MMS Modular Molding Systems was found in 2008 to serve the growing market for hybrid components made of metal and plastic, while SBT is focusing the activities on their core competences such as stamping, welding and assembly.

All Projects that contain injection molding technology are quoted and realized by MMS with using the resources of SBT for the manufacturing of machine and tools.

MMS flexible production machines for manufacturing hybrid components are unique because of the modular setup. The main advantages compared to classic Reel-To-Reel production or In-Line manufacturing are as follows:

- **✓** Less risk of producing scrap-parts because all operations are done in one process
- **✓** Better and more transparent quality control as only one machine is required
- **✓** Quicker production runs and easier planning of machine resources
- **✓** Less material required because no loops or coil starts/ends in the process
- **✓** Less Space and Energy consumption because of compact modular design and servoelectric drives
MMS MODULAR HYBRID MACHINES VS CLASSIC TECHNOLOGIES

Metal/Plastic Hybrid components are traditionally produced with the following technologies:

a) Reel-To-Reel Verfahren

With the Reel-to Reel technology the 3 processes are done separately on 3 machines, after each process the material is recoiled.

The main disadvantages of this system are:
- Long production lead times due to the 3 individual processes.
- High risk of scrap because a part defect may not be identified until the final process, after having run a large number of parts on reels.
- High material loss due to the 3 different start-up processes.
- High risk of damaging parts resulting from de- and recoiling from reels.

b) „In-Line“ Verfahren:

With „In-Line“ technology, two presses for pre-stamping and final blanking work in line with the injection molding machine in between. The slower injection molding process is compensated for by utilizing accumulation loops in between the machines. Thicker and harder strip stock require that the machines be farther apart to accommodate the loop size, resulting in the use of additional floor space.

The main disadvantages of this system are:
- Ample floor space is required because of the 3 machines with loops.
- High scrap levels due to the loop sizes as a result of faults and new coil start-up
- Risk of damaging the parts in the loops
- High equipment costs because 3 individual machines are required for the process.
MMS MODULAR HYBRID MACHINES VS CLASSIC TECHNOLOGIES

The philosophy of MMS is the combination of all possible processes in modular technology at only one production machine for getting a maximum of productivity and efficiency with lowest labour costs and scrap rates. This system can be realized because of the high-dynamic servo drives which are used at the SBT/MMS machine systems. Every module has and independent servo drives and these individual drives are electronically synchronized.

The MMS Multistroke technology:

This technology (Pat. Pend.) allows the efficient combination of quick stamping processes with progressive dies and injection mold tools with multiple cavities. The material transfer through the complete machine is done over the carrier strip with the feeder. After x- quick stamping strokes the feed stops, the mold tool closes and the strip is overmolded in x- cavities.

For process technical reasons or because of time-critical production it may not be possible to use the multistroke technology. In this case it is possible to use a machine-integrated loop. In this case it is possible to do the stamping process parallel to the molding process, which gives a run-speed advantage. The disadvantage is that there is more space required and an additional feed for pulling the strip through the mold tool.

Machine Config. 1: SBTM-300NC with 3 Stamping/Bending Modules and 2 Injection Molding Modules

Machine Config. 2: 1 200kN Press Module, 1 Riveting Module, 1 Welding Module, 1 Injection Molding Module and 1 Stamping/ Bending Module
THE COMPANY

MMS production machines are based on the modular machine systems of SBT Stanzbiegetechnik, but are specially designed and optimized for the production of hybrid components. With these systems it is possible to combine the classic SBT technologies such as stamping, bending, welding, and assembly with the MMS modular injection molding technology.

With all these technologies MMS supports the customer with project engineering and with quotations to the end customer. MMS develops the complete manufacturing process for the complete product, designs the strip layout and calculates the complete machine incl. run speed.

The customer receives with an MMS quote detailed information about:

- Costs for the complete machine incl. accessories
- Material usage of plastic and strip material
- Output of the machine

With this support of MMS it becomes simple for the customer to calculate even complex hybrid components

Global Presence:

MMS is a strongly exporting company. Together with the product line of SBT and the international sales and service partners we are represented worldwide.

OUR MARKETS

- Electro and Electronic Industry (Switches, Connectors, Semi Conductors,...)
- Medical Industry
- Telecommunication
- Automotive Industry
MODULAR SYSTEM CONSEQUENTLY REALIZED

MMS Production systems for the production of metal/plastic hybrid components can be set up individually like building blocks as required by the customer for the production of individual hybrid components.

This is possible because of:

a) Decentralizing of the individual production methods, for each technology an individual module is available

b) Dynamic servo drive technology, every module is driven by an individual servo motor. A flexible control synchronizes the individually driven modules

c) Modular machine bases which allow the customer to upgrade the machine in a later stage if required for future programs.

For the individual requirements, 2 basic machine systems are available

Maschine Type 1: MMS TRANSFER

Maschine Type 2: MMS LINEAR

1-4 Mache Bases with up to 12 synchronized servo drives
The special merits of the MMS Injection Molding Modules are the compact design combined with excellent and precise guiding of the moving rams. The moving patterns are actuated either by eccentric shafts or with roller spindles from the rear side by servo drives. Currently 3 different modules are available which are standardized for individual requirements and tooling sizes.

Injection molding module SG-1 Tooling Size 196 x 146
Injection molding module SG-2D Tooling Size 246 x 246
Injection molding module SG-2E Tooling Size 246 x 246, also for twin shot applications

For keeping the strip in a fixed position, without lifting it up for ejection and transfer, MMS has developed a completely new system where both tooling halves are moved away from the fixed strip guides. This allows the strip to remain in a fixed position which causes no deformation during the ejection and allows quicker opening and closing sequences.

The moving mounting plates are actuated from the rear side with servo driven slides. They are guided with 4 post and have additionally linear bearings which guarantee absolute parallel movement of the two tooling sides. Both tooling sides can be pulled out of the machine independently for quick inspection and service.
THE INJECTION UNIT

FOR SPECIAL SOLUTIONS REQUIRE SPECIAL SYSTEMS

Looking at the various manufacturers of injection molding machines it may sound strange that MMS designs and manufactures their own injection units, but because of the size and the working system the available systems on the market simply do not 100% fulfil the requirements. For not making compromises, MMS has developed an individual injection unit, very compact in design and specially designed for small shot weights and high temperature materials.

The main target for the development of the Injection unit HIU-SP-16/18 was a compact design combined with quick material processing, precise dosing of the material, simple operation and optimal process control. Therefore MMS has decided to develop the injection unit as a 2-stage system with servo electric screw plasticization and secondary screw injection.

Technical Data:

Plasticization: Screw Ø16mm or 18mm
Injection screw: Ø10mm, Ø12mm, Ø16mm
Injection pressure: depending on the plunger diameter (limited to max.2500 bar)
Max. shot weight: 16g (PS)

The development of the controls was focused on user friendly operations combined with inspection and documentation of all quality-relevant parameters. The controller is operated by a 15" Touch Screen in combination with a user-friendly hand-terminal for operations directly at the machine.
PODUCTION SAMPLES

Product: Switch socket
Strip Material: Brass/plated
Plastic: PPS 65%MF
Cycle Time Molding: 7 Sec.
Number of Cavities: 6
Shot weight: 8 g
Run Speed: 30 Parts/min:

Product: Switch
Strip Material: Brass
Plastic: PA 6 30%GF
Cycle Time Molding: 8 Sec.
Number of Cavities: 8
Shot weight: 18 g
Run Speed: 48 Parts/min:

Product: Switch housing
Strip Material: Steel
Plastic: LCP
Cycle Time Molding: 2.9 Sec.
Number of Cavities: 16
Shot weight: 4 g
Run Speed: 220 Parts/min:
MODULES FOR STAMPING AND BENDING

For the individual stamping, bending and coining applications, 5 different Modules of SBT are available. So, according to the required press force or tooling length, the right module can be selected. All these modules are operated by servo drives.

The 200kN and 120kN Press modules are mounted fixed at the machine frame, the other modules are fixed on mounting plates which allows the stepless movement of the modules in feeding direction.

The very precise and over-dimensioned guiding of the rams and slides at all modules provide long life times of the tooling and allow to produce parts out of thinnest materials. The various modules allow the usage of materials from 0,03-2,0mm.

At the machines, all kind of Press modules can be combined as required due to the standardised strip level.

The Stamping and Bending Module can be equipped with up to 6 forming slides, two from top, two from underneath and two from rear side for more simple tooling setups.

MODULES FOR CONTACT WELDING AND RIVETING

Overmolded contact parts with welded contacts from round wire or profile tape are today very common in switch manufacturing, as complicate and expensive processes for assembly of the components are then not required any more.

With the integration of SBT contact welding modules in combination with the MMS injection molding modules, these products can be manufactured completely at only one machine.

Additionally it is possible to integrate laser welding technology on special laser welding modules.

Contact rivets are fed as single components over bowl feeders into linear transportation tracks and are finally pressed into the pre-pierced strip material. The orientation can be head up or down, depending on the geometry. The rivet feed can be done in single or double tracks.

Rivets are made of solid precious material or as a bimetal with typically copper base material.
MODULES FOR ASSEMBLY OPERATIONS

SBT is specialized in assembly solutions for metal and plastic components; together with MMS it is also possible to integrate injection molding modules into the assembly machine.

The standardized Modules are linked either with a rotary indexing table or with a linear transportation system.

For difficult components, for example inert molded parts made of two types of plastic a various number of injection molding modules can be linked with a transfer system.

Producing quality components is simply not enough, the quality has to be ensured and documented. Therefore MMS offers various inspection and testing equipment for 100% quality control which can directly integrated into the machine and linked with stations to remove bad parts from the line.

Depending on the inspection method, various partners for the inspection systems are available.

The control systems are directly designed into the production machine which makes later installations, which normally cause higher costs, are not necessary any more.
THE TOOLROOM
FOR PROGRESSIVE DIES AND MOLD TOOLS

The production of the tooling and module components is mainly done at the precision toolroom of SBT and MMS. At the two locations in Wöllersdorf and Schönbach, high class progressive dies and injection molding tools are produced with sophisticated toolroom machinery. All technologies such as surface grinding, vertical CNC grinding and EDM is done in house to ensure the quality of each single element.

For cutting elements, SBT usually uses carbide H40S, mold inserts are made depending on the application and the resin from powder-metallurgical materials and with high glass filled materials the inserts are additionally TiAlN coated which provides a micro surface hardness of 3400HV.

The design of the progressive dies and mold tools is done at SBT and MMS on CAD workstations, mainly in 3D.

For ensuring the high quality of the products now and in the future, MMS operates a consequent apprentice program for tool and diemakers.
THE WAY TO US

We would be happy to welcome you in our facility in Wöllersdorf, approx. 20 Minutes south of Vienna and 45 Minutes from the Vienna International Airport.

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