M-RX

topDRILL & topClear Processing Machines & Washing Machines & combiFIN Processing Lines

SCHRAML
member of the LiSEC group

best in glass processing

Schraml Glastechnik GmbH

Schraml Glastechnik GmbH shines with a new sparkle. And with it, the LiSEC group business unit too.

Although Schraml Glastechnik GmbH was taken over by the LiSEC group, it still remains an independent company with the same managing director and the same employees as before. This is passed on to you as a customer in the form of high quality and safety, with a powerful and reliable partner in the background.

In the middle of the 1990s, we started with prototypes for a vertical glass drilling machine and this was brought into serial production in 1997. It was soon clear that we had had a great idea with this and that it could form the basis for a multitude of similar devices.

It is not without good reason that our motto is „first in vertical drilling". In the meantime we have delivered and installed hundreds of devices in all 5 continents. The topDRILL is currently manufactured in its fourth generation (G4) and we are now very proud to present the fifth generation – which can not only drill but also carry out milling tasks. Never before have topDRILL systems been so powerful and versatile!

Discover now the new combiFIN, our compact system combining the GLX grinding and polishing machine with the MRX milling centre!

Never before has this type of complex CNC processing centre been so straightforward and simple to operate!

Lay the foundation stone for advanced glass processing!

Machinery for Flat Glass Processing

Table of Contents

Overview of the processing options

The processing of edges is an important issue for every glass manufacturer. The many and varied requirements on edge quality and the manufacture of internal, edge and border cutaways necessitate the use of a diverse range of processes and production machines.

	Schraml topDRILL machines			
	Easy	nc G4	RX G4	MRX G5
Internal processing				
Bores	✓	✓	✓	✓
Deep-countersinking	-	-	✓	✓
Milling	-	-	-	✓
Grinding	-	-	-	✓
Polishing	-	-	-	-
Water jet	-	-	-	-
Machine construction				
Special shapes	✓	✓	✓	✓
Fully automatic	-	✓	✓	✓
Dual-sided processing	✓	✓	✓	✓
Interface-capable	-	✓	✓	✓
Automatic tool changing	-	-	✓	✓
Quick-change system for tools	○	○	-	-

	Schraml GLX grinding and polishing machine	
	3220 P1	3220 P1 Platinum
Outside processing		
Seamed edge or trapezoidal grinding rough	✓	✓
Edge grinding coarse and fine, edge polishing	✓	✓
Rectangles without or with round corners	✓	✓
Special shapes with straight edges	✓	✓
Water jet	-	-
Machine construction		
Special shapes	✓	✓
Fully automatic	✓	✓
Interface-capable	✓	✓
Automatic tool changing 12-fold (3 tools each)	○	✓

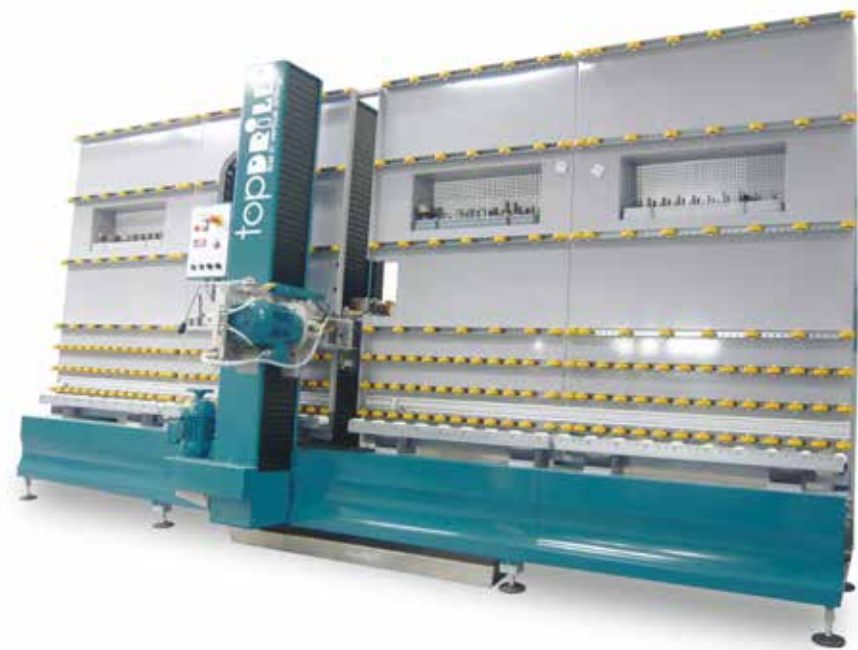✓ Standard, ○ Optional, - Not Available

topDRILL easy

Vertical Double-sided Drilling Machine

The topDRILL easy is a double-sided glass drilling machine with digital display for motorized setting of the drilling height. The manual handwheel allows fine adjustments to 1/10 mm. Marking the drill holes or additional laser markings are no longer necessary. The length adjustment via a double row of foldable, serial limit stops allows rapid processing of glass sheets of the same size. The glass sheet is transported manually. The patented drilling depth adjustment and the operation via central hand lever at the front render any adjustment for the glass thickness unnecessary. The drilling speed can be adjusted continuously, a selector switch activates one-sided drilling.

Configuration options

Extension modules allow an easy extension of the maximum possible processing glass length of the topDRILL to the customer's requirements. The optional DRITOP CMX quick-change system minimizes the set-up times of the machine. The topDRILL easy offers convincing arguments with its demonstrable, decades-long durability as well as its high precision with easy operation.

Highlights

- Very compact, modular design
- Single lever operation of the entire drilling process
- Motorized setting of the drilling height with digital display
- Patented system for the adjustment of drilling depth and drill wear
- Fits perfectly with every topCLEAR washing machine

Options

- CMX Drill Quick-Change System

Technical Data

	topDRILL 130 Easy
Glass height	Open at the top
Max. processing height	1,300 mm
Glass thickness	3 - 30 mm
Minimum size	200 x 100 mm
Maximum size	2,500 x 1,500 mm
Transport height	600 mm
Angle of inclination	7° (+/- 1°)
Max. bore diameter	100 mm
Spindle speed	0 – 5,000 rpm
Spindle power (rating)	2 x 2.1 kW
Maximum load	100 kg/lm
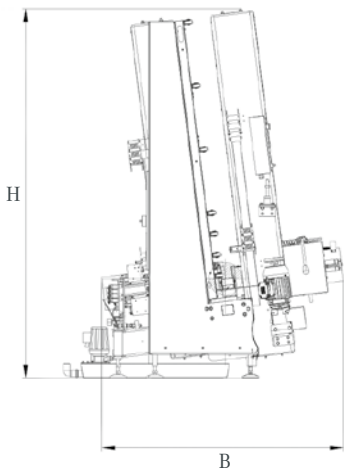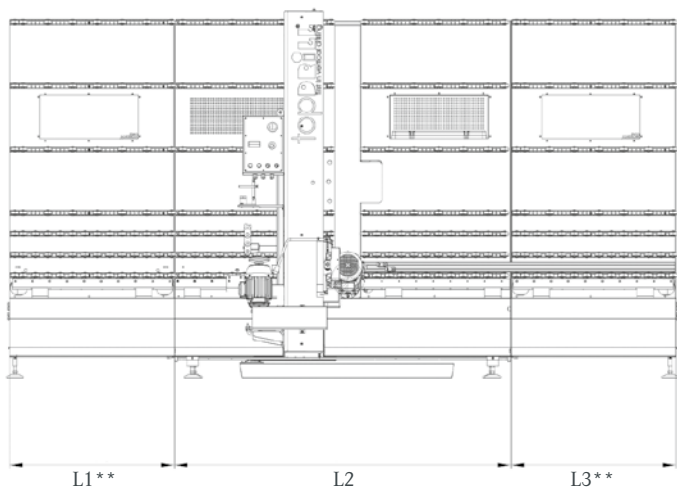
	L1** (mm)	L2** (mm)	L3 (mm)	B (mm)	H (mm)	Power consumption (kW)	Operating air pressure (bar)	Air consumption (l/min)	Operating water pressure (bar)	Water consumption (l/min) *
topDRILL 130 Easy	1,000	2,040	1,000	1,465	2,233	4.2	6 - 7	10	2 - 3	0.5

* Water consumption if used with a water treatment system
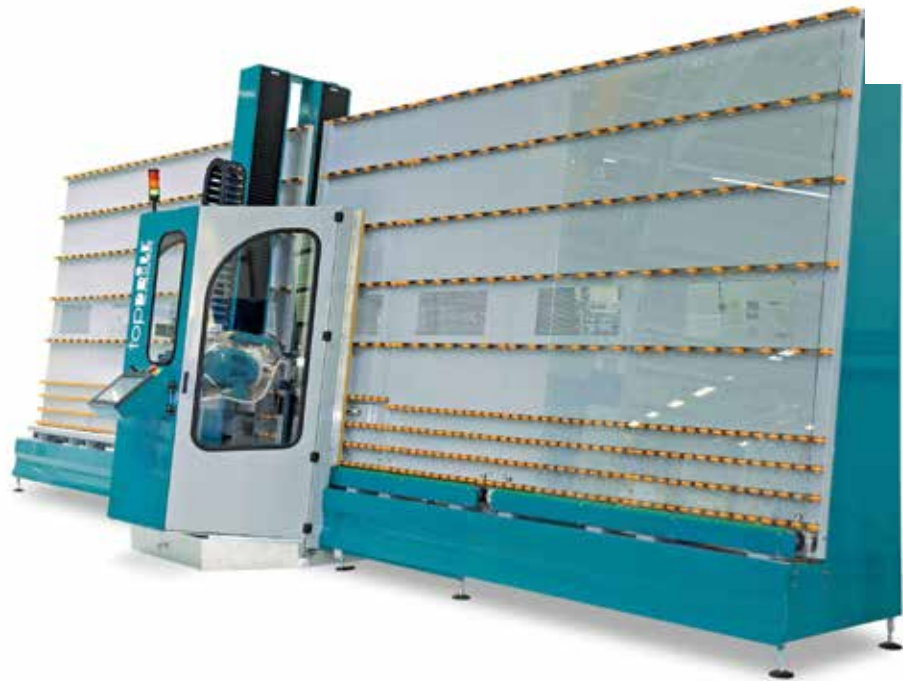
** Extension modules

topDRILL nc G4

Fully Automatic Vertical Double-Sided Drilling Center

The topDRILL nc is a fully automatic double-sided glass drilling machine with digital drilling heads and an automatic glass transport. All movements are controlled via the 15 inch display, manual adjustments are not required. The drills are automatically measured after every change, the operator only has to mount the glass sheet and start the program. Glass thicknesses of up to 40 mm and drilling diameters of up to 100 mm support a flexible production.

Freely configurable

The topDRILL nc can be configured according to the customer's requirements. The modular extension of the machine length, the choice between two machine heights as well as the freely definable direction of movement give a range of customizing options. Versatile extensions – such as an automatic drill sharpening unit or a data connection to an ERP system – allow adapting the topDRILL nc to the specific requirements of the production.
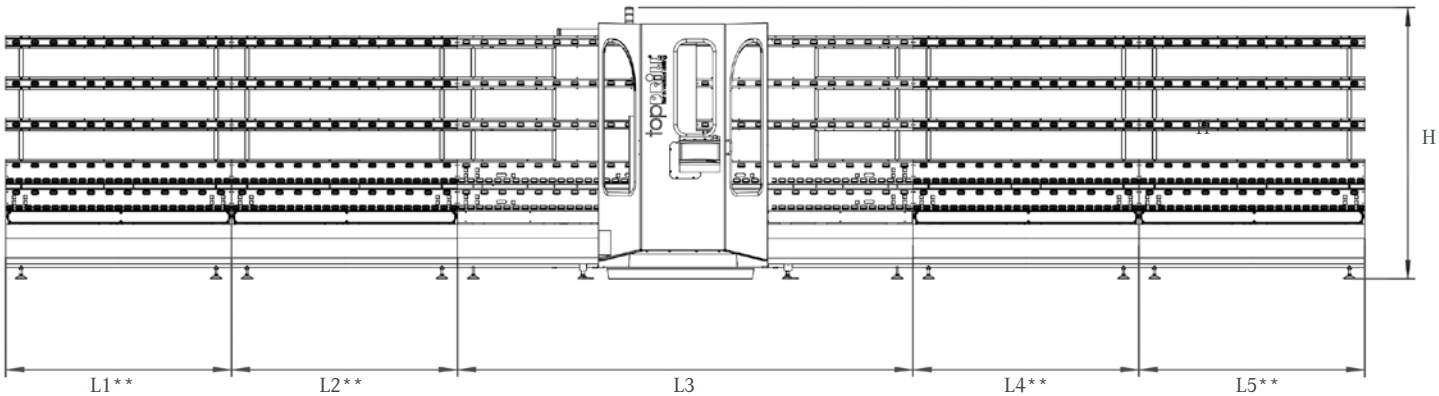
Highlights

- Very compact construction and modular design
- Automatic drilling length measuring
- All movement axes with servo motors
- Simple operation and programming
- Fits perfectly with every topCLEAR washing machine

Options

- Automatic drill sharpening unit
- Quick-change system for CMX drills
- Software interface and drawing programs
- PC-link

TDI TDI connect   **PC** PC Link

Technical Data

	topDRILL 130 nc	topDRILL 240 nc
Glass height	Open at the top	2,600 mm
Max. processing height	1,300 mm	2,400 mm
Glass thickness	3 - 30 mm	
Minimum size	600 x 150 mm	
Maximum size	ca. 3,200 mm, can be increased up to 8,000 mm with extension modules	
Transport height	600 mm	
Angle of inclination	7° (+/- 1°)	
Max. bore diameter	100 mm	
Spindle speed	0 – 5,000 rpm	
Spindle power (rating)	2 x 2.1 kW	
Maximum load	150 kg/lm	

	L1** (mm)	L2** (mm)	L3 (mm)	L4** (mm)	L5** (mm)	B (mm)	H (mm)	Power consumption (kW)	Operating air pressure (bar)	Air consumption (l/min)	Operating water pressure (bar)	Water consumption (l/min) *
topDRILL 130 nc	1,000 or 2,000	1,000 or 2,000	4,034	1,000 or 2,000	1,000 or 2,000	2,095	2,401	12.5	6 - 7	10	2 - 3	0.5
topDRILL 240 nc	1,000 or 2,000	1,000 or 2,000	4,034	1,000 or 2,000	1,000 or 2,000	2,095	3,416	12.5	6 - 7	10	2 - 3	0.5

* Water consumption if used with a water treatment system

** Extension modules

topDRILL RX G4

Vertical double-sided Drilling Center with Automatic Tool Turret

The topDRILL RX is the first choice for fully automatic drilling and sinking processes. The ingenious tool changer of the smart-5 series can be used very quickly, set up fast, and is absolutely easy to use. The speed-10 tool turret doubles the maximum number of available tools. Countersink holes can be carried out at the front and back without restrictions, regardless of the drilling diameter. The first tool change is already carried out during the drilling process on the opposite side. The high-performance drilling spindles are water-cooled, extremely robust and durable. Maintenance costs are reduced to a minimum.

Flexible configuration, solid quality

The topDRILL RX can be configured depending on the customer's requirements. In addition to the two types of tool changer, the modular extension of the machine length, the choice between two machine heights as well as the freely definable direction of movement give a range of customizing options. All drilling and countersinking operations are precisely produced in one clamping process. The torque control prevents glass breakage during countersink drilling. Standard includes processing of both float and laminated safety glass sheets.
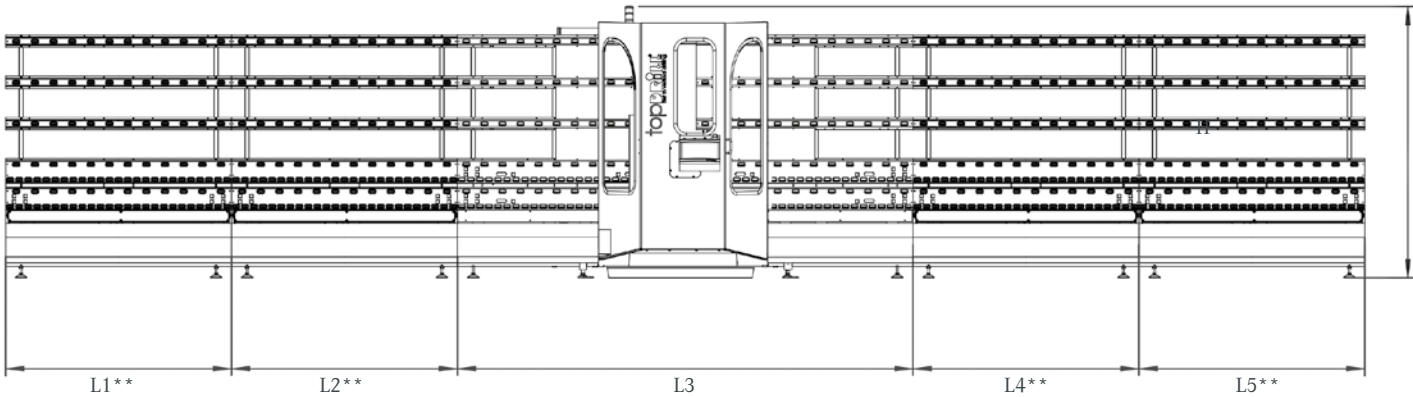
Highlights

- Compact, modular design
- Automatic tool change at front and back
- Automatic length measuring of the tools
- Continuous production without loading times
- Easy operation and programming

Options

- Automatic drill sharpening unit
- Y-axis ball screw for smart-5 (standard in case of roto-10)
- Software interface and drawing programs
- PC-link

TDI — TDI-connect   PC — PC Link

L1**   L2**   L3   L4**   L5**

Technical Data

	topDRILL RX 130	topDRILL RX 240
Glass height	Open at the top	2,600 mm
Max. processing height	1,300 mm	2,400 mm
Glass thickness	3 - 30 mm	
Minimum size	600 x 160 mm	
Maximum size	ca. 3,200 mm, can be increased up to 8,000 mm with extension modules	
Transport height	600 mm	
Angle of inclination	7° (+/- 1°)	
Max. bore diameter	80 mm	
Spindle speed	0 – 5,000 rpm	
Spindle power (rating)	2 x 5.5 kW	
Number of tools	5 + 5 in case of smart 5 / 10 + 10 bei speed 10	
Maximum load	150 kg/lm	

	L1** (mm)	L2** (mm)	L3 (mm)	L4** (mm)	L5** (mm)	B (mm)	H (mm)	Power consumption (kW)	Operating air pressure (bar)	Air consumption (l/min)	Operating water pressure (bar)	Water consumption (l/min) *
topDRILL RX 130 smart-5	1,000 or 2,000	1,000 or 2,000	4,032	1,000 or 2,000	1,000 or 2,000	2,397	2,401	3.5	6 - 7	10	2 - 3	0.5
topDRILL RX 130 speed-10	1,000 or 2,000	1,000 or 2,000	4,032	1,000 or 2,000	1,000 or 2,000	2,397	2,401	3.5	6 - 7	10	2 - 3	0.5
topDRILL RX 240 smart-5	1,000 or 2,000	1,000 or 2,000	4,041	1,000 or 2,000	1,000 or 2,000	2,465	3,416	3.5	6 - 7	10	2 - 3	0.5
topDRILL RX 240 speed-10	1,000 or 2,000	1,000 or 2,000	4,041	1,000 or 2,000	1,000 or 2,000	2,465	3,416	3.5	6 - 7	10	2 - 3	0.5

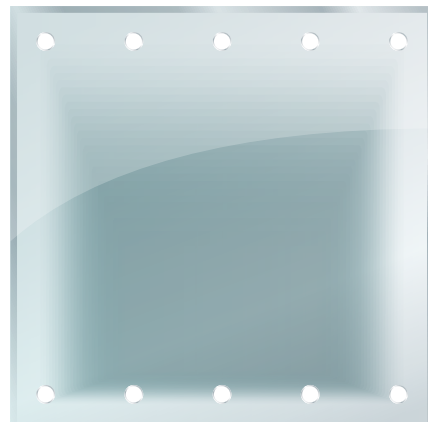* Water consumption if used with a water treatment system

** Extension modules

topDRILL RX G4
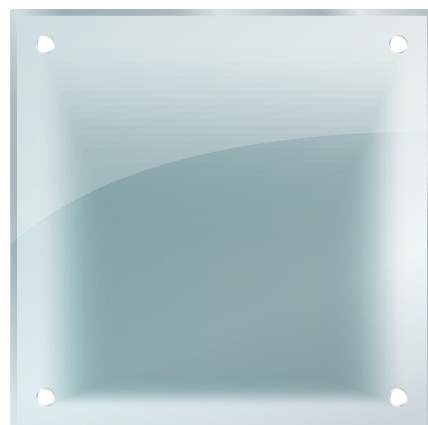## Cycle times and scope of processing

The RX is the ideal solution for all drilling and countersinking processes. All machine configurations allow fast, flexible and high-quality processing.

Glass sheet

- Dimensions: 1,000 x 1,000 mm
- 10 drillings standard

Cycle time for the entire processing: 160 seconds

Glass sheet

- Dimensions: 1,000 x 1,000 mm
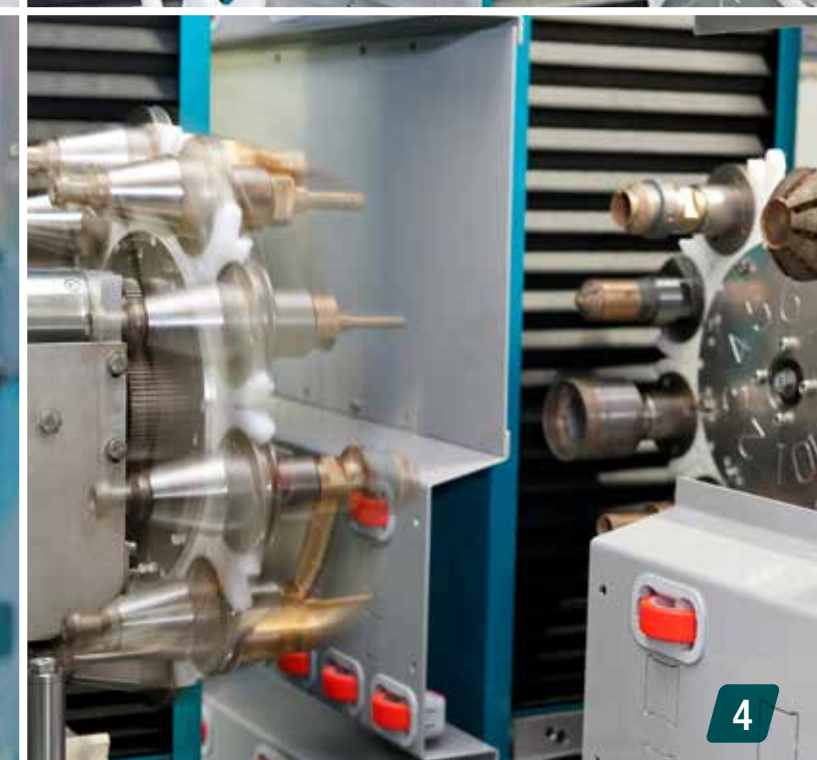- 4 drillings, countersunk double-sided

Cycle time for the entire processing: 160 seconds

Single-action door

- Dimensions: 800 x 2,000 mm
- 6 drillings, all countersink drilling

Cycle time for the entire processing: 320 seconds

1 Intelligent and fast cycle

- Simultaneous drilling from front and back (starting at 6mm) – for faster cycle times
- Simple tool changing during drilling or countersinking – cycle time reduction
- 5 resp. 10 drills or countersinks per side, individually programmable
- Automatic calculation of the drill depth using a stored formula

2 Easy operation

- Fully automated processing, no adjustments on the machine required
- Fully automatic recognition and adjustment of the drill length resp. drilling parameters
- Programming, data import or adjustments also during the operation
- User manual and spare parts list available online on the screen

3 Fast glass handling

- No set-up times for positioning the suction cups
- Different glass sizes, shapes and thicknesses without changeover
- Loading of the next glass sheet during the processing
- Trouble-free combination with previous or following module (e.g. washing machine)

4 Speed-10 tool turret

topDRILL MRX G5

Vertical double-sided CNC Drilling and Milling Center

The fully automatic milling and drilling machine topDRILL MRX makes a convincing argument with its high performance and its easy use. Drilling and countersinking processes are as easily accomplished as complex milling and grinding operations for corner, edge and inner cutouts. The vacuum belt system enables a flexible and continuous production. The drilling and milling center works fully automated and supports a data connection to external systems. The graphical input of the processing program as well as the automatic selection of all parameters for the drilling and milling processes support an easy, error-free operation.

Machine configurations for any requirement

The topDRILL MRX can be configured according to customer requirements. The linear-8 tool changer allows a very easy operation, the Roto-10 changers help increase the processing speed. Modular extensions of the machine length, the choice between two machine heights as well as the freely definable direction of movement give a range of customizing options. The intelligent machine design allows mounting the machine directly against a wall. Combine the MRX with a GLX outer edge grinding and polishing machine to form a combiFIN processing centre.

Highlights

- Milling and drilling in one work step
- Two types of tool changers available
- Modular design
- Continuous production without loading times
- Flexible product change
- Highly dynamic vacuum system for secure hold
- Easy operation and programming
- Fits perfectly with a topCLEAR washing machines
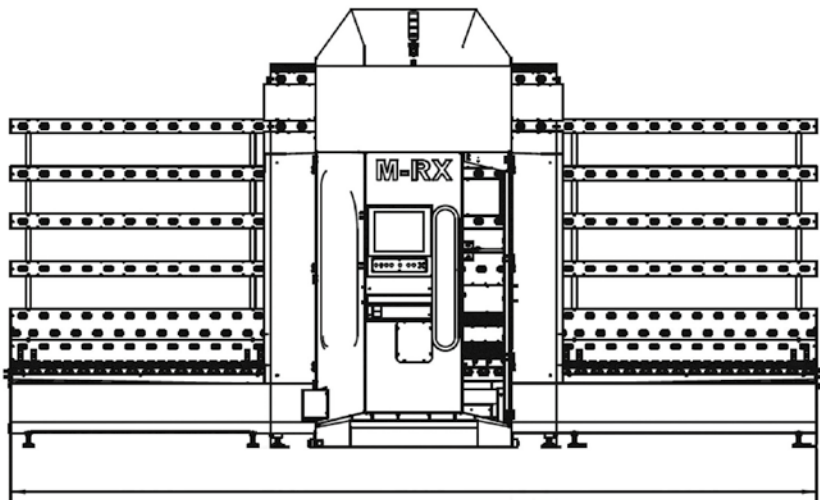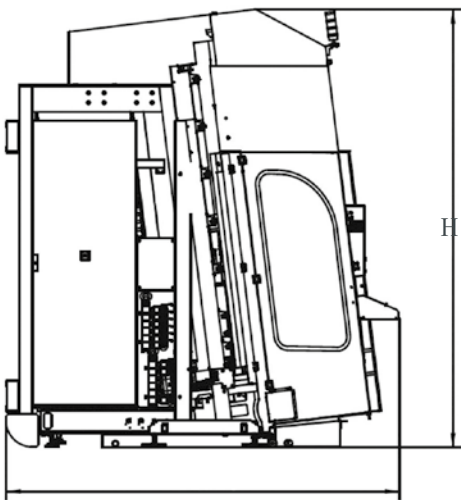- Extension with a GLX to a combiFIN processing line

Options

- Automatic drill dressing unit
- Vacuum system
- Air-conditioning unit for the switch cabinet
- Software interface and drawing programs
- PC-Link

CAD — CAD Impact
ERP — ERP Interface
PC — PC-Link

Technical Data

	MRX G5
Glass height	Open at the top (MRX 130) / 2,600 mm (MRX 200)
Max. processing height of tools	1,300 mm (MRX 130) / 2,000 mm (M-RX 200)
Glass thickness	4 - 20 mm
Minimum glass size	600 x 160 mm
Maximum glass size	approx. 3,200 mm, can be increased with extension modules
Transport height	600 mm
Angle of inclination	7° (+/- 1°)
Max. bore diameter	80 mm
Spindle speed	0 – 12,000 rpm
Spindle power (rating)	2 x 5.5 kW
Number of tools	8 + 8 in case of Linear 8 / 10 + 10 in case of Roto 10
Max. load	150 kg/lm

	L (mm)	B (mm)	H (mm)	Power consumption (kW)	Operating air pressure (bar)	Air consumption (l/min)	Operating water pressure (bar)	Water consumption (l/min) *
topDRILL M-RX 130 linear-8	6,200	2,755	2,695	19	7	200	2- 3	3.5
topDRILL M-RX 130 roto-10	6,200	2,755	2,695	19	7	200	2- 3	3.5
topDRILL M-RX 200 linear-8	6,200	3,027	3,364	19	7	200	2- 3	3.5
topDRILL M-RX 200 roto-10	6,200	3,027	3,364	19	7	200	2- 3	3.5

* Water consumption if used with a water treatment system

topDRILL MRX G5
Cycle times and scope of processing

The M-RX is the ideal solution for all drilling, sinking and milling processes. All machine configurations support fast, flexible and high-quality processing. The use of the Roto-10 tool changer on both processing spindles optimizes the cycle time when different tools are used on one glass sheet.

Shower Door

- Dimensions: 800 x 1,800 mm
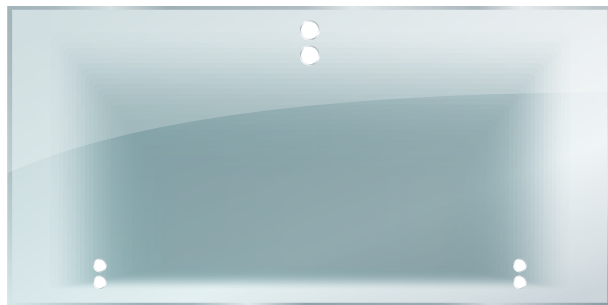- 2 Mickey Mouse edge cutouts
- 1 handle drilling

Cycle time for the entire processing: 210 seconds

Swing Door

- Dimensions: 1,000 x 2,000 mm
- 2 pieces PT fittings
- 2 handle drilling

Cycle time for the entire processing: 240 seconds

Single-action Door

- Dimensions: 800 x 2,000 mm
- 6 drillings, all countersink drilling

Cycle time for the entire processing: 360 seconds

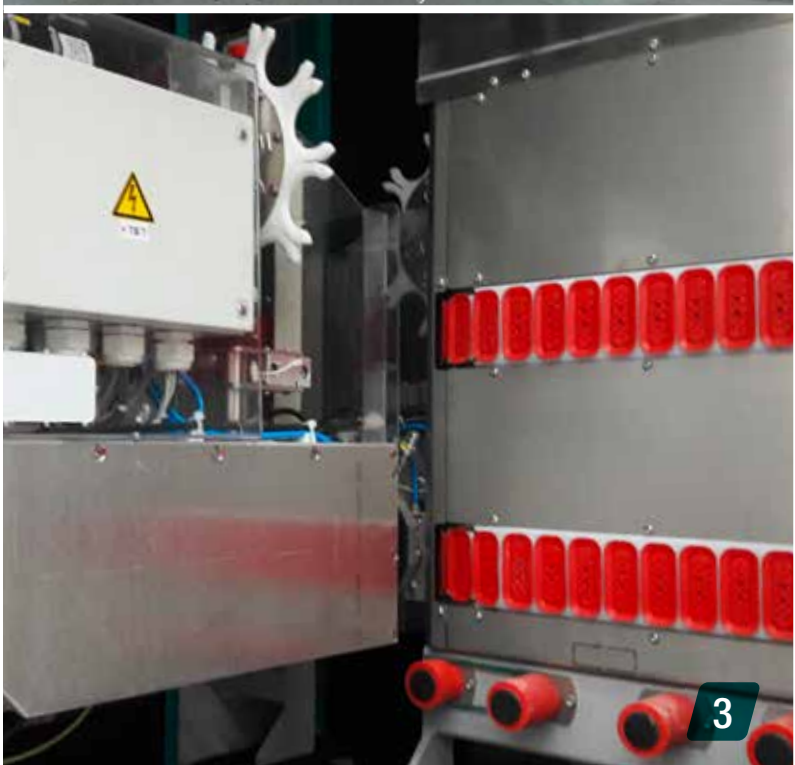### State-of-the-art machine technology

- Control of all movements by servo drives
- Solid ball screw for stroke and drill axes
- Fully automatic central lubrication of all essential machine components
- Network connection resp. remote maintenance option via remote access

HIGHLIGHTS M-RX

1 Fast and flexible processing
- Dynamic vacuum system without set-up time and also for shapes
- Roto-10 tool magazine directly on the spindle for anticipatory tool changes
- Drilling, (deep) countersinking, milling and grinding finished in one single cycle
- Perfectly adapted milling feed due to automatic parameter data

2 Fast glass handling
- No set-up times for positioning the suction cups
- Different glass sizes, shapes and thicknesses without changeover
- Loading of the next glass sheet during the processing
- Trouble-free combination with previous or following module (e.g. washing machine)

3 Fast and simple operation
- Graphical input of all processing operations
- Program generation for the next glass sheet during the processing
- Automatic selection of all processing parameters by the machine
- Autonomous setting of all auxiliary holes and puncture operations
- Program generation at the machine via network or USB

topDRILL MRX G5

Software interfaces

The machine can be operated directly on the large 19" touch screen as standard. The program is very simple and can be operated without CNC programming knowledge. All tool settings and axle movements are pre-configured. Maintenance intervals and service messages are computed and displayed online. Remote maintenance access for programs and parameters is available as standard*.

Standard scope of delivery

Operation directly on the machine. Maintenance instructions and spare parts lists available online on the machine. Shapes can be processed if these are listed in the shape catalogue.
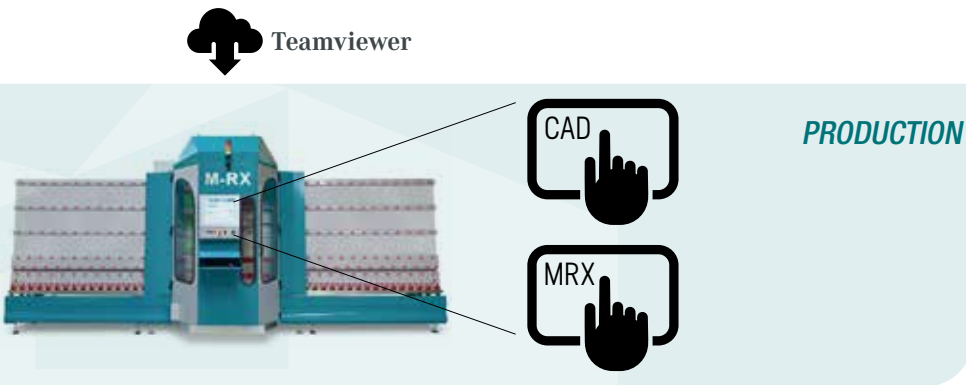
- Library selection for cut-outs and fixtures
- Remote maintenance access via TeamViewer*

Teamviewer

PRODUCTION
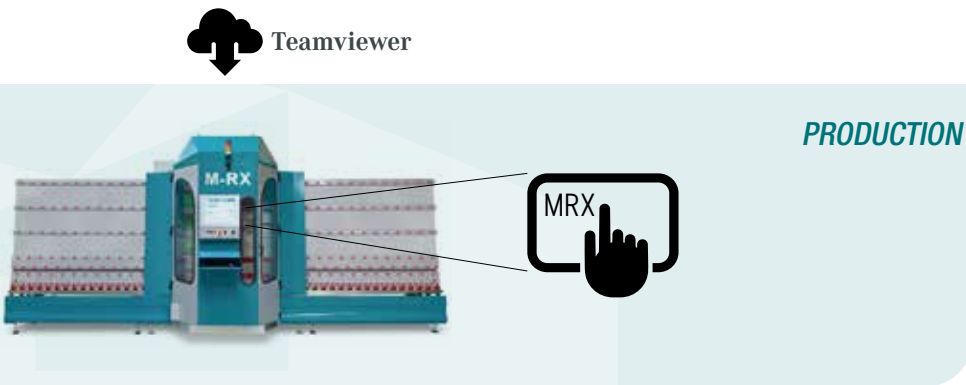
MRX + optional CAD import

Operation directly on the machine, comprehensive library for cut-outs and fixtures. Maintenance instructions and spare parts lists available online on the machine.

- CAD interface for importing, editing or creating .dxf drawings
- In-house cut-outs or drawings can be saved and added to the library
- Remote maintenance access via TeamViewer

Teamviewer

PRODUCTION

* The use of the remote services requires the installation of an internet access

** The use of the ERP interface usually requires a license of the ERP supplier

MRX + optional PC link

Operation directly on the machine, comprehensive library for cut-outs and fixtures. Maintenance instructions and spare parts lists available online on the machine.

- Network connection to external computer, MRX user interface for external parametrising
- Remote maintenance access via TeamViewer*

Teamviewer

PRODUCTION   OFFICE
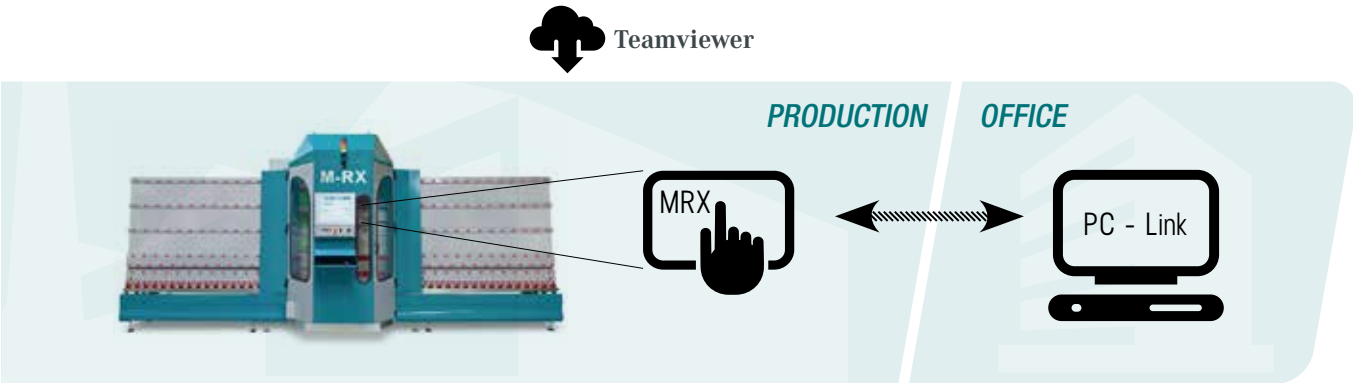
MRX + optional ERP interface

Operation directly on the machine, comprehensive library for cut-outs and fixtures. Maintenance instructions and spare parts lists available online on the machine.

- Network connection to customer's installed ERP (e.g. A+W, FeneVision, Hanic, LiSEC, etc.)**
- Handshake (data OK) for bidirectional use of the interface
- Scanner for processing barcodes and direct import into the machine
    Import as finished job (without re-work options, very fast)
    Import as editable program, confirmation on the machine required
- Remote maintenance access via TeamViewer*

Teamviewer

PRODUCTION   OFFICE

MRX + optional PC link + optional CAD import

Operation directly on the machine, comprehensive library for cut-outs and fixtures. Maintenance instructions and spare parts lists available online on the machine.

- Network connection to external computer, MRX user interface for external parametrising
- CAD interface for importing, editing or creating .dxf drawings
- In-house cut-outs or drawings can be saved and added to the library
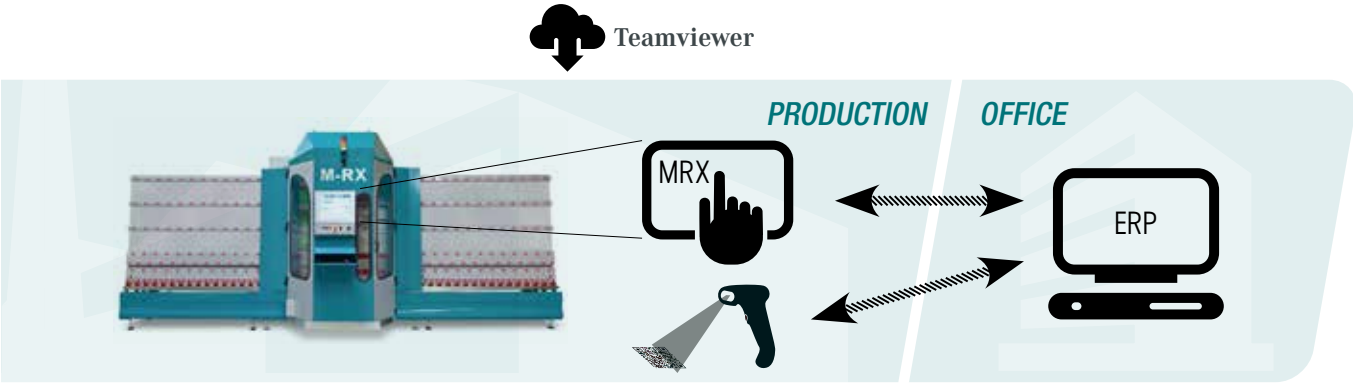- Remote maintenance access via TeamViewer*

Teamviewer

PRODUKTION   OFFICE
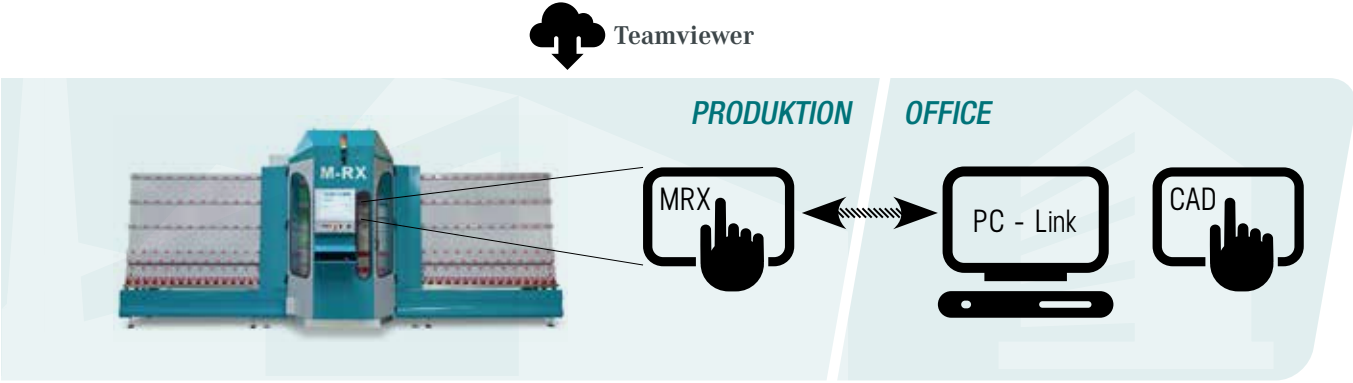
topDRILL MRX G5
Advantages

You can find an overview of the most important benefits here along with the superb product characteristics of topDRILL M-RX.

1 RAPID PROCESSING

topDRILL M-RX is optimised for the rapid and flexible processing of individual glass lites – even with small batch sizes:

- No restriction in equipping the drilling/milling head with tools
- Drilling, (deep) countersinking, milling and grinding completed in a single pass
- Optimum milling feed through automated parameter data
- Maximum milling speed through dynamic vacuum checking
- Tool changing carried out during the processing of the opposite side
- Automatic measurement of all tool types

2 FAST GLASS HANDLING

You will be astonished by the benefits arising in your daily work thanks to our innovative concept and the ingenious vacuum system:

- No maintenance time or equipping time due to the use of suction plates
- The next sheet can be loaded during processing
- Different glass sizes, shapes or thicknesses without changeovers
- The low loading edge enables the system to be loaded manually or with a crane
- Problem-free combination with washing machines or other devices
- Job sorting through continuous automatic tool checking

3 RAPID PROGRAMMING

A very important part of our development is not noticeable at first sight! The software has been specially developed for this machine:

- No CNC knowledge is required for operation
- There is only ONE programming interface for the whole control system
- A CAD program is integrated but (if preferred) is barely visible
- Auxiliary bores and plunge movements are set automatically
- Program creation on the machine, via network or USB
- Uncomplicated changes can be made to programs that have already been created

4 LATEST MACHINE TECHNOLOGY

Expect the latest machinery construction and the incorporation of our many years of experience in the construction of vertical processing systems:

- All movements are controlled through servo drives
- Solid recirculating ball spindles for the lifting and drilling axes
- Fully automatic central lubrication of all important components
- Usage-dependent maintenance interval display for important components
- Synchronously controlled waste conveyor for easy removal of glass waste (option)
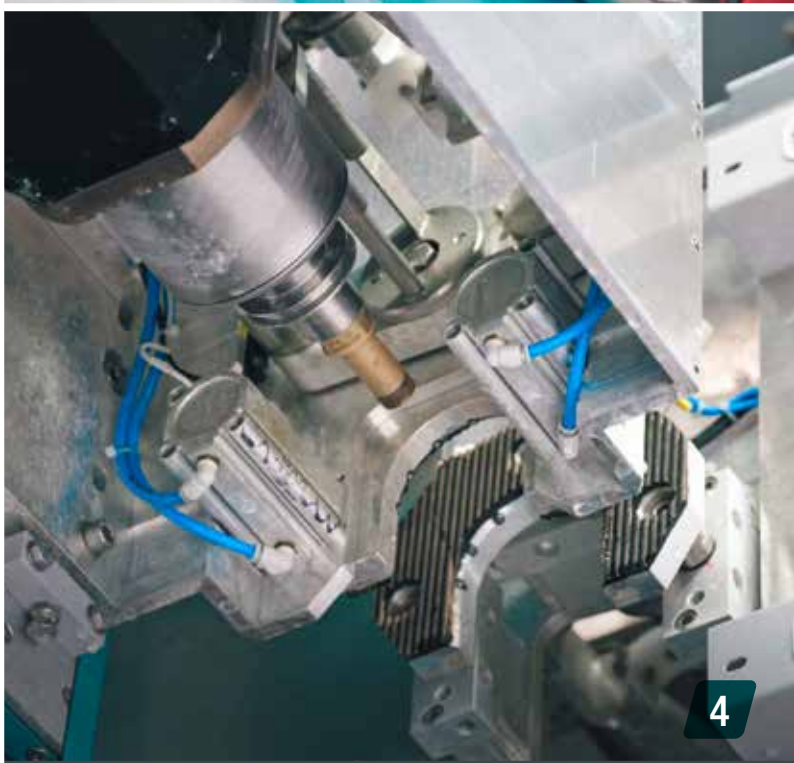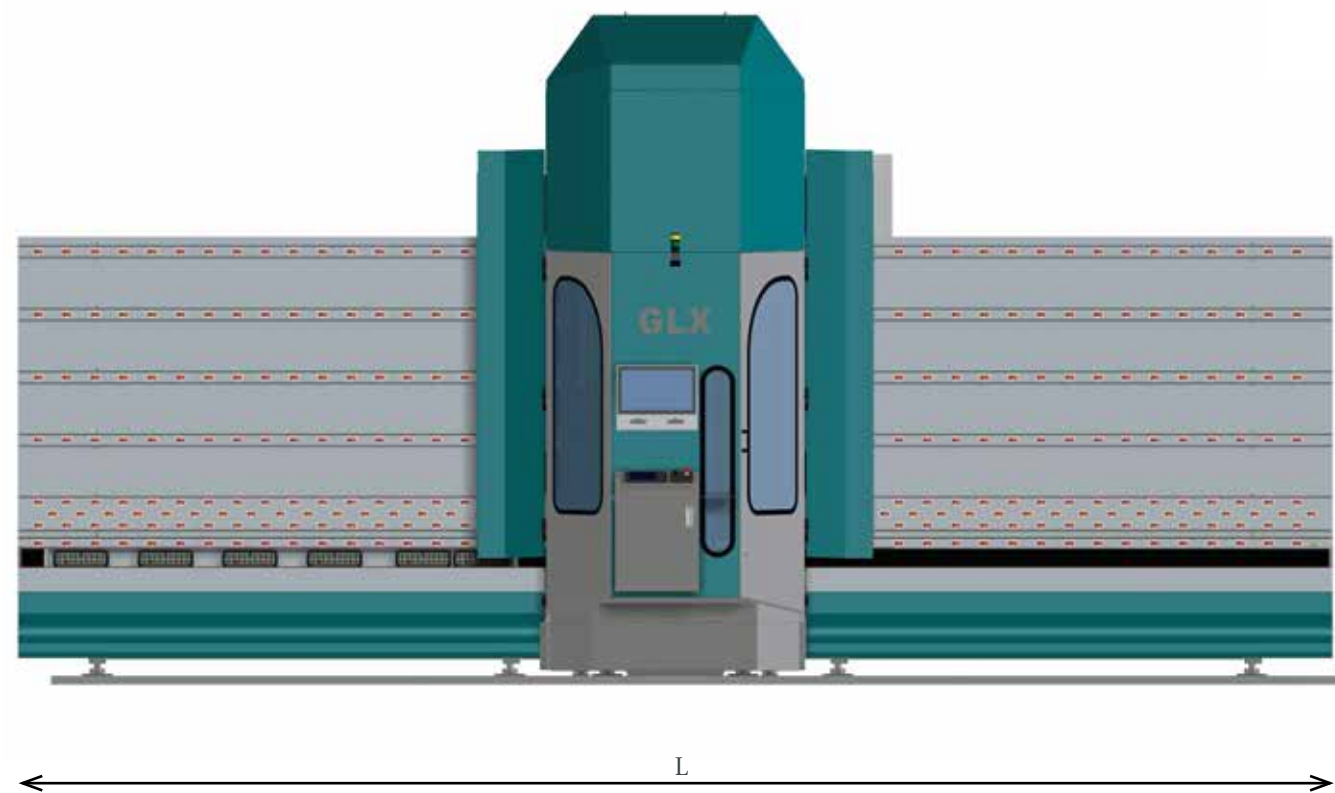- Network connection and remote maintenance facility or remote access

GLX 3220 P1

CNC grinding and polishing machine

The GLX is our CNC-controlled grinding and polishing machine for fast and uncomplicated outer processing of all glass sheets in the medium size range. All glasses - even special shapes - with a straight edge can be grinded and polished. The solid construction allows shortest cycle times with perfect edge quality.

Thanks to the intelligent CNC control, the machine is ideally suited for batch size 1 or small series with always different dimensions. The GLX can either be installed as a single machine or combined with an MRX and/or a matching glass washing machine as a combiFIN processing line. The running direction of the line is carried out according to your choice. The machine can also be supplied with manual tool change or with automatic 12-fold changer.

Combine the GLX grinding and polishing machine with the MRX drilling and milling centre to form a combiFIN processing line (see page 28)

Highlights

- Optimised grinding quality through specialisation of the grinding head
- Schräge Kanten oder Sonderformen mit Rundungen problemlos möglich
- Flexible use according to requirements, as fully integrable and yet independent
- Comprehensive water splash protection
- Water cushion as pane tracking
- As standard small glass version
- Easy maintenance access
- Standard lot size 1
- Automatic data exchange with MRX
- Integrated sound insulation

CAD — CAD Impact
ERP — ERP Interface
PC — PC-Link

Technical Data

	GLX 3220 P1
Maximum size	3,210 x 2,000 mm
Glass thickness	12 mm
Round corners and special shapes	possible
Cycle time	< 5 min. (polished shower door)
Control system	CNC
Tool changer	12-fold with 3 pcs. per holder (option)
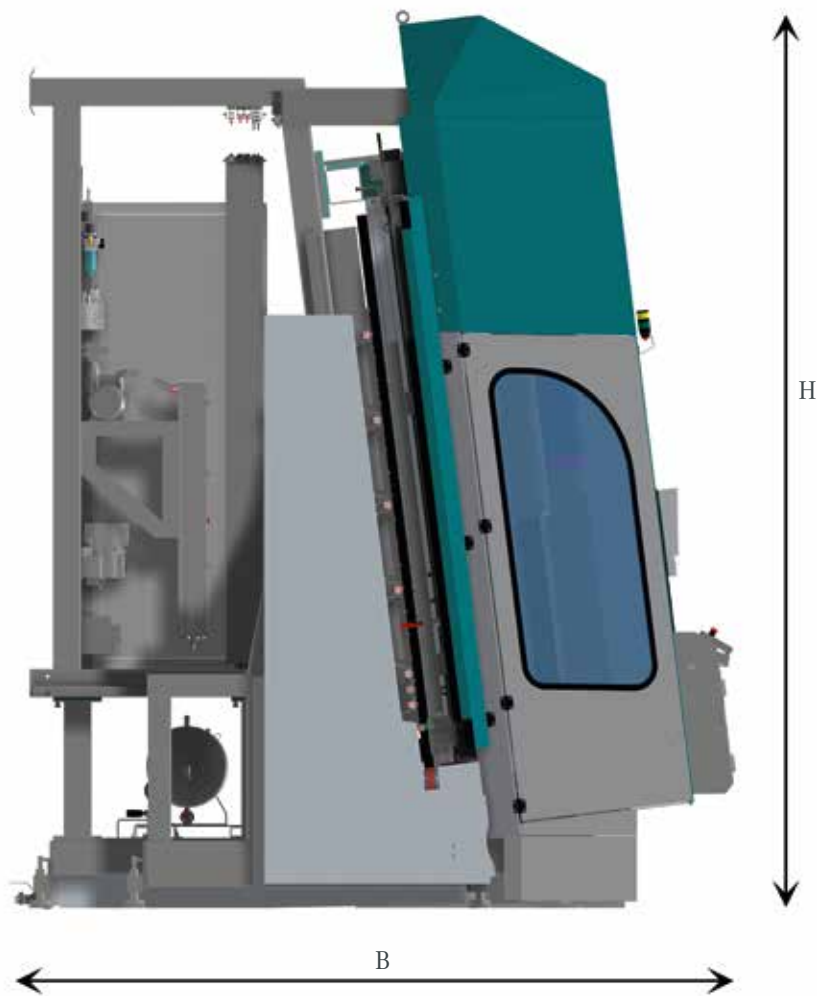
	L (mm)	B (mm)	H (mm)
GLX 3220 P1	7,620	3,016	3,825

topDRILL MRX & topCLEAR

Fully automatic vertical double-sided CNC drilling and milling centre

topDRILL M-RX is a vertical double-sided CNC centre for high-speed drilling/countersinking and milling/grinding tasks in a single operation. In conjunction with the simple-to-operate and fully automatic software, the system enables the rapid processing of glass doors, shower doors, kitchen splashbacks or similar products, even in very small batch sizes. The modern, in-house developed revolver head provides space at the front and back for 10 tools each, with no restrictions. All tools are always ready for use and can be changed on the opposite side even during processing if necessary.

In addition to internal processing with the MRX, outer edge processing with the GLX is also available. Combine these machines as you wish or in stages to form a combiFIN processing line (see page 28).

Highlights

- Milling and drilling in a single operation
- Two types of tool changers are available
- Modular construction
- Continuous production without loading times
- Flexible change of products
- Highly dynamic vacuum system for perfect fixing
- Easy operation and programming

Options

- Automatic Drill sharpening unit
- Vacuum system
- Air conditioning unit for control cabinet
- Software interfaces and drawing programs
- PC-Link

CAD — CAD Impact
ERP — ERP Interface
PC — PC-Link

combiFIN

## Vertical compact plant for flat glass processing

combiFIN is a compact but at the same time very efficient vertical processing line for flat glass with a thickness of typically 4 to 12mm. The line consists of several individual machines and can be supplemented with a glass washing machine if required. combiFIN is optimised for the following automatic and integrated processing options: Seaming, grinding, polishing of rectangles and special shapes with at least one straight set-up edge (optionally with or without automatic tool change), double-sided drilling, countersinking, milling, grinding as well as polishing with 10-fold tool change on both sides

The combiFIN consists of at least two individual units, which are fully networked with each other. If required, however, they can also be operated as single units. Typically, the GLX 3220 CNC edge grinding and polishing machine is the first unit installed and is complemented by an MRX 200 Roto-10 drilling and milling machine.

Due to the simultaneous outer and inner processing, cycle times in the range between 4 and 6 minutes are absolutely realistic for typical doors (80 x 200 cm). The incomparable variability, however, makes it easy to use only partial areas to combine the system with other production options (e.g. double-sided).

Highlights

- Fast cycle time
- Compact design
- Smooth glass transport and easy loading and unloading thanks to vertical processing
- Processing of rectangles and special shapes possible
- Fast rough and fine grinding and polishing of glass plates without changing tools
- Network-compatible, standard dxf import
- Highest energy efficiency through integrated vacuum generation and modern spindle technology with water cooling
- Choice of running direction, flexible extension options at any time
- Failure safety, as individual devices can be used without restriction
- Combination with washing machine or logistics solutions possible at any time
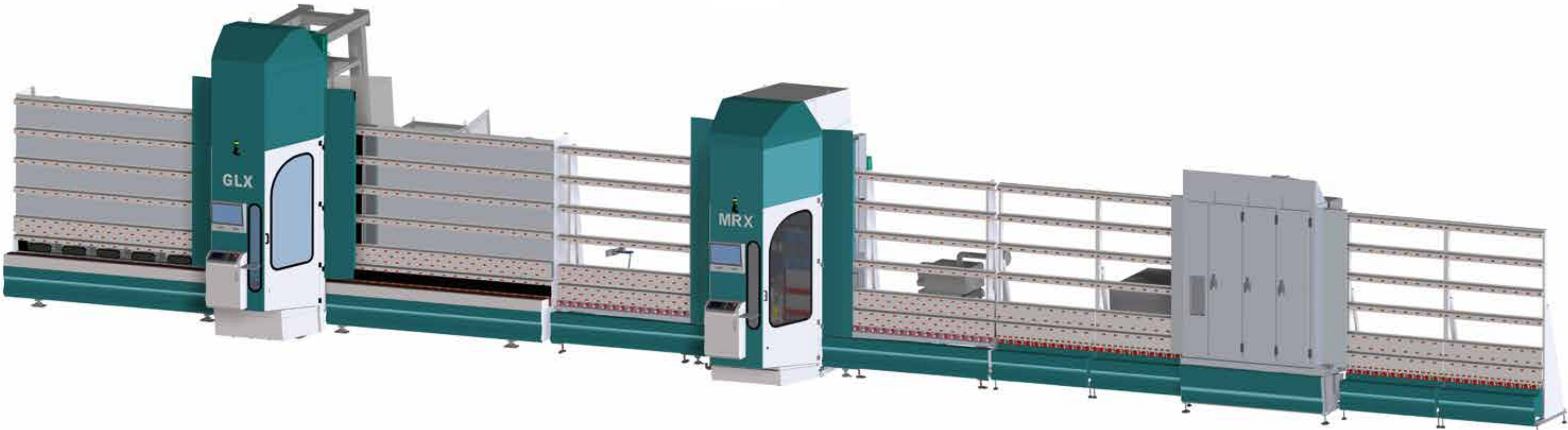
Technical Data

	general	GLX 3220 P1	MRX G7
Maximum size	3,210 x 2,000 mm	470 x 180 mm	600 x 160 mm
Glass thickness	-	3-12 mm	4-12 mm
Tool changer	-	12-fold (optional)	20-fold (Revolver 10-fold front + back)
Tool diameter	-	100 mm (with/without internal cooling)	max. 80mm (Drill/countersink/millingcutter)

Grinding speed	up to 15m/min
Millng speed	up to 20mm/sec
Drill feed	up to 3mm/sec
Deepening	with torque control
Transport speed	bis 30m/min
Total length	ca. 21,000 mm (modular)

PC PC-Link

Additional software for our NC, RX and MRX machines

PC link is modern additional office PC software for our NC, RX and MRX machines with which you can simply program hole drilling without a CAD program.

Highlights

- Highly advantageous for processing similar products with changing dimensions (samples)
- Input of drilled holes possible without CAD; program can be sent to the machine with 1 click
- Data export directly to the machine is possible (can be selected as a program or as a job, set with MRX)
- Suitable for creation of programs with rectangular glass, but also with special shapes
- As an option, the CAD-CAM interface can be loaded in the PC link program

TDI TDI-connect

Interface program for all popular ERP software solutions

TDI-connect is an interface program for all popular ERP software solutions for the NC and RX (G4 series) drilling machines.

Highlights

- Compatible with all popular ERP solutions, such as A+W, Lisec, Hanic, Bitec, FeneTech, AuPos, etc.
- Permits loading and starting of drill patterns, INCLUDING all important
- additional information (quantity, user, drilling depth, countersink depth, pulsing, etc.)
- Automatic cycle-controlled data import either to the program level OR directly to the jobs (select parameter)
- Fully-automatic operation can be achieved with labels and a barcode reader (scanner) in combination with your software solution (Scan-and-go)
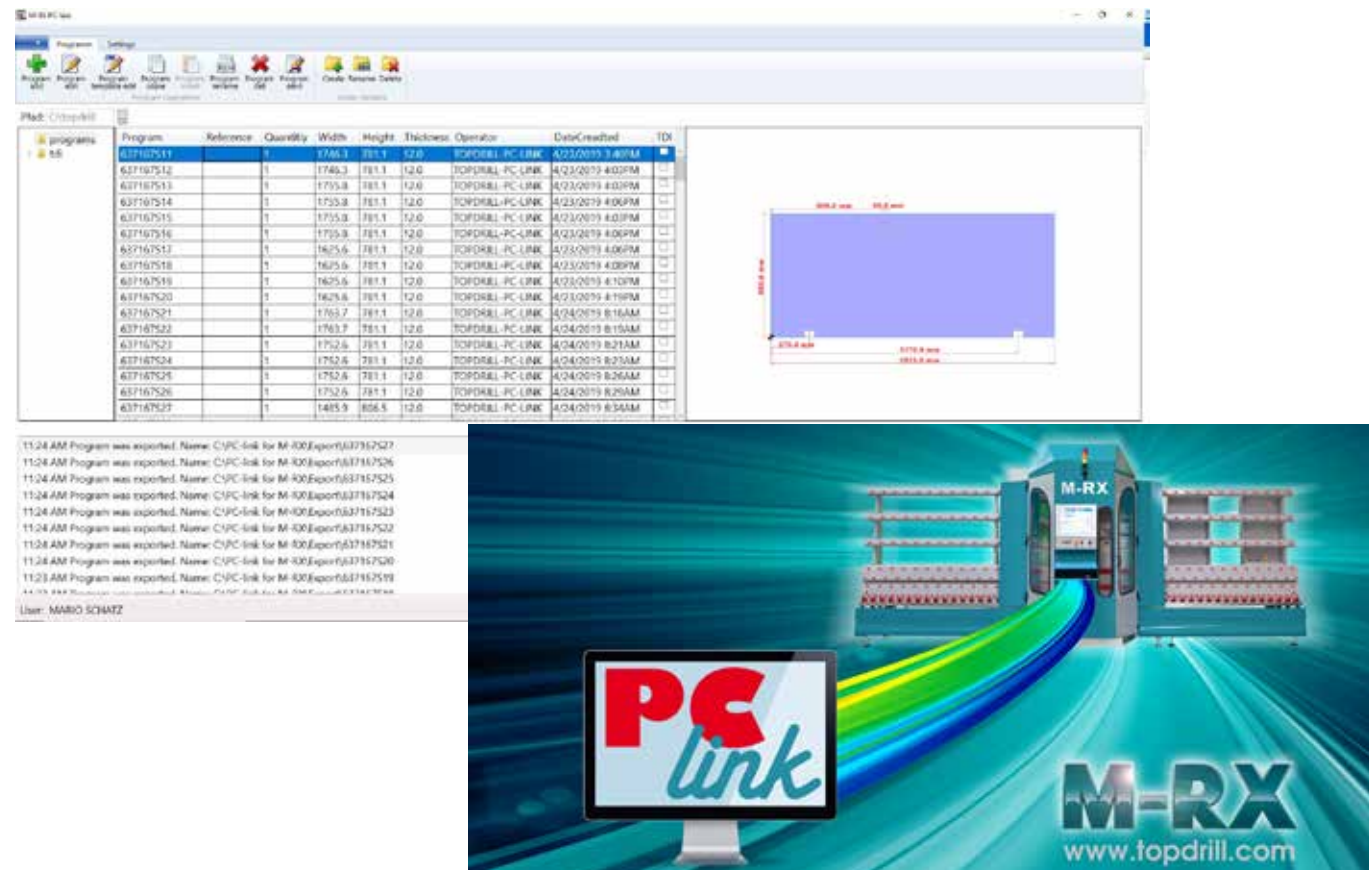
CAD CAD drawing and import program
Operation of the M-RX machines

CAD-Import is a modern and comprehensive CAD software solution for operating our M-RX machines. Programs can be created or modified with a clear graphic-driven interface. Of course you can also use this to import (your own or external) dxf customer data directly into the machine.

Highlights

- Automatic calculation of inbound and outbound movements for milling work
- Automatic calculation of auxiliary holes for internal cut-outs
- Automatic reference point regulation for cut-outs or for the complete sheet
- Dynamic programming of the customer's own fixtures or custom processing operations
- Unrestricted dxf import with further processing and CNC conversion
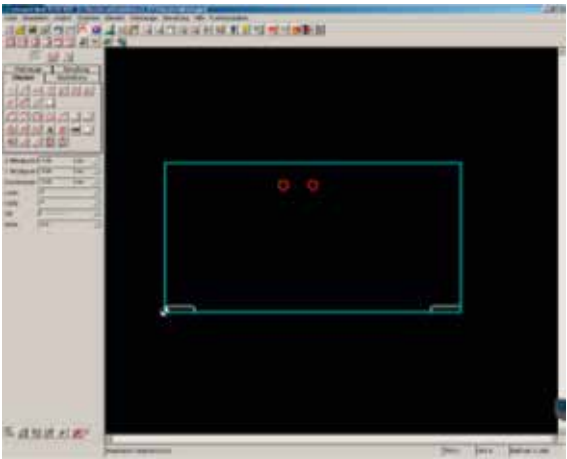
ERP ERP Interface
Without operator intervention

The ERP interface program is a high-quality and comprehensive technological facility that allows the quick and simple import of your work preparations directly into the job memory of the machine by means of a customer-provided barcode scanner.

All well-known ERP programs are already able to send an interface file for the topDRILL M-RX to pass on all of the important information on the glass sheet and any supplementary conditions. The machine monitors a directory on the server and imports automatically! With this solution, editing programs on the machine is not necessary but is also not possible.

Highlights

- Programs are automatically converted and saved WITHOUT operator intervention
- The fastest of all possible variants (just scan the barcode, download and start the machine)
- Automatic data handshake between M-RX and the partner software (bidirectional)
- The interface can also be used in addition to or together with the MRX CAD-CAM
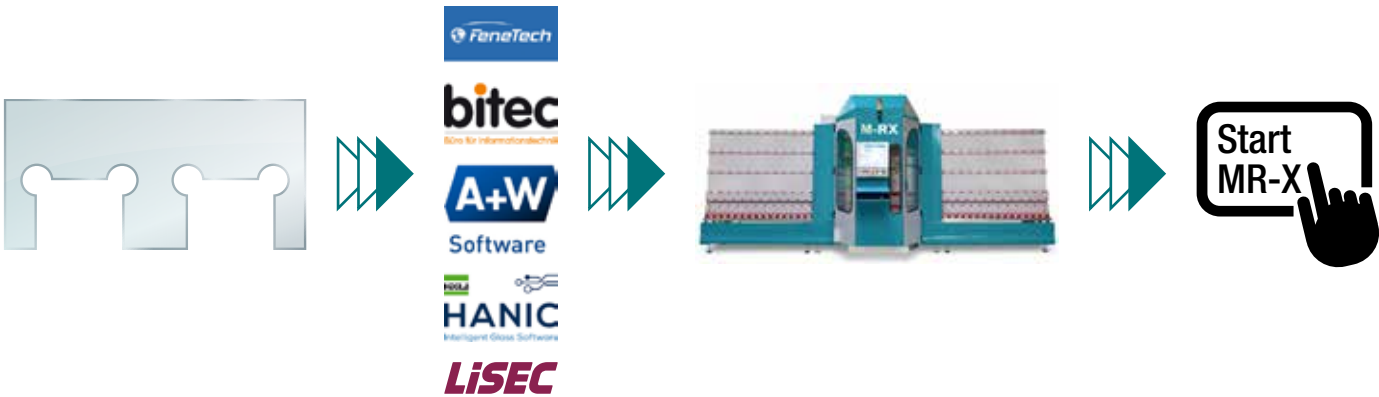
Overview washing machines

	Schraml topCLEAR machines		
	ECO	SPECIAL	SUPER
Glass thickness 3-12 mm	✓	✓	-
Glass thickness 3-20 mm	○	-	✓
Transport height	600 mm	600 mm	600 mm
Angle of inclination	7°	7°	7°
Increase working height	○	○	○
Distance between rollers only 120 mm	✓	✓	✓
All transport rollers individually driven, ball bearing mounted	✓	✓	✓
Rollers with slip clutch on input and output module	○	○	○
Basic frame, machine body and water tank in stainless steel	✓	✓	✓
Doors front- and rear side, guards in polycarbonate	-	✓	✓
Spraying tubes for brushes and rinsing section plastic	✓	-	-
Spraying tubes for brushes and rinsing section stainless steel	-	✓	✓
Glass support frame for drying section in stainless steel	-	✓	✓
Water heating with adjustable thermostat	✓	✓	✓
Sensor for water level and protection resistance	-	-	✓
Submersible pump with stainless rotor	✓	✓	-
High-pressure centrifugal pump with filter	-	-	✓
Noise reduction box for ventilator, with air filter	✓	✓	✓
Additional driving motors with bottleneck function	○	○	○
Light panels on outlet side	✓	○	○
AutoStart System with inverter for soft-start of brushes	-	○	○
Pre-washing area with high pressure pump, separate tank	-	○	○
Soft brushes frontside for soft coated glass	○	○	○

✓ Standard,   ○ Optional, - Not Available

topCLEAR
Vertical flat glass washing machines for all requirements

We have been supplying and installing the glass washing machines of the topCLEAR series for about 20 years. With the gathered experience of over 600 installations, the washing machines have been constantly optimized and adapted to the changing customer requirements. topCLEAR washing machines are currently available in 3 different models. All of them can be expanded with a variety of useful equipment options. We are sure we can provide the right solution for your requirements.

Many advantages included in the standard:

- Stainless design of base frame and machine body as well as all built-in components in the washing zone
- Narrow roller spacing inside and outside the machine for safe, problem free processing of short glasses
- Sound absorption box for fan perfectly insulates against operational noise
- Clear, easy to use operating units
- Partially or fully automatic water circulation system saves energy and resources
- Extensive and clear documentation for operation and maintenance tasks

Extensions and additional modules

Depending on the customer's requirements, the topCLEAR washing machines can be equipped with additional inlet and outlet modules. Those modules can of course be adapted to your needs in working height and equipment.

Combination with other devices

The topCLEAR series is ideal for combination with other devices. Both vertical grinding and drilling machines, as well as feeding systems, film applicators or tilting tables – even from non-LiSEC manufacturers – can be easily connected.

topCLEAR ECO
Washing machine

topCLEAR Eco is our basic machine for professional glass processing. All parts in contact with water are made from stainless materials. The standard version is already over-equipped with all practical features.
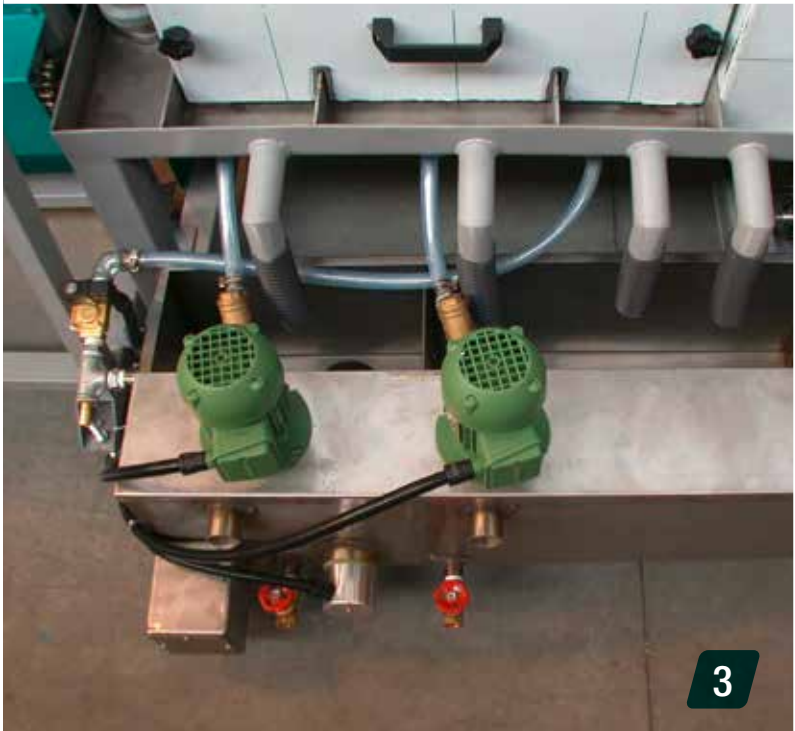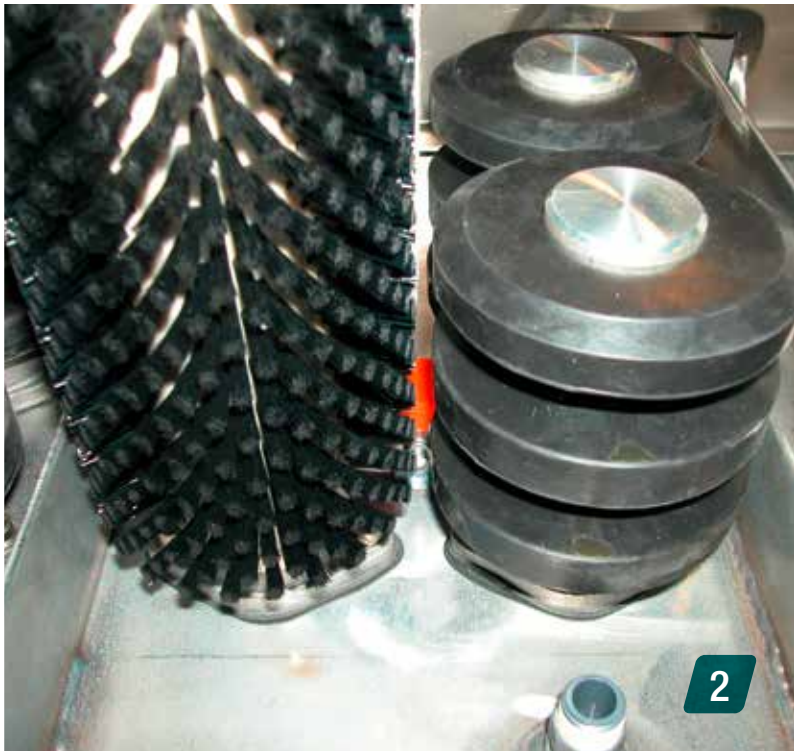
Highlights

- All important machine components made from stainless steel
- Individual water pump for each pair of brushes
- Water heating system with thermostat
- Variable working speed with variator
- Noise reduction box for ventilator

Options

- Rollers with slip clutch
- Light panels on outlet side
- Soft brushes frontside for soft coated glass

Technical Data

	topCLEAR 13 ECO 4/12	topCLEAR 13 ECO 4/20	topCLEAR 16 ECO 4/12
Max. processing height	1,300 mm	1,300 mm	1,600 mm
Construction	Open at the top	Open at the top	Open at the top
Glass thickness	4 - 12 mm	4 - 20 mm	4 - 12 mm
Minimum size	270 x 50 mm	300 x 50 mm	270 x 50 mm
Length of the inlet table	1,400 mm (optional 2,000 mm) – modularly expandable		
Length of the outlet table	2,000 mm (optional 2,800 mm) – modularly expandable		
Angle of inclination	7° (+/- 1°)		
Transport height	600 mm (+/- 20 mm) / optional increase		
Number of brushes	4 brushes		
Transport speed	1 - 5 m/min		

1 Optimized glass transport
- Distance between rollers only 120 mm
- Each roller individually driven
- Suitable for small pieces

2 Well thought-out design
- Washing brushes with shaft in stainless steel
- Extra strong clamping of glass
- Compact installation

3 Water management
- Water tank with individual pump for each pair of brushes
- Water heating with thermostat
- Water filter

topCLEAR Special

Washing machine for professional cleaning of glass up to 12 mm thickness

topCLEAR Special is the perfect washing machine for industrial glass processing, as long as no extreme glass thicknesses are processed. A particular advantage is the extremely easy access to the machine for user-friendly maintenance. topCLEAR Special can be individually configured to meet the needs of solar production and multi-shift operation.

Highlights

- All important machine components made from stainless steel
- Doors front- and rearside as maintenance entry
- Guards in polycarbonate behind the doors
- Individual water pump for each pair of brushes

Options

- Rollers with slip clutch
- AutoStart system for power saving
- Light panels on outlet side
- Pre-washing area with high pressure pump, separate tank
- Soft brushes frontside for soft coated glass

1 Optimal accessibility
- Doors front- and rearside for easy maintenance
- Plexiglas guards for inspection
- Additional noise reduction

2 Simple operation
- Ingenious - AutoStart system activates brushes, pump and ventilator only when needed (optional).

Technical Data

	topCLEAR 13 Special 4/12	topCLEAR 16 Special 4/12
Max. processing height	1.3 m	1.6 m
Construction	Open at the top	Open at the top
Glass thickness	4 - 12 mm / 4 - 20 mm	
Minimum size	270 x 50 mm	
Length of the inlet table	1,400 mm (optional 2,000 mm) – modularly expandable	
Length of the outlet table	2,000 mm (optional 2,800 mm) – modularly expandable	
Angle of inclination	7° (+/- 1°)	
Transport height	600 mm (+/- 20 mm) / optional increase	
Number of brushes	4 brushes	
Transport speed	1 - 5 m/min	

topCLEAR Super

Professional series for thick-glass processing up to 20 mm

topCLEAR Super is what we call our extremely robust series for thick glass processing, especially grinding. Any glass thickness up to 20 mm can be processed without further adjustment.

Highlights

- Stronger machine frame in stainless steel
- Doors front- and rear side, polycarbonate guards
- Individual water pump for each pair of brushes
- Sensor for water level and shutdown
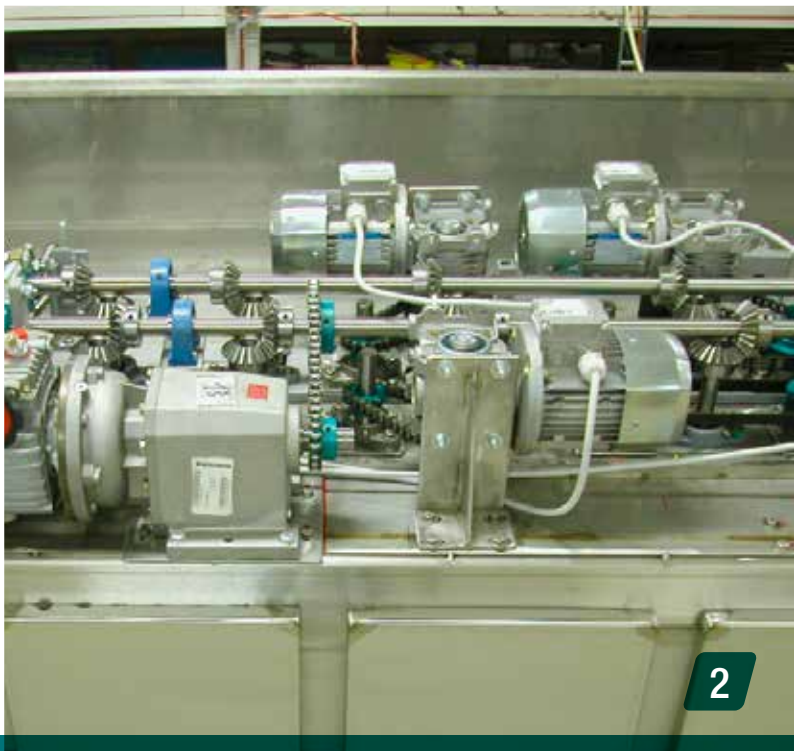- High pressure centrifugal pumps made of stainless steel

Options

- Rollers with slip clutch
- AutoStart system for power saving
- Light panels on outlet side
- Pre-washing area with high pressure pump, separate tank
- Soft brushes frontside for soft coated glass

1 Optimized water management
- Stainless steel centrifugal pump below washing area
- Water tank with heating
- Sensor for water level with indicator lamp

2 Well thought-out drive concept
- Overhead drive for brushes and glass transport
- Individual motor per brush or per pair of brushes (if closed construction)

Technical Data

	topCLEAR 13 Super 4/20	topCLEAR 16 Super 4/20	topCLEAR 20 Super 4/20	topCLEAR 25 Super 4/20
Max. processing height	1,300 mm	1,600 mm	2,000 mm	2,500 mm
Construction	Open at the top	Open at the top	Closed at the top	Closed at the top
Glass thickness	4 - 20 mm			
Minimum size	320 x 50 mm			
Length of the inlet table	2,000 mm (optional 2,800 mm) – modularly expandable		2,800 mm – modularly expandable	
Length of the outlet table	2,800 mm – modularly expandable			
Angle of inclination	7° (+/- 1°)			
Transport height	600 mm (+/- 20 mm)			
Number of brushes	4 brushes			
Transport speed	1-5 m/min	1-5 m/min	1-5 m/min	1-6 m /min

Services

We offer you worldwide service and the fastest possible supply of spare parts.

From machine installations to modernization of existing systems, we offer a wide range of services, and stay on your side as a competent and reliable partner throughout the entire life cycle of your systems. Whether you need a customized training program, detailed machine inspections, online support, spare parts or upgrades – the LiSEC service team will take care of it for you.

Facts & figures:

- Worldwide service network – 160 installation technicians & 45 subsidiaries/representatives
- Rapid support in the event of a fault
- High standard of training and quality of our service technicians

Service Products

- Online Support
- Hotline
- Service / Maintenance
- Training
- Long Life
- Spare parts
- Installation
- Repairs

Hotline

LiSEC attributes great importance to customer efficiency from the very beginning.

We will deal with your issues quickly:

| Monday - Thursday | 08:00 a.m. - 05:00 p.m. (CET) |
| Friday | 08:00 a.m. - 12:00 a.m. (CET) |

Phone: +43-7477 405-5701
E-Mail: service.schraml@lisec.com

Online Support

Preventive check-ups and maintenance ensure high plant availability, keep production output at the desired level and prevent unexpected plant downtimes.

Sunday 10:00 p.m. – Friday 09:00 p.m. (CET)

Phone: +43-7477 405-5701
E-Mail: aftersales@lisec.com

Emergency contact for urgent issues outside our working hours:

| Saturday | 6:00 a.m. – 10:00 p.m. (CET) |
| Sunday | 6:00 a.m. – 10:00 p.m. (CET) |

Phone: +43-7477 405-5701

Schraml Glastechnik GmbH
Lumplgraben 49
A-4463 Grossraming
Austria

+43-7254-8100 Tel
schraml@lisec.com Mail
www.schraml.com Web