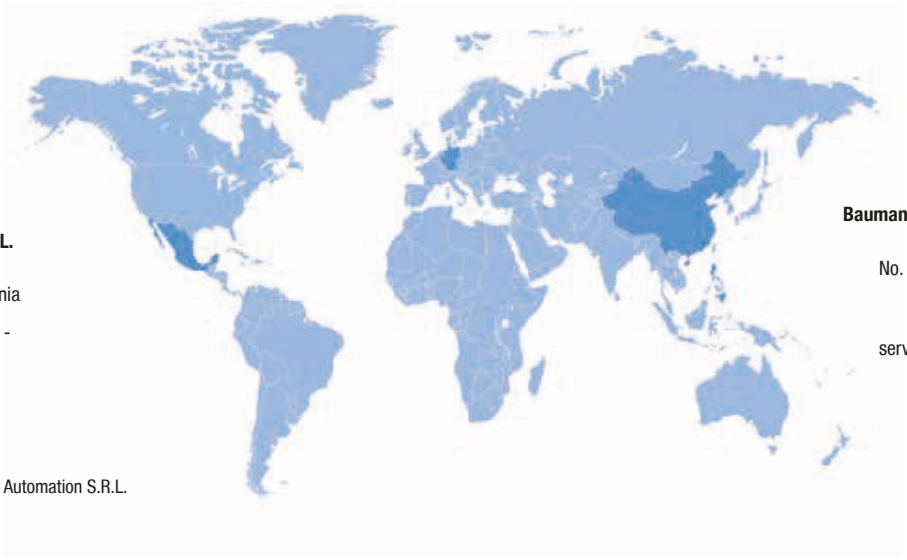

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