THE RFID FACTORY

PRODUCT OVERVIEW

Mühlbauer
High Tech International

CONTENTS

MUEHLBAUER GROUP AT A GLANCE

MUEHLBAUER'S BUSINESS UNITS AND SITES

The **Muehlbauer Group** is a German high-tech company that is known worldwide for its innovative solutions in the field of automated production. With over 40 years of experience, Muehlbauer develops customized technologies for the future of industry and everyday life. The company is the secret driving force behind many developments that make our modern lives safe and efficient.
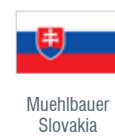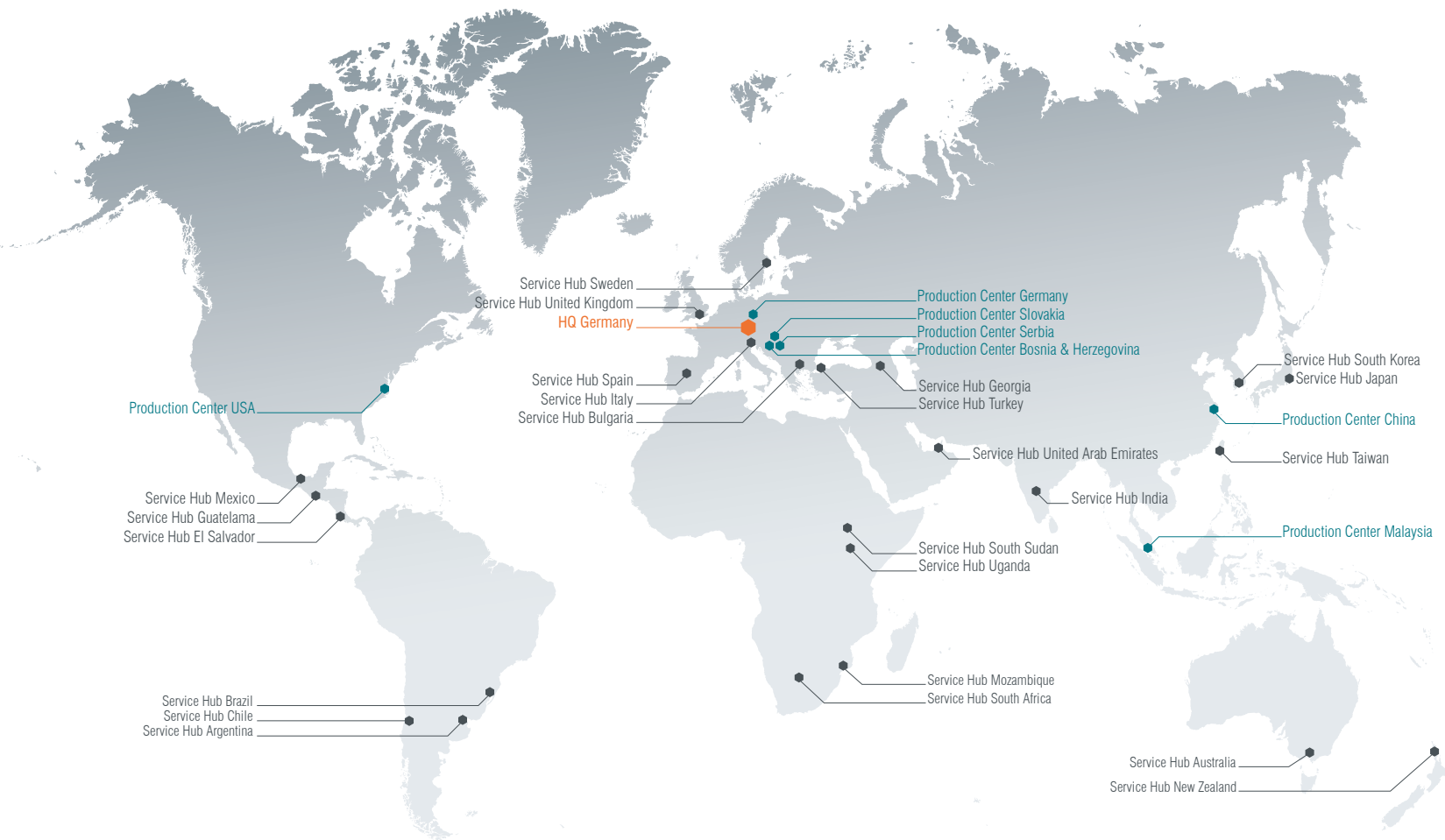
Since its foundation in 1981 in Roding, Bavaria, Muehlbauer has stood for maximum precision. The Muehlbauer **Parts & Systems** business unit consists of the company's own precision parts production with a state-of-the-art electroplating facility. All components for machines and other products are manufactured here in-house – individually and, if necessary, overnight! Our MPS makes us extremely agile and independent.

Our **AUTOMATION** division goes far beyond the assembly of customized production systems! We provide intelligent software solutions for the automation of different production steps and drive Industry 4.0 forward. We are passionate about serving 90% of the global RFID market with our high-speed bonders, and have achieved market leadership in the semiconductor industry with our unique die sorting technology.

Our newest and currently most dynamic division **ATECH** – Advanced Energy Technologies – brings unique machine requirements to series production. In the field of e-mobility, we offer highly efficient production lines for the manufacture of pouch cells and prismatic cells for lithium-ion batteries, as well as MEAs & stacks for fuel cells. Our newly built ATECH Giga Center with dry room provides optimal conditions for gigascale manufacturing.

Our **TECURITY®** division is the leading specialist when it comes to implementing innovative security systems for identifying and verifying documents and people. For example, we manufacture systems for the production of chip cards, IDs and passports or supply eGates and self-registration kiosks and the associated software for airports and border crossings. With more than 30 years of experience and over 300 successfully implemented ID projects worldwide, we offer our customers absolute expertise and trust at the highest level.

More than 4,000 employees at over 30 locations worldwide ensure that Muehlbauer's visions become reality around the globe. Sustainability, quality and unwavering trust in partnerships are the pillars on which our company has built its success story. Muehlbauer is not just a service provider, but a **creative problem solver** that shapes the future every day with innovative ideas and technological excellence.

Service Hub Sweden
Service Hub United Kingdom
HQ Germany
Production Center Germany
Production Center Slovakia
Production Center Serbia
Production Center Bosnia & Herzegovina
Production Center USA
Service Hub Spain
Service Hub Italy
Service Hub Bulgaria
Service Hub Georgia
Service Hub Turkey
Service Hub South Korea
Service Hub Japan
Production Center China
Service Hub United Arab Emirates
Service Hub Taiwan
Service Hub India
Service Hub Mexico
Service Hub Guatelama
Service Hub El Salvador
Production Center Malaysia
Service Hub South Sudan
Service Hub Uganda
Service Hub Brazil
Service Hub Chile
Service Hub Argentina
Service Hub Mozambique
Service Hub South Africa
Service Hub Australia
Service Hub New Zealand

Muehlbauer
Bosnia & Herzegovina

Muehlbauer
China

Muehlbauer
Germany

Muehlbauer
Malaysia

Muehlbauer
Serbia

Muehlbauer
Slovakia

Muehlbauer
USA

MPS
Precision Parts & Surface Engineering

AUTOMATION
Production Equipment & Systems

MB ATECH
Battery & Fuel Cell Technologies

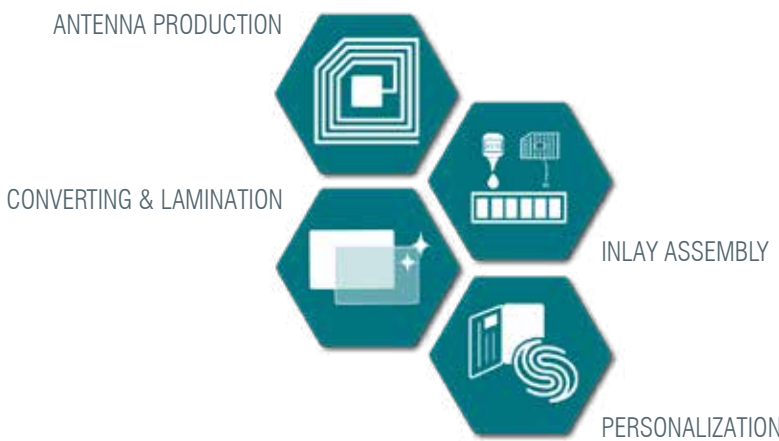**WORLD OF TECURITY®**
Government & Technology Solutions

RFID COMPETENCE CENTERS

REALIZING RFIDeas WORLDWIDE

ANTENNA PRODUCTION

CONVERTING & LAMINATION

INLAY ASSEMBLY

PERSONALIZATION

Newport News, VA
USA

Roding
GERMANY

Melaka
MALAYSIA

Wuxi
CHINA

Nitra
SLOVAKIA

COMPETENCE IN RFID

|	ANTENNA PRODUCTION	CHIP HANDLING	CONVERTING	PERSONALIZATION	
1985		■			Development of our core competence Chip Handling: Specialization on small chips, high speed and high accuracy for Flip Chip technology
1988		■			First turnkey production solutions for Smart Cards
1995		■			Development of the world's first RFID Inlay Production System (TAL 1500). Since then, Muehlbauer has been a major driving force in RFID production technology
2004		■	■		Muehlbauer develops a strategy to become a turnkey solution provider for the complete RFID factory. Our goal is to provide our customers with the most efficient and competitive RFID production and personalization solutions
2010			■		First Converting Solution
2014	■				The lastest innovations "Antenna Production Systems" have been realized
		■			The revolutionary "Direct Die Attach System DDA 20000" roadmap for 100.000 UPH entered the market
				■	The latest "Personalization Technologies" are presented to the market
	■	■	■	■	The Muehlbauer Group releases its new roadmap "CONCEPT 2020" during the 1st "RFID Innovation Days" event
2018		■			The DDA 40000 is launched
2019	■	■	■	■	Muehlbauer releases "Concept 2023" and MB PALAMAX®
2020		■			The world record machine DDA 80000 WF was launched as the "front runner" of our flexible DDA WF Family
2021	■				APS – newest market solution available
				■	Personalization solutions approach to medical applications
2023			■		Release of CL 40000 and IL 30000
2025	■	■	■	■	Celebration of 30 years RFID competence

SMART FACTORY CONCEPT

THE FUTURE OF RFID MANUFACTURING

Based on the machine innovations of Concept 2020, we have respected the needs of high-volume production combined with a sustainable green process and developed the **Smart Factory Concept**. The Smart Factory Concept is the roadmap for highly automated, sustainable production and material flow. Based on the intelligent production planning, the use of automated smart vehicles, preventive maintenance, and full production transparency, only a limited number of people are needed to run the system.
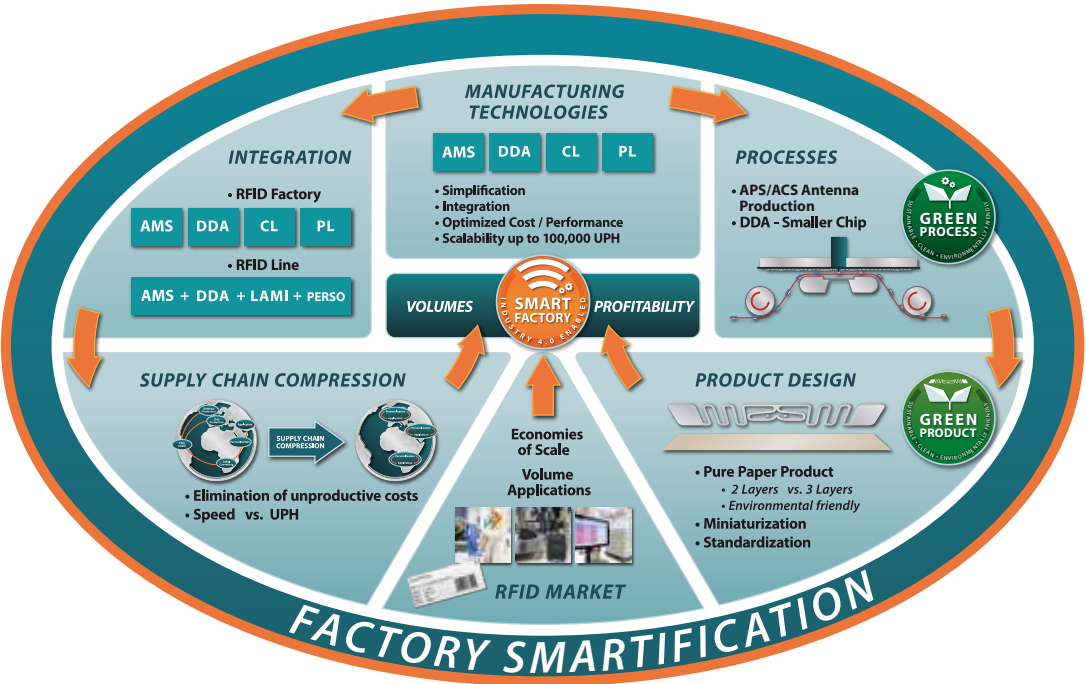
The integration of various manufacturing processes leads to stable and productive manufacturing lines that ensure high-volume production with consistently high yields and uptime. In addition, up to 30% less floor space is required.

With our Smart Factory Concept, we combine the revolutionary advances with our unmatched expertise to create a state-of-the-art technology, controlled and monitored by our proprietary software solution. We will do our very best to develop the technologies of the future and always provide you with the most competitive solutions.

THE RFID FACTORY

YOUR PARTNER FOR THE COMPLETE RFID SMART FACTORY

No one knows where the rapid growth of the RFID market will take us. Muehlbauer is able to provide you with the right technology to meet tomorrow's demands. Not only will supply chain compression, high UPH and yield be our challenge, in the future we will need to work on sustainable green manufacturing technologies and the decrease of process costs. Our Smart Factory Concept will provide the way to build a smart RFID factory Industry 4.0 by having automated control of manufacturing data, material and process flow. This new factory concept will be able to be more productive in less space and will even further reduce costs. The entire process can be handled by just a few people and will guarantee the highest utilization of the installed capacity. Even non-Muehlbauer machines will be supported.
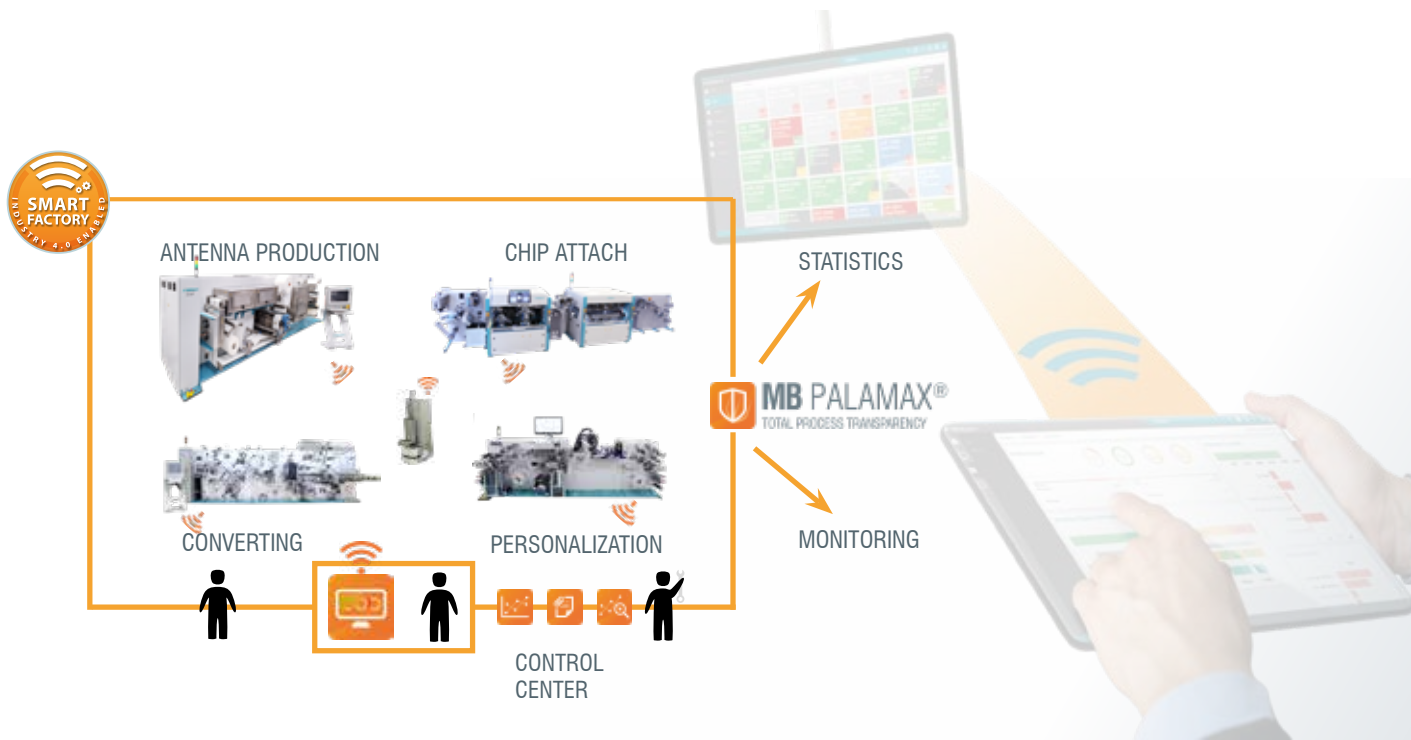
- Optimized material flow by automated vehicles for material transport
- Optimized machine utilization
- Preventive maintenance
- Support engineering in precise detection
- Fully automated data collection in real time
- Increased OEE and very fast ROI within months
- Significant reduction of manpower and floor space
- Full production transparency

MB PALAMAX®

TOTAL PROCESS TRANSPARENCY

MB PALAMAX®, Muehlbauer's Smart Factory solution, is designed for card, tag or booklet production, personalization factories and semiconductor backend shop floors. Consisting of a NOSQL database, it is designed to set and collect process data to monitor and improve the efficiency of production and person-alization. The collected process data is stored in big data sets for later processing, visualization and statistical analysis. MB PALA-MAX® is the backbone of our Smart Factory solution, collecting all relevant data and handling the process & material flow.

SMART PRODUCTION MANAGEMENT

SMART MATERIAL MANAGEMENT

TRANSPARENCY OF YOUR PRODUCTION
- Real-time monitoring during production
- Tracking & tracing of each individual product
- Minimized maintenance

Productivity +50%

Efficiency & Speed +30%

Cost Reduction +20%

- Securing Future Competitiveness
- New Business Models
- New Services

SMART FACTORY
INDUSTRY 4.0 ENABLED

FEATURES & ADVANTAGES

MB PALAMAX.MONITOR
Monitors the real-time performance of the production

MB PALAMAX.STATS
Statistical tool that analyzes collected data & delivers customized statistics on OEE

MB PALAMAX.REMOTE
Enables the remote operation of machines on the shop floor from a control centre

MB PALAMAX.TRACE
Allows for the auditing of single manufacturing runs

MB PALAMAX.MAINTAIN
Enables the implementation of maintenance on demand

MB PALAMAX.REPORT
Provides extensive reporting capabilities and data storage

MB PALAMAX.RECIPE
Allows production engineering to prepare & test a repeatable factory setup. Factories can switch between products in minutes.

- The only software solution worldwide to combine personalization data management, complete production control and material management
- Covers the full production control requirements
- Highly automated workflows with little operator interaction
- Streamlined web-based user interfaces with easy localization

KEY FEATURES

- Monitor your production in real time and generate real production statistics with your preferred KPIs – for specific chip types only
- Improve your transparency
- Gain better data to explore, understand, and map process flows and relationships
- Run your production with improved security and optimally deployed, well-trained staff
- Intuitive and easy-to-use web interface
- Responsive user interface design allows optimal presentation on any chosen device
- Collect data from the shop floor of Muehlbauer equipment and third party equipment
- State-of-the-art big data software architecture ensures future-readiness

RFID COMPETENCE

SMART FACTORY CONCEPT

MB PALAMAX®

ANTENNA PRODUCTION

INLAY ASSEMBLY

CONVERTING

PERSONALIZATION

ANTENNA PRODUCTION

TECHNOLOGY OVERVIEW

Driven by the need for environmentally friendly production processes, fast and flexible production cycles, and high volume production capabilities, Muehlbauer has taken antenna manufacturing to the next level. The Antenna Printing System (APS) is designed to provide zero waste production without the use of harmful chemicals. Muehlbauer's antenna manufacturing technology marks a milestone in supply chain compression, antenna on demand production, and total control over your design.

	APS 350
WEB WIDTH	350 mm
Annual capacity	approx. 240 million unit / year
ANTENNA TYPE	
UHF	Yes
HF	Yes
Throughput	3 m/min Roadmap 8 m/min
MATERIAL	Paper, Copper ink
YIELD	>99,7%

PRINTING TECHNOLOGY

ROTATION SCREEN PRINTING
● fully compostable thanks to natural materials

APS 350

ANTENNA PRINTING-SYSTEM

The completely new approach of the APS enables smart label suppliers to print their own antennas in-house on demand. The new process is cleaner and faster than any conventional antenna technology currently on the market. With the APS 350, copper ink antennas can be produced under an integrated quality assurance system. The APS is especially interesting for smart label manufacturers who need a fast response time, as they can produce antennas in hours instead of weeks.

GREEN DESIGN | GREEN PROCESS

PAPER SUBSTRATE ANTENNA ON DEMAND

BENEFITS

- Fully decomposable copper antennas on paper
- Copper ink printing process with no chemical waste (green process)
- Enables two-layer products (green design)
- Cost savings of up to 70% compared to silver printing
- In-house antenna supply – just in time
- UHF production

M/MIN   ROADMAP

1   2   3   4   5   6   7   8

FEATURES & ADVANTAGES

ADVANTAGES
- Supply chain compression (no shipping from sub-suppliers)
- Print-on-Demand flexibility (with existing design, production within 8 hours)
- Know-how remains in your company
- Tag disposal < 30 days in standard composter

WORKSTATIONS

- Input spooler
- Printing system
- Drying system
- Drive module
- Sintering system
- Visual tester
- Output spooler

THROUGHPUT
- up to 3 m/min, roadmap for 8 m/min with rotative screen print
- up to 36,000 UPH (20 mm pitch, 4 row)
- up to 240 Mio. per year

DIMENSIONS
- Length 6000 mm
- Depth 2100 mm
- Height 2300 mm
- Weight 2000 kg

SMART FACTORY INDUSTRY 4.0 ENABLED
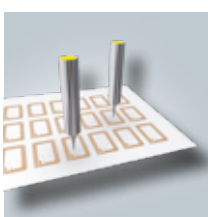
INLAY ASSEMBLY

TECHNOLOGY OVERVIEW

Thanks to continuous development efforts, our chip attach machines are the most proven solution for inlay production. Besides the well-known Muehlbauer quality & technology standards, our DDA 80000 WF demonstrates leading edge performance with a world record and unique UPH up to 80,000. With our green DDA 40000-P, your paper inlay will upgrade your operations to environmentally friendly and flexible inlay production.

	DDA 20000 WF	DDA 40000 WF	DDA 80000 WF	DDA 40000	DDA 40000 - P
WEB WIDTH					
35 - 160 mm				Narrow Web	Narrow Web
100 - 350 mm					
100-385 mm	Wide Web	Wide Web	Wide Web		
TECHNOLOGY	Direct Die Attach (Single Head)	Direct Die Attach (Dual Head)	Direct Die Attach (Quadruple Head)	Direct Die Attach (Single Head)	Direct Die Attach (Single Head)
Max. UPH	20 000	40 000	80 000	40 000	40 000
Yield			>99.7%		
Highlight	Upgradeable	Upgradeable			
DIES					
Size min.			0.2 x 0.2 mm		
Size max.			1.5 x 1.5 mm		
ANTENNA					
Material	Copper, aluminum, silver on PET or paper	Copper, aluminum, silver on PET or paper	Copper, aluminum, silver on PET or paper	Copper, aluminum, silver on PET	Copper, aluminum, silver on paper or PET
OUTPUT					
Single Row				■	■
Multi Row	■	■	■		
ACCURACY					
Machine			$\pm 15\,\mu m$		
Die Attach			$\pm 30\,\mu m$		
Post Cure			$\pm 50\,\mu m$		
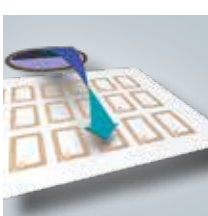
DDA TECHNOLOGY

THE REVOLUTION IN FLIP CHIP DIE ATTACH – PROCESS FLOW
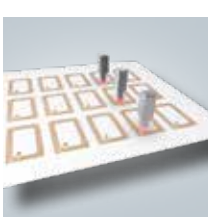
ADHESIVE APPLY
- Latest generation of adhesive jetting technology available
- Glue savings of approx. 25 % compared to dispensing system
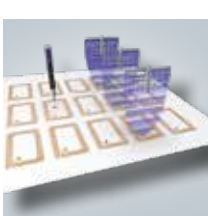- Highest flexibility for all antenna formats

PRE-BONDING
- Machine accuracy $\pm 15\,\mu m$, die attach accuracy $\pm 30\,\mu m$
- Die handling from 0.2 x 0.2 mm up to 5.0 x 5.0 mm
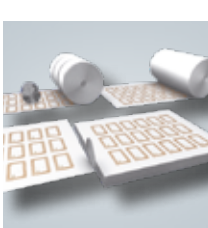- Full throughput with 100 % vision control for highest yield

FINAL BONDING
- Smallest & most efficient thermode generation 0.5 N to 5 N $\pm$ 10 %
- Best thermode coplanarity $\pm 5\,\mu m/mm$
- Highest process accuracy $\pm 50\,\mu m$ (after final bonding)

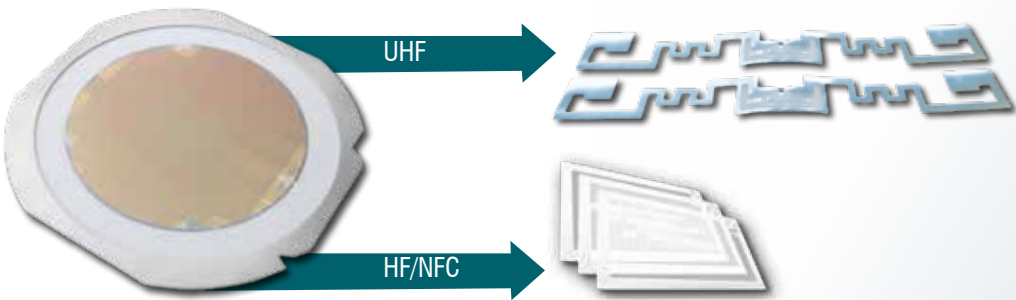### TESTING & BAD UNIT MARKING
- 100 % tested output quality
- In-house customized reader antenna design
- Muehlbauer standard tester
- Optional: CISC or Voyantic

UPWINDING OR SLITTING
- Single or multirow reels for label / ticket conversion

SUITABLE FOR EVERY APPLICATION

UHF

HF/NFC

DDA WF FAMILY

FLEXIBLE TECHNOLOGY FOR EACH & EVERY VOLUME

The DDA WF family represents Muehlbauer's most proven and established chip attach solutions for the latest market potentials. The flexible technology ready for each and every volume is based on our well-known direct die attach concept and beats up to 80,000 UPH with only one system and smallest footprint. With our state-of-the-art technology, you can enter at any production volume and have the flexibility to upgrade your inlay production machine to the next level. Production from 2 to 12 rows of antennas is possible with tape widths from 100mm to 385mm and 100 % high-quality output control to achieve highest yield.

MOST PROVEN CHIP ATTACH SOLUTION FOR THE LATEST MARKET POTENTIALS

BENEFITS

- Highest flexibility, in-field upgrade possible at any time
- Inlay production from 2 to 12 rows possible
- Tape width from 100 to 385 mm

STANDARD	UPGRADEABLE		UPGRADEABLE
▼	▼		▼
UPH
20000	40000	60000	80000

FEATURES & ADVANTAGES

ADVANTAGES
- Highest flexibility for wide web chip attach production
- Future proven technology
- Upgradeable concept that grows with the market – even later in the field

WORKSTATIONS

🔷	Input spooler	🔷	Final bonder
🔷	Prebonder	🔷	Tester and bad unit marker
🔷	Buffer	🔷	Output spooler

20000 WF DIMENSIONS E.G.
- Length 11605 mm
- Depth 2022 mm
- Height 2480 mm
- Weight 8150 kg

DDA 80000 WF

DDA 40000 WF

UPGRADEABLE

DDA 20000 WF

DDA 40000

ENTER A NEW DIMENSION FOR CHIP ATTACH

10 years ago, the Direct Die Attach concept was developed in Mühl-bauer's R&D department and continuously optimized. The patented technology outperforms the 40,000 UPH with a single station system and a 30 % smaller footprint. The significantly higher throughput and the reduced complexity result in 80 % lower die attach costs, outstanding quality and highest reliability. This system redefines the high-volume production and provides considerable potential for further cost and performance optimization.

SIMPLICITY IS THE ULTIMATE SOPHISTICATION

BENEFITS

- Production proven > 80 systems
- Cost reduction up to 80 %
- Very high productivity, over 10 billion products produced
- Fully compatible with standard curing process

UPH

```
      10000        20000        30000        40000
```

FEATURES & ADVANTAGES

ADVANTAGES
- Consistently high uptime
- Small footprint
- High accuracy & quality standards

WORKSTATIONS

	Input spooler		Final bonder
	Prebonder		Tester and bad unit marker
	Buffer		Output spooler
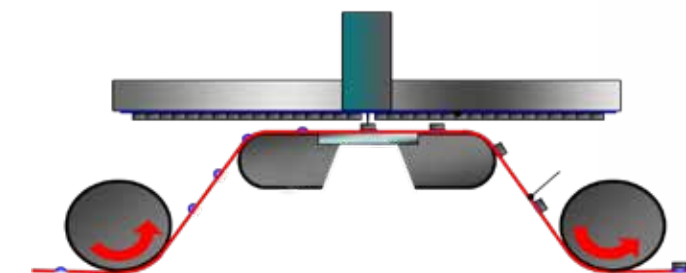
DDA – SPECIAL PROCESS
- DDA – Strap – Info on request

DIMENSIONS
- Length 5760 mm
- Depth 1625 mm
- Height 2000 mm
- Weight 3130 kg

DDA 40000 – P

SUSTAINABLE PRODUCTION SOLUTION FOR PAPER ANTENNAS

Our sustainable Direct Chip Attach DDA 40000-P has been developed as a production solution for paper antennas. The system is based on our well-known Direct Die Attach technology and allows you to produce green inlays with the same flexibility and speed in your inlay production. The ability to handle transparent and non-transparent materials gives you unlimited flexibility and prepares you for future material requirements. With 100 % high-quality output control, the machine can attach up to 280 million chips per year to antennas on paper substrates.

GREEN PRODUCTION MEETS HIGH SPEED CHIP ATTACH

BENEFITS

- Well-prepared for future material requirements
- Handling of transparent & non-transparent materials (e.g. paper)
- Fully compatible with standard curing process

FEATURES & ADVANTAGES

ADVANTAGES
- More pitch independent
- Cleaning paper from dust before processing in the machine (optional)
- High accuracy & quality standards
- Handling of green and enviromentally friendly products

WORKSTATIONS

Input spooler	Final bonder
Prebonder	Tester and bad unit marker
Buffer	Output spooler

DIMENSIONS
- Length 6695 mm
- Depth 1757 mm
- Height 1990 mm
- Weight 3950 kg

UPH

| 10000 | 20000 | 30000 | 40000 |

CONVERTING

TECHNOLOGY OVERVIEW

The wide range of Muehlbauer converting lines enables our customers to offer an incredible portfolio depth. From standard RFID labels to baggage tags, metal tags, animal ear tags, paper tickets and hang tags, nothing is impossible.

Muehlbauer converting lines can offer you the most efficient production solution for your products, no matter how demanding your product specifications might be.

	IL 30000	CL 40000	CL 60000
Max. Speed	50 m/min	40 m/min	60 m/min
Max. Reel Diameter	500mm	500 mm	600 mm
Web Width	30 - 250mm	30 - 250 mm	30 - 250 mm
GLUE PROCESSING			
Transfer Glue		■	■
Hot Melt		■	■
INPUT MATERIALS			
Face Liner	■	■	■
Dry Inlay		■	■
Wet Inlay	■	■	■
Compensation Layer			■
Bottom Liner	■	■	■
DIE CUTTING			
Cutter		■	■
Accuracy		± 0.5 mm	± 0.5 mm
Technique		Rotary	Rotary
OUTPUT			
Single Ticket		■	■
On Reel	■	■	■

FOR LABELS, TICKETS & TAGS

PROCESS FLOW
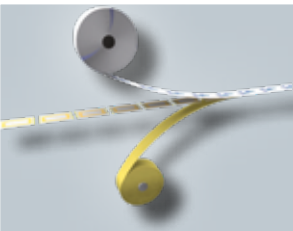
ADHESIVE COMPONENTS
- Transfer adhesive for wet inlays
- Hotmelt station for dry inlays
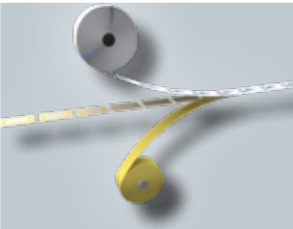
LAMINATION
- Cold lamination
- Register mark controlled

DIE CUTTING
- Rotary or semi-rotary die cutting process
- Fast and accurate
- Pitch controlled
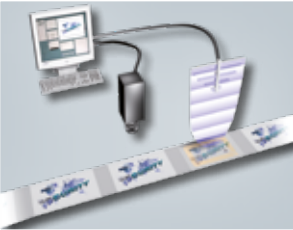
TESTING & MARKING
- 100 % tested output quality
- In-house customized reader antenna design
- Marking or rejection of bad units
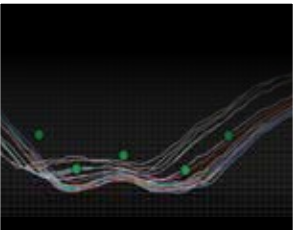
INLINE READ RANGE VERIFICATION/PERFORMANCE
- Inline performance test of UHF-inlays, -labels, -tickets etc. with Voyantic Tagsurance system
- Frequency test range (e.g. 860... 960 MHz) instead of one fixed frequency in standard test procedures
- Characteristic performance curve over the test range to evaluate quality & tolerances

IL 30000

RFID INLAY INSERTION LINE

The IL 30000 inlay insertion line is designed for the fully automatic insertion of RFID inlays into conventional self-adhesive labels. Label converters use their standard label printing presses to produce self-adhesive labels in a very efficient reel-to-reel process. By using the IL 30000, these labels can be easily converted into Smart Labels by inserting "wet RFID inlays" between the adhesive labels and the liner in a stand-alone reel-to-reel process ("de-lam/re-lam process"). With minimal investment and very fast production integration, it is your door opener to the RFID world.
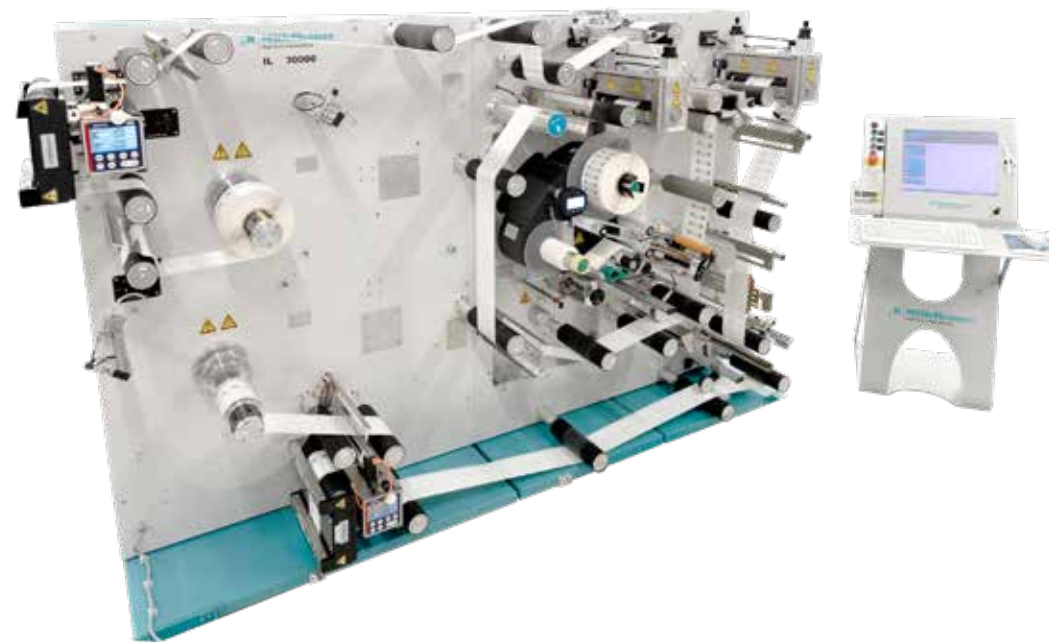
FULLY AUTOMATED INSERTION OF RFID INLAYS

BENEFITS

- Low investment costs and fast return of investment
- Easy in operation
- Highest placement accuracy
- Dual row solution possible

M/MIN

| 10 | 20 | 30 | 40 | 50 | 60 |

FEATURES & ADVANTAGES

ADVANTAGES
- Easy process solution with very small footprint
- High production speed
- Known process de-lam/re-lam
- Effortless expansion of your portfolio

WORKSTATIONS

Input spooler for self adhesive labels

Tester and bad unit marker

Wet inlay feeding and dispensing system

Output spooler

Lamination

APPLICATION POSSIBILITIES
- Self-adhesive HF & UHF labels
- Multi-layer labels (sandwich labels)
- Can also be used as an applicator

DIMENSIONS
- Length 2500 mm
- Depth 1170 mm
- Height 1720 mm
- Weight 1300 kg

CL 40000

CONVERTING LINE FOR MID-VOLUME PRODUCTION

The CL 40000 is a successful combination of cost-effective design with a high flexibility in output configurations. It is possible to convert wet inlays or finished labels directly from dry inlays in reel-to-reel mode with a wide variety of different adhesive options. All processes are in one modular system: antenna web handling, label lamination, die cutting as well as output inspection. The system has a throughput of up to 40 m/min for rotary cutting. With optimized changeover time between different products, coupled with the lowest tooling costs, this converting system is perfectly suited for a production with smaller lot sizes and fast changing applications. The friendly user interface, the intuitive handling of this converting machine and the low initial investment make the CL 40000 especially interesting for entering the RFID market.
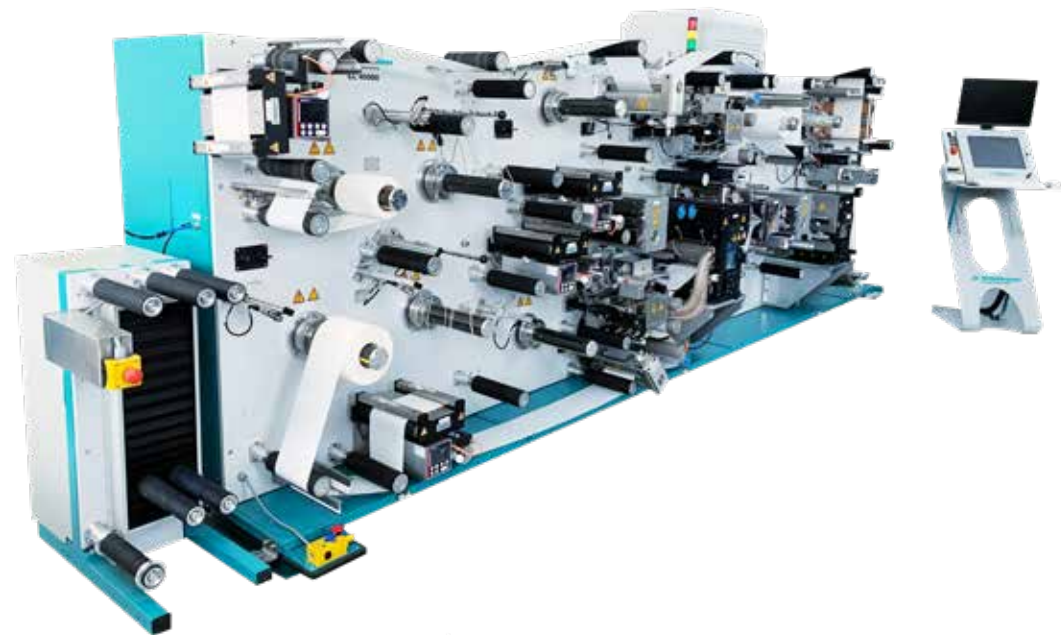
BEST PRICE/PERFORMANCE RATIO FOR SMALL & MID-RANGE VOLUME

BENEFITS

- Rotary Die Cutting
- Fast return of investment
- Reduced production time and costs
- Dry inlay with hotmelt possible
- Wet inlay dispensing
- Dual row solution possible

M/MIN

| 10 | 20 | 30 | 40 | 50 | 60 |

FEATURES & ADVANTAGES

ADVANTAGES
- Fast, easy & cost-minimized product changeover
- Easy in operation
- High precision inlay placement
- Small footprint

WORKSTATIONS

Input spooler		Lamination	
Input tester and bad unit marker		Cutting	
Adhesive components		Output tester and bad unit marker	
Material handling		Output spooler	

CONFIGURATION FLEXIBILITY
- Dry inlay off-pitch placement
- Dual hotmelt station
- One step production from inlay to Smart Label

APPLICATION POSSIBILITIES
- Wet inlay
- Self-adhesive label in one pass with dry inlay
- Ticket on reel
- Single row ticket production
- Two-row label production
- Delam/Relam process

DIMENSIONS
- Length 5978 mm
- Depth 1450 mm
- Height 2085 mm
- Weight 3133 kg

CL 60000

CONVERTING LINE FOR HIGH-VOLUME PRODUCTION

Muehlbauer's CL 60000 Converting Line represents a flexible, fast and modular concept for a wide range of converting possibilities: Smart Labels and Smart Tickets from reel-to-reel or from reel-to-ticket/fanfold. Various input materials such as dry inlay, wet inlay and even compensation layer (4-layer) can be processed. All processes are integrated in one platform: reel-to-reel antenna web handling, label/ticket lamination, die cutting

as well as output testing – of course with leading edge performance, state-of-the-art quality and the best cost/performance ratio available on the market. Muehlbauer's converting machine CL 60000 is perfectly suited for high-volume RFID Label and Ticket production, where fast changeover times and high quality are required.
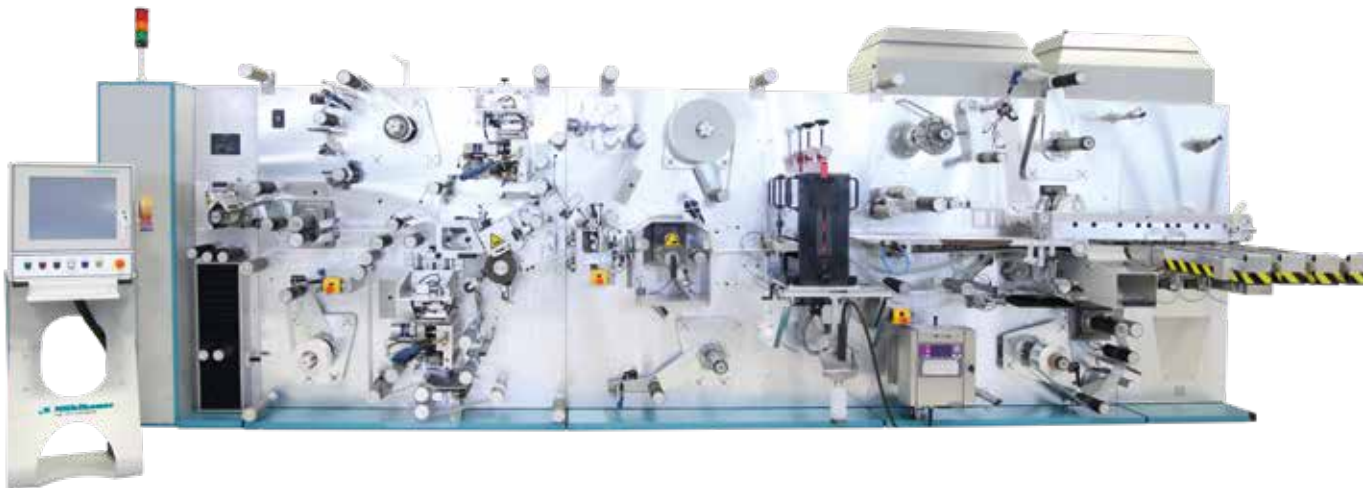
MOST FLEXIBLE MODULAR CONVERTING SOLUTION

BENEFITS

- Price / Performance leader
- Highest level of customization
- Lowest cost of ownership
- Flexible for labels, tickets and hangtags
- Dual-row solution

M/MIN

| 10 | 20 | 30 | 40 | 50 | 60 |

FEATURES & ADVANTAGES

ADVANTAGES

- High application flexibility
- Flexible for dry and wet inlays
- Upgrade possibilities also in field
- Hotmelt and/or transfer glue process

WORKSTATIONS

Input spooler		Lamination	
Input tester and bad unit marker		Cutting	
Adhesive components		Output tester and bad unit marker	
Material handling		Output spooler	

CONFIGURATION FLEXIBILITY

- Transfer adhesive and hotmelt
- Second die cutter
- Single ticket output
- 4-Layer handling
- Performance testing inline
- Vision system
- Delam/Relam process

YOUR APPLICATIONS

- Self-adhesive label
- Ticket on reel
- Single Ticket / Hangtag

SPECIAL APPLICATIONS

- CL wide web

DIMENSIONS

- Length 8000 mm
- Depth 3600 mm
- Height 2500 mm
- Weight 5610 kg
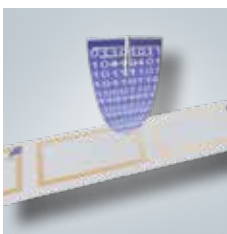
PERSONALIZATION

TECHNOLOGY OVERVIEW

Personalization brings each label/ticket to life and with our wide range of solutions, it's the ideal machine for chip encoding, printing and verification. The efficient and fast set-up allows for a rapid changeover. With transport speeds of up to 60m/min, the systems achieve peak-performance in terms of UPH. To guarantee 100% flawless output quality, 100% of the labels/tickets are tested for functionality and prints. The license-free encoding gives you maximum flexibility for all encoding formats.

	PL FLEX
SCOPE OF OPERATION	
Barcode reading	■
Chip encoding	■
Printing	■
Verification	■
Machine speed	up to 60m/min
FREQUENCIES	
UHF	■
HF	■*
NFC	■*
MATERIALS FORMAT	
Labels on reel	30-250mm
Singulated Tickets/Tags	■
Width	19-150mm
Length	50-200mm
PRINTING	
max. dpi	600
Mono color	■
OUTPUT FORMAT	
On reel	■
On belt	■
Bad ticket removal	■

*depending on chip type
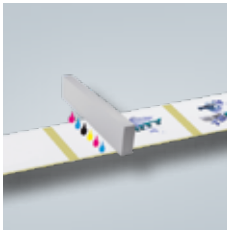
CHIP ENCODING & PRINTING

PROCESS FLOW
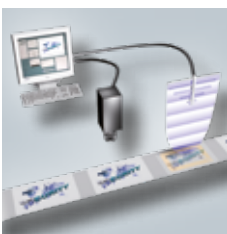
ENCODING
- Electronic encoding of data on each tag's RFID chip
- Data base with all relevant information
- For advanced encoding features such as password lock, perma lock and more

PRINTING
- High-speed digital printing system
- Monochrome or full color
- Variable Data-Printing (VDP) capability

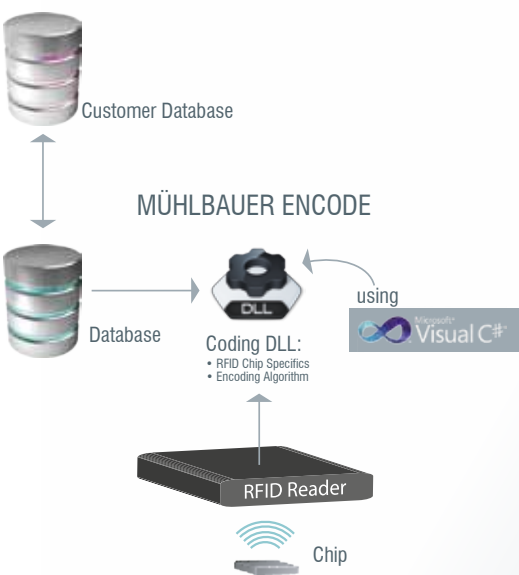### VERIFICATION & TESTING
- Every label will be tested for RF functionality and/or visual defects and/or data match
- Bad labels can either be visually marked or completely removed from the roll

MB MCES
PERSONALIZATION MANAGEMENT SYSTEM

MUEHLBAUER ENCODE FOR MAXIMUM FLEXIBILITY AND INDEPENDENCE

Customer Database

MÜHLBAUER ENCODE

Database

Coding DLL:
- RFID Chip Specifics
- Encoding Algorithm

using Visual C#

RFID Reader

Chip

The personalization software MUEHLBAUER ENCODE is based on Microsoft Dynamic Link Library (DLL) and therefore allows the adaption to any RFID Chip and encoding algorithm.

YOUR ADVANTAGES
- Suitable for all chip types with unique ID (TID or UID)
- For all frequencies (HF/NFC & UHF)
- Encoding algorithm is freely programmable

The DLL is based on Microsoft Visual C#. At the Muehlbauer Academy, customers receive specialized developer trainings for the coding of the DLL. Our developer workstations are equipped with an offline RFID reader kit for HF and UHF frequencies and are available for testing and debugging.

PL FLEX

SINGLE TICKET / REEL-TO-REEL PERSONALIZATION LINE

Muehlbauer's PL FLEX personalization line is the ideal machine for encoding, labeling and verification of tickets and tags in low and medium volumes. Efficient set-up and fast changeover allow for quick job changes, either reel-to-reel or ticket-to-ticket. Multiple job processing is also possible. Each ticket is tested and automatically reproduced if rejected in order to guarantee flawless quality and lot integrity. The PL FLEX's small footprint allows it to fit into the tightest of spaces, such as an office environment. Furthermore, this affordable system is available with the license-free Muehlbauer ENCODE software solution for UHF and HF/NFC, which further reduces operational costs.
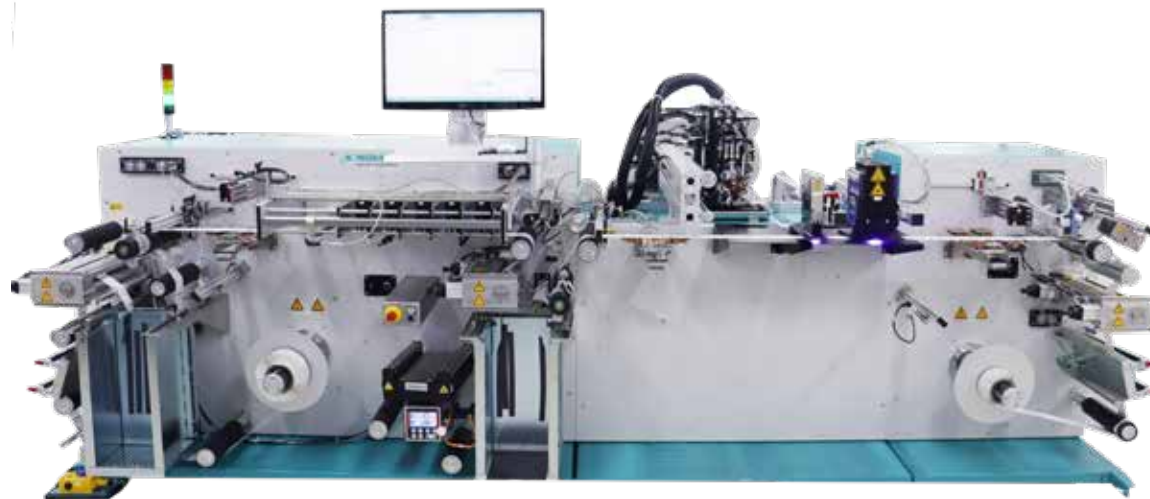
FEATURES & ADVANTAGES

ADVANTAGES
- Wide range of encoding formats for UHF and HF/NFC
- License-free MB ENCODE: Suitable for almost all chip types
- Ready for Industry 4.0 and the MB Palamax Software solution

WORKSTATIONS

- Input spooler
- Trigger sensor
- Barcode reader
- Encoding
- Printing
- Verification
- Output spooler

THE IDEAL SOLUTION FOR YOUR SERVICE BUREAU

BENEFITS

- Modular machine platform for highest flexibility
- Reel-to-reel and single ticket handling
- Multi-job handling in one batch
- UV inkjet printing up to 600dpi

M/MIN

20   30   40   50   60

CONFIGURATION FLEXIBILITY
- PL FLEX Scan and Encode or with print module
- UHF and HF/NFC
- Reel-to-reel and single ticket

YOUR APPLICATIONS
- Individually personalized Single Tickets / Hangtags
- Individually personalized Labels / Tickets on reel

PL FLEX DIMENSIONS (MAX.)
- Length 7900 mm
- Depth 1240 mm
- Height 1700 mm
- Weight 1290 kg

RFID COMPETENCE

SMART FACTORY CONCEPT

MB PALAMAX®

ANTENNA PRODUCTION

INLAY ASSEMBLY

CONVERTING

PERSONALIZATION

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