

ePASSPORT PRODUCTION TECHNOLOGY

PRODUCT OVERVIEW





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MÜHLBAUER GROUP AT A GLANCE

MÜHLBAUER'S BUSINESS UNITS AND SITES

Founded in 1981 in the heart of Bavaria, the Mühlbauer Group has ever since grown to a leading global player in the fields of Parts & Systems, Semiconductor Related Products, Document Solution Related Products and TECURITY® Solutions. With around 3,500 employees, technology centers in Germany, Malaysia, Slovakia, the U.S.A. and Serbia and 35 sales and service locations worldwide, Mühlbauer created a strong competence network around the globe.

We continuously invest in the latest technologies and innovative processes to enhance our competences and provide you with optimized solutions. Our in-house precision part production MPS – Mühlbauer Parts & Systems – guarantees unlimited flexibility and highest customer satisfaction.

Our business unit AUTOMATION does not only develop and assemble individually customized production systems, but also provides matching software solutions for the production process of Document and Solution Related Products. Vision inspection technologies as well as semiconductor and RFID applications complete our comprehensive portfolio.

Our business unit TECURITY® is established as a competent partner for the implementation of security systems for identifying and verifying both documents and individuals. Our clients benefit from more than three decades experiential value which we have gained during the realization of over 300 ID projects worldwide.



Mühlbauer
Bosnia & Herzegovina



Mühlbauer
China



Mühlbauer
Germany



Mühlbauer
Malaysia



Mühlbauer
Serbia



Mühlbauer
Slovakia



Mühlbauer
USA





MPS
Precision Parts & Surface Engineering



AUTOMATION
Production Equipment & Systems



WORLD OF SECURITY®
Government & Technology Solutions

MANUFACTURING EXECUTION SYSTEMS



MB MCES PERSONALIZATION MANAGEMENT

MB MCES is a personalization management software, which integrates incoming data with product definitions and controls the associated physical and electrical personalization processes. MB MCES handles personalization data from a variety of different input methods and formats.



MB INCAPE INTEGRATED PRODUCTION MANAGEMENT SOFTWARE

MB INCAPE is Mühlbauer's Production Management Software for the production and personalization of electronic cards and documents (e.g. ID cards, ePassports, Driver's Licenses, EMV or GSM cards). Combining data management, production control and material management, the system allows for highly automated processes. It processes customer- and application-specific production, personalization, quality control and document delivery scenarios with highest solution flexibility.



MB PalaMax[®] TOTAL PROCESS TRANSPARENCY

MB PalaMax[®], Mühlbauer's Smart Factory solution, is developed for card, tag or booklet productions, personalization factories and semiconductor backend shop floors to set and collect process data to monitor and improve the efficiency of production and personalization for later processing, visualization and statistical analysis.



MB tool.Leader CONNECTOR BETWEEN SYSTEMS

MB tool.Leader is a software package which consists of several applications and serves as a reliable link between the individual systems involved in the production process. By means of MB tool.Leader, the entire process chain – from the incoming order to the final precision part – can easily be monitored and controlled. This real-time machine monitoring guarantees an automated production process. Production errors can be detected and solved at an early stage. Thus, MB tool.Leader reduces the machine downtimes, which in turn leads to an increase of the machine's productivity by up to 20 percent.



FEATURES & ADVANTAGES



Configurable workflow steps regarding personalization, quality assurance & issuance



Seamless connection to MB PalaMax® & MB Data Preparation



Fully-automated processing & production management



Simplified administration due to web-based operator clients



Scalability regarding different documents, machines & personalization locations



Monitoring of real-time performance of the production



Flawless integration of Mühlbauer's material management system (MB WAREHOUSE)



Seamless tracking of documents from point of production to issuance



Connection to card / document management systems via web service, database, file-based interface



Statistical tool analyze collected data & deliver customized statistics on OEE



Standard interface to personalization machines with integration of third-party machines possible



Tool which enables the remote operation of machines on the shop floor from a control centre



Integration of MB User Management



Tool which increases effectiveness & efficiency so that production becomes more profitable



Full coverage of production control requirements (security industry & EMV standards)



Enables production engineering to prepare & test a repeatable factory set-up. Factories can switch between products within minutes.

SSH 2008

SEMI-AUTOMATIC SHEET HOT STAMPING SYSTEM

Mühlbauer's semi-automatic sheet hot stamping system SSH 2008 is used for applying security features on overlay or core sheets. Prior to the sheet lamination process, the hologram is embedded inside the document. This is a cost-efficient, economical and easy-to-operate solution that provides high-quality security features for different applications, including ID documents and passport holderpages. DOVID are processed from the reel and directly transferred to the core or overlay sheet. This

is achieved through freely programmable parameters such as time, pressure and temperature. The carrier material is rewound onto the reel, thus saving space and reducing changeover time. An integrated vacuum system ensures smooth handling without damaging the sheets and guarantees a highly accurate placement of the hologram. This system can be flexibly integrated into any production environment – a fact which makes the SSH 2008 extremely versatile.



KEY MODULES



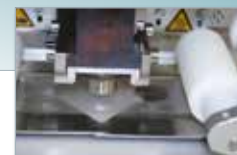
x/y sheet table



Hot stamping unit



DOVID application



FEATURES & ADVANTAGES

KEY FEATURES

- Semi-automatic hot stamping system for the application of security features on sheet layers
- Wide range of adjustable process parameters to process all kinds of security features
- Highly accurate & programmable positioning system
- User & operator-friendly
- Fast & easy use of interchangeable parts and / or products
- Customizable stamping tool design & manufacturing
- MB INCAPE ready

PRODUCTIVITY & PROCESS UNITS

- Manual sheet loading
- Vacuum fixing of the sheet on application table
- SPS controlled machine operation
- Easy teach mode of application position
- Flexibly programmable x/y table
- DOVID alignment to print mark or programmable fixed transport steps
- Availability: up to 95%
- Yield: up to 99.7%
- Environmental conditions:
 - » Room temperature: 23°C; +/-3°C
 - » Humidity: 50%; +/-10%

TECHNICAL DATA

- Sheet materials: PVC, PC, ABS; others on request
- Sheet size: max. 630 x 535 mm
- Sheet thickness: 50 µm to 3,000 µm
- Max. tape width of security material: 55 mm
- Max. hologram diameter: typically 20 mm
- Application accuracy: +/- 0.1 mm
- Hot stamping force: Continuously adjustable up to 3 kN
- Temperature range: 20°C - 170°C
- Throughput: up to 1,250 units per hour; depending on application processes & operator

SHEET HOT STAMPING

FOIL PUNCHING

INLAY TESTING

SHEET COLLATING

LAMINATION

HOLDERPAGE MILLING

HOLDERPAGE PUNCHING

HOLDERPAGE INSPECTION

eCOVER LAMINATION

BOOKLET PRODUCTION

PRE-PERSONALIZATION

SOFTWARE

UPH



FP 201

FOIL PUNCHING SYSTEM

Mühlbauer's FP 201 is a semi-automatic system to punch thin plastic material. It is the ideal solution for low-cost punching of compensation layers, as well as for contactless cards, hybrid cards and RFID tickets.

Additionally the FP 201 can be used for the production of windows in eCover inlays. As you can place more foils in one cycle, a throughput up to 300 foils per hour can be achieved.



KEY MODULES



Manual foil input



Automatic waste output



Foil punching unit



Manual foil output



FEATURES & ADVANTAGES

KEY FEATURES

- Manual input of foils
- Punching in one stroke with highest accuracy
- Manual output of foils
- In-house tool manufacturing assuring highest flexibility of tools
- Special / customized tool design
- Fast in-house regrinding service
- Most proven punching system for various materials

PRODUCTIVITY & PROCESS UNITS

- Pneumatic-driven punching system (direct drive)
- No electronics, easiest operation and maintenance
- Availability: up to 95%
- Yield: up to 99.7%
- Environmental conditions:
 - » Room temperature: 23°C; +/-3°C
 - » Humidity: 50%; +/-10%

TECHNICAL DATA

- Sheet materials: PVC, PC, ABS, PET; others on request
- Sheet size max.: 350 mm x 500 mm
- Sheet thickness: 50 μ m - 300 μ m
- Punch drive: Pneumatic-driven (air pressure connection 6 bar)
- Punching accuracy tool: +/- 0.02 mm
- Punching accuracy position: +/- 0.1 mm

SHEET HOT STAMPING 

FOIL PUNCHING 

INLAY TESTING 

SHEET COLLATING 

LAMINATION 

HOLDERPAGE MILLING 

HOLDERPAGE PUNCHING 

HOLDERPAGE INSPECTION 

eCOVER LAMINATION 

BOOKLET PRODUCTION 

PRE-PERSONALIZATION 

SOFTWARE 

UPH

50 100 150 200 250 300



ITH 540 - IT 50

INLAY TEST HANDLING & INLAY TESTING SYSTEMS

Mühlbauer's inlay test handler ITH 540 is a semi-automatic machine for the testing of transponders integrated in sheets. The system is well-proven, easy-to-operate and offers the possibility to freely program different sheet layouts. The processes of testing and pre-personalization of RFID pre-laminated sheets, collated sheets, laminated sheets and inlay sheets have significantly been simplified. The integrated ETS-surface for ergonomic operations guarantees convenient functionality for operators. The easy-to-maintain construction with a pro-

longed lifetime reduces running costs. The IT 50 inlay tester is used to manually check the functionality of the transponders which are integrated into sheets. The simple device offers highest flexibility as it can be transported to any location and allows an operator to quickly determine if the antenna is defect. Two LEDs indicate the test results: green indicates a functional antenna, whereas red indicates a defect. Damaged antennas are then marked to ensure that all antennas used in production are fully functional.



KEY MODULES



Y-axis sheet table



Contactless test station



Reject marking



FEATURES & ADVANTAGES

KEY FEATURES

ITH 540

- Realization of testing & pre-personalization
- High flexibility regarding materials & different sheet layouts
- Operator-friendly
- Automatic reject marking
- Automatic counting of functional & rejected antennas

IT 50

- Manual inlay testing device
- Test based on ATS (Answer To Select) test of antennas
- Configuration is adjustable to customer requirements according to ISO 14443 A or ISO 14443 B

PRODUCTIVITY & PROCESS UNITS

- ITH 540
- Y-axis sheet table
- Contactless testing station
- Reject marking
- Availability: up to 95%
- Yield: up to 99.7%
- Environmental conditions:
 - » Room temperature: 23°C; +/-3°C
 - » Humidity: 50%; +/-10%

TECHNICAL DATA

- Max. sheet size: 800 x 800 mm
- Sheet thickness: 0.10 to 1.00 mm (others on request)
- Configuration: Adjustable to customer requirements according to ISO 14443 A or B
- Throughput: up to 1,000 sheets per hour; depending on material, test parameters & operator speed

UPH



SHEET HOT STAMPING



FOIL PUNCHING



INLAY TESTING



SHEET COLLATING



LAMINATION



HOLDERPAGE MILLING



HOLDERPAGE PUNCHING



HOLDERPAGE INSPECTION



eCOVER LAMINATION



BOOKLET PRODUCTION



PRE-PERSONALIZATION



SOFTWARE



SSC 2502 - SSC 2502/1

SEMI-AUTOMATIC SHEET COLLATING SYSTEMS

Mühlbauer's semi-automatically operated sheet collating system SSC 2502 is designed for the gathering and pre-fixing of plastic foils into sheet sets ready for lamination. Distinguished by its high flexibility, the SSC 2502 is versatile and easy-to-handle. A swivel table along with a vertically adjustable frame and foot switch operation method make the equipment easy to use for any operator. Adjustable edge guides and additional thermal welding units allow for the collation of a wide variety of products, including sheet sets containing contactless inlets.

The manually operated sheet collating system SSC 2502/1 is also designed for the collating and welding of plastic foils into sheets ready for lamination. The system is flexibly adjustable in height and table position, thus guaranteeing operator friendliness. The layers are manually aligned to reference edges and manually prefixed with an ultrasonic welding unit. This allows prefixing of a complete set for the simultaneous in less than one second and at the same time, setting a random number of spots. After the collating process the prefixed set is manually removed by the operator.



SSC 2502



SSC 2502/1

KEY MODULES



Swivel mounted table



Thermal welding unit



Adjustable stop pins



Parameter control
(SSC 2502)



Illumination
(SSC 2502/1)



FEATURES & ADVANTAGES

KEY FEATURES

- Semi-automatically operated collating system for individual sheet layers & security layers
- Suitable for standard collating tasks & security applications
- Smallest footprint requirements easiest operation
- Easy set-up & maintenance
- MB INCAPE ready

PRODUCTIVITY & PROCESS UNITS

- Alignment of sheet layers based on cutting edge of the sheet
- Adjustable stop-pins on table
- SSC 2502/1 – manual ultrasonic welding unit
- SSC 2502 – thermal welding operated by foot switch
- Adjustable welding temperature
- Availability: up to 95%
- Yield: up to 99.7%
- Environmental conditions:
 - » Room temperature: 23°C; +/-3°C
 - » Humidity: 50%; +/-10%

TECHNICAL DATA

- Sheet materials: PVC, PC, ABS; others on request
- Sheet size min. / max.: 290 x 290 - 800 x 800 mm
- Sheet thickness min. / max.: 50 - 400 μ m
- Max. collating thickness: up to 1 mm
- Max. welding temperature: up to 450°C
- Throughput: up to 100 sheets per hour; depending on material & operator

SHEET HOT STAMPING 

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SSC 2700

SEMI-AUTOMATIC SHEET COLLATING SYSTEM

Mühlbauer's semi-automatic sheet collating system SSC 2700 is designed for gathering and pre-fixing the plastic foils into sheets ready for lamination. Besides being versatile, the SSC 2700 is distinguished by its precision and accuracy. An integrated vision system ensures that only sheets that are perfectly aligned to the

print marks are collated. Additional thermal welding units and vision systems allow for the collation of a wide variety of products, including sheet sets containing contactless inlets and / or magnetic stripes.



KEY MODULES



Vacuum table



2 welding units



Sheet storage



Parameter control



Vision



FEATURES & ADVANTAGES

KEY FEATURES

- Semi-automatic collating system for individual sheet layers & security layers
- Suitable for standard collating tasks & for security applications which require vision-controlled positioning processes
- Most precise vision-controlled alignment of sheet layers
- Smallest footprint requirements & easy operation
- Each single layer parameter is individually programmable (correct sequence)
- Thickness measurements to avoid double sheets (optional)
- Ergonomic shelf for supplying of sheets (optional)
- Integrated register punch for lamination of CLI / MLI feature (optional)
- MB INCAPE ready

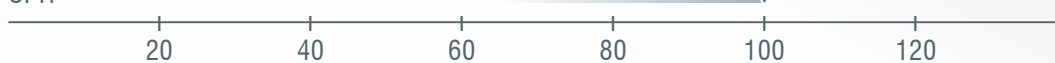
PRODUCTIVITY & PROCESS UNITS

- Vision system for high-precise sheet alignment on top & back side (see through) of the working table
- Alignment to recognize marks, antenna pads, security features or other visible features & the layers
- UV-illumination system to check presence of UV-print (optional)
- Up to three independent alignment camera systems
- Two thermal welding units from top (optionally from top & bottom)
- Programmable welding position, time & temperature
- Thickness measurement unit
- Alignment sensor for magnetic stripe foils (optional)
- Register hole punching system (optional)
- Availability: up to 95%
- Yield: up to 99.7%
- Environmental conditions:
 - » Room temperature: 23°C; +/-3°C
 - » Humidity: 50%; +/-10%

TECHNICAL DATA

- Sheet materials: PVC, PC, ABS; others on request
- Sheet size min. / max.: 290 x 290 - 750 x 750 mm
- Sheet thickness min. / max.: 50 - 400 μ m
- Max. collating thickness: up to 1 mm
- Max. welding temperature: up to 400°C
- Welding time / force: 0 - 10 sec / 78 - 188 N
- Throughput: up to 100 sheets per hour; depending on material & operator

UPH



SHEET HOT STAMPING

FOIL PUNCHING

INLAY TESTING

SHEET COLLATING

LAMINATION

HOLDERPAGE MILLING

HOLDERPAGE PUNCHING

HOLDERPAGE INSPECTION

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BOOKLET PRODUCTION

PRE-PERSONALIZATION

SOFTWARE

SSC 200

SEMI-AUTOMATIC SHEET COLLATING SYSTEM

The machine concept of Mühlbauer's SSC 200 is simple and ingenious at the same time. Only one operator gathers the core sheets before manually aligning them at the adjustable stop pins. The machine works independently from material and thickness. Depending on requirements, overlays from the top and bottom are delivered from reel.

The manually collated core sheets are securely fixed to the automatic fed overlay by two ultrasonic welding systems. Then the complete set is cut and transferred to the output stacker. The SSC 200 is controlled by one operating panel which also stores pre-set production configurations.



KEY MODULES



Manual sheet alignment table



Adjustable welding unit



Cutting unit



Parameter control



Automatic overlay spooling unit



Sheet stacker



FEATURES & ADVANTAGES

KEY FEATURES

- Semi-automatic collating system based on reel-to-sheet process
- Automatic feeding & positioning for overlay from reel
- Automatic transport & cutting system
- Manual feeding & alignment to reference edges of core layers in sheet format
- Easy handling & maintenance
- MB INCAPE ready

PRODUCTIVITY / PROCESS UNITS

- Integrated spooling systems for overlay foil
- Sensor controlled alignment of overlay to edge or magstripe
- Two adjustable ultrasonic welding units
- Automatic welding parameter control
- Adjustable stop pins
- UV-illumination system (optional)
- Thickness measurement system to avoid double sheets (optional)
- Cutting unit after welding position
- Sensor controlled overlay alignment to edge or magstripe position
- Upgradeable to ASC 200 – Mühlbauer's fully automatic sheet collating system
- Easy set-up & maintenance
- Availability: up to 95%
- Yield: up to 99.7%
- Environmental conditions:
 - » Room temperature: 23°C; +/-3°C
 - » Humidity: 50%; +/-10%

TECHNICAL DATA

- Sheet materials: PVC, PC, ABS
- Overlay thickness: 40 - 300 μm
- Width of overlay reel: max. 720 mm
- Reel diameter / core diameter: max. 750 mm / 70 mm
- Center layers min. / max. sheet size: 290 x 290 mm / 720 x 720 mm
- Center layers min. / max. thickness: 45 - 600 μm
- Alignment accuracy: +/- 250 μm
- Throughput: up to 400 sheets per hour; depending on material & operator

UPH



SHEET HOT STAMPING

FOIL PUNCHING

INLAY TESTING

SHEET COLLATING

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SOFTWARE

ASC 200

AUTOMATIC SHEET COLLATING SYSTEM

Mühlbauer's fully automatic sheet collating system ASC 200 is designed for the collating and welding of sheets for the lamination process. Using ultrasonic welding units from the bottom, the ASC 200 is highly flexible. The different core layers are automatically inserted and aligned to the edge before welding the

complete set. Configurations of up to three core layers and two overlays from reel are possible. The alignment of the overlay to the edge or the magstripe is also possible. The fully collated and welded set is then transferred to the output stacker.



KEY MODULES



Automatic input sheet feeder



Automatic overlay spooling unit



Output stacker



Ultrasonic welding unit



Cutting unit



FEATURES & ADVANTAGES

KEY FEATURES

- Automatic sheet collating system for individual sheet layers & security layers
- Reel-to-sheet handling system for overlay foils
- Sheet-to-sheet handling system for core layers
- Output stacker for collated & prefixed sheet sets
- Modular design for flexible individual configuration of collating-units, on-site upgrades & extensions possible
- Easy set-up & maintenance
- MB INCAPE ready

PRODUCTIVITY / PROCESS UNITS

- Spooling system for two overlay foils on reels
- Up to three core-layer-sheet feeding systems
- Alignment of core layers based on the cutting edge of the sheet
- Automatic overlay alignment according cutting edge or magstripe position
- Thickness measurement unit to avoid double sheets (optional)
- Programmable welding parameters (time, pressure, position)
- Availability: up to 95%
- Yield: up to 99.7%
- Environmental conditions:
 - » Room temperature: 23°C; +/-3°C
 - » Humidity: 50%; +/-10%

TECHNICAL DATA

- Sheet materials: PVC, PC, ABS; others on request
- Overlay thickness: 50 - 300 μm
- Reel diameter / core diameter: max. 750 mm / 70 mm
- Width of overlay: max. 720 mm
- Sheet size min. / max.: 290 x 290 - 720 x 720 mm
- Sheet thickness min. / max.: 100 - 600 μm
- Max. collating thickness: up to 1 mm
- Alignment accuracy: +/- 250 μm
- Throughput: up to 400 sheets per hour; depending on material & layout

UPH



SHEET HOT STAMPING

FOIL PUNCHING

INLAY TESTING

SHEET COLLATING

LAMINATION

HOLDERPAGE MILLING

HOLDERPAGE PUNCHING

HOLDERPAGE INSPECTION

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BOOKLET PRODUCTION

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SOFTWARE

ASC 2900

AUTOMATIC SHEET COLLATING SYSTEM

Mühlbauer's fully automatic sheet collating system ASC 2900 is designed for the collating and welding sheets for the lamination process. Using ultrasonic welding units from the bottom, the ASC 2900 is highly flexible. The different core layers are automatically inserted and aligned to edge before welding the complete set.

Configurations of up to three core layers and two overlays from reel are possible. The alignment of the overlay to the edge or the magstripe is also possible. The fully collated and welded set is then transferred to the output stacker.



KEY MODULES



Automatic input sheet feeder



Automatic overlay feeding system



Sheet stacker



Ultrasonic welding unit



Cutting unit



Vision system for print mark alignment



Movable control panel



FEATURES & ADVANTAGES

KEY FEATURES

- Automatic high-speed sheet collating system
- Sheet-to-sheet & reel-to-sheet handling system available
- High-precision alignment by camera systems
- Proven solution for high-end products like security documents & contactless cards
- Sheet-to-sheet handling system for core layers
- Output of collated & pre-fixed sheet to stacker system
- Modular design for flexible configuration of individual collating-units, on-site upgrades & extension possible
- MB INCAPE ready

PRODUCTIVITY / PROCESS UNITS

- Spooling system for overlay foils
- Up to five core-layer-sheet feeding systems; pallet handling system for fastest material feeding
- Two programmable ultrasonic welding units
- Vision-controlled alignment system
- Alignment programmable to print marks, antenna pads, security features or other individual shapes on the layers optional
- Continuous edge-control system for magnetic stripe overlays (optional)
- UV-illumination system (optional)
- Thickness measurement unit (optional)
- Register hole punching system (optional)
- Availability: up to 95%
- Yield: up to 99.7%
- Environmental conditions:
 - » Room temperature: 23°C; +/-3°C
 - » Humidity: 50%; +/-10%

TECHNICAL DATA

- Sheet materials: PVC, PC, ABS; others on request
- Overlay thickness: 50 – 300 μm
- Width of overlay: max. 720 mm
- Reel diameter / core diameter: max. 750 mm / 70 mm
- Sheet size min. / max.: 290 x 290 - 720 x 720 mm
- Sheet thickness min. / max.: 100 - 600 μm
- Max. collating thickness: up to 1 mm
- Alignment accuracy: +/- 150 μm
- Throughput: up to 600 sheets per hour; depending on material & layout

UPH



SHEET HOT STAMPING	●
FOIL PUNCHING	●
INLAY TESTING	●
SHEET COLLATING	●
LAMINATION	●
HOLDERPAGE MILLING	●
HOLDERPAGE PUNCHING	●
HOLDERPAGE INSPECTION	●
eCOVER LAMINATION	●
BOOKLET PRODUCTION	●
PRE-PERSONALIZATION	●
SOFTWARE	●

LP 5570/E

FULL SIZE SHEET LAMINATION SYSTEM – TWIN STACK

Mühlbauer's lamination system LP 5570/E is designed to laminate pre-lams, holderpages and similar products such as plastic cards, smartcards and contactless cards. The system complies with the latest demands regarding economics, eco-friendliness, as well as product and process quality. All important process parameters such as temperature, pressure and cycle time are continuously and individually controlled. Thus, it is possible to

laminate under optimal conditions with all current card materials such as ABS, PVC, PC, PET, PETG, PS, PE and PP. An available option is the weight compensation for the hot press, which allows for the lamination of plastic holderpages. The LP 5570/E can be configured with eight or ten openings and both systems are capable of holding between six and twelve layers per opening, depending on the production material.



KEY MODULES



Automatic loading and unloading basket



Press force reduction



Cooling unit



Automatic loading and unloading table



Freely programmable process parameter



Weight compensation



Lamination press



Product temperature measurement



Thermal oil heating



FEATURES & ADVANTAGES

KEY FEATURES

- Automatic TWIN STACK sheet lamination system with the most accurate heating technology worldwide
- Suitable for PVC volume production & for PC
- Wide range of programmable process parameters
- Intuitive human interface ensuring easy & efficient system & process handling
- Optimized energy management system for environmentally friendly & cost-saving operation
- Uniquely designed heating plates for homogenous temperature conditions
- Fully modular system design
- MB INCAPE ready

PRODUCTIVITY / PROCESS UNITS

- Eight up to ten openings
- Weight compensation system
- Average heat variation on heating plates: +/- 1°C
- Average heat variation overall heating plates: +/- 3°C
- Special temperature management
- Programmable cycle time, lamination pressure, lamination temperature
- New product-parameter teach / set-up in just five minutes
- Heating & cooling in both presses possible
- Availability: up to 95%
- Yield: up to 99.7%
- Environmental conditions:
 - » Room temperature: 23°C; +/-3°C
 - » Humidity: 50%; +/-10%

TECHNICAL DATA

- Sheet materials: PVC, PC, ABS; others on request
- Sheet sizes: 530 x 680 mm (other sizes on request)
- Openings: 8 / 10
- Lamination force / hot press: 25 - 630 kN
- Lamination force / cooling press: 50 - 1,250 kN
- Repeat accuracy: +/- 0.5%
- Temperature tolerance: +/- 1°C
- Surface finish (ground): $\leq 1.2 \mu\text{m}$
- Throughput: up to 350 sheets per hour; depending on material & layout

UPH

50 100 150 200 250 300 350

SHEET HOT STAMPING

FOIL PUNCHING

INLAY TESTING

SHEET COLLATING

LAMINATION

HOLDERPAGE MILLING

HOLDERPAGE PUNCHING

HOLDERPAGE INSPECTION

eCOVER LAMINATION

BOOKLET PRODUCTION

PRE-PERSONALIZATION

SOFTWARE

LP 5570

FULL SIZE SHEET LAMINATION SYSTEM – SINGLE OR TWIN STACK

Mühlbauer's lamination system LP 5570 is designed to laminate pre-lams, holderpages and similar products such as plastic cards, smartcards and contactless cards. The system complies with the latest demands regarding economics, eco-friendliness, as well as product and process quality. All important process parameters such as temperature, pressure and cycle time are continuously and individually controlled. Thus it is possible to laminate under

optional conditions with all current card materials such as ABS, PVC PC, PET, PETG, PS, PE and PP. Available options are weight compensation and vacuum chamber for the hot press, which allows for the lamination of more complex cards. The LP 5570 can be configured with four, six or eight openings and each system is capable of holding between six and twelve layers per opening, depending on the production material.



KEY MODULES



Automatic loading & unloading basket



Press force reduction



Cooling unit



Automatic loading & unloading table



Freely programmable process parameter



Weight compensation



Lamination press



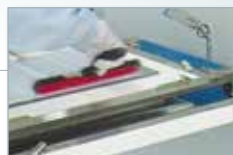
Product temperature measurement



Thermal oil heating



Vacuum



FEATURES & ADVANTAGES

KEY FEATURES

- Automatic SINGLE / TWIN STACK sheet lamination system
- Suitable for complex constructions like passports
- Wide range of programmable process parameters
- Intuitive human interface ensuring easy & efficient system & process handling
- Optimized energy management system for environmentally friendly & cost-saving operation
- Uniquely designed heating plates for perfect homogenous temperature conditions
- Fully modular system design
- MB INCAPE ready

PRODUCTIVITY / PROCESS UNITS

- Up to eight openings
- Vacuum system (optional)
- Weight compensation system (optional)
- Average heat variation on heating plates: +/- 1°C
- Average heat variation overall heating plates: +/- 3°C
- Special temperature management
- Programmable cycle-time, lamination pressure, lamination temperature
- New product-parameter teach / set-up in just five minutes
- Heating & cooling in both presses possible (TWIN)
- Availability: up to 95%
- Yield: up to 99.7%
- Environmental conditions:
 - » Room temperature: 23°C; +/-3°C
 - » Humidity: 50%; +/-10%

TECHNICAL DATA

- Sheet materials: PVC, PC, ABS; others on request
- Sheet sizes: 530 x 680 mm (other sizes on request)
- Openings: 4 up to 8
- Lamination force / pressure: 50 – 1,250 kN
- Repeat accuracy: +/- 0.5%
- Temperature tolerance: +/- 1°C
- Surface finish (ground): $\leq 1.2 \mu\text{m}$
- Throughput: up to 144 (SINGLE STACK) / 288 (TWIN STACK) sheets per hour; depending on material & layout



SHEET HOT STAMPING

FOIL PUNCHING

INLAY TESTING

SHEET COLLATING

LAMINATION

HOLDERPAGE MILLING

HOLDERPAGE PUNCHING

HOLDERPAGE INSPECTION

eCOVER LAMINATION

BOOKLET PRODUCTION

PRE-PERSONALIZATION

SOFTWARE

HPM 300

HOLDERPAGE MILLING SYSTEM

Mühlbauer's HPM 300 is designed to manufacture the holderpage Hinge, a thin and flexible, yet robust layer which is sewn into the passport. Mühlbauer's patented Hinge Technology offers fast and effective production of Hinges. Due to the adjustable and variable parameters, such as Hinge thickness or the flexibility in the composition of the material, it is adaptable to any kind of production.

Ultimate quality and reliable production are guaranteed by integrating various features such as input separation, thickness measurement control and output reject sorting. Processing of holderpages in 2-up format allows for the effortless integration of the machine into the existing and proven Mühlbauer passport production line which provides a throughput of up to 300 holderpages per hour.



KEY MODULES



Input module



Thickness measurement station



Reject unit



Input control



Cutting station



Output module



CNC milling station



FEATURES & ADVANTAGES

KEY FEATURES

- Designed for the unique Mühlbauer Hinge Technology
- Fast & easy-to-handle Hinge production by milling procedure
- Higher flexibility of the Hinge because of adjustable & variable parameters such as thickness
- The milling of the special composition material within the holder page results in a flexible & robust Hinge
- The high accuracy of the milling process leaves a smooth finish transition between holder page & the Hinge
- No more additional processes like attaching the hinge to the holder page

PRODUCTIVITY / PROCESS UNITS

- Suction units guarantee scratch free handling
- Input control ensures the processing of one holderpage at a time
- Milling head with adjustable rotation speed
- Integrated cleaning station for waste removal
- Thickness measurement & reject unit for holderpages outside the predefined tolerance
- Availability: up to 95%
- Yield: up to 99.7%
- Environmental conditions:
 - » Room temperature: 23°C; +/-3°C
 - » Humidity: 50%; +/-10%

TECHNICAL DATA

- CNC milling head: setup of Hinge thickness & size
- Movable axis: X, Y & Z
- Material: PC; others on request
- Holderpage dimensions: according to 2-up ID-3 format
- Y accuracy: ± 0.20 mm
- Z accuracy: ± 0.05 mm
- Throughput: up to 300 (2-up) holderpages per hour

UPH

50 100 150 200 250 300

SHEET HOT STAMPING

FOIL PUNCHING

INLAY TESTING

SHEET COLLATING

LAMINATION

HOLDERPAGE MILLING

HOLDERPAGE PUNCHING

HOLDERPAGE INSPECTION

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SOFTWARE

HPP 2021/A - HPP 2021/M

HOLDERPAGE PUNCHING SYSTEMS

Mühlbauer's HPP 2021 A and HPP 2021M holderpage punching systems exceed all requirements for high-precision and reliable punching of holderpages in 2-up format. These systems are available in fully and semi-automatic versions, depending on production needs and the required level of automation. Mühlbauer's punching systems are well-proven around the globe. A powerful hydraulic system enables the processing of PC material while the easily accessible punching unit ensures a quick tool change, making this system robust and easy-to-op-

erate. The systems are designed for continuous quality production: Double sheet recognition and optical sheet alignment sensors ensure that only single sheets are processed and that the punching is done in accordance to the print marks. The handling of double sheet sizes is also possible by means of an integrated double sheet lift and cutting system. This allows even higher productivity and yield. Both systems, depending on configuration, are able to produce up to 5,000 holderpages per hour.



HPP 2021/A



HPP 2021/M

KEY MODULES



Sheet feeding



Optical sheet alignment



Automatic skeleton ejection



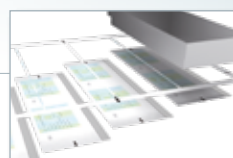
Double sheet recognition



Hydraulic punching unit



Output module



FEATURES & ADVANTAGES

KEY FEATURES

- Automatic punching system for polycarbonate & PVC passport holderpages
- Manual or automatic sheet feeding
- Highly accurate & precise hydraulic driven punching unit
- Easy-to-operate & to maintain
- Customized tool design, in-house tool manufacturing & regrinding services
- MB INCAPE ready

PRODUCTIVITY / PROCESS UNITS

- HPP 2021/M based on manual sheet feeding
- HPP 2021/A with automatic sheet feeding from sheet stacker
- Hydraulic driven punching system
- Programmable punching speed & punching distance
- Optical sensor system top & bottom for sheet positioning in punching position available
- 1- / 2-up punching tools
- Adjustable punching parameters for punching speed
- Automatic holderpage output to conveyor belt or to stack handling system
- Availability: up to 95%
- Yield: up to 99.7%
- Environmental conditions:
 - » Room temperature: 23°C; +/-3°C
 - » Humidity: 50%; +/-10%

TECHNICAL DATA

- Sheet materials: PC, PVC; other materials on request
- Sheet sizes: up to 405 x 510 mm
- Sheet thickness: 500 – 1,000 μm ; other thickness on request
- Punching speed / pressure: 25 - 200 m/s / 100 kN
- Punching tools: 1- / 2-up
- Single tool size: up to 205 x 205 mm
- Punching accuracy: +/- 100 μm
- Throughput: up to 5,000 holderpages per hour; depending on material & layout

UPH



SHEET HOT STAMPING

FOIL PUNCHING

INLAY TESTING

SHEET COLLATING

LAMINATION

HOLDERPAGE MILLING

HOLDERPAGE PUNCHING

HOLDERPAGE INSPECTION

eCOVER LAMINATION

BOOKLET PRODUCTION

PRE-PERSONALIZATION

SOFTWARE

HPI 3000

HOLDERPAGE INSPECTION

Mühlbauer's HPI 3000 is tailor-made for the inspection of PC holderpages. This high-volume system, which includes up to ten high-resolution cameras, inspects UV print, color print, surface, micro text and DOVID. It guarantees the highest inspection quality. Cutting edge client and server technology, as well as statistical error reporting, control the production pro-

cess and offer live online visualization of the inspection. This ensures 100% quality output. The system is controlled by our open universal personalization platform MB MCES and can be connected to various production management systems such as the integrated personalization and production management system MB MB INCAPE



KEY MODULES



Input module



Turning station



Output module



Cleaning station
(front)



Cleaning station
(back)



Reject



Vision inspection
(front)



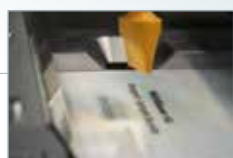
Vision inspection
(back)



Reject Marking



Contactless test station



FEATURES & ADVANTAGES

KEY FEATURES

- Fully-automatic optical inspection, testing & pre-personalization system for holderpages, inlays, pre-lams & eCovers
- Easy self-teach modus for optical systems
- 2-up, 2-up double, 3-up & 3-up double ID-3 formats possible
- Thickness measurement, print or hot stamp marking possible
- Easy to adjust, operate & maintain
- MB INCAPE & MB MCES ready

PRODUCTIVITY / PROCESS UNITS

- Automatic holderpage feeding & stacking from / to input / output stacker
- Individual surface & print inspection systems for front side & back side inspection, inspection features:
 - » UV-inspection
 - » Microtext inspection
 - » Format inspection
 - » CLI / MLI / relieve inspection (optional)
- Customized inspection features (optional)
- RFID / chip test / initialization unit
- Customized test procedures (optional)
- Reject marking by hot stamping or print mark
- Adjustable lamination temperature, speed & pressure
- MB MCES-based chip pre-personalization (optional)
- TCP/IP interface (optional)
- Environmental conditions:
 - » Room temperature: 23°C; +/-3°C
 - » Humidity: 50%; +/-10%

TECHNICAL DATA

- Holderpage format: 2-up, 3-up, 2- / 3-up double
- Holderpage thickness: 500 - 1,000 μm
- Resolution print inspection: 2,048 Pixel b/w – ca. 65 μm / Pixel
- Resolution surface inspection: 2,048 Pixel color – ca. 65 μm / Pixel
- Optical system surface inspection: Line-Scan color camera
- Optical system print inspection: Line-Scan b/w
- IC Module types: Contactless: ISO 14443 / 15693
- Throughput: up to 3,000 holderpages per hour; depending on process & chip coding time

UPH



SHEET HOT STAMPING

FOIL PUNCHING

INLAY TESTING

SHEET COLLATING

LAMINATION

HOLDERPAGE MILLING

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HOLDERPAGE INSPECTION

eCOVER LAMINATION

BOOKLET PRODUCTION

PRE-PERSONALIZATION

SOFTWARE

ePLS 6000

eCOVER LAMINATION SYSTEM

The Mühlbauer ePLS 6000 is a fully-automatic machine which produces the booklet eCover, used later in the state-of-the-art passport production.

In a gluing application assisted by mechanical and electronic processes, the cover which is provided by the cover input feeder, is joined together with the RFID Inlay provided by the Antenna Feeder on one side of the future eCover and with the Compensa-

tion Layer on the other side. The result of this process is a raw booklet eCover. The eCover will be collated later with the booklet paper set to form a state-of-the-art eCover Passport.

The required materials are handled through the ePLS 6000 in a 2-up format, with a throughput of up to 1200 eCovers per hour, depending on used material variety and/or applied process parameters.



KEY MODULES



Input module



Thickness measurement station



Reject unit



Input control



eCover lamination



Output module



Glue applicator



Chip & antenna functionality testing



Movable control panel



FEATURES & ADVANTAGES

KEY FEATURES

- Industrial, fully-automatic eCover lamination
- Latest technology for highly reliable & efficient eCover lamination
- Intuitive user interface for efficient & productive operation
- MB MCES / MB INCAPE / MB PalaMax® ready

PRODUCTIVITY / PROCESS UNITS

- Input feeder cover material
- Input feeder system antenna Inlay
- Input feeder compensation layer
- Glue applicator
- Pressing unit
- Chip Testing unit
- Output unit
- Environment conditions:
 - » Room temperature: 23°C +/- 3°C

TECHNICAL DATA

- Passport types & formats: ID-3 MRP, ePassports according to ICAO 9303
- Processing format: 2-up
- Max pages: up to 96
- Glue type: hot melt glue
- Throughput: up to 1,200 eCovers per hour; depending on process parameters

SHEET HOT STAMPING

FOIL PUNCHING

INLAY TESTING

SHEET COLLATING

LAMINATION

HOLDERPAGE MILLING

HOLDERPAGE PUNCHING

HOLDERPAGE INSPECTION

eCOVER LAMINATION

BOOKLET PRODUCTION

PRE-PERSONALIZATION

SOFTWARE

UPH

200

400

600

800

1000

1200

SABL 100

SEMI-AUTOMATIC BOOKLET LINE

Mühlbauer's semi-automatic Booklet Line (SABL) provides highest flexibility in the production of passports and ePassports in terms of: product development, product evaluation and / or small to medium production volumes.

The standalone semi-automatic machines – SABL 100 RF, SABL 100 CS, SABL 100 LS, SABL 100 CF, SABL 100 BP, IDENTIFIER

60 PERSYS, SABL 100 IP – form a highly flexible production system for collating and sewing, laminating and bonding, booklet finishing and booklet pre personalization.

Booklets are handled through the SABL line in a 2-up format, with a throughput of up to 130 passports per hour, depending on used material variety and/or applied process parameters.



SABL100 RF



SABL100 BP



IDENTIFIER 60 PERSYS



SABL100 LS



SABL100 CS



SABL100 CF



SABL100 IP

KEY MODULES



Passport collating & sewing



Laser number perforation



Passport number impact print



Final booklet punching



Lamination



Passport finishing



FEATURES & ADVANTAGES

KEY FEATURES

- Industrial semi-automatic booklet production & pre-personalization
- Perfectly suitable for product development, small & medium batch production
- Processes equipment identical with the Automatic Booklet Line, e.g. sewing, laser perforation, impact print numbering
- MB MCES / MB INCAPE / MB PalaMax® ready

PRODUCTIVITY / PROCESS UNITS

- SABL 100 RF: Reinforcement tape application on flyleaf
- SABL 100 CS: Collating & sewing system of inner paper set of the booklets
- SABL 100 LS: Lamination system of the cover to the paper set & bonding system
- SABL 100 CF: Cutting & finishing system (2-up cutting, booklet folding, booklet spine forming)
- SABL 100 BP: Booklet punching to ICAO format
- IDENTIFIER 60 – PERSYS: Laser Perforation Numbering with chip pre-personalization (optional)
- SABL 100 IP: Booklet impact printing

TECHNICAL DATA

- Passport types & formats: ID-3 MRP, ePassports according to ICAO 9303
- Processing format: 2-up
- Max pages: up to 96
- Max booklet format: according ICAO 9303
- Glue type: water-based cold glue
- Throughput: up to 130 booklets per hour; depending on process parameters

SHEET HOT STAMPING

FOIL PUNCHING

INLAY TESTING

SHEET COLLATING

LAMINATION

HOLDERPAGE MILLING

HOLDERPAGE PUNCHING

HOLDERPAGE INSPECTION

eCOVER LAMINATION

BOOKLET PRODUCTION

PRE-PERSONALIZATION

SOFTWARE

UPH

20 40 60 80 100 120 140

BOOKLET LINE

PASSPORT BOOKLET PRODUCTION SYSTEMS

Mühlbauer's Booklet Line comprises the complete systems for the production of passports and ePassports. Four stand-alone machines – PCS 6000, PLS 6000, PBS 600 and PFS 6000 – form a highly effective production system for collating and sewing, laminating, embossing, binding and finishing different kinds of

passports. Separated processes allow for the highest production flexibility. Materials are handled through the Booklet Line in a 2-up format with up to 3,000 passports per hour (depending on material and process parameters).



PCS 6000



PLS 6000



PFS 6000



PBS 600

KEY MODULES



Cover embossing



Passport lamination



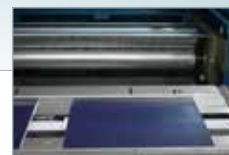
Passport finishing



Passport collating and sewing



Passport bonding



FEATURES & ADVANTAGES

KEY FEATURES

- Highly modular designed process modules & units for stand-alone & in-line production
- Latest technology for highly reliable & efficient ePassport production
- High-secure “interlock stitching” sewing process supported
- Most gentle & sensitive material handling for high-quality booklet production
- Intuitive user interface for efficient & productive operation
- MB MCES / MB INCAPE / MB PalaMax® ready

PRODUCTIVITY / PROCESS UNITS

- PCS 6000 – Passport Collating System: collating & sewing of the inner set of booklets
- PLS 6000 – Passport Laminating System: lamination of the cover to the inner set; also suitable for eCover production
- PBS 600 – Passport Bonding System: pressing system for post pressing of glued covers
- PFS 6000 – Passport Finishing System: embossing, Cutting, folding & punching system to finalize the booklet
- Environmental conditions:
 - » Room temperature: 23°C; +/-3°C
 - » Humidity: 50%; +/-10%

TECHNICAL DATA

- Passport types & formats: ID-3 MRPs; ePassports according to ICAO 9303
- Processing format: 2-up
- Max. pages: up to 96
- Max. booklet format: Booklets according to ICAO 9303
- Glue type: cold / hot
- Throughput: up to 3,000 passports per hour; depending on process parameters

SHEET HOT STAMPING

FOIL PUNCHING

INLAY TESTING

SHEET COLLATING

LAMINATION

HOLDERPAGE MILLING

HOLDERPAGE PUNCHING

HOLDERPAGE INSPECTION

eCOVER LAMINATION

BOOKLET PRODUCTION

PRE-PERSONALIZATION

SOFTWARE

UPH

500 1000 1500 2000 2500 3000 3500

IDENTIFIER 6000 PERSYS

BOOKLET PERFORATION & NUMBERING SYSTEM

Mühlbauer's IDENTIFIER 6000 Persys is a state-of-the-art booklet perforation and numbering system for passports according to ICAO 9303. The IDENTIFIER 6000 Persys is designed to meet highest industrial demands regarding modularity, integration of process modules, as well as latest electronics and software technology. The machine covers all processes, necessary for high-class passport perforation and numbering requirements. In addition, the system can also be used for inkjet printing, impact print with sequent or random numbering, chip initialization and / or encoding, as well as labeling. The highlight is the new

numbering unit with a unique matrix minting process – a Mühlbauer development which is already well proven in the card personalization sector.

The operator-friendliness was further enhanced with regard to the system's improved ergonomic design and a new graphical user interface (GUI). Due to its highly flexible design, the IDENTIFIER 6000 Persys can easily be configured according to customer and project demands, as well as extended to a fully-automatic passport personalization system, even on site.



KEY MODULES



Multi booklet input
(stacker or magazine)



Numbering station optionally



Multi booklet output
(stacker or magazine)



Booklet opening / pageturning



Inkjet printing
(serial number / barcode)



Booklet closing



Passport identification module
(e.g. serial number detection)



Laser number perforation



Labeling module



Contactless chip encoding



Laser engraving
(serial numbers)



Packaging module



Quality assurance including
reject & data verification



FEATURES & ADVANTAGES

KEY FEATURES

- Combinable with IDENTIFIER 6000 process modules
- Fully-automatic high-speed passport perforation system
- Highly modular system design – upgradeable even on site
- Parallel process tracks to achieve max. speed & availability
- Multiple RFID / chip coding stations for pre-personalization (optional)
- Laser perforation technology
- Patented impact print technology (random numbering, mixed characters, special characters)
- Inkjet and / or laser printing technology (optional)
- Online support
- MB MCES / MB INCAPE / MB PalaMax® ready

PRODUCTIVITY / PROCESS UNITS

- Automatic passport feeding & stacking
- Automatic page turning units
- 400 W laser perforation system with integrated exhaust system
- Unique matrix numbering system with highest embossing flexibility
- Fully flexible numbering e.g. sequence, random & position
- Up to 24 chip coding units (optional)
- Electrical and / or optical output quality control (optional)
- Packing module (optional)
- On-site upgradeable to complete passport personalization with laser systems, inkjet printing systems, lamination modules, packing modules, labeling modules, etc.
- Environmental conditions:
 - » Room temperature: 23°C; +/-3°C
 - » Humidity: 50%; +/-10%

TECHNICAL DATA

- Passport types & formats: ID-3 MRPs; ePassports according to ICAO 9303
- Perforation technology: 400W CO2 laser
- Inkjet printing system: max. continuous ink printer, DOD printing
- Interface: TCP / IP
- IC Module types: Contactless: ISO 14443 / 15693
- Throughput: up to 3,000 passports per hour; depending on process & chip coding time

SHEET HOT STAMPING

FOIL PUNCHING

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SHEET COLLATING

LAMINATION

HOLDERPAGE MILLING

HOLDERPAGE PUNCHING

HOLDERPAGE INSPECTION

eCOVER LAMINATION

BOOKLET PRODUCTION

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SOFTWARE

UPH

500 1000 1500 2000 2500 3000 3500

QUALITY ASSURANCE

TESTING EQUIPMENT ACCORDING TO ICAO 9303 REQUIREMENTS



PRODUCT PORTFOLIO

YOUR ONE-STOP-SHOP TECHNOLOGY PARTNER

AUTOMATION

CARDS & ePASSPORTS

- IC Module Production
- Card Body & Smart Card Production
- Holderpage & Booklet Production
- Card & ePassport Personalization
- Packaging & Mailing

RFID / SMART LABEL

- Antenna Production & Inlay Assembly
- Converting
- Personalization

SEMICONDUCTOR BACKEND

- IC Module Production
- Carrier Tape Production
- Die Sorting

INDUSTRIAL INSPECTION SYSTEMS

- Packaging
- Metal Working
- Special Solutions

FUTURE TECHNOLOGIES

- Concentrator Solar Technology
- Flexible Solar Cell Technology
- Solar Panel Technology
- eSIM PERSO
- LED Technology

TECURITY®

- ID Card Solution
- ePassport Solution
- MB IDVERSO® Border Management Solution
- Driver's License & Vehicle Registration Solution
- Production Facilities

PARTS & SYSTEMS

- Precision Parts
- Surface Engineering

CONSULTING

- Identification of Customer Requirements
- Planning & Design
- Implementation
- Ongoing Operations

SERVICE

- Worldwide Locations for Service & Support
- Worldwide Spare Parts Supply
- Reaction Time & Full Service Contracts
- Service & Maintenance Management
- Updates & Upgrades
- Teleservice, Remote Access & Hotline (24 hours)
- Training & Support on Different Levels
- Production & Administration Support

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