



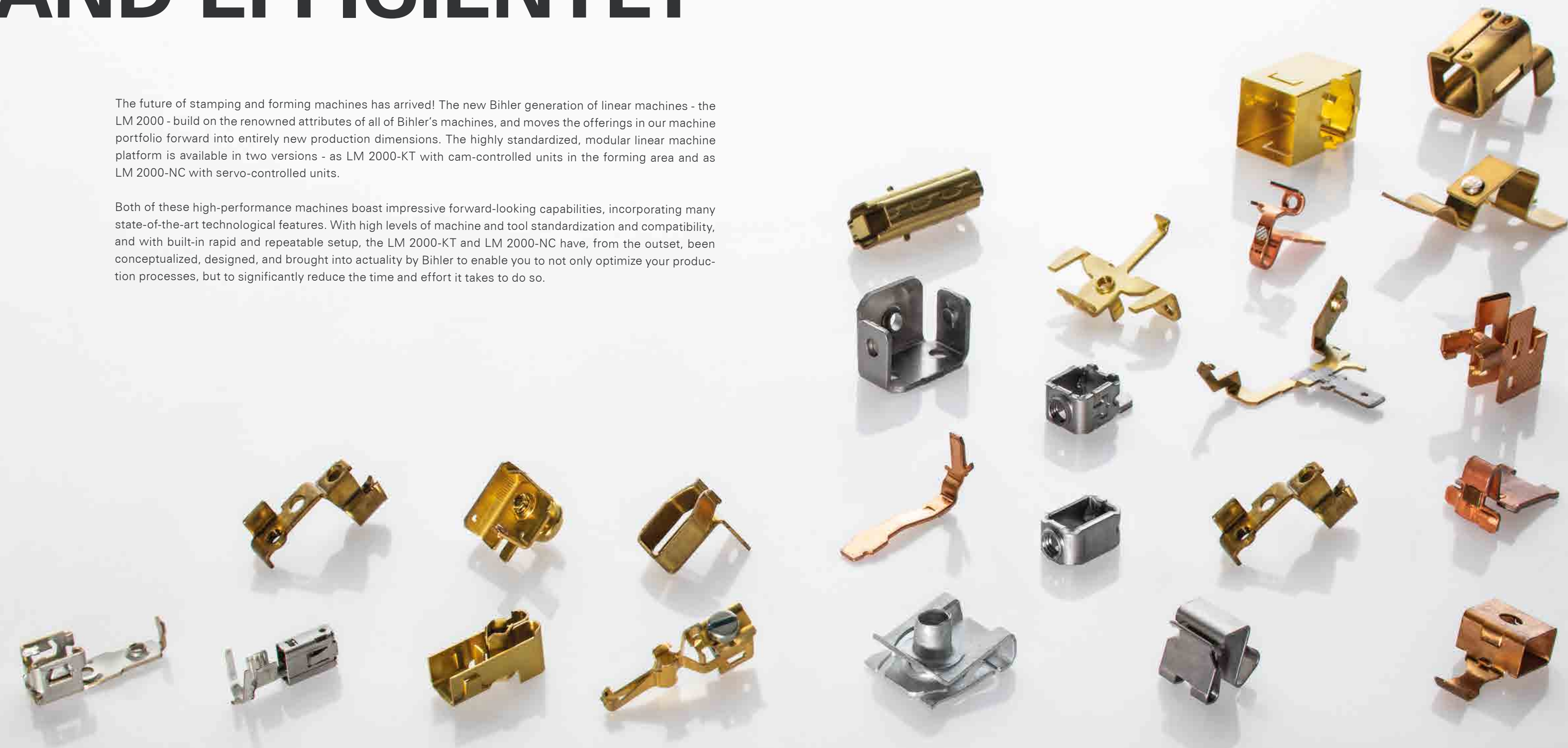
LM 2000

Linear machine
(cam-/servo-controlled)

INTO THE FUTURE SAFELY, QUICKLY, AND EFFICIENTLY

The future of stamping and forming machines has arrived! The new Bihler generation of linear machines - the LM 2000 - build on the renowned attributes of all of Bihler's machines, and moves the offerings in our machine portfolio forward into entirely new production dimensions. The highly standardized, modular linear machine platform is available in two versions - as LM 2000-KT with cam-controlled units in the forming area and as LM 2000-NC with servo-controlled units.

Both of these high-performance machines boast impressive forward-looking capabilities, incorporating many state-of-the-art technological features. With high levels of machine and tool standardization and compatibility, and with built-in rapid and repeatable setup, the LM 2000-KT and LM 2000-NC have, from the outset, been conceptualized, designed, and brought into actuality by Bihler to enable you to not only optimize your production processes, but to significantly reduce the time and effort it takes to do so.



HIGHLIGHTS AT A GLANCE

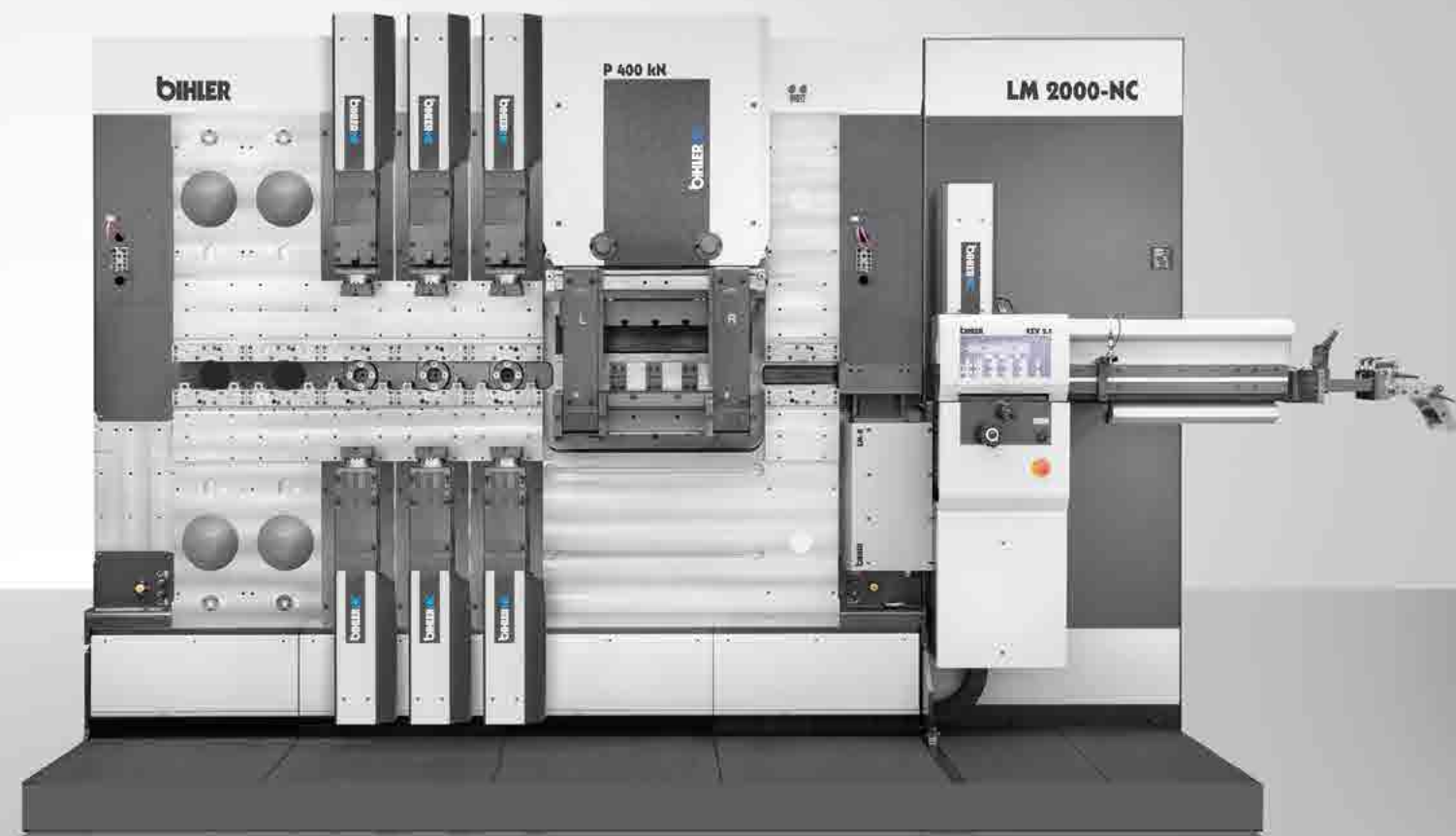
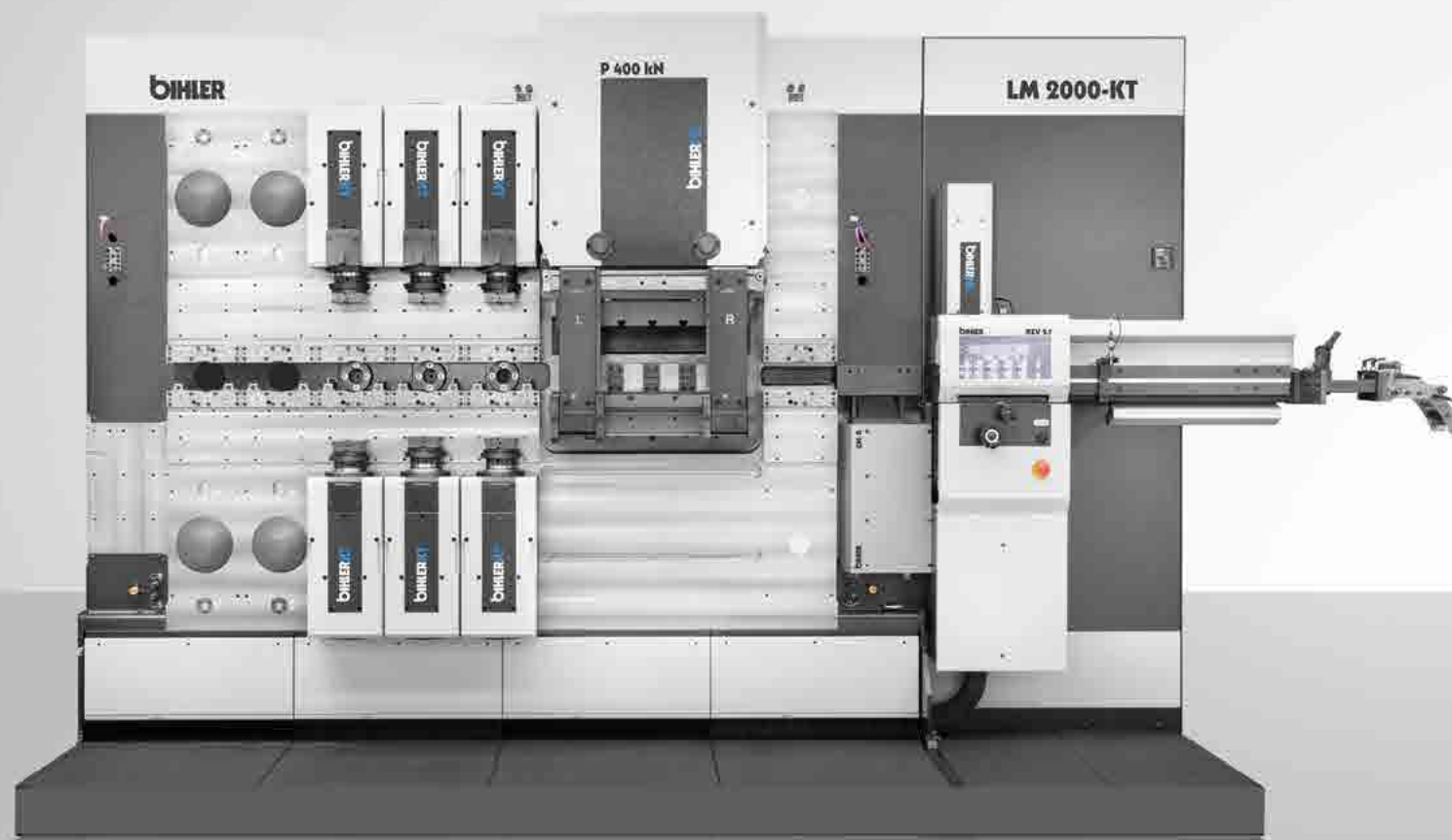
Highly standardized machine platform for the production of stamped and formed parts from strip material using linear tooling technology

LM 2000-KT (cam technology): for efficient production of medium to large batch sizes with cycle rates up to 500 /min.

LM 2000-NC (servo technology): for efficient production of small to medium batch sizes with cycle rates up to 250 /min.

- 2,000 mm processing length for stamping, forming, coining and other processes
- Press installation space compatible with Meusburger standard cutting frames
- Standard interfaces and zero-point clamping system with hydraulic clamping functions for easy and fast forming tool setup
- Full compatibility of linear stamping and forming tools with the machines of the Modular Series

- Can be extended with other process modules for welding, threading, and screw joining applications for additional added value
- Integrated sensors in all machine and processing components for monitoring and protection as part of predictive maintenance
- Unrestricted access to all machine components that require maintenance ensures the shortest possible downtimes
- Simple and safe operation via VariControl VC 1 control system
- Connection of the machining units to an oil circulation lubrication system eliminates oil consumption
- OPC UA interface for transferring machine conditions to an MES or ERP system and/or the Bihler Digital App



MACHINE PLATFORM

LM 2000 platform: Standard platform for manufacturing stamped and formed parts from strip material, can also be expanded to include processes such as welding, thread cutting, and screw insertion. The main components are:

- Machine body with integrated electrics and control system
- Material feed, press, units, central mandrel, configured for all speed ranges
- Pre-installed electrics for later expansion of machining components in the linear area.

The machine platform offers ample space for the configuration of your applications. All processes are easily accessible from the front, guaranteeing ideal conditions for maintenance and setup. This ensures short downtimes and long machine running times together with high machine availability.

Cam or servo controlled variant

The LM 2000 machine platform is available in two variants. The two variants are distinguished by the processing units in the linear area. Variant 1: Cam-controlled for the production of medium to high batch sizes (KT variant). Variant 2: Servo-controlled for the production of small to medium batch sizes (NC variant).



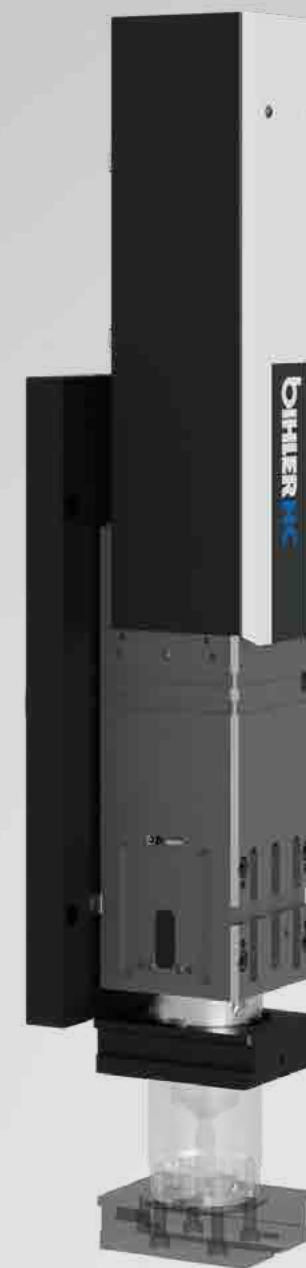
MACHINE EQUIPMENT



KT

LM 2000-KT* slide unit

The LM 2000-KT compact slide units are designed for a maximum speed of up to 500 /min. The units are operated by a positively driven cam. A manual quicklift function is used to reach the setup/maintenance position without having to change the cam. The newly designed quick-change system enables the cam to be replaced easily and conveniently. The slide units feature an overload sensor system and an oil circulation lubrication system as standard to ensure maximum service life. The sealed, fully encapsulated housing improves overall cleanliness in the tool area.



NC

LM 2000-NC* servo slide unit

LM 2000-NC compact servo units provide maximum flexibility. Operating stroke, operating position, and the motion profile can be freely programmed, are infinitely variable and 100% reproducible. This guarantees extremely fast setup times, as manual interventions (e.g. cam change, stroke position adjustment) are no longer required. All NC units have a cooling and circulation lubrication system. An overload protection device integrated in the software protects the units from improper handling or overloading. The units are equipped with an absolute measuring system for continuous high precision.

*A slide unit can be retrofitted with minimal additional effort. All interfaces required, such as fluid, mechanics, and electrics, are pre-installed on the machine side as standard.



Movements

The machine provides up to three movements for each of the five module positions in the linear area, independently of each other from three directions (top, bottom, 3rd level). Consequently, up to 15 movements are available in the entire linear area. As an option, a servo slide unit can also be placed under the press. This provides all the required degrees of freedom, maximum flexibility for the forming process, and simplifies the tool technology.

Interfaces tool

The press area (cutting tools) is compatible with Meusburger SBP 400 and SBH 400 series standard cutting frames. Each module station in the linear area is designed with standard interfaces and zero-point clamping system with hydraulic clamping functions to ensure fast and safe positioning and clamping of the tool modules. This enables the tools to be set up quickly and conveniently and can be used for all machines within the Modular Series.



Press module

LM 2000-KT and LM 2000-NC eccentric presses feature a press force of 400 kN and a fixed stroke of 16 mm. A manual stroke position adjustment with stroke measuring system and control connection to compensate for tool wear and manufacturing tolerances ensures readjustment and reproducible setting from the control interface. Integrated press force monitoring with overload protection, bearing temperature monitoring and connection to the oil circulation lubrication system ensure enhanced process reliability and longer service life. The press is fully encapsulated for improved process cleanliness. The press installation space is compatible with Meusburger SBP 400 and SBH 400 series standard cutting frames.



Infeed module

The RZV 2.1 servo radial gripper feeder ensures a highly dynamic, slip-free feeding and positioning of the strip material. This is designed for all speed ranges. In addition to the RZV 2.1, the infeed module contains all the necessary components for the „material feed“ process (e.g. strip guards, strip lubricator, straightener, standardized strip guide blanks, ...). These components can be adjusted, (re)positioned on the infeed module depending on the specific process, or expanded with optional accessories - everything is 100 % standard.

PROCESS MODULES

Further processes can be integrated on the LM 2000 platform in addition to the forming processes. The corresponding Bihler process modules are integrated on a compact module unit, which is then placed on the respective LM 2000 platform module workstations. Each module unit is compactly designed, equipped with all process-relevant functionalities and includes the interfaces to the machine platform.

Software plugin: All software modules are included as standard in the VC 1 controller and do not require any subsequent installation. In addition to the operation of the corresponding process module, further functionalities such as monitoring, process control and checks are consequently available.

Applications: Each process module can be set up in different positions according to specific process requirements. This enables the LM 2000 platform to be transformed into a manufacturing system on which other processes can be added in addition to forming. Resulting in even more added value and cost savings.



Contact welding*

- For the production of all types of electrical contact carrier components
- Contact welding possible from above or below
- Integrated contact welding units D1 and D2 in the variants M/K
- Compact unit with all relevant components for the contact welding process
- Contact welding units allow free access to the process and strip



Thread forming*

- For the production of threaded strip parts
- Thread forming units GSE KS1 (M2-M5) or GSE KS2 (M5-M10)
- Integrated lifting unit for free access to the process and strip
- Thread former quick-change system
- Centering function and strip guide integrated in module unit
- Integrated spray lubrication, suction optional
- Digital display of thread position in longitudinal and transverse direction to the strip



Screw insertion*

- For the production of sheet metal parts with screw
- Multi-screw unit MSE 2 (-M8) for separating, positioning and screwing-in
- Integrated lifting unit for free access to the process and strip
- Optional screw feed system
- Centering function and strip guide integrated in module unit
- Digital display of screw position in longitudinal and transverse direction to the strip

*currently in pre-development

Rear of machine

The control cabinets as well as fluid supply, are located on the left-hand side of the clearly arranged rear of the machine. These are completely integrated into the machine housing. Next to them, the right part of the rear offers free access to the central mandrel units. Swing-open covers speed up and facilitate maintenance work.

Central mandrel

LM 2000-KT and LM 2000-NC central mandrels are servo-driven and designed for all speed ranges. An integrated manual positioning system ensures that the central mandrels can be quickly and accurately moved to any of the five central mandrel positions on the machine platform. Up to five central mandrels can be retrofitted with little additional effort.

OPTIMUM ACCESSIBILITY



EFFICIENT MAINTENANCE

All the required machine elements, electrical components, and connection elements of the LM 2000-KT and LM 2000-NC are freely accessible. Covers, doors, and flaps can be opened quickly and conveniently. All the relevant components are clearly arranged for fast and convenient maintenance. Unnecessary maintenance and service times as well as machine downtimes are consequently reduced, and the technical availability of the machine is increased.





Oil circulation lubrication

Both the LM 2000-KT and LM 2000-NC variants feature oil circulation lubrication for the lubrication and cooling of all machining components (e.g. press, slide units). To ensure maximum protection, this is equipped with electronic oil temperature, fill level, and contamination monitors. Temperature-controlled cooling of the lubricant and flow-dependent monitoring of each individual lubrication point ensure maximum process reliability. The oil circulation lubrication system is easy to access and consequently ensures the shortest possible maintenance times.

Central lubrication system

The central lubrication system that is installed as standard is used to supply the tool and application with lubricant. The system is divided into two differently timed lubrication circuits, each of which can be freely and independently programmed. This means, for example, that the lubrication pulse can be determined separately for each lubrication circuit as a function of the number of strokes.

Example:

- Lubrication circuit 1: Tool (forming area)
- Lubrication circuit 2: Tool (press)

To ensure optimum lubrication, each of these lubrication circuits is equipped with an electronic lubrication pressure monitor. All maintenance positions are easy to access.



MACHINE CONTROL

Machine control VC 1

The VariControl VC 1 (Version 3.0) provides a full range of machine and process control functions. It controls, regulates and monitors all machine and process functions. Freely programmable digital and analog I/O bus modules have been integrated on the machine side, which serve to operate, monitor, and safeguard the tooling and process technology.

Operation and visualization

Designed to be simple, the control interface is divided in a structured arrangement and can be easily and conveniently operated. Customized menu interfaces for the machine, process and tool areas, clearly displayed machine conditions, functional areas (e.g. process module, infeed, or tool clamping), and production overview have all been integrated and provide for easier and more structured operation. The redesigned control panel is now combined with a 24-inch multi-touch display. In 16:9 format, this enables larger views, the display of additional information and operation with several fingers for zooming in

OPC UA

The standard integrated OPC UA interface allows machine conditions to be transmitted to higher-level MES or ERP systems or to the Bihler Digital App. OPC UA is the interface and basis for future requirements in the field of IoT, M2M, and I4.0.

Condition monitoring

All machine component measured values, parameters and system conditions are measured, evaluated and monitored in real time (e.g. force, torque, temperatures, flow rate, oil pressure, ...). The machine control system indicates when limit values have been reached. Warning messages or a machine stop are triggered if limit values are reached or exceeded. This ensures that downtimes are reduced and any system deviations are detected. All values are clearly evaluated, displayed, and adjusted according to the permissible limit values. As a result, the machine condition and individual components can be evaluated for maximum transparency and safety.

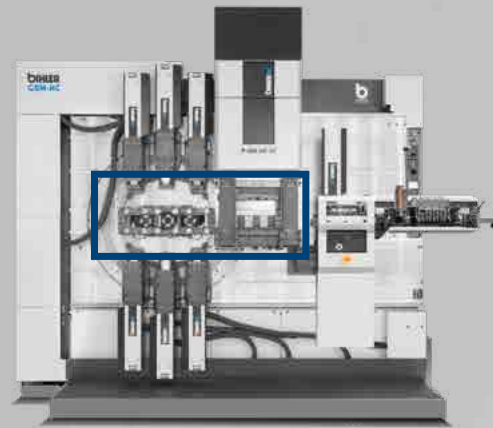




LINEAR TOOL TECHNOLOGY

MODULAR SERIES

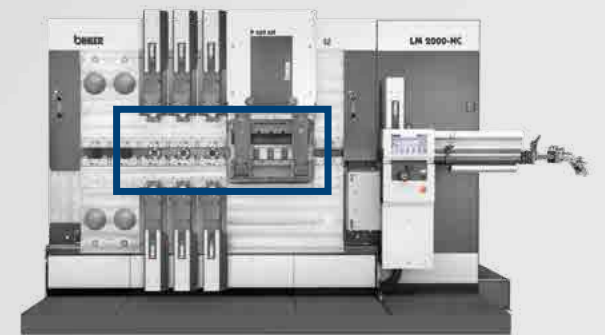
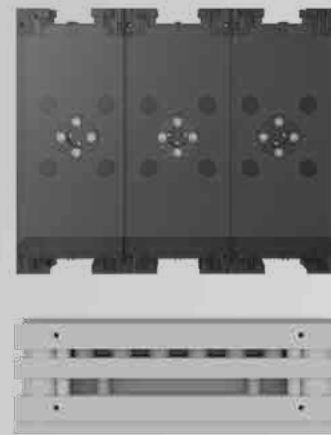
The new Modular Series provides the basis for new production dimensions. These enable an even more effective response to the increasing demands of production. The series consists of five highly standardized, high-performance machines of the latest generation. They feature uniform interfaces in the forming area and are fully compatible with each other in terms of the linear forming tools that are used. As a result, the variety of different solutions and machines is significantly reduced. Uniformly designed forming tools can now be operated simply and independently of the machine in accordance with the „plug & produce“ principle.



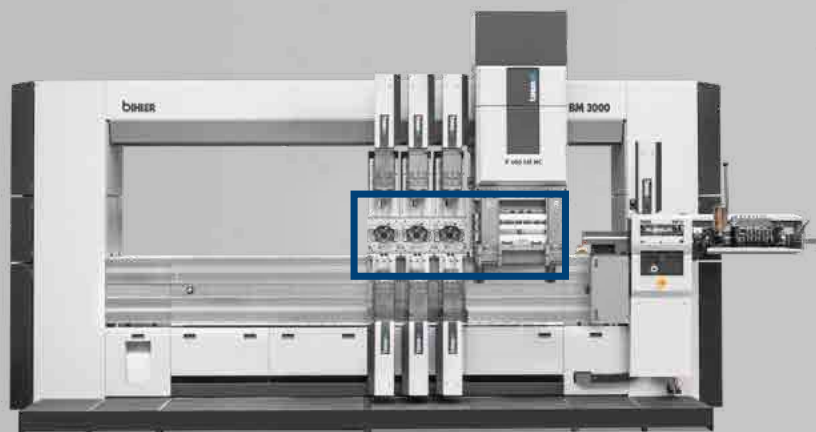
Servo stamping and forming machine
GRM-NC



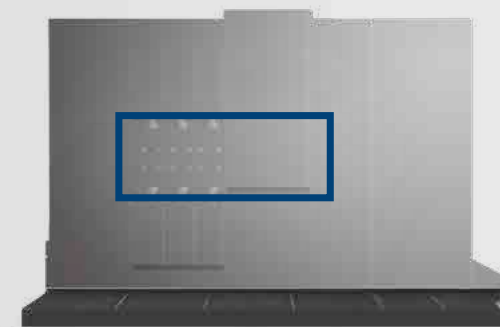
Cam-controlled linear machine
LM 2000-KT



Servo-controlled linear machine
LM 2000-NC



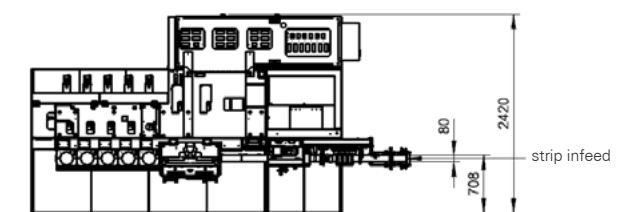
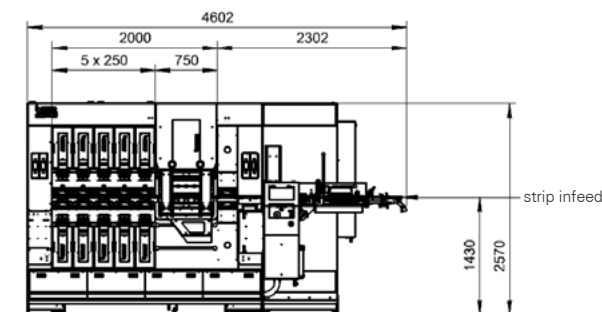
Servo production and assembly system
BIMERIC Modular



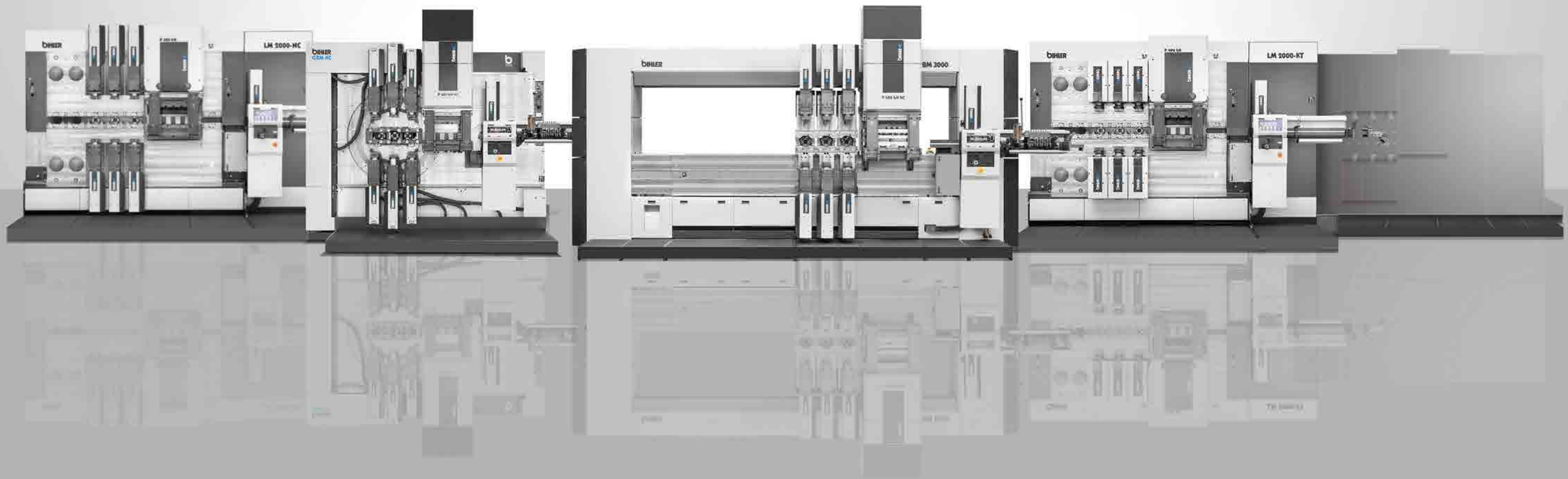
Mechanical high-speed machine
(in planning)

TECHNICAL DATA

Forming technology	Linear
Total processing length	2,000 mm
Infeed length	NC feed mechanism: any
Material	Strip width max. 80 mm, strip thickness depending on material and process
Press	Nominal stamping force 400 kN Fixed stroke 16 mm, infinitely variable stroke adjustment 3.5 mm Nominal height of cutting frame in BDC: 208 ±0.05 mm Table length: 670 mm
NC central mandrel	max. 5 central mandrels max. force 8.9 Kn max. stroke 95mm
Weight	approx. 8 000 kg (without tooling)
Equipment – KT	
Stroke rate	Infinitely variable up to max. 500 /min.
Slide units	Nominal forming force max. 31 kN Stroke max. 28 mm, infinitely variable stroke adjustment 28 mm
Equipment – NC	
Stroke rate	Infinitely variable up to max. 250 /min.
NC units	Nominal forming force max. 31 kN Stroke max. 100 mm



CONSISTENT MODULAR COMPATIBLE





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