Mühlbauer
High Tech International

IC MODULE

PRODUCT OVERVIEW

CONTENTS

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 TECURITY®
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.

PROCESS OVERVIEW

COMPLETE TURNKEY SOLUTION FOR IC MODULE PRODUCTION

DIE BONDING

The chip is placed onto an IC module tape (leadframe). Typically, epoxy glues are used to fix the chip on the rear side of the tape. The exact pick-up-and-place position of the chip from the wafer is controlled by several vision systems. Afterwards, the resin is cured by an inline thermal curing oven before the tape is finally rolled up.

WIRE BONDING

The contact pads of the chip are electrically connected to the contact pads of the tape by an approximately 30μm thick gold wire. The wires are fixed to the contact pads using the thermosonic bonding method.

ENCAPSULATION

The resin is now dispensed in order to protect the chip and open wires against mechanical and environmental stress. Typically, a transparent UV curing material or a black thermal curing material are used for encapsulation. Due to the high accuracy of this method, no additional surface treatment like milling is necessary. For the dispensing process itself, two different methodes can be used: Dam&Fill or Glob Top. In the Dam&Fill mode, the first dispensing head places a dam bar to limit the glob top area. Then, a second dispensing head fills the area inside the dam. In the Glob Top mode, both dispensing heads completely fill the whole module.

TAPE INSPECTION

The fully automatic tape inspection carries out a thickness measurement and checks the glob tops and the surfaces as option. The front and/or rear side of the tape can be controlled for surface defects like open wedges or scratches, fingerprints, etc. Faulty modules are clearly marked by a reject punch hole.

MOLDING

This process step is typically used for 3-row tapes for contactless cards, ID applications and ePassports. The multi plunger mold system works with an electro-mechanical press. This process includes offline cleaning which increases the productive uptime.

ELECTRICAL TEST & PRE-PERSONALIZATION

As an output functional test, the IC modules are electrically singulated and tested or even pre-personalized in one process step. Depending on the chip type (memory or microprocessor chip), complex test routines and parameter tests are performed by best-in-class test readers. Faulty modules are clearly marked by a punch hole.

THE ALL-IN-ONE FLIP CHIP IC MODULE PRODUCTION SYSTEM

The flip chip IC module production system combines all single process steps in only one single machine. Starting from glue dispensing through to high accuracy flip chip die attach to final bonding, followed by optical and electrical quality control as well as bad unit reject punching - just one machine is completing the whole IC module assembly. Neither wire bonding nor encapsulation is required, which makes flip chip IC module production very cost-competitive.

CME 3060

- Contact-based
- Dual Interface
- Contactless (optional)

TI 2280

- Contact-based
- Dual Interface
- Contactless (optional)

PACKSTAR

- Contactless

CMT 6560

- Contact-based
- Dual Interface
- Contactless

FCM 10000 + CMTI

- Flip Chip

IC MODULE PRODUCTION

ENCAPSULATION

TEST INSPECTION

MOLDING

ELECTRICAL TEST & PRE-PERSONALIZATION

FLIP CHIP PRODUCTION

CME 3060

CHIP MODULE ENCAPSULATION

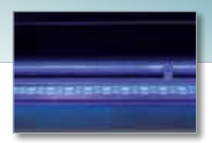
Mühlbauer's CME 3060 represents a new generation of high-speed chip module encapsulation equipment. While providing 100% INLINE PROCESS CONTROL, the machine also features 50% more curing capacity compared to other systems. Based on the new dosing head design program with 16-fold encapsulation and improvements in terms of quality and maintenance friendliness, an easy and quick recipe creation is now possible. CME 3060 can work with thermal-, UV and even an LED UV curing station. The LED UV curing system requires significantly less space and at the same time has more power (compared to standard UV discharge lamps), thus enabling high-speed production with reduced warpage and higher process control. In order to guarantee best output quality control, the tape inspection process of TI 2280 can be integrated inline. The TI 2280 controls the thickness. It is even possible to integrate an electrical test station to receive completly tested modules which are ready for shipment.

GSM cards

Banking cards

Contact &
Contactless ID cards

Any other type of Smart Card



FEATURES & ADVANTAGES

KEY FEATURES

- Integrated thermal and/or UV (LED) curing station
- New dosing design program for easy recipe creation
- Inline integration of Tape Inspection System TI 2280 (optional)
- 50% more curing capacity compared to other systems

NEW FEATURES FOR CME 3060

- 16-fold shaft dosing head V66
- 16-fold membrane dosing head V60
- Purging stations for dosing heads in stop or standby mode by vision cameras
- Inline automatic process control to monitor the encapsulation of all nozzles
- CNC programming software for easy & fast dosing layout creation
- Visualization cameras for accurate dosing head adjustment

DESIGN

- Automatic spooling systems for 35 mm reel-to-reel module tapes & spacer tapes incl. reverse mode
- Automatic tape indexing system
- Vacuum fixing of the tape at dispensing positions
- Tandem dosing head for Dam&Fill or Dual Glob Top (without buffer)
- IC module output counter
- Locked production cabinet
- ETS menu-driven operator interface
- Spooling systems TS 1150/I, /O

WORKSTATIONS

- CME 3060 for Dam&Fill or Dual Glob Top process
- TI 2280 for inline quality inspection

ACCESSORIES

- Ultrasonic cleaning station
- UV measurement tool
- Resin rolling system
- Fridge

TAPE MATERIAL

- Module tape: 35 mm / super 35 mm, reel Ø max. 700 mm, pitch 9.5, 14.25 (others on request)
- Spacer tape: 35 mm; reel Ø max. 700 mm

CURING SYSTEMS

- UV/discharge: up to 3 UV systems (each 3 lamps), 315 - 400 nm (75 W)
- UV/LED: different lengths of LED bars with 365 nm (up to 250 mW/cm²)
- Thermal curing support up to 170° C programmable
- Extended thermal curing oven (optional)

FACILITIES

- Power: 400 V, AC, 3 x 16 A, 50 Hz
- Compressed air: 6 bar, oil-/water-free 100 l/min
- Vacuum: -0.7 bar 35 l/min

ENVIRONMENTAL CONDITIONS

- Room temperature: 23 °C ± 3 °C
- Humidity: 50% ± 10%

DIMENSIONS

- Height: 2300 mm
- Length: 4935 mm
- Depth: 1100 mm
- Weight: 1650 kg

THROUGHPUT

- Up to 38,000 (Dual Glob Top)
- Up to 23,000 (Dam&Fill)

IC MODULE PRODUCTION
ENCAPSULATION
TEST INSPECTION
MOLDING
ELECTRICAL TEST & PRE-PERSONALIZATION
FLIP CHIP PRODUCTION

TI 2280 & TI 2281

TAPE INSPECTION

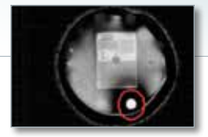
Mühlbauer's tape inspection systems TI 2280 and TI 2281 perform a 100% thickness measurement check on 35mm IC Module tapes. Faulty modules are clearly marked using an automatic and x/y movable reject punch tool. The systems can either be integrated in the encapsulation system CME 3060 for inline inspection or can be operated as a stand-alone system for off-line quality control. The highlights of Mühlbauer's TI systems are the integrated electrical test station which can finish the module even if the material is already isolated (disconnected). Furthermore, the TI series guarantees a 100% output quality control.

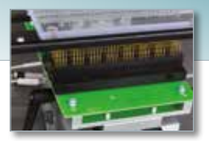
GSM cards

Banking cards

Contact &
Contactless ID cards

Any other type of Smart Card





FEATURES & ADVANTAGES

KEY FEATURES

- For 100% tested output
- 100% mechanical thickness measurement check
- Fully automatic optical inspection of glob tops & surfaces
- Operation as stand-alone or inline system
- Reject punch to mark faulty modules
- Integrated electrical final test station

NEW ON TI 2280

- Automatic, x/y movable reject punch tool
- 8-fold thickness measurement

NEW ON TI 2281

- Electrical test station for top/ bottom/ Dual Interface test

DESIGN

- Automatic spooling systems for module & spacer tapes with integrated tape buffers
- Automatic tape indexing system
- Vacuum fixing of the tape at measurement position
- Detailed production data report (good/reject modules)
- Graphical display & traceability file (optional)
- Menu-driven operator interface ETS
- Spooling systems or TS 1150/I, /O
  Variant: Diameter: 12.5, 25, 40, 56, 76 mm
- Integrated tape buffer for inline solution with CME 3060 (optional)

WORKSTATIONS

- Tape break
- Thickness measurement
- Test or inspection stations
- Reject punch
- Tape transport

OPTIONS

- Printer
- Barcode reader
- United power supply
- Statistical analysis
- Electrical test station in case of already pre-disconnected IC Modules

TAPE MATERIAL

- Module tape: 35 mm / super 35 mm,
  reel Ø max. 700 mm, pitch 9.5, 14.25
- Spacer tape: 35 mm
  reel Ø max. 700 mm

FACILITIES

- Power: 400 V, 50 / 60 Hz, 0.5 kW
- Compressed air: 6 bar, 230 l/min

ENVIRONMENTAL CONDITIONS

- Room temperature: 23 °C ± 3 °C
- Humidity: 50 % ± 10 %

DIMENSIONS

- Height: 2300 mm
- Length: 2185 or 2700 mm
- Depth: 1100 mm
- Weight: 615 kg

THROUGHPUT

- Up to 40,000 UPH,
  depending on process parameters

REELSTAR

MODING

Mühlbauer's REELSTAR is a reel-to-reel, stand-alone, fully automatic, multi-plunger mold system with electromechanical press, for lead frame tapes of 35 mm. The system is designed for offline cleaning, thereby increasing the productive uptime to the highest level and the related machine time for single 35 mm tape to less than 16 seconds (compound and product specific transfer and curing time to be added).

ePassport

Contactless ID cards

Any other type of Smart Card

FEATURES & ADVANTAGES

KEY FEATURES

- Typically used for contactless 3-row
- Most cost-efficient, reel-to-reel transfer molding system on the market
- Perfect fit for ID- & contactless applications
- Capable of transfer molding flex tape (contact cards) or metal tape (contactless cards)
- Advanced process control to ensure reliable & high-quality transfer molding for ultra thin devices

DESIGN

- Synchronous friction & forcefree reel transport system
- Gentle handling of the thinnest lead frames & tapes
- Low force de-gating principle
- Module cavity block design assures minimal offset & precise thickness control

WORKSTATIONS

- Electromechanical press with unique patented clamp systems ensuring minimal bleed
- Separate mold cleaning by vacuum, air jet & vibrating brushes to ensure a clean mold
- Controlled & programmable lead frame pre-heating
- Advanced process control as standard features
- Fully automatic lead frame transport
- Complete set of data management feature for easy process & production control
- Live transfer & temperature graphs for process monitoring

OPTIONAL MODULES

- Non-fill detection unit
- Inline microscope inspection unit
- Multi-language on man-machine interface

SPOOLING SYSTEMS

- Spooler accepts standard reel dimensions
- Automatic signal when spooler is empty (input) or full (output)
- Spacer tape can be wind off (input) or on (output)
- Spoolers can be removed for inline operation with wire bonders

CONFIGURATION

- Molding length: 342 mm
- Tape width: 35 mm

MEASUREMENTS

- Cycle time: >16 sec. (35 mm single tape)
- Mold temperature: ± 2.5 °C
- Plunger speed: 0.1 - 10 mm/s
- Fast changeover times: 5 min for mold, 15 min for de-gater

FACILITIES

- No water-cooling required
- Low energy consumption

ENVIRONMENTAL CONDITIONS

- Room temperature: 23 °C ± 3 °C
- Humidity: 50 % ± 10 %

DIMENSIONS

- Height: 2283 mm
- Length: 4383 mm
- Depth: 1305 mm

THROUGHPUT

- Up to 6,500 UPH
  (with width of lead frame: 35mm; pitch: 95mm)

CMT 6560 & CMT 2280

ELECTRICAL TEST & PRE-PERSONALIZATION

Mühlbauer's chip module encoding and testing system CMT is designed for the counting, testing and initialization of IC modules and RFID products on standard or 35 mm tapes. Depending on the configuration, the system can be used as an output quality measurement system for tape manufactures incl. integrated disconnect punch tool or as an input quality measurement and pre-personalization system for card manufacturers. High-speed test-handling or module counting with up to 69,000 modules per hour can be realized through the synchronization of test and pre-personalization. Tests of contact, contactless, Dual Interface and single or multirow modules as well as for RFID applications can be conducted with the best performance and yield available in the market. Faulty modules are clearly marked by a reject punch hole.

CMT 6560

CMT 2280

GSM cards

Banking cards

ePassport

Contact &
Contactless ID cards

Any other type of Smart Card

FEATURES & ADVANTAGES

KEY FEATURES

- High-speed test handler
- Up to 69,000 UPH
- Simultaneous electrical test & pre-personalization / initialization
- Perfect design for reel-to-reel module initialization, personalization & test
- Encoding of up to 32 modules with CMT 2280
- Encoding of up to 64 modules with Basic CMT 6560 or even128 modules in parallel with extension module

DESIGN

- Easily accessible control electronics & pneumatics
- Automatic spooling systems for module & spacer tapes
- ETS menu driven software, available in different languages
- TCP/IP interface for external data transfer
- Spooling systems TS 1130/I, /O

WORKSTATIONS CMT 6560

- Electrical test & pre-personalization (8-fold, up to 128-fold)
- Input & output module counting
- Moveable x/y-reject punch

WORKSTATIONS CMT 2280

- Electrical test & pre-personalization to 8-fold up to 32-fold
- Input & output module counting
- Moveable x-y-reject punch

OPTIONAL MODULES

- Test upgrades for Dual Interface modules
- Extension module EM600/ DPU disconnect punch with either pneumatic or motoric punch
- PRS inspection for disconnect punch
- Extension module EM600/ T for 128-fold test / personalization
- Camera system for module counting

READER SYSTEMS

- Mühlbauer chip encoding system (MCES) for module test and/or pre-personalization
- Micropross or Smartware Reader (optional)
- Open platform for using customer test/personalization systems

TAPE SPECIFICATION

- Module tape: 35 mm, super 35 mm reel Ø max. 700 mm
- Spacer tape: 35 mm reel Ø max. 500 mm

IC MODULE TYPES

- Processor modules: T=0, T=1 protocol
- Memory cards: I2C BUS/2-wire/3-wire
- Special adaption to other applications (upon request)

FACILITIES

- Power: 400 V, AC, 16 A, 50 Hz
- Compressed air: 6 bar, oil- / water-free, 80 l/min
- Suction: -0.12 bar, 1,300 l/min

ENVIRONMENTAL CONDITIONS

- Room temperature: 23 °C ± 3 °C
- Humidity: 50 % ± 10 %

DIMENSIONS (BASIC CONFIGURATION)

- Height: 2100 mm
- Length: 3320 mm
- Depth:1000 mm
- Weight: 520 kg

THROUGHPUT

- Up to 69,000 UPH (depending on encoding time)

FCM 10000 & CMTI

FLIP CHIP IC MODULE PRODUCTION

Mühlbauer's FCM 10000 excels with its compact design, high output yield and excellent cost-efficiency. This system assembles the module tapes with chips directly from the wafer through Mühlbauer's proven flip chip technology. A placing accuracy of ± 20 µm and a throughput of up to 9,500 UPH can be achieved – the equivalent of an annual capacity of 50 million modules.
The CMTI is integrated inline into the FCM 10000 for a fully automatic optical and electrical inspection. The CMTI provides full control of the chip placement with high precision optical measurement of position, size and contamination of chip bottom surface (depending on glue type and contrast). Additionally, an electrical test station can be integrated for ATR and functional tests as well as for pre-personalization. Faulty IC modules are clearly marked by a reject punch hole.
The 100% optical inspection during each bonding process guarantees highest production quality.

CMTI

FCM 10000

GSM cards

Banking cards

Any other type of Smart Card

FEATURES & ADVANTAGES

KEY FEATURES
- All-in-one Solution
- High-speed flip chip mounting of up to 9,500 UPH
- High placement accuracy of ±20µm
- A compact production & high-speed inspection line for IC modules
- Optical & electrical quality control of the finished product

DESIGN
- High-security access control with individual operator & service identification
- Menu-driven software, available in different languages
- Storage of process data
- Vacuum fixing of the tape at inspection position
- Input & output IC Module counter
- Detailed production data report (good/reject modules)

WORKSTATIONS

FCM 10000
- Adhesive application
- Linear bond head
- Optical tape positioning
- Flip chip die attach
- Final bonder

CMTI
- Input module counter
- Tape break
- Reject punch
- Tape transport

OPTIONS

FCM 10000
- ACP or NCP
- Epoxy dispensing
- Plasma cleaning
- Wafer mapping
- Several thermode stations can be configured
- Motorized wafer zoom inspection

CMTI
- Electrical test system (Micropross or Smartware)
- Flip chip inspection
- Binocular microscope
- Printer
- Bar code reader
- United power supply
- Statistical analysis

SPOOLING SYSTEMS
- In- & output spooler TS 1150/I, /O with integrated tape buffer for module & spacer tape

PLACEMENT ACCURACY
- Placement accuracy +/- 20 µm
- Final bond accuracy +/- 30 µm

WAFER
- 6", 8" or 12" wafer

TAPE SPECIFICATION
- Module tape: 35 mm, super 35 mm reel Ø max. 700 mm, pitch 9.5, 14.25, 19 mm
- Spacer tape: 35 mm, reel Ø, max. 500 mm

PROCESS PARAMETERS
- Chip position & size: repeatability: ± 5 µm, rotation: ± 1°

PITCH
- x = direction of transport
- y = 90° to direction of transport min: x = freely programmable y = 35 mm

DIE SIZES
- min: 0.5 mm x 0.5 mm
- max: 5.0 mm x 5.0 mm

IC MODULE PRODUCTION

ENCAPSULATION

TEST INSPECTION

MOLDING

ELECTRICAL TEST & PRE-PERSONALIZATION

FLIP CHIP PRODUCTION

FACILITIES
- Power: 400 V, AC, 16 A, 50 Hz
- Compressed air: max. 10 bar, 85 l/min.
- Suction: 6 bar, 65 l/min.

ENVIRONMENTAL CONDITIONS
- Room temperature: 23 °C ± 3 °C
- Humidity: 50 % ± 10 %

DIMENSIONS
(FCM 10000 & CMTI incl. spoolers)
- Height: 2200 mm
- Length: 7300 mm
- Depth: 1300 mm
- Weight: 3300 kg

THROUGHPUT
- Up to 9,500 modules per hour (depending on process specification)

UPH

2000 40000 6000 8000 10000 12000

ELECTRICAL TEST & PRE-PERSONALIZATION

PERSONALIZATION & TEST MANAGEMENT SOFTWARE

ABOUT NATIONAL INSTRUMENTS

Former Micropass, 40 years experience in the field of testing and programming of electrical components, Microprossis one of the marketleading providers for the smart card industry. Active in the test of contact, contactless and Dual Interface micro-modules, Microprossupplies the most evolved test features, allowing customers to ensure the quality of your production.

SPECIAL FEATURES MICROPROSS

- MVPI personalization environment
- Optimum throughput thanks to embedded programming
- Access to HSM devices available
- On-site training by Microprossengineers available

ABOUT SMARTWARE

Established in 1986, Smartware is one of the leading providers of software / hardware solutions and services for smart cards. Smartware designs, develops and manufactures electronic boards and embedded systems dedicated to the personalization and the test of contact/contactless and Dual Interface GSM, banking, transport and ePassport smart card chips.

SPECIAL FEATURES SMARTWARE

- SmartGear personalization environment
- Embedded application for faster personalization
- Script language for easy application development
- Full range of accessories for development & de-bugging
- Training and on-site assistance available

STANDARD FEATURES/SUPPORTED TESTS:

- Contact & contactless parametric testing:
  - » open/short
  - » leakage current
  - » resonance frequency
  - » retro modulation measurement
  - » remote & embedded user applications
  - » chip consumption
  - » drivability testing
  - » chip impedance
- Personalization of cards or chip card modules
- OS loading, pre-personalization, personalization

SUPPORTED PROTOCOLS:

- ISO 7816 (T=0 T=1)
- Memory chips (SLE 4406, AT24CXX, …)
- SWP
- USB 2.0
- SD
- ISO 14443 (A/B)
- ISO 15693
- FeliCa
- Mifare (Classic, Ultra Light, Ultra Light C, DesFire, etc.)

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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High Tech International

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