State-of-the-Art Technologies and Solutions

Cutting-Edge Technologies and Solutions
The Mühlbauer Group is the only single-source technology partner for the production and personalization of cards, passports and RFID applications worldwide. With around 3,000 employees, technology centers in Germany, Malaysia, Slovakia, the USA and Serbia, and a global sales and service network, we are the world’s market leader in innovative systems and software solutions, supporting our customers in project planning, technology transfer including system integration and production support.

Exclusive Manufacturer Service
35 production and service facilities on five continents, worldwide spare parts repositories and individual service and financing concepts enable us to provide a unique service quality, allowing us to react and bring solutions within two hours.

Seeing is Believing
In our global technology centers, such as the ones in Germany, Malaysia, South Africa and the USA, we exhibit our complete range of smart card and ePassport production and personalization products, as well as RFID inlay production and converting processes. Almost any system is available and ready for demonstrations. Additionally the company’s know-how can be experienced in the TECURITY EXPRESS show truck, an unrivaled mobile high-security production center. Convince yourself of the superiority of Mühlbauer technologies.

Technology and Market Leadership
To ensure and expand the technology and market leadership, Mühlbauer continuously invests in innovative products and processes. Our research and development centers with over 400 highly qualified engineers and technicians collaborate closely with customers and research institutions in order to efficiently launch reliable solutions in increasingly shorter development and production cycles.

Open Communication
While aiming to extend our current leading market position in the emerging areas of government security and biometric applications, we ensure strict privacy in all projects and serve as a reliable partner for sophisticated industries. We are committed to provide the highest speed, best quality and strict customer oriented services.

Business Unit TECURITY®
Mühlbauer specializes in innovative one-stop solutions encompassing the production, personalization and issuance of ePassports, ID cards and other card related security documents, and fully automatic border control systems. The business unit TECURITY® bundles the extensive know-how of the development of tailor-made security solutions. In the last 30 years we have been intensively involved in over 300 government related ID projects across the globe.

Business Unit Automation
More than 100 different standard and customized products and intelligent software solutions for data enrollment, border control as well as personalization and production management are the core of the business unit Automation. The division is responsible for the development and manufacturing of Mühlbauer technologies. In addition to systems used for high-quality document production and personalization in high-end security products, we manufacture one-stop turnkey solutions for industrial image processing of cards, coins and bank notes, tubes and other products. Moreover we develop and produce innovative systems such as microchip die sorting, flexible solar cells or carrier tape equipment for specific niche applications in the semiconductor back-end area (semiconductor related products), as well as labeling and marking systems for traceability of electronic components (traceability).

Business Unit Parts & Systems
Mühlbauer's Parts & Systems segment produces high-precision components both for the manufacturing of Mühlbauer products and as a supplier to security-sensitive industries such as aerospace, motorsports, semiconductor and medical engineering.
Single-Source Technology Partner

Comprehensive Competence in End-to-End Systems

Mühlbauer Group is the only global acting single-source provider for end-to-end production of solutions and systems for the smart card, ePassport and semiconductor industry. We incorporate significant competence in providing optimized and state-of-the-art technology as well as customized equipment. Our products merge the main three factors for our customers’ success story:

- In-house development and research
- In-house production and assembly
- In-house training and technology transfer
The Mühlbauer Group’s core competences in delivering perfected machine products are the manufacturing of the precision parts, the development and constant enhancement of mechanics and electronics, the process and the software solutions. Due to constant investments and a well-trained R&D team, Mühlbauer has grown to be a most innovative technology partner that guarantees optimized systems. We excel in perfectly coordinating every single step of the process, thus ensuring the most efficient and reliable products for our customers.
**MB INCAPE/BASIC**

Integrated Production & Personalization Management Software

**Key Features**

- Streamlined web-based user interfaces with easy localization / internationalization support
- Out-of-the-box support of current Microsoft® operating systems
- Highly automated workflows with less operator interaction
- The only software solution in the world for combined data management, complete production control and material management
- Modular solution to organize the complete production of premium high-secure documents
- Covers the full production control requirements (security industry and EMV standards)
FEATUES

MB INCAPE/BASIC is Mühlbauer’s PMS Solution (Production Management Software) for the personalization of electronic cards and documents (e.g. ID cards, ePassports, driver’s licenses, EMV or GSM cards).

Main Functions
- Production management
- Data management
- Seamless integration of Mühlbauer materials management

MB INCAPE/BASIC is targeting
- Cost-effective and scalable data, workflow and material management for card and document personalization
- Configurable workflow steps (personalization, quality assurance, mailing)
- Main focus on automated processing (minimum operator intervention except for personalization on machines and manual quality checking)
- Web-based operator clients:
  - UI is customizable (localization, internationalization, branding)
  - ICAO compliant data preparation
- Scalability regarding:
  - Document types
  - Connected machines (up to 20 desktop machines)
  - Personalization offices (up to 10 sites)
- Seamless tracking of document life-cycle inside the personalization with integration of Mühlbauer materials management (MB Warehouse)
- Connection to card or document management systems (e.g. civil register): Via web service, database or file-based interface
- Direct interface to MB personalization machines (integration of 3rd party machines possible)
- Integration of MB User Management

The MB INCAPE architecture consists of a modular concept to fulfil the needed scalability in all kinds of document body production steps as well as in all types of personalization characteristics (e.g. centralized and decentralized processes, various types of personalization machines, application specific data preparation scenarios etc.).

Concerning hardware and software components the scalability applies to the implementation of all kinds of ID documents, fulfils performance requirements and allows to process customer and application specific production, personalization, quality control and document delivery scenarios with highest solution flexibility.
CMT 200
Chip Module Testing System

KEY MODULES

- Spooling unit (IC Module)
- Electrical test station
- Reject punching unit

UPH

5,000 10,000 15,000 20,000 25,000 30,000

Contact-IC Contactless-IC
Design as an open platform, the test handling system CMT 200 is suitable for counting and testing of IC Modules. Built on a compact basis with integrated spoolers, CMT 200 can be used for input quality measurement for card manufacturers handled via the reel-to-reel principle. The modules can be tested mechanically as well as electronically with 4-fold contact. Optionally, contactless modules can be tested using a 6-fold contact based head. Identified reject modules are marked by reject punching.
CMT 2280
Chip Module Pre-Personalization System

KEY MODULES

- Spooling unit (IC Module)
- Pre-personalization and initialization
- Reject punching unit
- Thickness measurement (optional)

UPH

20,000 30,000 40,000 50,000 60,000 70,000
Key Features

- Compact and cost efficient pre-personalization and initialization system
- Easily accessible control electronics and pneumatics
- Automatic spooling systems for module tape and spacer tape
- Fully automatic processing of test and pre-personalization procedures
- Contact- (dual interface) and contactless interface test systems available
- User friendly operator interface ETS
- MCES / INCAPE ready

Productivity / Process Units

- Integrated spooling systems for module tape and spacer tape
- Highly flexible testing solution for various IC Module applications
- Sensor based module counting system
- Module thickness measurement optional
- Up to 1-, 16- or 32-fold test / encoding heads
- Programmable positioning of reject punch location in x/y
- Printer for reporting and statistics (reel report)
- Spooling systems TS 1145/1,0 for IC Module tape and spacer tape
- UPS (uninterruptable power supply)
- Full performance personalization through MCES (MB coding system)
- Smartware or even micropross compatible capability
- Availability: Up to 95%
- Yield: Up to 99.7%
- Environment conditions: Room temperature: 23°C; +/-3°C
  Humidity: 50%; +/-10%

Technical Data

- Module tape: 35 mm / super 35 mm
  Reel diameter max. 700 mm
- Module pitch: 9.5; 14.25 mm (others on request)
- Spacer tape: 35 mm
  Reel diameter max. 500 mm
- Typical test time / ATR test: Ca. 2 sec
- Throughput: Up to 34,000 uph based on 2 sec. ATR test

The new generation of high-speed IC Module pre-personalization and initialization system CMT 2280 is designed for test / pre-personalization of smart card IC Modules especially used for GSM and banking application. Integrated high-end reader technology such as Mühlbauer’s MCES as used in card personalization equipments, smartware or micropross guarantees the fastest personalization performance. A mechanical thickness measurement and optical quality control can be chosen optionally to ensure 100% good quality of personalized modules. Faulty modules are automatically marked by the reject punch. The punch – which can move in x- and y-direction – is freely programmable and can mark IC Modules on any position of the module tape without decreasing the throughput. The final counting of the IC Modules takes place after the whole process. This enables the pre-personalization of a determined quantity of IC Modules and the generating of a total report.
CMT 6560

Chip Module Pre-personalization System

**KEY MODULES**

- Spooling unit (IC Module)
- Reject punching unit
- Pre-personalization and initialization

**UPH**

- 20,000
- 30,000
- 40,000
- 50,000
- 60,000
- 70,000
The chip module encoding and testing system CMT 6560 is designed for counting, testing and initializing of IC Modules on standard 35 mm tapes. High-speed test handling or module counting with up to 65,000 modules/hour can be realized through the synchronization of test and pre-personalization. Testing of contact, contactless, dual interface and single or multirow modules is achieved with the best performance and yield in the market by using high-end reader systems such as Mühlbauer’s MCES as used in Mühlbauer’s card personalization systems. Alternatively, smartware and even micropross readers are available upon request.
CML 201
Glue Tape Lamination System

KEY MODULES

- Spooling unit (IC Module)
- Punching unit (Glue tape)
- Tape application (Glue tape)
- Lamination (IC Module - glue tape)

UPH

- 8-contact module tape
  - 5,000
  - 6,000
  - 7,000
- 6-contact module tape
  - 8,000
  - 9,000
  - 10,000
The CML 201 is a highly reliable and efficient glue tape lamination system. A standardized set-up, produced in large lots results in a very competitive price. This machine is suitable for a wide range of IC Module tapes (standard as well as dual interface).

Short product changeover and highest autonomy times lead to a great cost of ownership value. Automatic spooling units as well as easy operation allow for a throughput of up to 9,000 modules / hour.
SCM 501
Smart Card Milling System

KEY MODULES

- Magazine card input
- CNC milling station
- Cleaning module
- Cavity depth measurement
- Magazine card output
- Reject bin

UPH

2,500 3,000 3,500 4,000 4,500 5,000
FEATUES & TECHNICAL DATA

Key Features

- Fully automatic milling of cavities for IC Modules into plastic cards, with reference card top side
- Operator friendly, flexible and modular system design
- Scratch-free handling of card bodies due to vacuum card separation
- Graphical based milling design programming
- Highly accurate milling system with cooled spindle drive
- Excellent cavity cleaning by efficient suction system
- Fast milling tool changing and fully automatic calibration
- INCAPE ready

Productivity / Process Units

- Card feeding and stacking based on Mühlbauer magazine system
- Automatic magazine changer
- Magazine handlers with magazine buffer optional
- Card orientation and card thickness measurement system optional
- 1 CNC controlled weight optimized milling system
- Patented antenna detection system (ATS) for dual interface card production optional
- In-line antenna quality measurement station optional
- Cavity cleaning station
- Cavity measurement station with in-line feedback loop
- Electrical and optical antenna pad control systems optional
- Reject and sampling station (up to 3 fold max. optional)
- Availability: Up to 95%
- Yield: Up to 99.5%

Technical Data

- Card types: ID-1 cards; PC, PVC, ABS, PET, TeCoLas®; other materials on request
- CNC milling heads: 1
- Programmable milling axis: 3 (x-, y-, z-axis)
- Dynamic drive accuracy: x-/ y-axis: +/- 15 µm
  z-axis: +/- 10 µm
- Measurement system accuracy: +/- 2.5 µm
- Throughput: Up to 3,500 uph; depending on cavity design and material

The smart card milling system SCM 501 is used for automatic milling of cavities for IC Modules in plastic cards. This system represents a very economical card milling process for small to medium sized production tasks. Flexibility and modularity are a key benefit of this system providing a variety of options including dual interface production. SCM 501 can reach a throughput of up to 3,500 cards / hour, producing standard cavities.
SCM 5001

Smart Card Milling System

KEY MODULES

- Magazine card input
- 2x CNC milling stations
- 2x cleaning modules
- 2x cavity depth measurement
- Magazine card output
- Reject bin

UPH

2.500 3.000 3.500 4.000 4.500 5.000
FEATUERES & TECHNICAL DATA

Key Features

- Fully automatic milling of cavities for IC Modules into plastic cards, with reference card top side for standard contact cards and dual interface cards as well as DUAL-SIM cards
- Best accuracy, process ability and flexibility due to 2 independent milling stations (6 axis)
- Operator friendly, flexible and modular system design
- Scratch-free handling of card bodies due to vacuum card separation
- Graphical based milling design programming
- High accurate milling system with cooling spindle drive
- Excellent cavity cleaning by efficient suction system
- Fast milling tool changing and fully automatic calibration
- INCAPE ready

Productivity / Process Units

- Card feeding and stacking based on the Muehlbauer magazine system
- Automatic magazine changer
- Magazine handlers with magazine buffer optional – close to 1 hour system autonomy
- Card orientation and card thickness measurement system optional
- 2 CNC controlled independent milling systems
- Patented antenna detection system (ATS) for dual interface card production optional
- In-line antenna quality measurement station optional
- 2 cavity cleaning stations
- 2 cavity measurement stations with in-line feedback loop
- Electrical and optical antenna pad control systems optional
- Reject and sampling station (up to 3 fold max., optional)
- Availability: Up to 95%
- Yield: Up to 99.5%

Technical Data

- Card types: ID-1 cards; PC, PVC, ABS, PET, TeCoLas®; other materials on request
- CNC milling heads: 2
- Programmable milling axis: 3 (x-, y-, z-axis)
- Dynamic drive accuracy: x- / y-axis: +/- 15 µm
- z-axis: +/- 10 µm
- Measurement system accuracy: +/- 2.5 µm
- Throughput: Up to 5,000 uph; depending on cavity design and material

The smart card milling system SCM 5001 is used for automatic milling of cavities for IC Modules in plastic cards. The system is perfectly suitable for all contact cards, dual interface cards and multi-SIM cards. This system features a highly economical card milling process for medium to large sized production tasks.

Flexibility and modularity are a key benefit of this system providing a variety of options including dual interface production. With a standard milling configuration SCM 5001 reaches a throughput of up to 5,000 cards / hour.
MFB 2500

System for Dual Interface Card Production

**KEY MODULES**

- Magazine card input
- CNC milling station with automatic antenna detection system
- Electrical test station (Antenna resistance)
- Flexible Bump dispensing station
- Vision inspection (Bump height)
- Vision inspection (Bump size & position inspection)
- Pre-curing station
- Magazine card output
- Sample box

**UPH**

- 1,500
- 2,000
- 2,500
- 3,000
- 3,500
- 4,000
Mühlbauer’s Flexible Bump technology offers a well proven system that guarantees an absolutely secure connection between chip and antenna for dual interface cards. This is achieved with the unique and patented Flexible Bump process, ensuring electrical connection even when the card is intensively used. The latest generation MFB 2500 offers even more state-of-the-art ingenuity and the flexibility of integration into existing production lines without additional upgrades. This solution combines the both unique and patented technologies antenna touch milling as well as the Flexible Bump process in one system. The MFB 2500 offers the lowest costs per card especially for high production volumes with a throughput of up to 2,500 cards / hour. Thanks to a vision system as well as the possibility of re-working this system guarantees 100% good cards and a maximized yield.
CMFB 2500

Advanced System for Dual Interface Card Production

**KEY MODULES**

- Magazine card input
- CNC milling station for cavity milling
- Cleaning station
- Cavity depth measurement
- Milling station for ATS milling
- Antenna resistance measurement
- Flexible Bump dispensing station
- Vision inspection (Bump size & position inspection)
- Pre-curing station
- Magazine card output
- Reject box
- Cavity check

**UPH**

- **ONE DISPENSING STATION**
  - 1,000
  - 1,500
  - 2,000

- **TWO DISPENSING STATIONS**
  - 2,500
  - 3,000
  - 3,500
Mühlbauer CMFB 2500 combines the superior and economic Mühlbauer cavity milling system with the patented ATS milling and Flexible Bump application technology in one manufacturing step. Highest accuracy and proven Mühlbauer technology ensure an efficient and high-quality production of dual interface cards. An output of 100% flawless cards is guaranteed by integrated measurement systems of the cavity depth and antenna resistance as well as optional features such as thickness measurements and orientation checks of cards. With a number of optional upgrades the CMFB 2500 adjusts flexibly to any requirements, achieving a throughput of up to 2,500 cards / hour.
DICL 5000
Dual Interface Card Line

**KEY MODULES**

- Magazine card input
- 2x CNC milling station
- 2x cleaning module
- 2x cavity depth measurement
- Antenna resistance measurement
- Dosing station for solder bump
- Optical inspection of solder bump
- Implanting station
- 3x hot press
- Cold press and module height measurement
- Optical module inspection
- Electrical test station contact
- Electrical test station contactless
- Resonance frequency measurement
- Magazine card output
- Reject bin

**UPH**

- DUAL INTERFACE
  - UPH 2,500
  - UPH 3,000
  - UPH 3,500
  - UPH 4,000
  - UPH 4,500
  - UPH 5,000

**STANDARD**
FEATURES & TECHNICAL DATA

Key Features
- Compact system for inline production of dual interface cards
- Developed for MB TeConnect technology for longest life time and easy handling
- Equipment suitable for milling and implanting of standard contact cards as well
- Operator friendly, flexible and modular system design

Productivity / Process Units
- Card feeding and stacking based on Mühlbauer magazine system
- 2 independent CNC controlled milling systems (6 axis)
- Patented antenna detection system (ATS) for dual interface card production
- 100% antenna pad detection by vision and/or electrical resistance measurement
- Additional cleaning station for highest process stability
- Cavity depth measurement with closed loop feedback to milling head
- Quality check of antenna pad by electrical resistance measurement and/or optical inspection
- Dosing unit for MB TeConnect solder paste or customized glue on request
- Optical Inspection of bump height and optionally bump position and size
- IC module tape feeding high precision punching system with reject handling
- Position and force controlled z-axis to avoid damaged chips
- Up to 4 hot press stations possible
- IC Module inspection by vision system optional
- Electrical test of contact (ATR) and/or contactless (ATS) cards
- 100% resonance frequency measurement for dual interface or hybrid cards optional
- In-line multi encoding system for pre-personalization and initialization with up to 6 coding heads optional

Technical Data
- IC Modules: 35 mm / super 35 mm tapes; 9.5 / 14.25 mm pitch
- Card types: ID-1 cards from PC, PVC, ABS, PET, TeColas®, other materials on request
- CNC milling heads: 2
- Programmable milling axis: 3 (x-, y-, z-axis)
- Dynamic drive accuracy: x-/y-axis: ± 15 µm
- z-axis: ± 10 µm
- Measurement system accuracy: ± 2.5 µm
- Implanting accuracy: X, Y = ± 30 µm
- Implanting pressure / temperature: Up to 200 N / up to 300 °C
- Throughput: 5,000 uph (standard smart cards)
  2,500 uph (dual interface cards with TeConnect)
- Availability: Up to 95%
- Yield: Up to 99.7%

DICL 5000 is an effective in-line production system for long-life dual interface cards as well as standard ID-1 smart cards. The system is designed for large size production tasks while providing an economic and flexible design that promises extremely high accuracy.

It excels in providing the highest yield with a throughput of up to 5,000 cards / hour. The DICL 5000 provides the continuously proven Mühlbauer technology and quality, known for decades in the smart card business.
SCI 201

Smart Card Implanting System

KEY MODULES

- Magazine card input
- Implanting station
- Hot press
- Cold press
- Electrical test station
- Magazine card output
- Reject box

UPH

1,500 2,000 2,500 3,000 3,500 4,000
Key Features

- Fully automatic implanting of IC Modules into plastic cards
- Suitable for contact and dual interface card production
- Operator friendly, flexible and modular system design
- Scratch-free handling of card bodies due to vacuum card separation
- Operator friendly and fast tool changing
- In-house tool manufacturing and customizing
- INCAPE ready

Productivity / Process Units

- Card feeding and stacking based on Mühlbauer magazine system
- Cavity detection
- Automatic card and IC Module tape transport and indexing system
- Up to 2 hot press units
- 1 cold press unit with integrated module height difference measurement
- IC Module inspection by vision system optional
- Electrical contact station for IC Module check after implanting (ATR)
- Contactless test for dual interface or hybrid cards optional
- Resonance frequency measurement for dual interface or hybrid cards optional
- Optional multi encoding system up to 6 stations for pre-personalization and initialization
- Customized system extension on request
- Reject and sampling station (up to 2 fold max. optional)
- Availability: Up to 95%
- Yield: Up to 99.7%

Technical Data

- IC Modules: 35 mm / super 35 mm tapes; 9.5 / 14.25 mm pitch
- Card types: ID-1 cards; PC, PVC, ABS, PET, TeCoLas®; other materials on request
- Implanting accuracy: x, y = +/- 30 µm
- Implanting pressure / temperature: Up to 200 N / up to 300°C
- Throughput: Up to 2,500 uph; depending on material

**SCI 201** is a cost-efficient IC Module implanting system for ID-1 smart cards. The system is designed for start-up and medium size production tasks, offering minimum footprint, economic but flexible design as well as extremely high accuracy. It excels with an outstanding uptime providing the highest yield at a throughput of up to 2,500 cards / hour.
SCI 5001
Smart Card Implanting System

KEY MODULES

- Magazine card input
- Implanting station
- 3x hot press
- Cold press
- Electrical test station
- Magazine card output
- Reject box

UPH

2,500 3,000 3,500 4,000 4,500 5,000
SCI 5001 is a high-speed IC Module implanting system for ID-1 smart cards. The system is designed for medium to large size production tasks. With an economical implanting process, flexible design and extremely high accuracy this system excels with an outstanding uptime providing the highest yield with a throughput of up to 5,000 cards / hour.
CMI 201
Combined Milling & Implanting System

KEY MODULES

- Magazine card input
- CNC milling station
- Cleaning
- Depth measurement
- Implanting station
- Hot press
- Cold press
- Electrical test station
- Magazine card output
- Reject bin

UPH

1,500 2,000 2,500 3,000 3,500 4,000
CMI 201 is a highly efficient combined milling and implanting system for standard ID-1 smart card applications. The system is designed for small to medium size production tasks, offering a minimum footprint and economic yet flexible design with extremely high accuracy.

Customers benefit from an excellent uptime, providing a very high yield with a throughput of up to 2,500 cards / hour. The CMI 201 provides all the proven Mühlbauer technology and quality, known for decades in the smart card business.
CMI 3051
Combined Milling & Implanting System

KEY MODULES

- Magazine card input
- CNC milling station
- Cleaning
- Depth measurement
- Implanting station
- 3x hot press
- Cold press
- Electrical test station
- Magazine card output
- Reject bin

UPH

1,500 2,000 2,500 3,000 3,500 4,000
CMI 3051 is an effective combined milling and implanting system for standard ID-1 smart card applications. The system is designed for medium to large size production tasks with an economical yet flexible design that provides extremely high accuracy. It excels with an outstanding uptime providing the highest yield with a throughput of up to 3,500 cards / hour. The CMI 3051 provides the continuously proven Mühlbauer technology and quality, known for decades in the smart card business.

**Key Features**
- Fully automatic cavity milling and implanting machine
- Graphical based milling design programming
- Highly accurate milling system with water cooled spindle drive
- Integrated pre-heating / heating and cooling stations
- Integrated spooling systems for IC Module tape and spacer tape
- In-line integrated electrical, mechanical and optical (optional) quality test systems
- Fast tool changing
- In-house tool manufacturing and customizing
- Operator friendly, flexible and modular system design
- MCES / INCAPE READY

**Productivity / Process Units**
- Card feeding and stacking based on Mühlbauer magazine system
- Magazine handlers with magazine buffer optional
- Fully automatic card and IC Module tape transport and indexing system
- 1 cavity measurement station with in-line feedback loop
- 1 cold press unit with integrated module height difference measurement
- IC Module inspection by vision system optional
- Electrical contact station for IC Module check after implanting (ATR)
- Contactless test for dual interface or hybrid cards optional
- Resonance frequency measurement for dual interface or hybrid cards optional
- Customized system extension on request

**Technical Data**
- IC Modules: 35 mm / super 35 mm tapes; 9.5 / 14.25 mm pitch
- Card types: ID-1 cards; PC, PVC, ABS, PET, TeCoLas®; other materials on request
- CNC milling heads: 1
- Programmable milling axis: 3 (x-, y-, z-axis)
- Dynamic drive accuracy: x-/y-axis: +/- 15 µm
  z-axis: +/- 10 µm
- Measurement system accuracy: +/- 2.5 µm
- Implanting accuracy: x, y = +/- 30 µm
- Implanting pressure / temperature: Up to 200 N / up to 300°C
- Throughput: Up to 3,500 uph; depending on material
CMI 5001

Combined Milling & Implanting System

KEY MODULES

- Magazine card input
- 2x CNC milling station
- 2x cleaning module
- 2x cavity depth measurement
- Implanting station
- 3x hot press
- Cold press
- Electrical test station
- Magazine card output
- Reject bin

UPH

2,500 3,000 3,500 4,000 4,500 5,000
CMI 5001 is an effective combined milling and implanting system for standard ID-1 smart card applications. The system is designed for large size production tasks while providing an economic yet flexible design that promises extremely high accuracy. It excels at providing the highest yield with a throughput of up to 5,000 cards / hour. The CMI 5001 provides the continuously proven Mühlbauer technology and quality, known for decades in the smart card business.

Key Features

- Fully automatic cavity milling and implanting of IC Modules into plastic cards
- Suitable for contact and dual interface card production
- Operator friendly, flexible and modular system design
- MCES / INCAPE ready

Productivity / Process Units

- Card feeding and stacking based on Mühlbauer magazine system
- Magazine handlers with magazine buffer optional
- Card orientation and card thickness measurement system optional
- Fully automatic card and IC Module tape transport and indexing system
- 2 independent CNC controlled milling systems (6 axis)
- Patented antenna detection system (ATS) for dual interface card production optional
- Up to 4 hot press stations possible
- IC Module inspection by vision system optional
- Electrical contact station for IC Module check after implanting (ATR)
- Contactless test for dual interface or hybrid cards optional
- Resonance frequency measurement for dual interface or hybrid cards optional
- Optional multi encoding system up to 6 stations for pre-personalization and initialization
- Customized system extension on request
- Reject and sampling station (up to 3 fold max., optional)
- Availability: Up to 95%
- Yield: Up to 99.7%

Technical Data

- IC Modules: 35 mm / super 35 mm tapes; 9.5 / 14.25 mm pitch
- Card types: ID-1 cards; PC, PVC, ABS, PET, TeCoLas®; other materials on request
- CNC milling heads: 2
- Programmable milling axis: 3 (x-, y-, z-axis)
- Dynamic drive accuracy: x- / y-axis: +/- 15 µm
  z-axis: +/- 10 µm
- Measurement system accuracy: +/- 2.5 µm
- Implanting accuracy: x, y = +/- 30 µm
- Implanting pressure / temperature: Up to 200 N / up to 300°C
- Throughput: Up to 5,000 uph; depending on material
CMP 2000/M

Chip Module Punching System

Key Modules

- Card input
- GSM punching tool
- GSM cutting tool
- Reject box
- Card output

UPH

1,500 2,000 2,500 3,000 3,500 4,000
FEATURES & TECHNICAL DATA

Key Features

- Fully automatic system for punching and pre-cutting of:
  - GSM plugs in formats 2FF, 3FF, 4FF
  - Mini Visa
  - DUAL-SIM
  - Customized shapes
  - 1 working punching / cutting unit
  - Manual card handling
  - Operator friendly
  - In-house tool manufacturing and customizing

Productivity / Process Units

- Card feeding by operator
- Punch cycle start with foot switch

Technical Data

- Card types: ID-1 cards; PVC, ABS, PET, TeCoLas*; other materials on request
- Punching / cutting system: Hydro pneumatic driven
- Punching speed: Manually adjustable
- Punching / cutting force: Max. 31 KN
- Punching accuracy: +/- 0.1 mm
- Punching / cutting geometry: 2FF, 3FF, 4FF; special shapes on request
- Throughput: Up to 2,000 uph

The manual table top chip module punching system CMP 2000/M is designed for punching and cutting of SIM cards in compliance with ISO standards. ID-1 cards are placed manually under the punching / cutting unit and the hydro-pneumatic punching process is activated by a foot switch. The “combi tool” simultaneously punches and cuts the SIM forma (ID-000) which is then ready to be pushed out of the ID-1 card. The throughput depends on the operator.
CMP 200
Chip Module Punching System

KEY MODULES

- Magazine card input
- GSM punching unit
- GSM cutting unit
- Reject box
- Magazine card output

UPH

2,500  3,000  3,500  4,000  4,500  5,000
FEATURES & TECHNICAL DATA

Key Features

- Fully automatic system for punching and pre-cutting of plugs for GSM-SIM cards and DUAL-SIM cards
- New Mühlbauer replug tool generation allows for the punching of all SIM sizes of one card in one step
- Punching and cutting of various GSM shapes
- Highest throughput on smallest footprint
- Operator friendly, flexible and modular system design
- In-house tool manufacturing and customizing
- INCAP ready

Productivity / Process Units

- Card feeding and stacking based on Mühlbauer magazine system
- Automatic magazine changer
- 1 punching system
- 1 pre-cutting system
- Card orientation and card thickness measurement system optional
- Reject and sampling station (up to 2 fold max., optional)
- Availability: Up to 95%
- Yield: Up to 99.7%

Technical Data

- Card types: ID-1 cards; PVC, ABS, PET, TeCoLas®; other materials on request
- Punching system: Hydro pneumatic driven
- Pre-cutting system: Hydro pneumatic driven
- Punching speed: Adjustable
- Punching / cutting force: Max. 31 kN
- Punching accuracy: +/- 0.1 mm
- Punching / cutting geometry: 2FF, 3FF, 4FF; special shapes on request
- Throughput: Up to 3,000 uph; depending on material

Mühlbauer’s CMP200 is a flexible chip module punching system for all GSM shapes. Its compact and ergonomic design offers a minimum footprint without the loss of flexibility and productivity. The automatic magazine changer allows for an automated production time of up to 20 minutes. Despite its simple setup, this system offers astounding quality and reliability with a throughput of up to 3,000 cards / hour.
CMP 2020
Chip Module Punching System

KEY MODULES

- Magazine card input
- GSM punching tool
- GSM cutting unit
- 3rd Punching / stamping tool (optional)
- Vision system (optional)
- Reject box
- Card output

UPH

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<tbody>
<tr>
<td>SINGLE-SIM</td>
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<td>DUAL-SIM</td>
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The CMP 2020 is designed for pre-cutting and punching of GSM Cards (SIM Cards) or other shapes out of an ID-1 plastic card according to ISO standard or individual customer requirements. The new replug technologie offers highest flexibility for different configurations of the tools. The CMP 2020 can be set up with up to 3 punching tools which make the system the ideal equipment to punch half-cut SIM, Mini SIM or Mini Visa, and paper GSM cards in one run. The cards are handled from magazine to magazine. A pick and place system feeds the incoming cards to the punching and pre-cutting stations. An optional vision system checks the punch position and the complete removal of waste.
MCES

Personalization Software

Job Page

Todo, in progress and finished queues

Machine Page

Documents in their locations

Options Page

Documentation display

Options Page

Chip coding stations

Key Features

- Intuitive and secure user interface
- Open interfaces
- Adaptable for all purposes
  - Identification documents
  - Telecommunication
  - Payment
  - Others
- Multiple data input formats
- Chip OS specific coding applications
- Configurable payment application scripts

- High-secure document and data processing
- In-line card data testing
  - Data pre-test
  - Sample post-test
  - Full test
- Customizable reporting
- Vendor independent extensions through powerful SDK with system simulator
- Highly scalable system
- Runs on all machine sizes
FEATURES & ADVANTAGES

The User
has an intuitive and easy to use front-end, allowing easy and intuitive control of personalization jobs, processes and reports.

The Administrator
finds an environment allowing the fine-tuning of the security and a system that fully complies with the requirements for secure document production in the ID, tele communication or the banking areas. The MCES is ideally suited to run within the restrictions set out by PCI, the best practices as set out for EMV personalization, or the regulations prescribed by credit card companies.

The Supervisor
can get in-depth reporting that allows the management to make informed decisions.

The Management
gets a tried and proven system, as the MCES has been in use since 1999. It can be adapted easily and cost-effectively to new card products. Where required this can even be done independently of Mühlbauer, the machine vendor. Thus Mühlbauer gives its clients a speed and price advantage over users of other equipment. Therefore Mühlbauer empowers its clients to be able to take advantage of new opportunities in the market.

The MCES is able to support different interface methods. The Mühlbauer data acquisition handles the option of input files with a variety of different formats ranging from classic formats like Tag Length Value (TLV) coded files, through Comma Separated Lists (CSV) flat files, to XML files. The data required for the personalization process is merged with the product information within the MCES.

All personalization data can be buffered in encrypted form and deleted after use. The backend of the MCES are the Mühlbauer master system and various processing units. After the personalization finishes all stored personalization data is deleted. These processing units operate the individual personalization actions during which a large amount of logging data is generated allowing the generating of reporting information in XML. This in turn can be transformed into any required format.

The personalization management system integrates incoming data with product definitions in a similar way as a mail merge process. Additionally the MCES is a personalization management system controlling the associated physical and electrical personalization processes. The MCES handles personalization data from a variety of different input methods, formats and applies them to the cards, regardless whether magnetic stripe, chip encoding, or one or more of the various optical personalization processes, such as thermo-transfer printing, laser engraving, embossing or indent printing. The MCES manages all personalization processes within one software system. All this technology has to serve the purpose of helping the customer to make the best use of his investment. Therefore the system has been optimized to give every stakeholder the best value for his money.
QUALITY ASSURANCE

Testing Equipment

Card Body Testing Equipment

Smart Card Testing Equipment

Card Personalization Testing Equipment
### PRODUCT PORTFOLIO

**Your One-Stop-Shop Technology Partner**

#### Automation

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<td>Process Automation &amp; Board Handling</td>
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<td>Flexible Solar Cell Technology</td>
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#### TECURITY®

- Document Issuance Solutions for eID, ePassport, Driver’s License, Vehicle Registration
- Border Management Solutions
- Production Facilities

#### Parts & Systems

- Precision Engineering
- 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
- Training & Support on Different Levels
- Production & Administration Support

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Mühlbauer
High Tech International