

CARRIER TAPE EQUIPMENT

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 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
-  Fully-automated processing & production management
-  Scalability regarding different documents, machines & personalization locations
-  Flawless integration of Mühlbauer's material management system (MB WAREHOUSE)
-  Connection to card / document management systems via web service, database, file-based interface
-  Standard interface to personalization machines with integration of third-party machines possible
-  Integration of MB User Management
-  Full coverage of production control requirements (security industry & EMV standards)
-  Seamless connection to MB PalaMax® & MB Data Preparation
-  Simplified administration due to web-based operator clients
-  Monitoring of real-time performance of the production
-  Seamless tracking of documents from point of production to issuance
-  Statistical tool analyze collected data & deliver customized statistics on OEE
-  Tool which enables the remote operation of machines on the shop floor from a control centre
-  Tool which increases effectiveness & efficiency so that production becomes more profitable
-  Enables production engineering to prepare & test a repeatable factory set-up. Factories can switch between products within minutes.



CT 8/24 D

ROTARY TAPE FORMING SYSTEM WITH DUAL-ROW OPTION

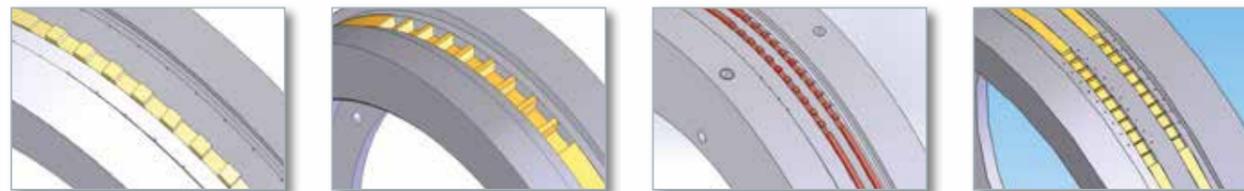
The CT 8/24 D is a rotary forming carrier tape system with a throughput of up to 600 meters per hour, depending on cavity size, positive or negative forming and used material / thickness.

The CT 8/24 D offers a tape range from 4 mm to 24 mm for both positive and negative forming. Dual forming is possible for the following tape size ranges: 2 x 4 mm, 2 x 8 mm, 2 x 12 mm.



KEY FEATURES

- One machine for all applications on rotary forming (positive or negative)
- Well-proven, in-house developed dual-row forming system
- Suitable for high volumes



FEATURES & ADVANTAGES

DESIGN

- Welded steel frame with aluminium front & table plate on all workstations
- Easily accessible control electronics
- Automatic tape wind-on and production control
- Menu-driven software (different languages)
- Mechanism controlled by PLC
- Central control & programming unit
- Integrated vacuum pump
- CE-conformity

WORKSTATIONS

- Buffer station for wind-off
- Temperatur controlled forming station
- Buffer station with control unit for cutting process
- Cutting station for tape width trimming with waste wind-on
- Buffer station
- Punching unit
- Split cutting station
- Buffer station with control unit for wind-on unit
- Wind-on on 200 mm crosswinder

OPTIONS

- Mühlbauer vision for 100% quality control
- Multi-level/crosswinding wind-on up to 200 mm
- Tape cleaning station

SPOOLING SYSTEMS

- Automatic, sensor-controlled wind-off
- Different wind-on speeds for winding directions

TAPE MATERIALS

- Most thermo-formable materials available on the market (pre-slit thermo plastics)

TAPE WIDTH RANGE

- Single: 1 x 8 mm, 1 x 12 mm, 1 x 16 mm, 1 x 24 mm
- Dual: 2 x 4 mm, 2 x 8 mm, 2 x 12 mm

FACILITIES

- Power supply: 25 A / 4.7 kW
- Compressed air supply: min. 6 bar (90 psi), oil- and waterfree

ENVIRONMENTAL CONDITION

- Room temperature: 23 °C ± 5 °C
- Humidity: 50 % ± 10 %

DIMENSIONS

- Height: 2315 mm
- Length: 1900 mm
- Depth: 905 mm
- Weight: 530 kg

THROUGHPUT

- Single row 300 up to meter/hour
- Dual row up to 600 meter/hour

DUAL ROTARY SYSTEM

LINEAR SYSTEM

TAPE DEFINITION

ROTATION CHECK

CARRIER TAPE DIMENSIONS

MÜHLBAUER VISION

IN-HOUSE PRODUCTION

DIE SORTING



CT 12/88 L

LINEAR TAPE FORMING SYSTEM FOR BASIC PRODUCTION

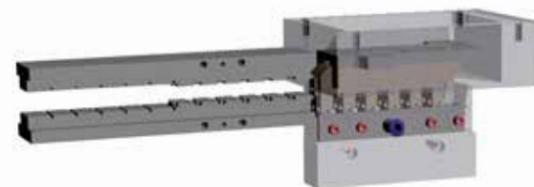
The linear carrier tape forming system CT 12/88 L uses a common method for tape forming: first the pre-heating, then the forming of tools – stroke by stroke. With the optional feature “Deep

Pocket Stamping”, a cavity depth of 25 mm can be achieved. The maximum throughput of this linear forming system is 250 meters per hour. It depends on cavity size, used material and thickness.



KEY FEATURES

- One machine for all applications on linear forming
- 4th generation, meeting all current production demands
- Low tooling cost with easy structure
- Up to 25 mm cavity depth through optional “Deep Pocket Stamping”



FEATURES & ADVANTAGES

DESIGN

- Welded steel frame with aluminium front & table plate on all workstations
- Easily accessible control electronics
- Automatic tape wind-on & production control
- Menu-driven software (different languages)
- Mechanism controlled by PLC
- Central control & programming unit
- CE-conformity

WORKSTATIONS

- Buffer station for wind-off
- Water-cooled forming station
- Buffer station with control unit for wind-on unit
- Wind-on
- Multi-level/crosswinding wind-on up to 400 mm

OPTIONS

- “Deep Pocket Stamping”
- Cutting station for tape width trimming for 12 mm & special 16 mm & 24 mm tapes
- Air booster for sharper pocket forming walls

SPOOLING SYSTEMS

- Automatic, sensor-controlled wind-off & wind-on system

TAPE MATERIALS

- Most thermo-formable materials available on the market (pre-slit thermo plastics)

TAPE WIDTH RANGE

- 12, 16, 24, 32, 44, 56, 72 & 88 mm

PROCESS PARAMETERS

- Max. cavity depth: 25 mm
- optional “Deep Pocket Stamping”
- Punch pitch: 4, 8, 12 & 20 mm
- Standard punch stroke: up to 112 mm

FACILITIES

- Power supply: 16 A / 4.7 kW
- Compressed air supply: min. 6 bar (90 psi), oil- and waterfree

ENVIRONMENTAL CONDITION

- Room temperature: 23 °C ± 5 °C
- Humidity: 50 % ± 10 %

DIMENSIONS

- Height: 2080 mm
- Length: 1880 mm
- Depth: 780 mm
- Weight: 555 kg

THROUGHPUT

- Up to 250 meters/hour depending on cavity size & used material/thickness

DUAL ROTARY SYSTEM

LINEAR SYSTEM

TAPE DEFINITION

ROTATION CHECK

CARRIER TAPE DIMENSIONS

MÜHLBAUER VISION

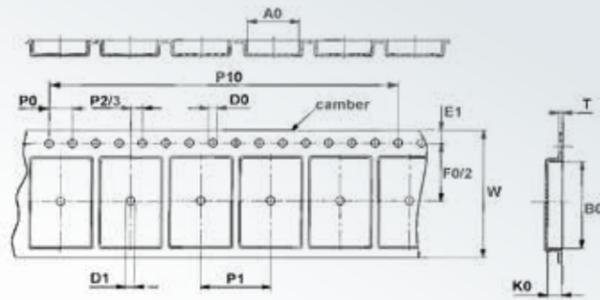
IN-HOUSE PRODUCTION

DIE SORTING

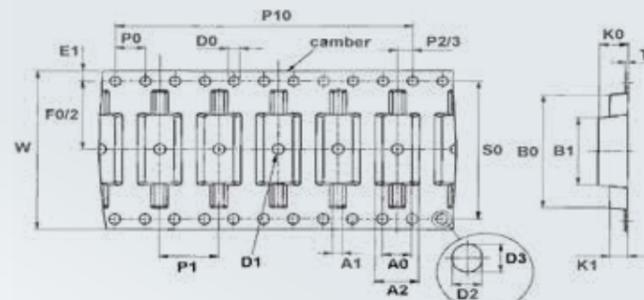


TAPE DEFINITION

EXAMPLE FOR ROTATION TAPE



EXAMPLE FOR LINEAR TAPE



LEGEND

- A0** Pocket length (specified with A1, A2, ...; x-direction)
- B0** Pocket width (specified with B1, B2, ...; y-direction)
- K0** Pocket depth (specified with K1, K2, ...)
- W** Tape width
- T** Tape thickness
- E1** Distance from transport hole to cutting edge
- F0** Distance from center of pocket (center of B0) to center of transport hole (y-direction)
- F2** Distance from center of pocket hole to center of transport hole (y-direction)
- S0** Distance center around transport hole to center oval transport hole (y-direction)
- P0** Distance between two transport holes
- P1** Distance from pocket to pocket
- P2** Distance from center of pocket (center of A0) to center of transport hole (x-direction)
- P3** Distance from center of pocket hole to center of transport hole (x-direction)
- P10** Distance between ten transport holes
- D0** Transport hole diameter
- D1** Pocket hole diameter
- D2** Second transport hole diameter (x-direction)
- D3** Second transport hole diameter (y-direction)

DEFINITION OF CAMBER (CURVE OF TAPE)

- camber (single reel): $\leq 1.0 \text{ mm} / 250 \text{ mm}$
- camber (crosswinding): $\leq 2.0 \text{ mm} / 250 \text{ mm}$

ROTATION CHECK

EXAMPLE

PROPOSED POCKET DIMENSION (mm)

	Spec.	+	-	Min.	Max.
A0	1.07	0.05	0.05	1.02	1.12
B0	2.33	0.05	0.05	2.28	2.38
K0	0.56	0.05	0.05	0.51	0.61

UNIT DIMENSION (mm)

	Spec.	+	-	Min.	Max.
A	0.96	0.01	0.01	0.95	0.97
B	2.22	0.01	0.01	2.21	2.23
C	0.48	0.01	0.01	0.47	0.49

MAX. ROTATION ANGLE (deg)

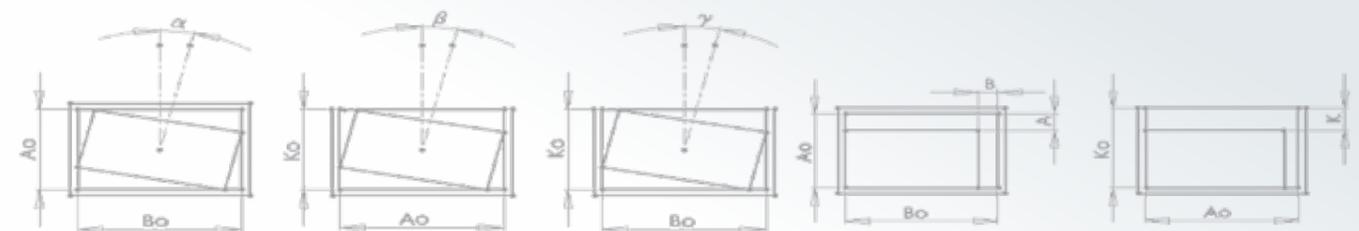
	Max. Rotation Angle (deg)	EIA Spec. (deg) for 8 & 12 mm
A-B (top view)	α (deg)	4.49
A-K (front view)	β (deg)	8.81
B-K (side view)	γ (deg)	3.66

MAX. LATERAL MOVEMENT (UNIT MIN. VS. POCKET MAX.)

	Max. Tolerance (mm)	EIA Spec. (deg) for 8 & 12 mm
A Side	Amax (mm)	0.17
B Side	Bmax (mm)	0.17
K Side	Kmax (mm)	0.14

MIN. LATERAL MOVEMENT (UNIT MIN. VS. POCKET MAX.)

	Min. Tolerance (mm)	EIA Spec. (deg) for 8 & 12 mm
A Side	Amin (mm)	0.05
B Side	Bmin (mm)	0.05
K Side	Kmin (mm)	0.02



DUAL ROTARY SYSTEM

LINEAR SYSTEM

TAPE DEFINITION

ROTATION CHECK

CARRIER TAPE DIMENSIONS

MÜHLBAUER VISION

IN-HOUSE PRODUCTION

DIE SORTING



CARRIER TAPE DIMENSIONS

EXAMPLE FOR ROTATION TAPE

Ident number	Tool on stock	W	Ao	BO	KO	P	t	Contour 0/1	
LO-53	MB SP 35/3-2/1,0	35	4,10	2,10	1,00	6,65	0,20	Spacer	
LO-56	MB SP 35/2-1/2,0	35	4,00	2,00	2,00	2,66	0,20	Spacer	
LO-1973	MB SP 35/2-3/1,15	35	4,03	1,03	1,12	8	0,20	Spacer	
LO-194	MB SP 35/3-3/1,2	35	4,40	1,30	1,20	6,65	0,20	Spacer	
LO-1843	MB SP 35/4-5/0,8	35	5,00	2,00	1,00	6,65	0,20	Spacer	
LO-54	MB SP 35/3-1/0,8	35	7,5	2,00	0,8	15	0,20	Spacer	

>> SPACER TAPE TO PROTECT THE IC MODULE ON THE REEL

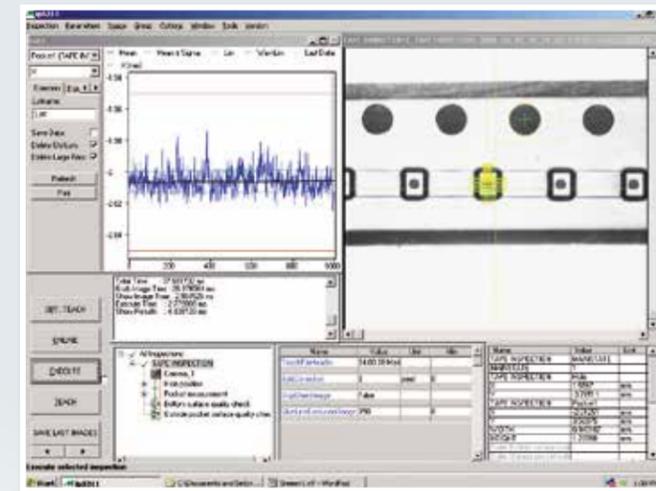
- Available material: polycarbonate
- Conductive
- Softening temperature: 154°C

>> CUSTOMIZED SOLUTIONS AVAILABLE

MÜHLBAUER VISION

FOR 100 % QUALITY OUTPUT

To ensure 100% quality output, all our systems can optionally be equipped with Mühlbauer Vision which can display all inspection results and recognize any deviations in P2, FO A- and B-dimension.



YOUR ADVANTAGES

- Immediate identification of quality problems
- Increased throughput & productivity
- Improved cost of ownership
- Highest quality standards
- No influence on equipment or machine throughput
- Less waste of material due to the fast failure identification

MATRIX SCAN

The matrix scan is another means of constant quality check – regardless of pocket size or tape width. In this way, Mühlbauer systems provide the confidence customers need to deliver superior tapes and to ensure utmost security during the transportation of highly sensitive components.

DUAL ROTARY SYSTEM

LINEAR SYSTEM

TAPE DEFINITION

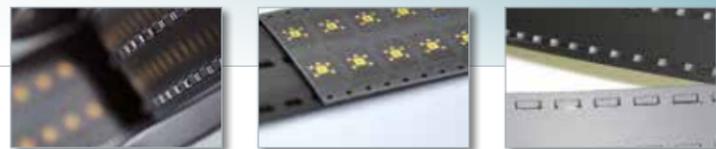
ROTATION CHECK

CARRIER TAPE DIMENSIONS

MÜHLBAUER VISION

IN-HOUSE PRODUCTION

DIE SORTING





IN-HOUSE PRODUCTION

COMPETENCES IN CARRIER TAPE PRODUCTION

AT MÜHLBAUER, WE ALSO PRODUCE CARRIER TAPES IN OUR OWN FACILITIES. WE OFFER:

SMALL & THIN BARE DIE GEOMETRIES

- Incl. vacuum hole down to 0.15 mm
- 1.0 mm pitch
- 4.0 mm tape width

HUGE PORTFOLIO

- Positive or negative forming
- Linear forming
- Spacer tape for IC modules
- Single or multi-row

CUSTOMIZED SOLUTIONS

- Contact us for any specific carrier tape requirements. Our experts will be glad to assist you.

PRODUCTION CENTERS IN MALAYSIA AND GERMANY

OPEN TOOL LIST

- For more information on our specific products, please visit our website: www.muehlbauer.de/carrier-tape



DUAL ROTARY SYSTEM

LINEAR SYSTEM

TAPE DEFINITION

ROTATION CHECK

CARRIER TAPE DIMENSIONS

MÜHLBAUER VISION

IN-HOUSE PRODUCTION

DIE SORTING



SYNERGIES WITH DIE SORTING

A PERFECTLY MATCHING SOLUTION FOR CARRIER TAPE & DIE SORTING

IN THE AREA OF DIE SORTING, MÜHLBAUER IS THE ONLY COMPANY WORLDWIDE

- which can handle dies as small as 0.2 x 0.2 mm and down to 50 µm thickness with the highest level of precision & speed
- offering die sorting equipment with up to 40.000 UPH (including 100% vision inspection)
- offering an "all in one" platform solution for different kinds of applications

TRUST IN THE MOST EXPERIENCED SUPPLIER IN TERMS OF PRECISION, SPEED AND QUALITY!



MÜHLBAUER NOW LASERS BARCODES ON CARRIER TAPE.
WE INVENTED A LASER STATION TO MARK
CARRIER TAPE ON DS MACHINES!

SORTING INTO



Carrier Tape



Reconstructed wafer



Combined solution



Jedec tray



Waffle Pack / Gel Pack

We also can provide customized solutions, please free to contact our carrier tape experts.



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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