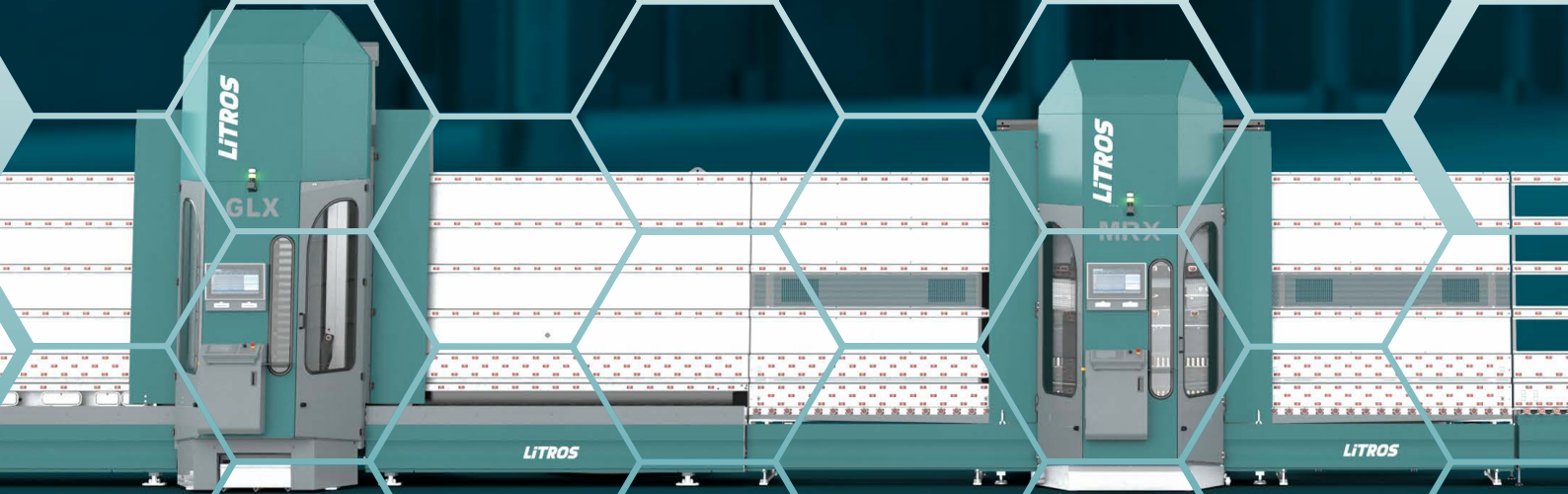


LITROS



LITROS Combifin Processing Line for Flat Glass

Service

Strong at the start, reliable in use.

With LiTROS, a brand of the LiSEC Group of companies, we see service not just as support — but as a real growth engine for our customers. Our goal is to make it easy for glass processors all over the world to get started in industrial production. We do that with well-thought-out machine solutions, personal support and a strong network in the background.

What you can expect from our service:

- **Reliable support right from the start**
Whether you are just taking the first step towards mechanical manufacturing or would like to modernize your existing machinery — we will support you with know-how, experience and a clear focus on your needs.
- **Local contacts — globally connected**
Our local service technicians are available to provide you with advice and assistance. At the same time, you benefit from the worldwide knowledge network of LiSEC group.
- **Maintenance & support — easy and efficient**
Our systems are designed to be easy to maintain. We are here for you in case something is not running smoothly — in partnership, solution-oriented and reliable.
- **Advice that thinks ahead**
We not only help you select the right machines, but also provide you with strategic advice — so that your investment is successful in the long term.



About LiTROS

LiTROS is a brand of the LiSEC group. As part of LiSEC Group, we combine decades of mechanical engineering expertise with a fresh, practical approach.

Mission

We provide a simple and inexpensive entry into the world of industrial glass processing — with a well-thought-out range of products and integrated solutions throughout the entire production process. We want to help our customers grow with our solutions and to be competitive and successful in the long term.

Vision

We want to give companies access to modern, software-supported production — and thus build bridges to the LiSEC world of high-end solutions. In doing so, we rely on trust, partnership and sustainable growth.

What we stand for

- **Simplicity:** Our solutions are intuitive, understandable and easy to use.
- **Versatility:** Whether it's cutting, insulated glass production or processing — our portfolio is constantly growing.
- **Accessibility:** We offer quality at a fair price with personal local support.

Stance

LiTROS stands for a young, dynamic approach to glass processing. We speak the language of our customers, are approachable, solution-oriented and think in terms of possibilities. Our products are robust, efficient and focused on the essentials.



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LiTROS Combifin

Possible configurations

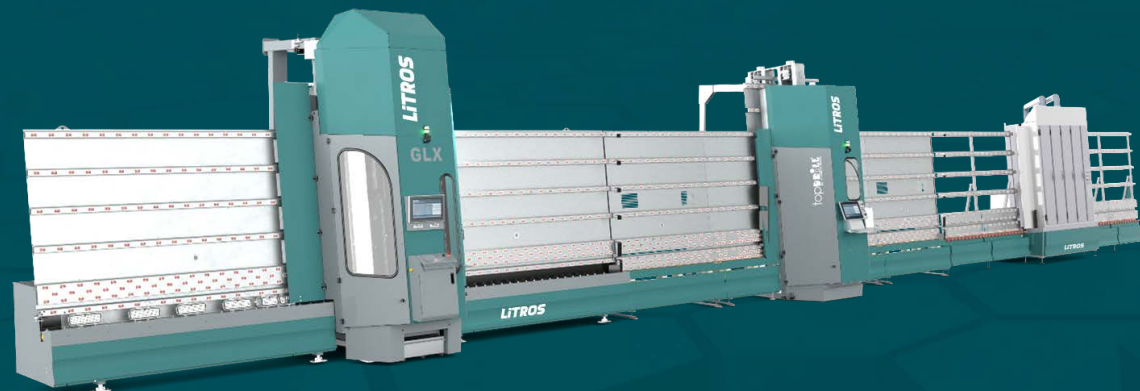
LiTROS GLX + M-RX G7 + Topclear



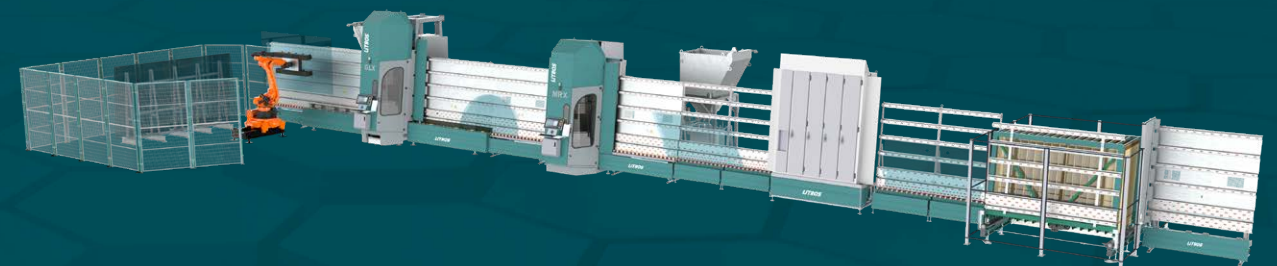
LiTROS GLX + M-RX G7 + Topclear + 2x SSP-A



LiTROS GLX + RX G8 + Topclear



LiTROS GLX + M-RX G7 + Topclear + robot loading + SSP-A





LiTROS Combifin

Possible configurations

	GLX M-RX (G7)	GLX M-RX WJ (G7)	GLX NC WJ (G8)	GLX RX (G8)	GLX RX WJ (G8)
Grinding and polishing outer edges	✓	✓	✓	✓	✓
Grinding and polishing outer edges for special shapes	✓	✓	✓	✓	✓
Self-measuring for automatic seaming of rectangles	○	○	○	○	○
Hole drilling and countersin-king	✓	✓	✓	✓	✓
Milling and grinding cut-outs with diamond tools	✓	✓	✗	✗	✗
Cutting cut-outs with a water jet (without seam)	○	○	○	✗	○
Seaming waterjet cuts (see detailed instructions)	✓	✓	✗	✓	✓
Grinding waterjet cuts with a trapezoidal tool	✓	✓	✗	✗	✗
Polishing cut-outs (see detailed instructions)	✓	✓	✗	✗	✗
Integrated data splitter (automatic .dxf splitting)	✓	✓	✓	✓	✓
Industry 4.0 standard	✓	✓	✓	✓	✓
Automatic control via data interface	○	○	○	○	○
Extension with Topclear or SSP-A sorting memory	○	○	○	○	○
Suitable for low-E glass	✓ ○	✓ ○	✓ ○	✓ ○	✓ ○
Minimum size (mm)**	650 x 180	650 x 180	650 x 180	650 x 180	650 x 180
Maximum size (mm)**	3210 x 2000	3210 x 2000	3210 x 2000	3210 x 2000	3210 x 2000
Glass thicknesses**	4 – 12 (19)	4 – 12 (19)	3 – 12 (19)	3 – 12 (19)	3 – 12 (19)
Length of the entire line**	from 19,8m	from 19,8m	from 22m	from 22m	from 22m
Minimum installation depth**	from 3500mm	from 4700mm	from 3500mm	from 3500mm	from 4700mm
Total installed output incl. Topclear Super (kW)	57	87	52	51	81

* depending on the radius
** see detailed description
✓ Standard
○ Optional
✗ Not Available



LiTROS Combifin

Glass processing of the future

Vertical glass processing is already well established on the market and is available in various variants. Vertical processing is certainly the fastest, most uncomplicated and by far the most economical way of manufacturing standard products.

LiTROS Combifin systems impress with their well-thought-out concept and now offer a wide range of variants and possible configurations. Based on the LiTROS Topdrill drilling machines, the platform has been continuously developed and is now the standard for medium-sized glass formats.

Combifin combines individual processing units that can still be used independently to form an intelligent and networked processing line. This means that the individual devices can be used completely independently of each other if required, but as a rule the devices work in direct coordination with each other as a logical unit.

Design versions

LiTROS Combifin is available in various versions and combinations. The right solution can be configured for your specific requirements and tasks from a wide range of options:

- GLX grinding and polishing machine for CNC external processing, also for special shapes
- GLX grinding and polishing machine in specialized design for automatic seaming
- M-RX drilling and milling center with vacuum fixing of the glass during processing
- M-RX drilling and milling center with integrated water jet head
- Topdrill G8 drilling machine, optionally with single head or with RX turret drilling head
- Topdrill G8 series NC or RX, with integrated waterjet head
- Topclear glass washing machines in a configuration precisely matched to the line
- SSP-A sorting storage system can be integrated BEFORE or AFTER the Combifin in all variants
- RHV Robotic systems for automatic loading and/or unloading



The LiTROS Combifin concept offers the following advantages:

- Flexible and modular configuration
- Well-thought-out and low-maintenance stand-alone machines
- Fast cycle times thanks to separate processing
- Automatic and integrated data splitter
- State-of-the-art CNC technology, easy to operate
- Optionally with or without water jet system

LiTROS Combifin

Variant A - GLX + G8 & Topclear

In the configuration with the LiTROS Topdrill G8 series, the Combifin is even faster. The glass is held on the conveyor belts by gravity only and clamped for drilling and countersinking.

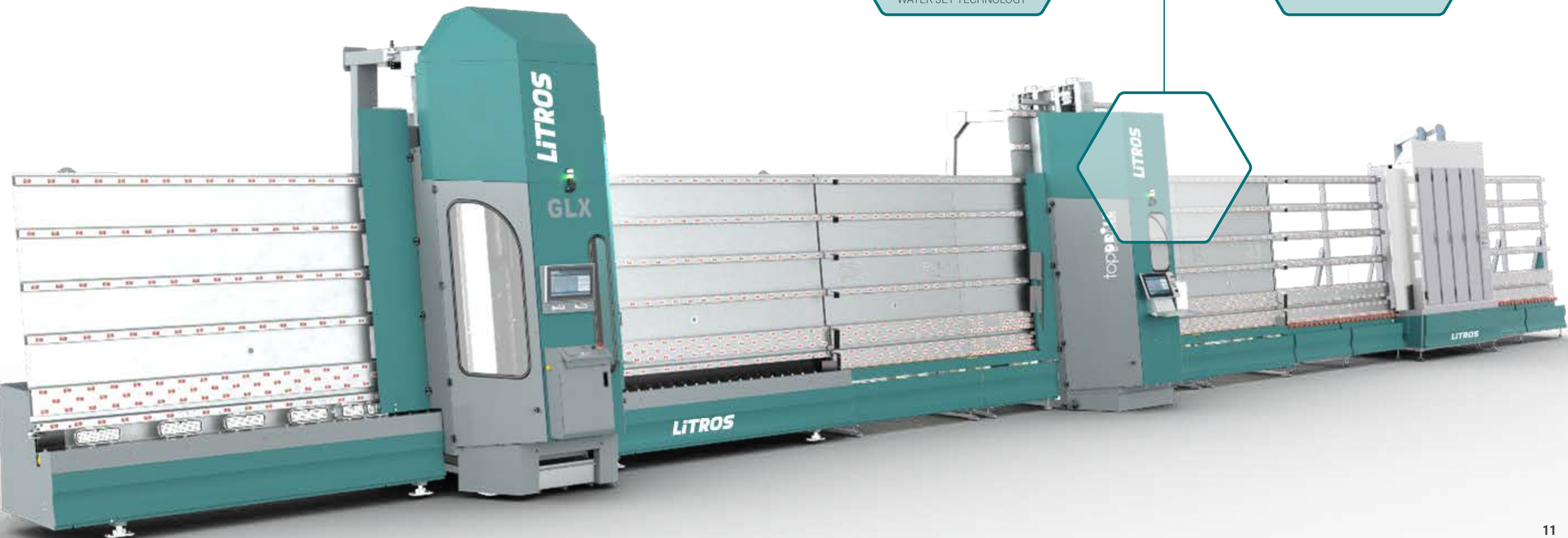
Only in combination with the water jet head, the G8 series can also produce cut-outs at the edge and in the surface without restrictions. The cut-outs are finely ground by the cutting sand (abrasive material) in the water jet, but can then no longer be ground with diamond tools (45° edge) - because no side force transmission is possible.

Highlights

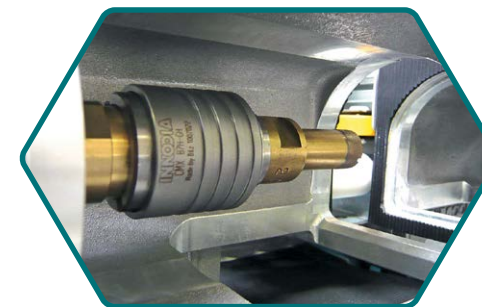
- The LiTROS Topdrill G8 is the fastest CNC drilling and countersinking machine
- Less complexity because no vacuum system is required on the G8
- Suitable for seaming waterjet cuts

Design variant

- Grinding and polishing of outer edges with the GLX
- Drilling and countersinking or water-blasting with the Topdrill G8
- G8 is available as RX or NC version - with or without water jet technology
- Optional and expandable with washing machine at any time



Drilling head technology of your choice



NC-single drilling head

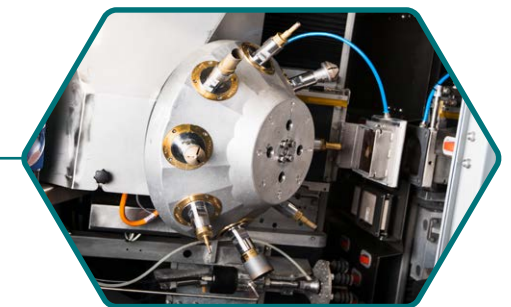
With manual CMX quick change

NC-single drilling head

With additional water jet head



With optional
WATER JET TECHNOLOGY



RX-turret drill head

8-speed changer front and rear

RX-turret drill head

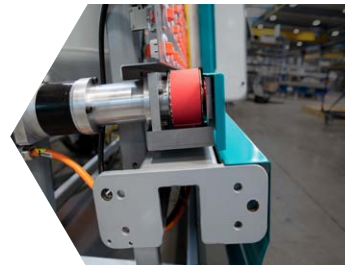
With additional water jet head



Processing Sample

Highlights of the LiTROS Topdrill G8 series

The unique LiTROS Topdrill system concept enables simple and straightforward use, while also offering stability and many advantages for industrial use!



Modular construction: The systems can be equipped with extension modules at any time.

Glass transport with belt drive: The belt drive is still the simplest way of performing glass transport, whilst also delivering very high precision. In combination with the modular design, the belt lengths are very compact and each individual belt module - depending on the pulley size - is either commonly controlled or used as an inlet or storing station module.



Lifting axis (Y-axis) with belt: Depending on the model or the high-precision recirculating ball screw. The guide rails are extremely solid.

Lifting axis (Y-axis) with spindle drive (option): Y-axis, two separate drive motors are also in use, and of course central lubrication is also used. All settings and movements are thus even more dynamic and uncomplicated.



Water splash protection is significantly improved: The water splash protection has been further enhanced on both the drill heads and the Z-axes. Even in continuous operation, the system and the individual technical parts are provided with maximum protection against contamination.



Turret drill head now 8-fold front and rear: The machining capabilities have been further extended and 8 drilling and countersinking tools can be mounted at both the front and the rear according to free configuration. The turrets are controlled by servo drive and the guide system has been significantly reinforced. The special turret type allows changing one side while the opposite head is still working, thereby enabling an incredible cycle time for hole drilling and countersinking.



Water jet system now optionally available: The patented water jet head is optionally available on both the single-head and turret machines. With this system, the drilling machine is expanded to form a processing centre with outstanding flexibility and speed.



Glass thickness sensing integrated: An additional feature is the automatic measurement and checking of the glass thickness, which reduces the risk of operating errors and incorrect occupancy to an absolute minimum.



Mechanical measurement of the glass sheets: Precise and rapid measurement of the start position is fundamental to the machine function. Our system allows measurement of the glass edge during movement - also for shapes. Topdrill devices can process all shapes with a straight cut-out edge.



Probing and sharpening tools - integrated: The tedious measurement and sharpening of your drilling tools is a thing of the past. Topdrill does the work automatically and as required. The tools are sharpened and dressed cyclically and automatically - or at the operator's request.





LiTROS Combifin

Variant B - GLX + M-RX G7 & Topclear

When the LiTROS M-RX (G7 series) is integrated into the LiTROS Combifin, all glass is dynamically fixed at the rear during processing using special vacuum belts. This means that even in the standard version (without waterjet), all cut-outs can be milled and ground or polished with diamond tools. With the optional waterjet head, the processing options are even faster and more flexible.



- Fast cycle time
- Easy grinding of cut-outs thanks to the vacuum belts
- Gentle glass transport and easy loading and unloading thanks to vertical processing
- Processing of rectangles and special shapes

Design variant

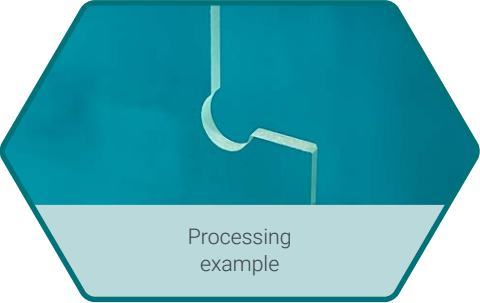
- Grinding and polishing of outer edges with the GLX
- Drilling, countersinking and routing with the M-RX, with or without water jet technology
- Optional and expandable with washing machine at any time



Perfect and dynamic fixing during processing



With WATER JET TECHNOLOGY on request



Processing example



Also available in combination with SSP-A sorting buffer



Highlights of the LiTROS Topdrill M-RX G7

The LiTROS MRX is a well-known system for the most flexible drilling, countersinking and milling operations. The G7 series has been consistently further developed in essential details but continues to shine with unbeatable variability and extreme performant double-sided operation.



Turret drilling head with tool preselection:

The highly dynamic turret heads change the tool during the opposite machining and also during the positioning.

The intelligent tool management even recognizes whether milling and grinding tools are only equipped at the front or only at the rear and optimises or changes according to the processing progress. Auxiliary drilling is also carried out without operator intervention.



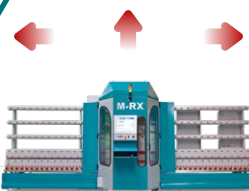
Dynamic vacuum belts with special shape recognition:

This highly flexible fastening system is still unmatched in terms of speed and variability. The 3-sided sealing of the vacuum chambers and, on request, the version with particularly low-wear metal guides. By separating the machine into right and left parts, you can load the next glass sheet while the previous one is still being transported out.



Super-compact design allows space-saving assembly:

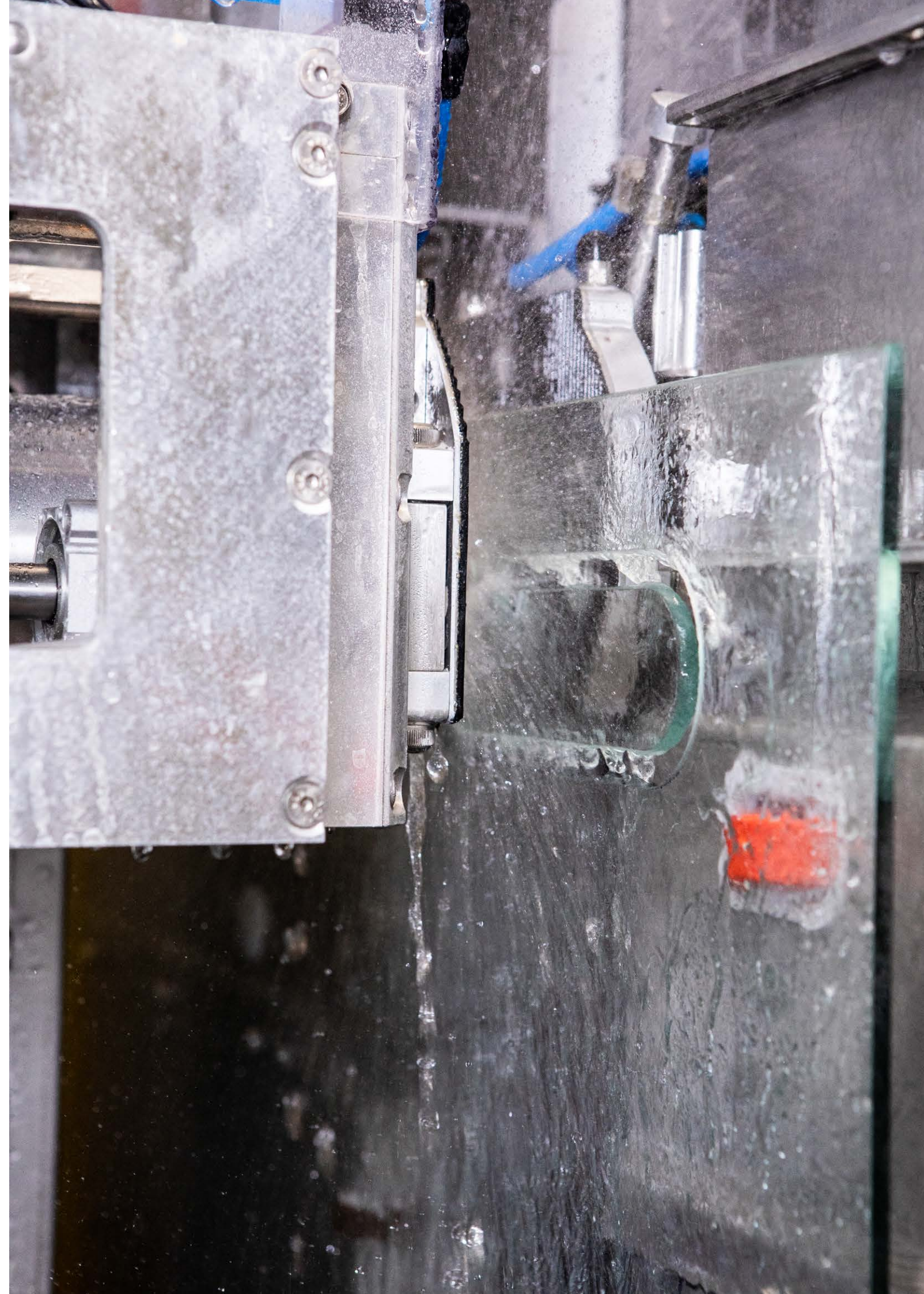
The multiply optimised compact design allows it to be used even in confined spaces. If necessary, the machine can be placed directly on the wall, the system components are integrated and the maintenance access is at the side. Of course, the MRX is also lubricated automatically, the accessibility is exemplary and the maintenance intervals are calculated automatically.



Flexible in all directions:

Forget the annoying measuring and sharpening of your drilling tools. The Topdrill performs the work automatically and always as required.

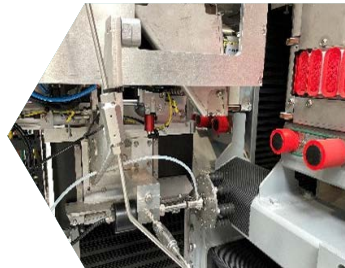
The tools are sharpened and dressed cyclically and automatically - or at the operator's request.



Highlights of our water jet system

The optionally available waterjet system on the LiTROS M-RX and also on the LiTROS Topdrill G8 series differs significantly from conventional and familiar solutions.

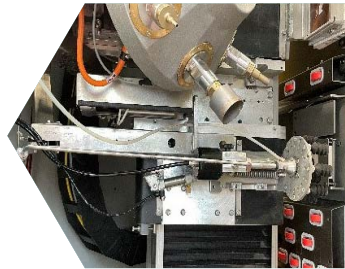
The complete integration into the processing head and the system-related advantages of our vertical solution offer massive benefits in terms of easy maintenance and cost efficiency.



Water jet head directly below the processing head

The interaction and task sharing between the processing head and the water jet system is seamless and practically without cycle time loss.

All openings in the surface are made fully automatically using diamond drills, so there is NO rebound of abrasive material during drilling!



Cycle time optimisation in the machine's running direction

Thanks to the constant availability of diamond tools (front and rear without restriction) and the water jet head, drill holes, countersinks and complex cut-outs are automatically optimised along the throughput direction of your machine.



Fully automatic, parameter-controlled waterjet cutting

Our aim is to make the system as user-friendly as possible. All parameter and feed data are calculated and set fully automatically depending on the glass thickness and radius. With our quality system, you can also respond to your customers' special requirements.



No cutting sand (abrasive material) in the machine

Thanks to the patented and moving jet shredder at the rear of the water jet head, 100% of the abrasive material is captured and transported away.

At no time does the abrasive material enter the machine room, so no guides or other complex systems of the machine are damaged.



State-of-the-art pump technology without hydraulic systems

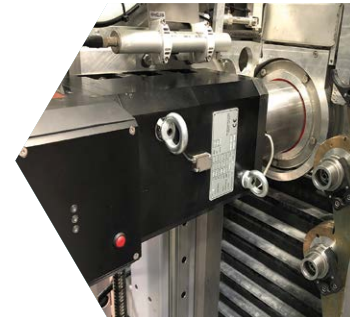
We use modern and economical high-pressure systems with outstanding operational advantages.

A directly driven motor controlled by a frequency inverter only requires power when cutting. The absence of hydraulic components saves many maintenance intervals and the pump works practically without pulsation.



Highlights of the LiTROS GLX

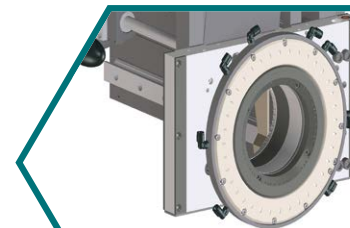
Grinding and polishing outer edges is a central and very important work step in glass processing. We decided to optimise this process in a separate machine and not to attempt it together with the drilling and milling process. The result is optimal, the LiTROS GLX offers many advantages in besides the much faster cycle time. In addition to the grinding of special shapes, the fully automatic and fast seaming of glass in case of rectangles is now possible - with rectangles even by self-measurement.



Comprehensive water splash protection:

Sufficient cooling of the tools is important for the quality of the edge and for the feed rate. The amount of water is encapsulated and drained off on the GLX directly in the area of the grinding wheels.

All important drive and control components are located outside in the dry area. This is an unbeatable advantage in terms of maintenance and longevity.



Water cushion for surface tracking:

The LiSEC water cushion for perfect tracking of the grinding and polishing wheels along the glass surface is installed as standard on the GLX.

Unmatched precision and quality - necessary for a perfect result and unique in this machine category. Can be used for special shapes.



Equipment for small glass processing as standard:

The practical use of the GLX is unbeatable. In addition to processing special shapes with a straight edge, small glasses and, if desired, thin glasses can also be ground and polished.

With the optional 12-fold tool change, even changing the glass thickness within the production flow is no problem. The minimum dimension in case of stand-alone installation is just 470x180mm.



Unmatched ease of maintenance access:

In addition to the compact footprint, a particular focus of development was the very simple operation and uncomplicated maintenance in your day-to-day business. The system therefore supports the operator with predictive and interval-controlled maintenance messages, but mechanical access is also optimised and very easy to do. The production flow is no problem. The minimum dimension in case of stand-alone installation is just 470x180mm.

LiTROS Combifin – the perfect choice for your task

The LiTROS Combifin concept is basically available in two versions, which are visually and technically very similar. The main difference lies in the internal processing machines and the type of glass transport.

Variant A: LiTROS GLX + Topdrill RX G8 + Topclear



Glass transport with belts as supporting surface

Advantages of the conveyor belt

- Very fast and uncomplicated
- Automatic accumulation distance function
- Very low-maintenance

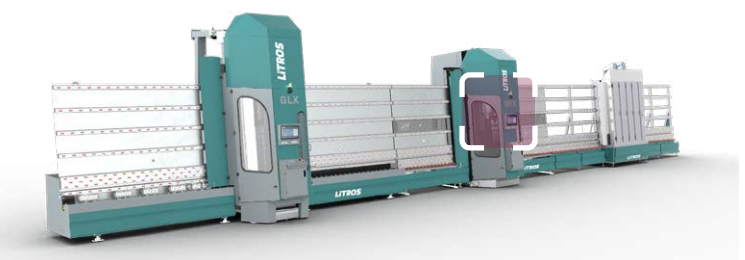
Advantages of the LiTROS RX G8 (with water jet option)

- Tool change already during opposite machining
- Magnetic holder for quick tool change

Possible processing with the LiTROS RX G8

- Drilling and countersinking as well as deep countersinking in extreme cycle times, own multiple VSG mode
- All edge and internal cut-outs with the waterjet head option, no absolute size limit
- Seaming of waterjet cuts (depending on the radius or with restrictions)

Variant B: LiTROS GLX + M-RX G7 + Topclear



Glass transport with dynamic vacuum belts at the back of the machine

Advantages of the vacuum belt

- Very compact machine design
- Extremely high holding force during ongoing movement
- Dynamic fixing for drill holes or moulds

Advantages of the LiTROS M-RX G7 (with water jet option)

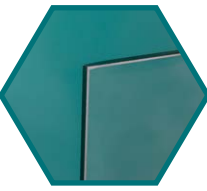
- Grinding and polishing of cut-outs with diamond tools even without a water jet
- Even faster and more flexible with waterjet

Possible processing with the LiTROS M-RX G7

- Drilling and countersinking as well as deep countersinking on one or both sides, dedicated multiple VSG mode
- All edge and interior cut-outs, milled, ground and polished (even in the standard version)
- Edge and internal cut-outs with greater flexibility and speed with the waterjet head option

LiTROS Combifin

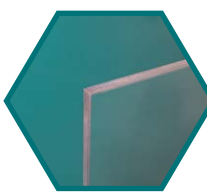
Offers all glass processing options - fully automatically



Edge arrising

GLX

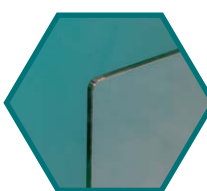
- With self-measurement option also possible in fully automatic mode (for rectangles, without data input)



Edge grinding

GLX

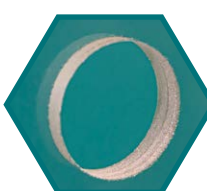
- Special shapes with a straight installation edge are also possible
- Round or bevelled corners up to 15 mm without loss of cycle time



Edge polishing

GLX

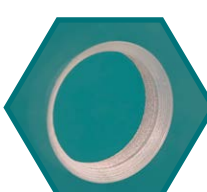
- Special shapes with a straight installation edge are also possible
- Round or bevelled corners up to 15 mm without loss of cycle time
- Quality system optional



Hole drilling

M-RX G7
NC G8
RX G8

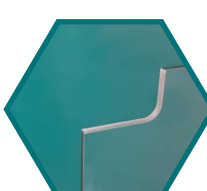
- Maximum drilling diameter 80 mm
- Separate LSG mode for multiple LSG or for multiple foils



Hole countersinking

M-RX G7
RX G8

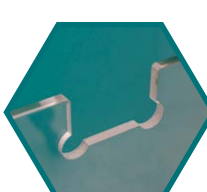
- Countersinking up to 1 mm depth also fully automatic with combi countersink
- Countersinks with automatic torque control



Cut-out ground

M-RX G7
RX G8 WJ

- Cut-out size theoretically not limited by the use of fixing tabs (automatic process for diamond or waterjet machining)



Water jet cut*

M-RX G7
NC G8
RX G8

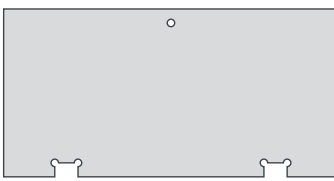
- Waterjet cutting without post-processing on the NC G8 or on the RX G8
- Waterjet cut with additional trapezoidal cut on the M-RX G7

*Cycle times for examples shown with simultaneous use of GLX and MRX, times include infeed and outfeed but do not include waterjet option | Subject to change

Cycle times in the top league

In practise, our system of separate processing heads brings numerous advantages. The only disadvantage is the slightly longer line length compared to all-in-one machines. The example of the cycle time in particular shows that the Combifin represents a major economic advantage for your business. We have tried to compare and illustrate different processing options:

Shower door



Sheet	Dimensions	Internal processing
1	Glass size: 1800 x 750mm Glass thickness: 10mm Glass type: Float	2 x Mickey Mouse: 74 x 45mm 1 x drilled hole ø 20mm

Machine	GLX	M-RX G7 / RX G8	M-RX
Quality	Polished edge	Rapid processing	Ground / countersunk
Cycle time	248 sec	133 sec	172 sec

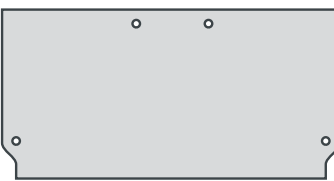
Parallelogram



Sheet	Dimensions	Internal processing
8	Glass size: 1400 x 700mm Glass thickness: 6mm Glass type: Float	/

Machine	GLX	M-RX G7 / RX G8	M-RX
Quality	Polished edge	Rapid processing	Ground / countersunk
Cycle time	194 sec	/	/

Swing door



Sheet	Dimensions	Internal processing
2	Glass size: 2000 x 850mm Glass thickness: 10mm Glass type: Float	2 x PT: 161 x 37mm & 2 x ø 20mm

Machine	GLX	M-RX G7 / RX G8	M-RX
Quality	Polished edge	Rapid processing	Ground / countersunk
Cycle time	273 sec	230 sec	326 sec

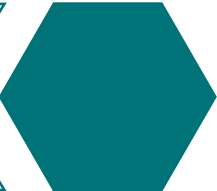


Overview washing machines

LiTROS 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°
Increased 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	○	○	○
Stainless steel basic frame, machine body and water tank	✓	✓	✓
Doors front- and rear side, guards in polycarbonate	✗	✓	✓
Plastic spraying tubes for brushes and rinsing section	✓	✗	✗
Stainless steel spraying tubes for brushes and rinsing section	✗	✓	✓
Stainless steel glass support frame for drying section	✗	✓	✓
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	○	○	○
Two-stage speed infeed for optimum cycle time	○	○	○

✓ Standard, ○ Optional , ✗ Not Available



LiTROS Topclear

Vertical flat glass washing machines for all requirements

The glass washing machines of the Topclear series are grounded in 20 years of experience from over 600 installations. The LiTROS Topclear is the result of constant optimisation and adaption to customer requirements. LiTROS Topclear washing machines are currently available in 3 different models, which can be expanded with a variety of useful equipment options to create the best solution for your requirements.

Advantages included in the standard:

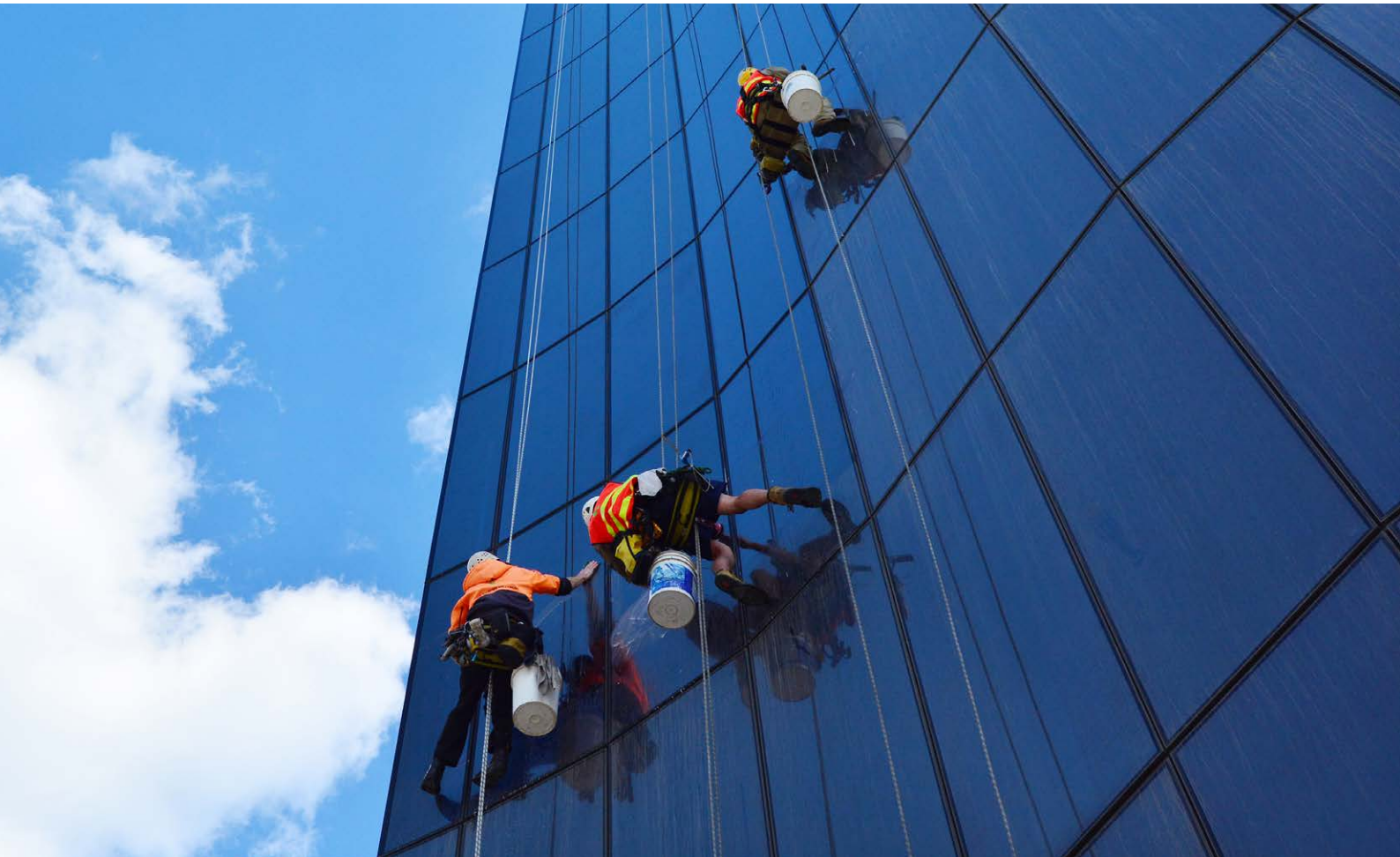
- Stainless design of base frame and machine body as well as all built-in components in the washing zone
- Narrow roller spacing inside and outside the machine for safe, problem free processing of short glasses
- Sound absorption box for fan perfectly insulates against operational noise
- Clear, easy 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

The Topclear washing machines can be equipped with additional inlet and outlet modules which can be adapted to individual working height and equipment requirements.

Combination with other devices

The Topclear series is ideal for combination with other machines: Both vertical grinding and drilling solutions as well as feeding systems, film applicators or tilting tables – even from third party manufacturers – can be easily connected.





LiTROS Topclear Super

Professional series for thick-glass processing up to 20 mm

LiTROS Topclear Super is our extremely robust series for higher glass thicknesses. Glass with up to 20 mm thickness can be processed without further adjustment.



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		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



Highlights

- 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
- Two-stage speed infeed for optimum cycle time

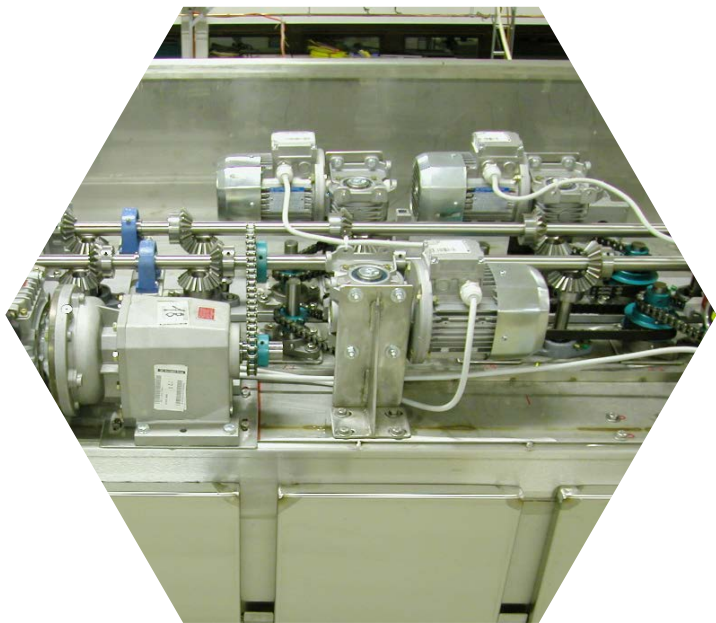


Optimised water management

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

Well thought-out drive concept

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





Intended use



LiTROS Topdrill machines are optimised for the extremely quick, simple and straightforward drilling and countersinking of individual glass lites sheets. With the water jet cutting option, edge and surface cut-outs of any shape can also be cut.

Tools

We recommend the INNODIA diamond tools

- Perfectly suited for vertical glass processing
- Drills and countersinks are slotted as standard
- Enhanced diamond quantity - fast feed
- Tools pre-ground, ready for immediate use
- Reasonable price and quickly available from stock





LiTROS Combifin - ready for the future

A specific advantage of the modular and scalable LiTROS Combifin systems is that they can be adapted to the respective production process at any time, even retrospectively. You therefore have absolute investment security, even if you only start with one or a few pieces of the system puzzle.

In principle, our processing line consists of a processing machine and a washing machine, with the GLX grinding and polishing machine being the logical and typical addition.

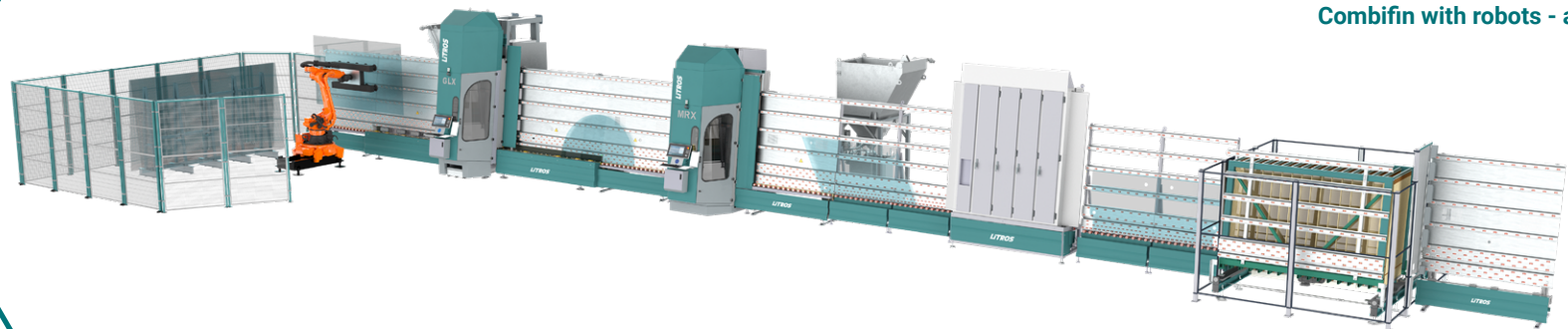
Our SSP-A sorting storage system is available for increased ease of use or for fully automatic and unmanned production over a certain period of time. The SSP-A is available in two sizes and can dynamically buffer the jars on 30 compartments.

The integration of the SSP-A into the downstream processing machine is already planned and provided for. The glass is sorted automatically, but can still be changed by the operator if required.

Depending on the space available, the glasses can be loaded or unloaded into the SSP-A via a separate loading station; if there are space problems, operation is also possible via the infeed of the processing machine.

It is not even necessary to use a whole processing line to have the advantage of unmanned production with SSP-A or robots. Even with a single processing machine, probably in combination with a washing machine, you can integrate the SSP-A at any time.

With our production systems, you are already taking a big step into the future!



Combifin with robots - anything is possible

Instead of the SSP-A sorting and storage buffer, the Combifin can also be loaded and unloaded by robot. This variant enables even greater flexibility and can be combined with carousel or loading systems for uninterrupted production. Robot systems are available in various weight classes and can of course also be combined with upstream or downstream production cells.

LiTROS Combifin - your step into a green future

The design of our machine meets the most modern standards in terms of cost effectiveness and resource conservation. All drives are tested and optimised for maximum efficiency, and precise metering ensures that water and compressed air supplies are as economical as possible.

Compared to previous systems, and especially compared to horizontal systems, the vertical and fully integrated processing line is superior in many ways. Here are the advantages in detail:

Vertical instead of horizontal

The vertical transport and processing of glass panes saves between 30 and 50 % of floor space compared to traditional horizontal machines. Furthermore, the operation is safer and more ergonomic, and glass breakage is prevented.

This not only saves valuable space in your company building but also reduces your ecological footprint since a smaller area requires less heating and cooling capacity.

Latest servo drives and frequency converters

We almost exclusively use the latest servo technology with single-cable connections. This is coupled with load-dependent control, which consumes only the minimum amount of electrical energy required. As a side effect, the machine's mechanics are protected as much as possible.

This future-proof solution saves electrical energy and reduces heat waste in the energy recovery systems.

Separate water valves for each circuit

All individual processing steps are supplied with cooling or use water only as needed. Unlike the „shower systems“ of the past, our systems are equipped with targeted water spray nozzles. Each water circuit is individually controlled and only active when actually needed.

Conserving fresh water reduces waste water as well as costs!

Automatic data import and interfaces

The control of our machines is in most cases fully integrated and complies with Industry 4.0 standards. No manual entry of glass dimensions and processing steps is required. Our software recognizes the details of each processing step and creates both the tool list and the entry and exit movements fully automatically.

This saves time and effort for your operator team and effectively prevents incorrect or faulty data entries.

Integrated and simultaneous processing

A special highlight of our Combifin lines is the simultaneous processing of different work steps. While the GLX performs the external processing, the RX or M-RX machine performs the internal processing and any necessary drilling. The drilling sequence is optimised as far as possible so the work steps on the front and back of the machine are coordinated and take place simultaneously.

This means significantly shorter cycle times compared to all-in-one machines.

Maintenance interval display and online evaluations

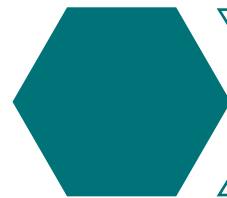
Not only the mechanical processing of your Combifin is optimised. The scope and intervals of maintenance activities on individual machines are also timed and optimised according to actual requirements. In the first year, special online monitoring is included, which gives you and your team insights into the machine operation and allows you to create detailed maintenance plans.

This saves unnecessary downtime and reduces maintenance effort.



Overview scheduled				
	Unit	Total	Interval	Interval in days
[-]		0	0	180
[Pce]		1 212	500	14
[h]		32	500	365
[Pce]		1 725	50 000	730
ile	[-]	0	0	730
control system	[-]	0	0	



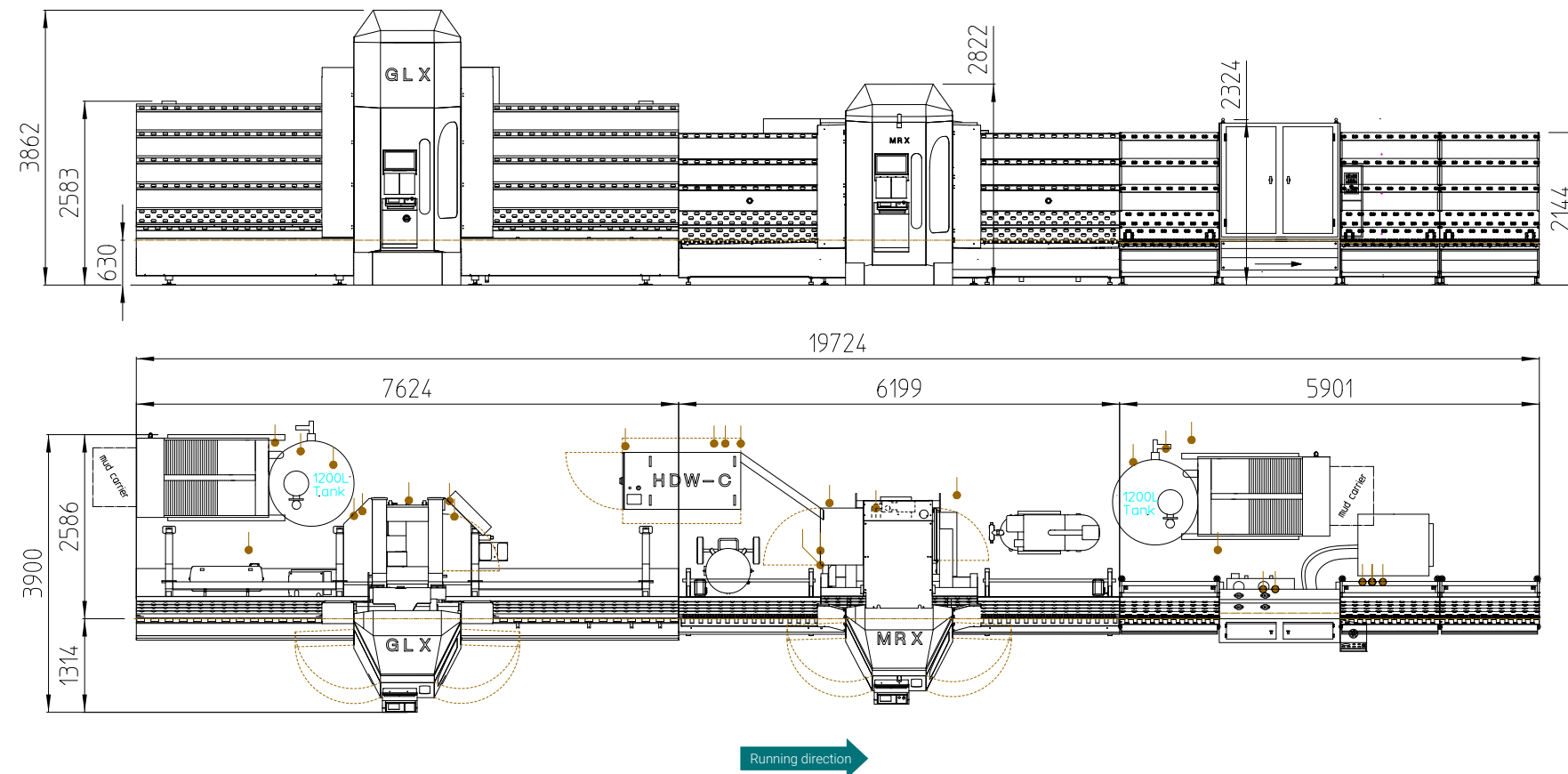


LiTROS Combifin

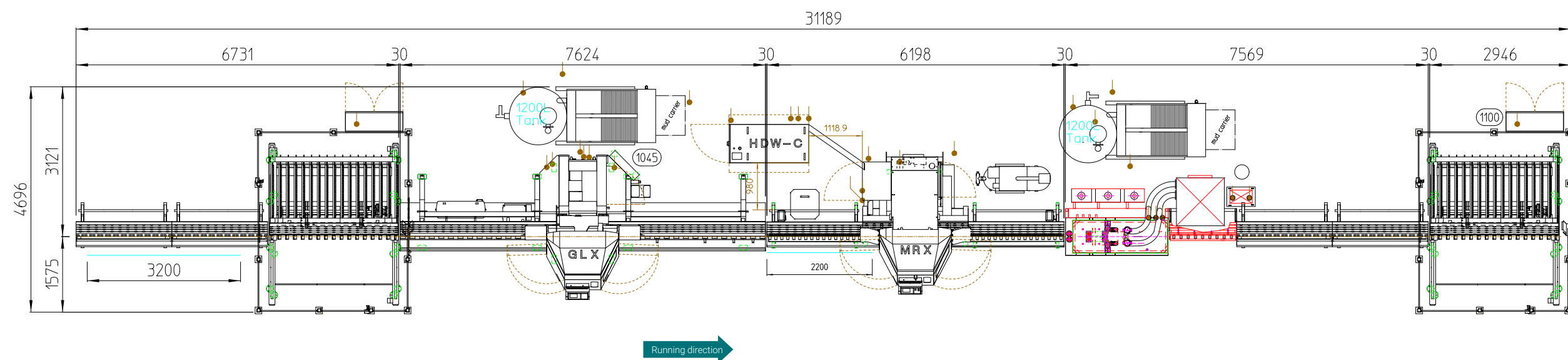
Convenient layout configurations

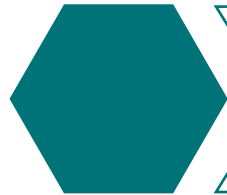


Compact system for manual loading and unloading:



Extended version with M-RX G7 and with SSP-A buffer:





Industry 4.0

Future-ready manufacturing starts here

Industry 4.0

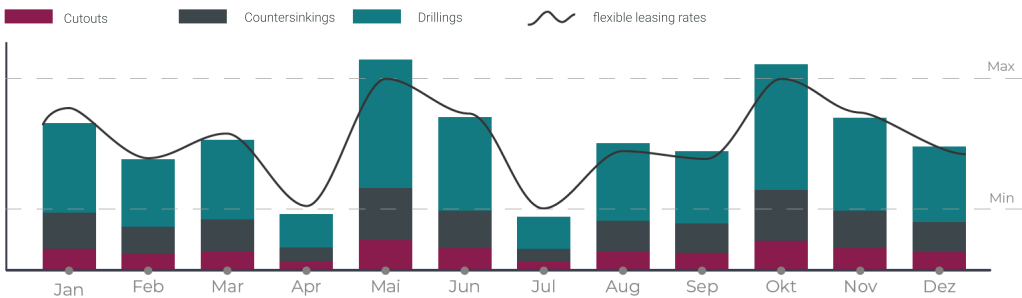
The term Industry 4.0 refers to projects for the comprehensive digitalization and intelligent networking of industrial production.

All LiTROS machines including the Combinfin line (except the standard version of the Topclear washing machine) have been developed and are compatible with principle of Industy 4.0. The machines are largely automatic, dynamically networked, easily understandable and compatible with other machines via interface. Assistance systems are available online on the machines or via remote maintenance.

Any funding or support for Industry 4.0 is achieved and supported.

Pay-per-use:

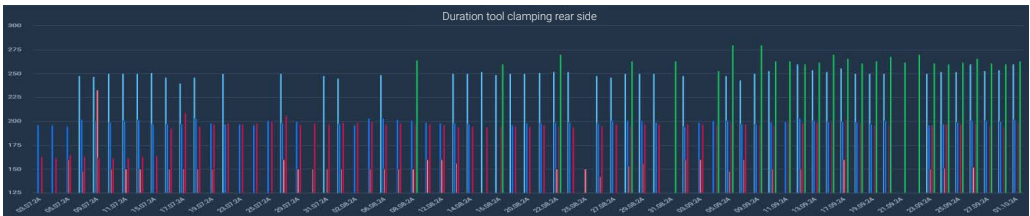
Pay-per-use is a type of billing model in which the rate is calculated dynamically depending on actual usage. Together with our partners, we offer the option of financing the machines over shorter or longer periods of time depending on their actual utilization.



The advantage for you as a customer is that you pay less when utilization is low, but can finance the equipment more quickly when utilization is very high. Known from the pay-per-use models for office machines, there is an agreed minimum usage, but also a maximum amount per agreed usage unit.

Predictive maintenance:

The term predictive maintenance refers to the ongoing monitoring and evaluation of meaningful maintenance components of the system. Maintenance is therefore not carried out at fixed intervals but dynamically and only when necessary, thanks to clever advance calculations and based on empirical values. The result for the customer is the best possible uptime with reduced maintenance costs and downtimes. Depending on your company's IT architecture, our predictive maintenance systems can communicate with the systems via IoT (Internet of Things) or the mobile network.

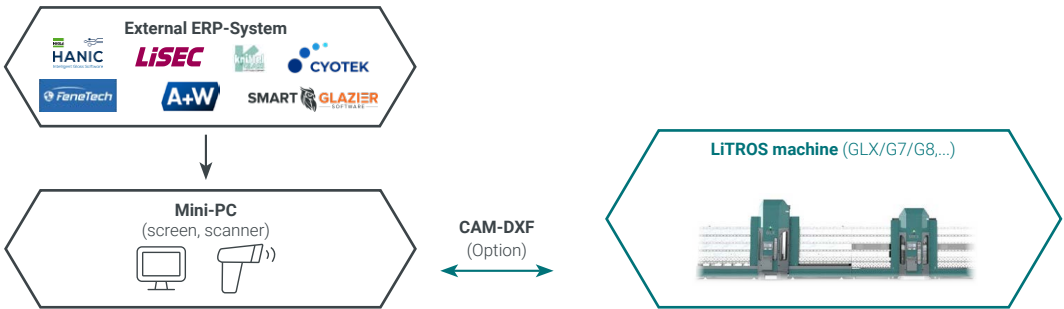


Possibilities for integration into production lines

Option 1 - Remote-Read VISU

Article:

CAM-dxf (P-022738)



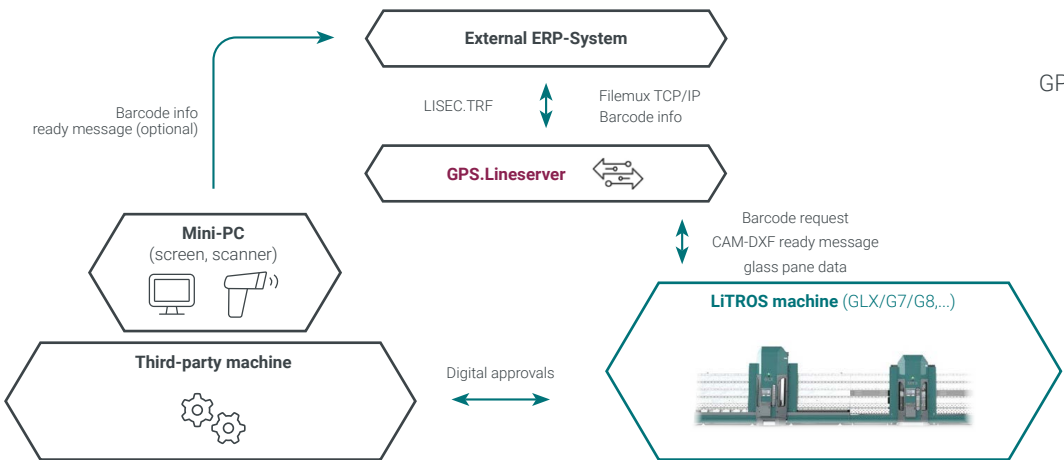
Fast, simple and very stable solution for automatic programming, no direct integration of third-party machines, manual loading and manual scanning. Direct transfer of CAM dxf data (operator loads machine and scans the glass sheet).

Option 2 - LiSEC software and direct communication to a third-party machine

Article:

CAM-dxf (P-022738)

GPS.Lineserver (P-024894)



Automated interface with integrated lineserver (data management between the devices). Only digital approvals required between machine manufacturers. Data exchange is automated (breakage and completion reports are optional)

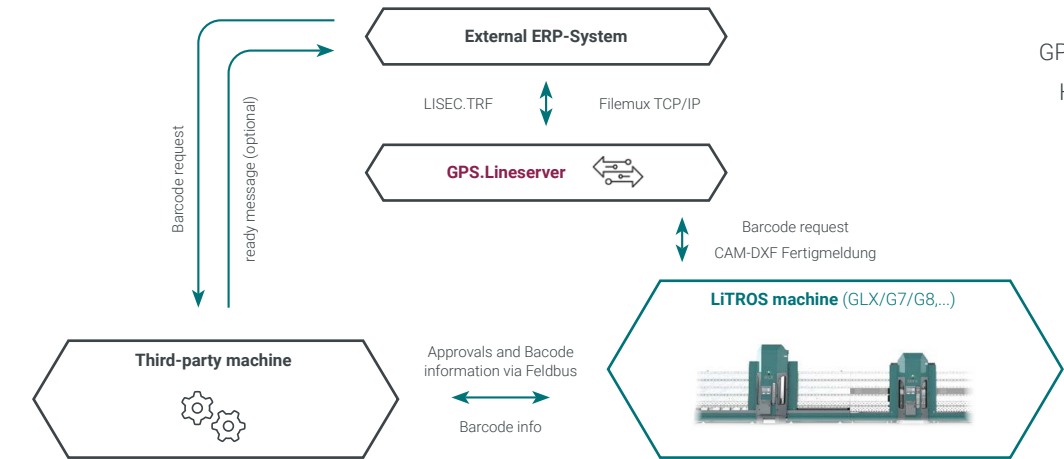
Variant 3 - LiSEC software and third-party machines Integration via ERP system (e.g. A+W ToolTV)

Article:

CAM-dxf (P-022738)

GPS.Lineserver (P-024894)

HW-Interface (P-024761)



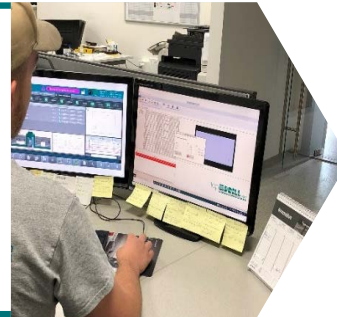
Complete integration of third-party machine and third-party ERP based on the lineserver function. Fully automatic and synchronized sheet transport between the individual devices. Data exchange directly between the external devices and the LiTROS machines via Feldbus (e.g. EtherCat or Profinet)

Options for operating your processing machine

Programming your LiTROS processing machine is simple and flexible. All the detailed programs you require are integrated in a single interface. The concept is modular and open to the outside. Various options are available for importing data or for interfaces with other systems.



Data entry takes place directly on the device or on an office workstation, and it is easy to make subsequent changes.



Programming directly on the machine

All desired machining operations for rectangles and shapes can be entered directly at the machine via user-friendly menu guidance as standard. It is possible to import .dxf drawings if they comply with the specifications.

Programming via dxf import (standard scope of delivery)***:

Our CNC machines are equipped with a convenient import function for dxf files. The typical machining operations are automatically recognized on the basis of adjustable parameters and linked to the necessary process steps. The division of the files for the devices for external and internal machining is also carried out automatically.

CAD program with glass-specific interface

A comprehensive CAD solution is available as an advanced option. The interface and the operating buttons are already prepared for processing, importing and defining processed glass lites sheets and cut-outs. Numerous macros are available for countersunk holes or edge qualities.

The CAD program can be used directly on the machine or in the office on the PC-Link platform.



CAM data interface to external ERP programm

If you are already using an ERP system, you can take full advantage of digitalisation: Control the processing machine via interface and a simple scan of your product label. All the operator has to do is position the glass correctly, the „Scan-and-Go“ functionality takes care of the rest! Our interface is bi-directional, the systems also send status messages back to your system.

LiTROS Processing for Flat Glass



*** Describes the semi-automatic import of drawings in Layer/Color 0/0 by the operator. The function is not identical to the fully automatic CAM data interface!

www.litros.com

LITROS a brand of the LiSEC Group
LiSEC Korea Ltd.
13- 121, 507 Teheran-ro, Gangnam-gu
06169 Seoul
Republic of Korea

+ 827047844003
office@litros.com

Tel
Mail

