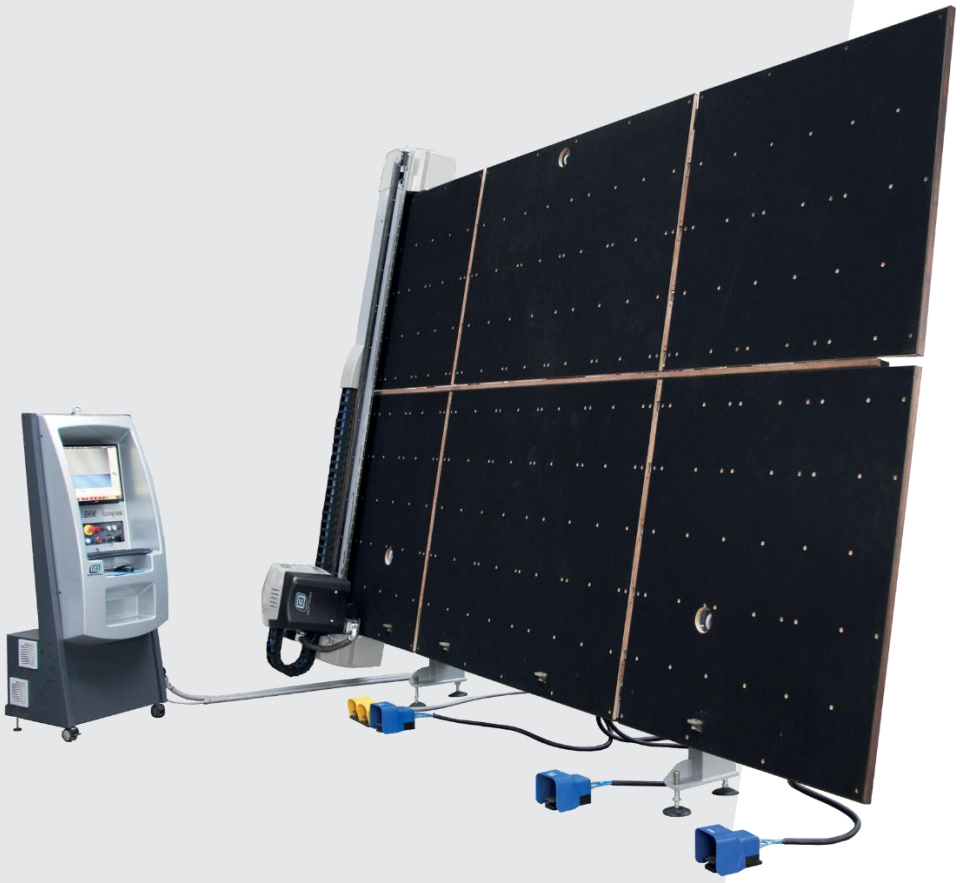
353BKM

Technical specification



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MONOLITHIC GLASS CUTTING

MAIN CHARACTERISTICS OF THE MODEL 353BKM

Loading, cutting, grinding, and break out machine for monolithic glass sheets.

Hard frame made of electro-welded steel tubular pipes ensure a working surface high rigidity.

Tilting or fixed working table.

With optional tilting surface, the work top is controlled by hydraulic cylinders that make it possible to reach the sub-vertical position to simplify the manual loading of the sheet of glass.
If tilting, the machine is equipped with pneumatically activated loading lugs, with “dead centre” cam and a pneumatic solenoid valve with bistable logic.
The lifting system is intrinsically save: in case the supply tubes are damaged, the movement is immediately stopped.

A perfect planarity and a drastic friction reduction that makes all the glass handling operations easier, are ensured by a powerful air cushion made by centrifugal fans fixed under a MDF plan. The plan is composed by synthetic felt covered panels, that are assembled on a pre – machined frame.

Quick shut-off valve insuring the maximum air cushion reactivity.

The working table edges are made of solid wood to enable the glass manual breakout.

Wooden coated breakout bars assembly (option), inserted in the working surface, with pneumatic foot pedal controls located close to the relevant bar.

Cutting bridge made up of steel and placed transversally to the machine fitted with state-of-the-art motoring.

Bridge driven by motor gripping directly on pinion with racks system, with teeth facing downwards to prevent the deposit of impurities in - between.

A guides and transmission system fixed on pre-machined parts warranties a perfect alignment.

Head holder carriage activated by direct drive engine on precision racks and re-circulating ball bearing linear guide, in order to grant the highest possible accuracy.

The following devices can be installed on the carriage:

Cutting head (included in the standard supply):

The cutting head is the third axis (Z-axis) of the cutting machine. The cutting head consists in an aluminium alloy body guiding the stem housing the tools for cutting glass or plastic film; on the head body some devices allowing a safer and better performing machine have been installed.

Cutting head safety devices:

1. Glass detection device.
2. Easily replaceable collapsible cutting head element that prevents mechanical stress on the carriage and the bridge in case of crash.

Moreover:

3. Glass thickness automatic measurement and cutting parameters loading.

Special solenoid valve for lubrication control, allocated close to the cutting wheel, proper for high evaporating oils use.

Easy deletion grinding head (fitting "E"):

The head consists in an aluminium alloy body, which supports the grinding head and allows its movement.
On this assembly some devices allowing a safer and better performing machine have been installed as well.
Devices avoiding the dispersion of dust:

1. Total cover of the working area.
2. LOW-E standard-performance exhauster.

Moreover:

3. Automatic optimization of the grinding wheel approach stroke.
4. Automatic optimization of the grinding path in order to speed-up the machine cycle.

The "Easy deletion grinding head" option can be also retrofitted later

The machine can execute any cutting or grinding diagram. The machine computer will optimize the path of tools in order to reduce the machine cycle time as much as possible.

Glass squaring electronic search.

Possibility of installing mechanical reference devices to position glasses that are not detectable with electronic devices.

Ergonomic and reduced–volume pulpit movable on independent wheels, that allows an easy access to the operator interface and safety commands.

Control panel inclusive of machine calculator (Personal Computer and C.P.U. with remote machine control cards on BUS-Ethercat) power logic with relative controls and safety logic.

The electronic control of all the parameters (pressure, speed and cutting acceleration, quantity of oil on cut, head descent time, beginning of cut head pressure delta, ecc...) is constantly ensured by the machine CNC. In this way we can obtain a constant an high quality glass cutting, which permits a good glass breakout.

Man-machine dialogue simple and intuitive owing to a software interface which takes into account all the glassmaker's requirements *(on WINDOWS operative system)*.

In the data input phase as well as in all machine operative functions the operator is guided step-by-step by the software, which helps him to detect any possible error.

Cutting parameters adjustment directly from keyboard with possibility to memorise parameters linking them to the type of glass making the use of the machine simple and intuitive.

Easy reachable and repositionable electrical cabinet and hydraulic gear case.

Among the standard functions: "Shape Scanner", "ScanCad", On Board optimisation software.

ON BOARD OPTIMISER FEATURES:

- Reduced set of parameters for easy use
- Processing parallel to the cut

  The processing times vary depending on the number of pieces inserted and the use of the machine's CPU (while processing, the CNC prioritises the control of the machine axes).
- Change of the optimised sheets using the BCMS machine interface
- Printing of the sheets optimised using the BCMS machine interface (only with CNC connected to a local or networked printer).

TECHNICAL SUMMARY		Jumbo	Regular
Maximum glass size	mm	6100 x 3355	3810 x 2750
Glass Thickness	mm	2 ÷ 19	
Working table		Synthetic fiber carpet (PES) covered working table, accurate in flatness and free of obstacles to the glass.	
Air cushion device		Air cushion device for the pneumatic support of the glass	
Cutting		Steel cutting bridge, motoring according to the pinion – racks scheme, upturned teeth rack. Light aluminium alloy cutting head carriage activated by direct drive motor on precision racks. Cutting head with glass detection device, automatic lubrication of the cutting wheel, management of cutting pressure.	
Glass squaring		Electronic on both sides Mechanic on both sides (OPTIONAL)	
Fast air cushion closure		Fan-integrated system to quickly decrease the power of the air cushion.	
Operator Interface		Bottero Numeric Control on PC; management of interpolated axes. Learning and use facilitated by drop down menus and soft function keys. Possibility of display personalisation.	
Data Entry		Alphanumerical keyboard in the control panel. Production data on Hard Disk or USB or through office Ethernet connection.	
" Shape Scanner" + "SCAN CAD"		Electronic system for shape detection and adjusting	
Optimiser on board		Bottero genetic optimiser: simplified data processing system for the efficient and automatic arrangement on the sheet of the pieces to be cut	
Shape Catalogue on board		Bottero parametric shape library	
Noise	$L_{eq}(A)$ dB(A) $L_w(A)$ dB(A)	77 ± 2 ***	

SOLUTIONS	FITTINGS	
	Cutting	"E"
1 Tool	X	
2 Tools	X	X

	AXIS HIGHEST PERFORMANCE			
	1 Tool		2 Tools (E)	
	Speed m/min	Acc. m/s^2	Speed m/min	Acc. m/s^2
Cutting Bridge	150	2.5	150 Max 80 during grinding with Easy deletion	2.5 Max 1 during grinding with Easy deletion
			Depending on kind of glass and required quality	
Head holder carriage	150	6	150 Max 80 during grinding with Easy deletion	6 Max 1 during grinding with Easy deletion
			Depending on kind of glass and required quality	

GENERAL PERFORMANCE Cutting head without fittings	Jumbo	Regular
Air cushion power (With optional air Cushion)	240 mm minimum of water column	
Glass thickness sensor	Glass thickness automatic detection device, enables the automatic adjustment of the machine parameters.	

GENERAL PERFORMANCE (Fitting "E")		Jumbo	Regular
Easy Deletion LOW-E coating removal	Grinding wheel rotation speed rpm	30.000	
	Grinding wheel size	D. 20 mm, h = 10 mm	
	Glass Thickness mm	3 ÷ 25	

CUTTING PRECISIONS		Jumbo	Regular
Cutting precision (on processed glass) on straight cutting (Length ≤ 1 m)	mm	+/- 0,15	
Maximum length difference between two diagonals (Area rectangle ≤ 2 m^2)	mm	1	
Maximum length difference between two diagonals (Area rectangle > 2 m^2)	mm	2	
Straightness tolerance (cut) (Length ≤ 1 m)	mm	0,5	

All tolerances are intended as measured on glass with 2 mm thickness with its 4 sides cutted automatically by the machine.

SAFETY FEATURES	Jumbo	Regular
Perimetral photocell barriers (Where foreseen)	2 rays integrated system in order to guarantee maximum protection to the operator during the motion of the cutting bridge	
Hydraulic tilting (With optional tilting surface)	Flexible pipes protected by cut-prevention steel plait. Safety valves (parachute) on the cylinder breeches (automatic cylinder block in case of pressure loss)	
Electromechanical safety	Hardware security systems through special safety modules.	
Moving parts management	Block with electro-mechanical hardware breaking (with guaranteed maximum machine opening)	
Gestione Parti In Movimento	Blocco con frenatura hardware elettromeccanica (con finecorsa meccanico ad apertura garantita).	
Glass detection device	Safety device that prevents the cutting head from hanging the glass	
Mechanical fuse on the cutting head	Terminal part of the cutting head with piloted breakage	
Supporting wheels of the cutting head on glass	Supporting wheels of the cutting head to avoid hooking the glass sheet	

INSTALLATION AND CONDITIONS OF USE		Jumbo	Regular
Overall dimensions	mm	See layout	
Weight max (Complete configuration)	kg	2250	1760
Work surface height	mm	930 +/- 40	
Installed Power	KVA	12.50	10.25
Additional power (With Tilting motion assembly)	KVA	2.75	
Additional power (With fitting “E”)	KVA	1	
Air consumption (max)	NL/min	70 500 (With Easy deletion fitting)	
Air characteristic		Compressed Air: pressure of use 7 bar – MAX 10 bar Filtering : 5 micron Lubrication: without lubrication Dew point : <-5°C (room temperature)	
Power supply		Voltage: 400 V (+/- 10%) 3Ph + PE (TN system) Frequency 50 Hz o 60 Hz	
Stocking, temperature and moisture	°C	From - 5° to + 55°, Reference pressure 1 Bar 90% of relative moisture at 20° (w/o condensation) 50% of relative moisture at 40° (w/o condensation)	
Use: Temperature, Humidity and Altitude	°C	From + 5° to + 40°, Reference pressure 1 Bar 90% of relative moisture at 20° (w/o condensation) 50% of relative moisture at 40° (w/o condensation) Maximum altitude 1000 m (above sea level)	

AVAILABLE OPTIONS	Jumbo	Regular
MDE167 Gruppo Basculamento	Unit made up of two hydraulic cylinders that make it possible for the work top to reach the sub-vertical position, to simplify the manual loading of the sheet of glass.	
	Maximum tilting weight (Down / Up)	
	1260 / 1000 (kg)	660 / 660 (kg)
MDA150 Loading Lugs (Standard supply with optional tilting surface)	Pneumatically activated lugs for loading sheets of glass, with "dead centre" cam and a pneumatic solenoid valve with bistable logic (without consent the valve does not move)	
MDE153 Lateral manual reference Lugs	Single reference lug for manually squaring the sheet of glass	
	Quantity on demand Max 5	Quantity on demand Max 4
MDE184 Frontal reference Lugs	Single lug for manually squaring the sheet of glass (Quantity on demand).	
MDA104 Glass Pushing Device	Pair of pneumatic cylinders that ease the glass loading with the aid of one glass grab. (Only with tilting surface option)	
MDA137-MDB137 Breakout-bars	2 + 1	1 + 1
	Pneumatic pedal-controlled breakout bars.	
MDA138-MDB138 Additional "X" breakout-bars	1	
	Pneumatic pedal-controlled cross breakout bar.	
	Pneumatic pedal-controlled longitudinal breakout bar.	
MDA108 Double control for break out bar	Second pneumatic control of breakout bar via comfortable pedal on the ground.	
MDA114 Plastic cut	Incision system of the plastic layer placed on the glass before the sanding.	
MDA129 Double Tank Kit (Standard supply with "E" fitting)	Second oil tank with selection from operator terminal.	
D00001 Natural Wool Felt	Coverage of the work surface with natural wool felt	

AVAILABLE OPTIONS	Jumbo	Regular
MDA107 Glass transport lugs mm	Llugs for glass (max 19mm) transport on air cushion Plate max size	
	5940 x 3355 x 19	3650 x 2750 x 19
MDA155 Vacuum cups for glass transport	Vacuum cups for glass transport on air cushion twinned to Bottero loading machine Plate min size	
	300 x 1700 x 3	300 x 1500 x 3
MDA128 12-metre Long Sheaths	Machine-Control panel connection with 12.000 mm long sheaths instead of standard 7.000 mm long sheaths	
MDE159 Rollers module for machine coupling	Rollers module W=380mm for machine coupling (TC300).	
MDE160 Air cushion module for machine coupling	Air cushion module W=380mm for machine coupling	
	TC201	TC200
MDA133 Conditioner	Air conditioner for Electric al Cabinet, for installation in difficult environments.	
MDE130 Opty-Win CAD/M: high quality on-board optimisation	Fully developed optimisation software allowing to set specific optimisation parameter, equipped with the most complete Shape Catalogue existing today on the market and with a new generation CAD.	
ATR109 Residual current device for compatibility with TT power systems	Main switch with residual current device for compatibility with TT power systems	
ATR107 Power supply unit	Adapter for power supply voltage different than 380-400-415V	
MDA157 Special glass or other materials reader device	Special glass or other materials reader device (ex.: Opaque materials/traslucent such as frosted glass, ceramic glass, etc...)	
MDA153 Wood kit	Kit for covering the slots created by the absence of breakout bars	

Materials such as: cutting wheels (tools) _ grinding wheels to remove low emissivity (low-e coating) _ glass loading pads _ glass squaring pads, glass reference pads, membrane of the cutting head _ working surface covering (PES) _ proportional valves - etc... are not covered by warranty.

PROJECT AND PRODUCTION STANDARDS	Standards Adopted
The machine is designed, built and installed in consideration of the safety standards in force. Importance is placed upon the following aspects: Easy use. Workstation ergonomics. Easy access to organs requiring maintenance. Reliability of the machine and its components. Reduced noise levels. Power savings.	The following versions are available: Arrangement in compliance with the European Standard and CE mark Directive 2006/42/CE Directive 2014/30/CE IEC EN 60204-1 EN ISO 12100 The machine is not compliant to UL/CSA Mark

BOTTERO S.p.A.
Via Genova 82
12100 Cuneo Italy
Tel.: +39 0171 310611
Fax: +39 0171 401611
www.bottero.com