

11/14 Technical specifications subject to change. Actual colors may differ.

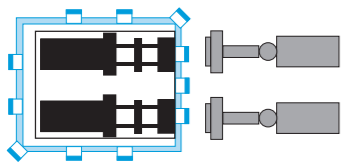


micro-män
All-Electric Micro Injection Molding System

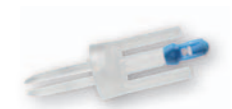


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SAMPLE CONFIGURATION
micro-män 50 2C

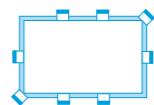


Clamping force 2 x 50 kN
Transposition system 10 tracks
7 process modules

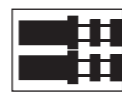


Product Medical valve
Residence time < 10 min

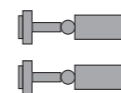
Both components are directly injected using the valve gate hot runner system



TRANSPPOSITION SYSTEM WITH PROCESS MODULES AND TRACKS



CLOSING UNIT



INJECTION UNIT

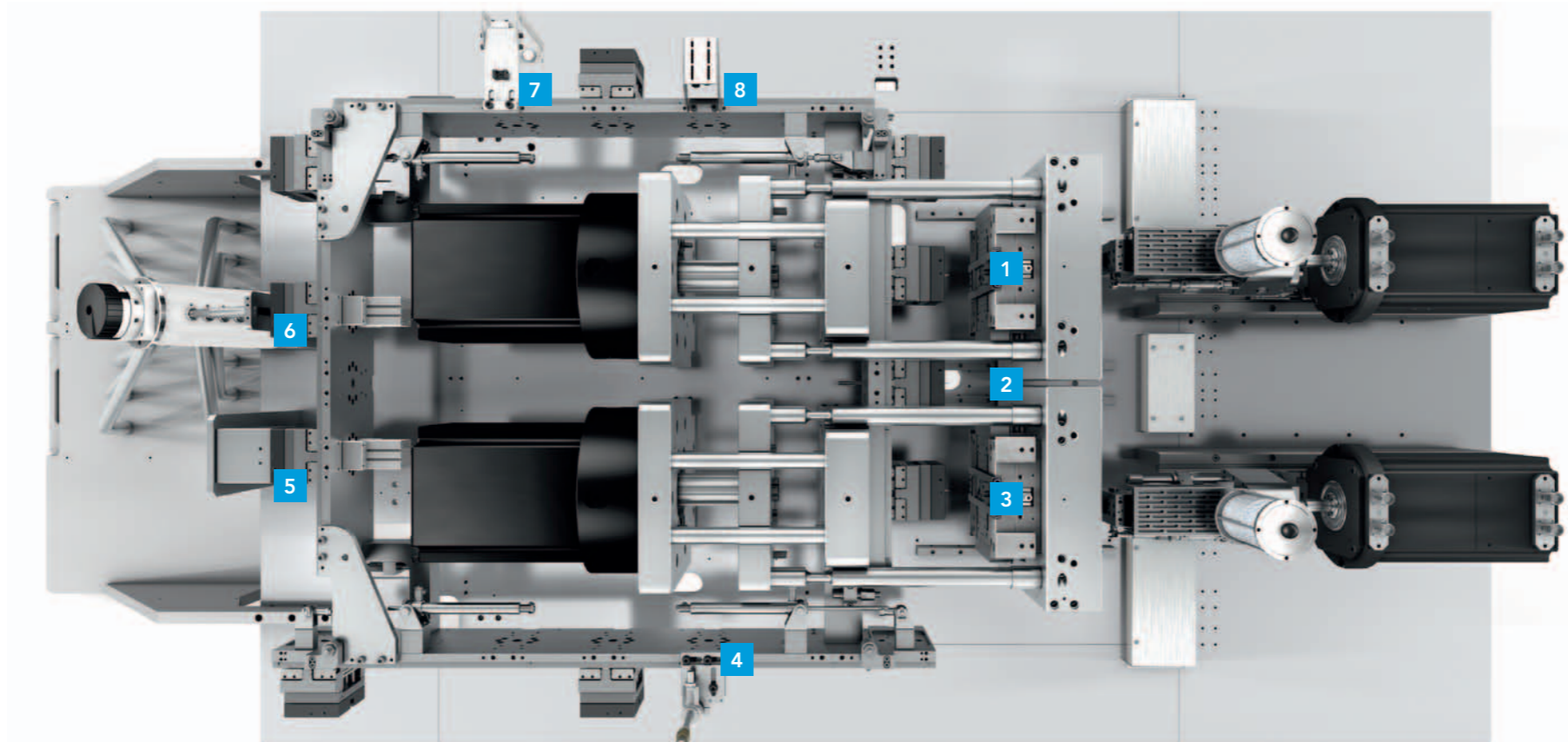
micro-män: The Multitasking Production Cell

micro-män is a production cell for the production of high-precision plastic small parts and microparts that offers a wide range of tailored solutions. The revolutionary new concept enables cost-effective production of both large- and small-volume batches.

Unlike conventional injection molding machines, micro-män performs each processing step – such as the vario-thermal processes, removal, and actual injection – at a separate location. The processes take place simultaneously within different modules, increasing the frequency rate and saving valuable production time.

The system allows for easy integration of both upstream and downstream processing steps.

- 1 Injection, component 1**
PP 250 mm³ per cavity, direct injection using 6-cavity valve gate system
- 2 Cooling**
Intermediate station, ambient-air cooling
- 3 Injection, component 2**
TPE 9 mm³ per cavity, direct injection using 6-cavity valve gate system
- 4 Cooling**
Sterile filtration and energy separation of compressed air. A temperature of approximately -40 °C is generated without additional energy input.
- 5 Ejection of start up, bad and purge parts**
- 6 Sorting**
2 x 6 cavity sorting
- 7 Laser sensor**
Monitors proper removal of molded product from cavities
- 8 Track identification**
Performed using QR code



UPSTREAM PROCESSES

- Insertion
- Overmolding

INJECTION-MOLDING PROCESSES

- Micro injection molding
- Family molds
- Multicomponents
- Sprueless injection molding with hot runner

DOWNSTREAM PROCESSES

- Magnetization
- Assembly
- Separate removal
- Packaging
- Printing

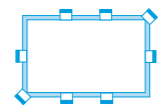


Tailored, flexible, micro-precise

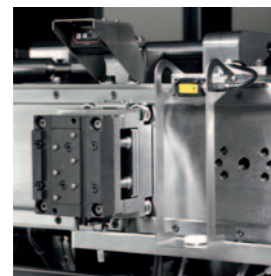
The all-electric transportation system conveys the ejector-side mold halves, or tracks, to the process modules. The integration of custom process modules into the transposition system makes it possible to create a tailored production cell.

SAMPLE PROCESS MODULES

Basic modules	Heating, injection, cooling
Removal modules	Handling, sorting, automation, assembly
Control modules	Sensor system, camera, scanner
Processing modules	Insertion, magnetization, compression, side cores
Peripheral modules	Hot runner control, water temperature modulation, material drying, dosing for master batch, flushing, clean room



TRANSPPOSITION SYSTEM WITH PROCESS MODULES AND TRACKS



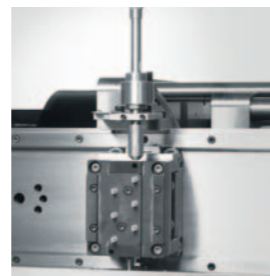
Track recognition
Laser monitoring



Sorting

The electrical linear drive makes it possible to customize the movement of individual tracks.

- High dynamics and speed
- Intermediate stops can be fully programmed
- Reverse tracks are possible, meaning the track does not pass through the entire transposition unit, but stops only at the required modules for small batches, start-up, etc.



Cooling

In terms of size and autotuning, the tracks are standardized mold halves that can be modified to meet the requirements of a specific application.

- Mold change in only a matter of minutes
- Custom-controllable mold mechanics
- Slider technology (for up to 32 cavities)
- Up to 64 cavities
- Data matrix code
- Side cores
- Multistage ejection



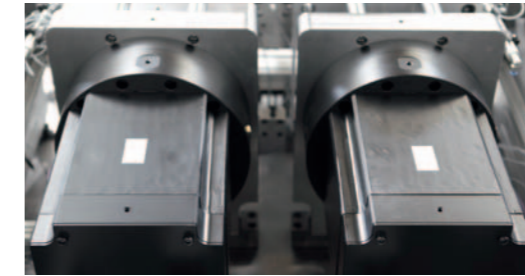
Track



CLOSING UNIT



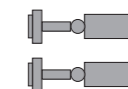
Injection



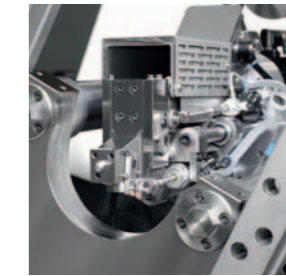
Clamping force unit

The closing unit is a highly stable and rigid system. The closing movement is executed by a high-performance torque motor that is virtually wear and maintenance free.

- 50-kN and 150-kN torque motors
- Closing movement via recirculating ball screw
- Path-dependent configuration of closing profile
- Mold protection with configurable speed and mold protection force
- Separate closing units for 2C applications



INJECTION UNIT



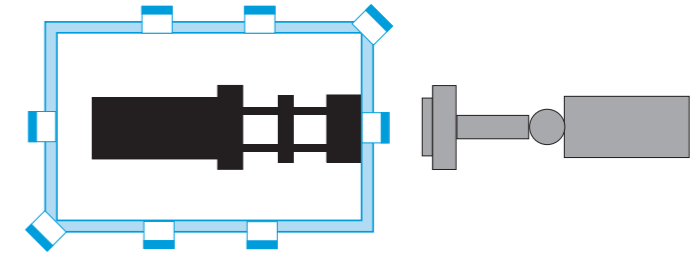
Plasticizing unit

Plasticization is performed gently by means of a two-stage screw preplasticizer with plunger injection or, for larger volumes, by means of a screw.

- Processing of commercially available granules
- First-in / first-out operation
- Screw is optimized for dwell time
- Injection pressure of max. 3,000 bar (depending on plunger Ø)
- Injection unit can be exchanged without a drive change
- Water-cooled, maintenance-free drive technology via torque motor
- Full hot runner system for up to 16 cavities

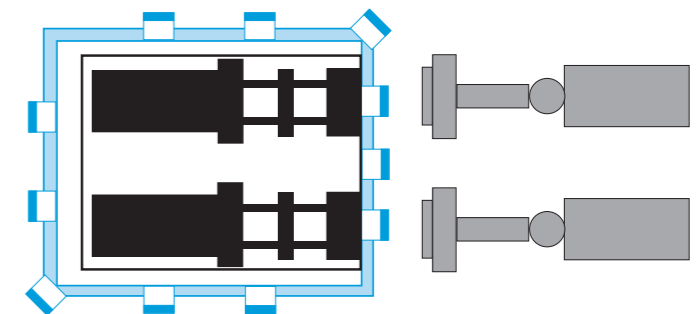
1 COMPONENT

- Up to 8 tracks
- 7 custom-configurable process modules
- Additional intermediate stations (camera/sensors) possible



2 COMPONENTS

- Up to 12 tracks
- 8 custom-configurable process modules
- Additional intermediate stations (camera/sensors) possible



Intelligent Control

The high-performance control concept is optimally tailored to the requirements of electrical drive mechanisms. Precise analysis of vital process data and a plausibility check of all input parameters are both performed as matter of course.

Operators can easily customize individual process stations of the transposition system to meet specific needs. Transposition of the tracks is independently controlled by the machine's control system.

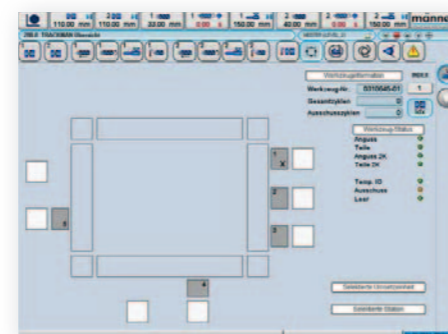
Process parameters, track status, and various quality monitoring parameters are recorded and statistically analyzed for each track. Alongside other benefits, this type of analysis enables product-related maintenance of the tracks without machine downtime.

Optional Web access is available, which allows users to control the software remotely. Our experienced specialists and application engineers provide you with the direct support you need to enhance performance, maximize your productivity, and ensure delivery capability.

- Operating console with membrane keypad and 15" TFT LCD monitor
- Alert display and malfunction messages in plain text
- Screen shots can be saved
- Tolerance display for production monitoring
- Side cores can be custom-configured using operating panel
- One adding and one subtracting shot counter
- Automatic machine shutdown in response to malfunctions or tolerance violations as well as via shot counter
- All inputs and outputs are displayed on Service Page
- Parallel execution of processes, mold movement, and plasticizing

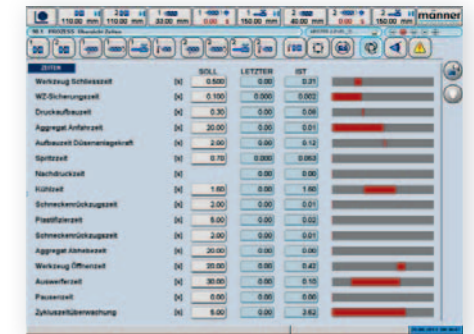
Process chain

Track position and status are displayed in an easy-to-read format.



Time analysis

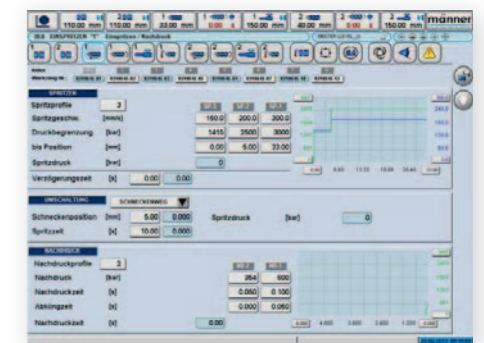
The cycle time analysis enables recording, visualization, and optimization of the process to achieve optimum cycle time and maximum output.



Process control

Multiple injection and holding pressure profiles can be tailored to the specific process.

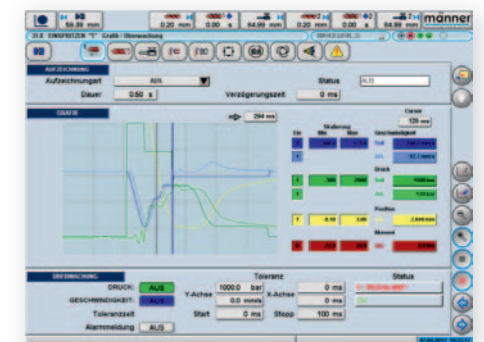
- Path, time and combination of path / time
- Digital control of process data
- Precise path recording by measuring angle of rotation on the drive motors (without position transducer) and using absolute encoder measurement system



Quality monitoring / statistical process control (SPC)

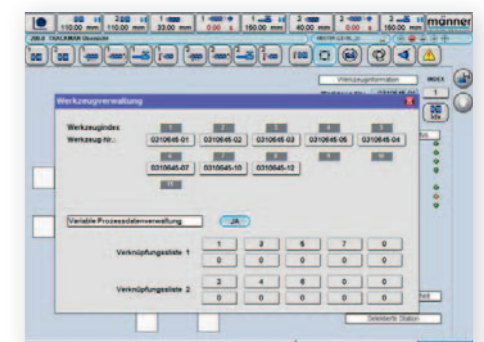
All parameters and movement profiles can be displayed as a graphic, which you can customize as needed. Multiple curves can be superimposed, giving you an instant view of process fluctuations so that you can take appropriate action.

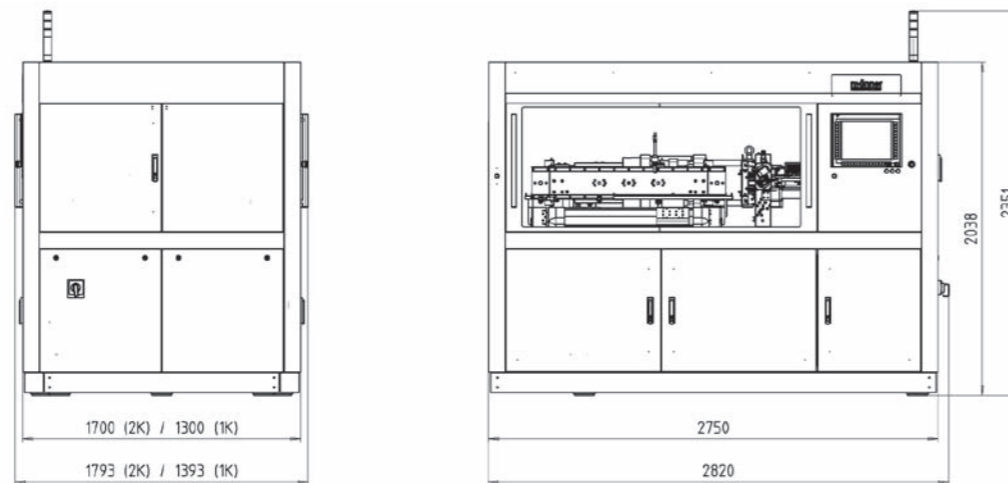
- USB port
- Trend graphic showing process parameters (in cycles)
- 4-curve process graphic together with tolerance monitoring



Parameter variability

You can time each track separately for operation within a completely independent process or combine tracks into process groups. This unique functionality not only enables flushing tracks and family molds, but also compensates for mold wear that may occur with time.





	micro-män 50	micro-män 150	micro-män 50 2C	micro-män 150 2C
	All-electric 1C injection-molding production cell		All-electric 2C injection-molding production cell	
MACHINE DESIGN	Machine frame with machine table on 3-point supports			
	Protective enclosure with glass sliding doors and integrated control cabinet			
Dimensions (approx. LxWxH) [mm]	2750 × 1300 × 2080	2750 × 1300 × 2080	2750 × 1700 × 2080	2750 × 1750 × 2080
Connection	400V/ 50Hz – 3/N/PE			
Total connected load	18 kW		20 kW	
Air consumption without cooling nozzle	2.8NI / shot			
	approx. 25 l/min	approx. 27.5 l/min	approx. 45 l/min	approx. 50 l/min
Color	RAL 9006 white aluminum			
Weight [approx. kg]	approx. 2,500	approx. 2,550	approx. 3,200	approx. 3,300

CLOSING UNIT	Closing movement via recirculating ball screw			
	Drive: water-cooled torque motor			
	Path-dependent configuration of closing profile			
	Mold protection with configurable speed and mold protection force			
Clamping force [kN]	50, configurable	150, configurable	2 × 50, configurable	2 × 150, configurable
International size rating	50	150	50	150
Opening stroke [mm]	110			
Min. mold installation height [mm]	110			
Max. plate gap (standard) [mm]	220			

TRACK-MÄN TRANSPPOSITION SYSTEM

- System for linear transposition of the tracks
- Servo-electric transfer units with pneumatic corner transfer units
- Designed for modular installation of various process stations
- Data matrix code reader for individual mold recognition
- ▶ In-process flushing for dwell time optimization
 - ▶ Mold-specific process parameters
 - ▶ Statistical shot count recording
 - ▶ Statistical error recording for tracks (only in conjunction with camera)

OPTIONAL ACCESSORIES

- ▶ Material conveyor
- ▶ Air conditioning
- ▶ Material drying
- ▶ Remote control
- ▶ Water temperature modulation
- ▶ Mold lift
- ▶ Transfer unit
- ▶ Sensor system camera

Specifications

INJECTION DRIVE

- ▶ Plasticizing movement via water-cooled torque motor
- ▶ Injection movement by means of ball screw driven by water-cooled torque motor
- ▶ Screw advance safety feature
- ▶ Different injection profiles can be activated based on path, pressure, or time
- ▶ Injection parameter monitoring with configurable tolerance zones
- ▶ Graphical display for injection parameters and barrel temperatures
- ▶ Five profiles can be configured for screw speed and back pressure based on path
- ▶ Custom holding pressure profiles can be programmed based on path and time
- ▶ Plasticizing time monitoring
- ▶ Configurable nozzle contact force
- ▶ Temperature monitoring, tolerances configurable for each zone

INJECTION UNIT

	pico 4	pico 6	pico 8	pico 10	pico 12	solo 14
	Injection unit with 2-stage reciprocating screw for use with 17.2 injection drive					
	Suitable for processing commercially available plastic granules.					
	Material is fed, prepared, and injected on a first-in / first-out basis.					
	Material feeding: 0.8-liter hopper with sliding output gate					
International size rating	1.2	2.7	5.6	11.0	14.8	17.2
Injection pressure, max. [bar]	3,000	3,000	3,500	3,500	2,700	2,000
Injection stroke [mm]	32	32	32	40	48	56
Screw diameter [mm]	14	14	14	18	18	14
Injection plunger diameter [mm]	4	6	8	10	12	
Displacement [cm³]	0.4	0.9	1.6	3.1	5.4	8.6
Weight of molded part, PS (1.05 g/cm³) [g]	0.42	0.95	1.68	3.0	5.1	9.03
Injection flow rate, max. [cm³/s]	3.8	8.5	15.1	23.6	33.9	46.2
Installed heating output [kW]	2.44	2.44	2.44	4.12	4.12	2.57
Number of heating zones	5	5	5	5	5	5
Mass volume in injection unit for determination of dwell time (calculated by feeder nozzle)	7.2 cm ³	7.3 cm ³	7.5 cm ³	26.4 cm ³	26.7 cm ³	19.3 cm ³
Screw torque [Nm]	30					
Screw speed [min⁻¹]	400					
Nozzle contact force	6.5 kN					
Injection unit stroke	175 mm					
Injection speed [mm/s]	300					

OPTIONAL

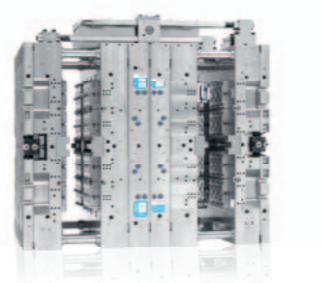
VALVE GATE HOT RUNNER SYSTEM

	2-cavity	4-cavity	6-cavity	8-cavity	12-cavity	16-cavity
Connected load [W]	1,210	1,570	1,930	2,290	3,010	3,730
Number of control zones	4	6	8	10	16	18

- ▶ HCS-TS hot runner control system integrated into machine housing

For large-volume production of reproducible injection-molded parts with maximum part-to-part consistency

Extremely durable and easy-to-maintain high-performance molds with optimum temperature control for short cycle times.



Valve gate hot runner systems

Tailored and reliable

Recognized as the superlative hot runner solution for impeccable surface quality, part-to-part consistency, and process reliability.



moldMIND



The black box of the injection mold

Tamper-proof recording of all process-relevant data, providing factual evidence in the event of disputes and for other uses.

Your One-Stop Source

Reliability and cost-effectiveness in production:

- Perfectly coordinated components
- Extensive engineering know-how
- Dedicated contact person for your project



duo-män

Injection molding units for multicomponent applications

Turn one component into two – high-precision dosing of even the smallest injection volumes.

HCS 2 series

Temperature controllers

Easy-to-use control technology with the latest functions such as early recognition of leaks.



micro-män

Production cells for micro injection molding

For both large-volume and small-scale production of precision miniparts and microparts. Can be custom configured for a wide range of production needs.



männer

SOLUTIONS FOR PLASTICS

A business of BARNES GROUP INC



Plant I: High Precision Molds in Bahlingen

Plant II: Hot Runner Systems in Bahlingen

Plant III: in Bahlingen

Plant IV: High Precision Molds in Au, Switzerland

Plant V: Manner USA, Inc.

männer develops high-tech solutions for injection molding applications. We offer high-performance molds, tailored valve gate hot runner technology, and innovative micropart manufacturing systems for the production of plastic parts capable of meeting the most demanding requirements for precision and surface quality.

Founded in 1965, männer is among the industry's leading suppliers, with over 400 employees and production, sales, and service locations in Europe, the USA, and Asia.

Headquarters in Bahlingen

