

### Pressure foot

Moveable pressure foot for pin less routing or multifunctional pressure foot (brush and pressure ring). The release of the brush is performed automatically. It is possible to switch off individual spindles for non-vacuuming small parts.

### Tooling plate system

Lateral mushroom clamping for standard work, as well as lateral mushroom clamping with increased tensile force for routing work. Further customized tooling plate systems are available on request.

### Loading and unloading systems

**Operator free shifts:** the automatic 20 level loading and unloading system permits stocking each level with different formats and production programs. The stocking is also possible during the operation of the machine.

### Further Options:

- pneumatic cover
- additional noise damping
- data input and output:  
Ethernet interface; barcode scanner for error-free entry of the program name

### Quality assurance

Before delivery of a machine, precision-relevant components are subject to a geometric test as per DIN 8601, especially the granites and the axis. Then follows a functional and productivity test with subsequent drilling precision test according to Schmoll Maschinen acceptance control program. The evaluation is performed with a coordinate measuring machine.



MicroVision ACM 2000

## Standard equipment/specifications MX 1, MX 1 -CCD, MX 1 -Twin, MX 1 -DH und MX1 -XXL

|   | MX 1-24   | MX 1 CCD            | MX 1 DH            | MX 1 Twin          |
|---|---|---------------------|--------------------|--------------------|
| Base  | Massive granite with low coefficient of thermal expansion for high accuracy and long durability |                     |                    |                    |
| Drive   | High dynamic linear motor drives in X, Y- and Z-axis  |                     |                    |                    |
| Speed   | X-axis  | 60 m/min            |                    |                    |
|   | Y-axis  | 50 m/min            |                    |                    |
|   | Z-axis  | 25 m/min            |                    |                    |
| Acceleration  | X-axis  | 20 m/s <sup>2</sup> |                    |                    |
|   | Y-axis  | 12 m/s <sup>2</sup> |                    |                    |
|   | Z-axis  | 30 m/s <sup>2</sup> |                    |                    |
| Positioning accuracy                                    | ± 4 µm  |                     |                    |                    |
| Drilling accuracy                                       | ± 20 µm   |                     |                    |                    |
| Depth accuracy blind hole drilling                      | ± 12 µm   |                     |                    |                    |
| Number of spindles                                      | 1   | 1                   | 2                  | 2                  |
| Tool change   | Up to 2600 fold Euro chain tool change  |                     |                    |                    |
| Tool change cycle                                       | 25 seconds incl. tool measurement   |                     |                    |                    |
| Vacuum  | minimum 60bar drilling, minimum 80 bar routing  |                     |                    |                    |
| Noise level   | < 75 dB/A   |                     |                    |                    |
| Maximum panel size (width*depth)                        | 655 x 650 (750)   | 655 x 650           | 530 x 650 (750)    | 655 x 650 (750)    |
| Maximum panel size (width*depth) with mushrooms in mm   | 635 x 650 (750)   | 635 x 600           | 530 x 650 (750)    | 635 x 650 (750)    |
| Maximum panel size (width*depth) with loader in mm      | 620 x 650 (750)   | 620 x 600           | 530 x 650 (750)    | 620 x 650 (750)    |
| Floor space (width * height * depth) in mm              | 1570 x 1720 x 1920  | 1570 x 1720 x 1920  | 1570 x 1720 x 1920 | 1570 x 1720 x 1920 |
| Floor space incl. loader (width * height * depth) in mm | 1570 x 1720 x 2960  | 1570 x 1720 x 2960  | 1570 x 1720 x 2960 | 1570 x 1720 x 2960 |
| Weight of the machine in kg                             | 4400  | 4422                | 4450               | 4450               |
| Weight of the loader in kg                              | 450   | 450                 | 450                | 450                |



## Drilling and routing machines with one station

**MX 1**

**MX 1 CCD**

**MX 1 Twin**

**MX 1 DH**

**MX 1 XXL**

### Flexible - like the chameleon!

High-Performance with the small accurate one.

Already during the development of this machine type, Schmoll Maschinen placed the greatest emphasis on flexibility, reliability and precision. To do justice to this high demand, all single station machines are standard equipped, amongst other things, with linear motors for X-Y and Z-axes.

Sometimes it is necessary to try out something new! What are you waiting for?

- Equipped with a drilling and routing spindle, your prototypes will be ready faster than the design. Where have you ever seen anything like this before?
- Position-corrected drilling- and routing machines (MX1 CCD) reduce your operating costs - one more reason for deciding on this machine.



# The machine with which you spend less time

## MX1 /CCD/Twin/DH and MX1 XXL

### MX 1

The single spindle machine for highest flexibility and performance - whether for series production or for single panels. For drilling or routing

**Spindle types:** Our goal is quality, precision and innovation. These goals can only be achieved with competent partners. Therefore we rely on spindles from "Westwind", "Precise" and "Schmoll". Decades of experience in the manufacture of highly accurate spindles make these partners so highly valuable to us. You have the choice between the following spindle types:

- Westwind W 1331-17\* (Standard)
- Westwind 1686-10\* Highspeed
- Westwind 1331-26\*, drilling, routing
- Precise SC 3063\* routing
- Schmoll SM 170 Sync\*
- Schmoll SM 220 Sync\*

\*Details can be found in our technology brochure.

**Future-orientated:** the standard linear motor reduces the production costs through higher quality.

By far greater dynamics in comparison with lead screw leads to a 10-20 % productivity increase when drilling typical printed circuit boards. Whereas the accuracy of conventional drives decreases over the years, with the linear motor it remains constant.

When comparing the lifetime of both drive systems, the maintenance-free linear motor is up to ten times higher. The high precision during drilling and routing results from several factors. Firstly, the machine structure is executed completely based on solid granite with a low thermal expansion coefficient.

Through the compact construction of the X-axis, high rigidity with low mass is the result.

This leads to the spindles being able to move on the X-axis with extremely high precision.

The highly accurate prism slot clamping, is also a feature of high quality of this machine type.

Productivity up to the detail also in the control. Using the graphic user interface

with the clearly structured machine function sides, you easily have access to all machine functions. Control all CNC functions via the practical editor.

Use all statistical information of the machine running times and error messages, so that you can optimize your production processes.

An integrated error management system with diagnosis function and user guidance, helps you in case faults should arise.

### MX 1 CCD

The MX 1 CCD is equipped with a camera system, which serves for position corrected drilling and routing.

Drilling and routing are carried out in this case considering the determined shrinkage, stretching, misalignment and torsion values.

Alternatively, the CCD system can be used for the analysis of inner layers. Here the fiducials of the individual inner layer are drilled freely in the first step and then checked for shrinkage, stretching, misalignment and torsion values.

After that, a new reference hole system can be drilled or the entire drilling program can be processed. Thus you have the functionality of a X-ray machine and this at considerably lower costs.

A problem involved in the drilling of blind holes is that the tolerances are very high, while pressing the individual inner layers to one multi-layer.

The layer level drilling helps you to determine a topography of a certain inner layer of the ready pressed multi-layer.

In this case, reference holes are drilled and this analysis gives an exact inference of the actual inner layer depth.

### MX 1 Twin

Two independently driven spindles simultaneously process the panel. Especially with multiple use, the productivity increases by more than 100 %.

### MX 1 DH

This machine is equipped with a high performance routing- and drilling-spindle. These spindles allow flexible and nevertheless high productive drilling and routing.

As drilling and routing can be performed in one table load - you have quality advantages.

These are all arguments, which speak especially for prototype and small lot sizes.

### MX 1 XXL

May it be a little bit more? Due to the large format, the MX 1 XXL is especially interesting for drilling and routing large printed circuit boards (Back panels).



CCD camera system: MX 1 CCD



Double head and table: MX 1 DH



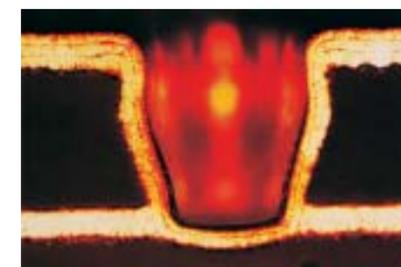
20 level loader



Westwind Spindle



Insertion station



Cross section of a blind via hole

## Options

### Spindles

**Westwind 1686-10:** an air bearing High-speed spindle for drilling from  $\varnothing$  0,05 to 6,35 mm. Increase your productivity by between 8 and 25 % with a spindle speed of 180 000 rpm at improved hole position accuracy, hole quality and less tool breakage.

**Westwind 1331-26:** : make use of this drilling routing spindle for your production. Routing up to  $\varnothing$  2,4 mm. The spindle speed lies between 20 000 und 125 000 rpm.

**Precise SC 3063:** : a ball bearing routing spindle up to  $\varnothing$  2,4 mm with a spindle speed between 15 000 und 60 000 rpm.

**Synchronous spindles:** Schmoll has developed a new generation of spindles with special synchronous motor drives.

The spindles are characterized by very good torque over the entire speed range and low thermal development, where the entire tool diameter of  $\varnothing$  0,05 to 6,35 mm is covered.

**SM 170 Sync:** : The enormous torque at low rotation speeds enables productive drilling with this all-round spindle from 8 000 rpm to 170 000 rpm.

Even drills with up to 6,3 mm are inserted with the optimal cutting speed, so that the tool lives are optimized and costs are minimized.

**SM 220 Sync:** The complexity of printed circuits boards is constantly increasing. The tool diameters are becoming smaller. The SM 220 Sync high-performance spindle handles these requirements.

It also drills a diameter under 0,2 mm with optimal cutting speed and thus increases the quality of the holes introduced, with simultaneously increased tool lives.

### Tool management

You have the choice between a cassette tool change for 200 tools or the Euro chain tool change with 2600 tools (MX 1 XXL 3600 tools). Through the dislocation of your tool bearing onto the Euro chain, operator free shifts

are possible without any problems.

The stocking of the Euro chain tool change is also possible during the operation of the machine. Therefore expensive downtimes are dropped.

### Tool control system

**Laser measuring unit:** for diameter, run out and length of the tools (process control).

**Contact bit detection (CBD):** if your printed circuit boards have conducting surfaces, the option CBD can be selected in combination with the laser measuring unit.

The surface contact of the drill is recognized. In each new drilling position, the contact is then expected at the same Z-position. Breakages of drill bits up to 0,05 mm are thereby automatically recognized.

Through the electrical contact between the printed circuit board and the drill bit, the stroke of the Z-axis is optimized according to the printed circuit board surface and stack thickness. There results an up to 10 % shorter cycle time (Quick drill).

**Online Accuracy Check:** Using a software function, the spindle position is checked and optimized for the tooling plate system.

You have never yet adjusted your machine so rapidly and so exactly.

**Depth drilling:** in combination with the CBD option, we offer you a blind hole drilling appliance. The depth drilling performance lies by up to 1000 hits per minute with a precision of  $\pm$  12  $\mu$ m. An adjustment for the spindle rotor expansion is not required, since it is automatically compensated by the CBD. A second measuring system is not required here.

**Depth routing:** as an alternative to the CBD function, we offer a depth routing function with Quick drill via a second measuring system. The precision here is  $\pm$  50  $\mu$ m. Building on the depth routing function, Schmoll Maschinen additionally offers the mapping function. This option permits precise depth processing with respect to the underside of the printed circuit board, which leads to high web accuracy.