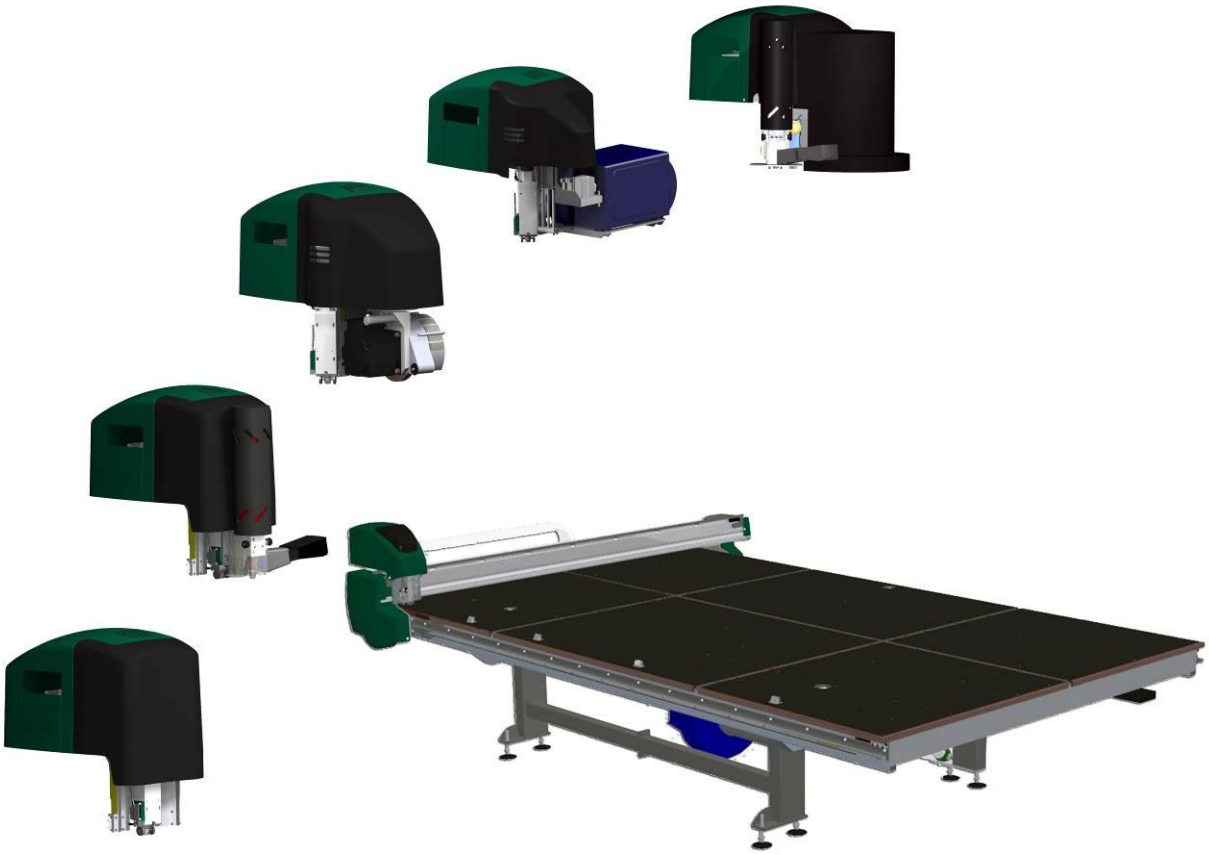
353 BCS

Numeric control cutting, grinding and marking machine for flat glass



MAIN CHARACTERISTICS OF THE MODELS 353BCS

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

Hard frame made of electro-welded steel tubolar 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 of (Z-axis) of the cutting machine. The 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.

HP grinding head (fitting "**L**"):

The high-performance grinding head is the fourth axis (C-axis) of the cutting machine. The head consists in an aluminium alloy body, bearing the grinding assembly and driving it by interpolating the C-axis with X and Y axes. On this assembly some devices allowing a safer and better performing machine have been installed as well.

Devices avoiding the dispersion of dust:

1. Protective guards with automatic fitting according to the grinding wheel diameter.
2. LOW-E standard-performance exhauster.

Moreover:

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

The "HP grinding head" fitting can be also retrofitted later

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

Labelling head (fitting"**P**"):

The head for labelling the glass pieces is an essential tool for the glass identification. The head consists in a printer and system for the application of the label on the finished glass piece. The label is placed by the machine on the marking field chosen by the customer. On the label field it is possible to insert the data required to identify the finished piece.

The "Labelling head" fitting can be also retrofitted later.

LAM Shape head (fitting "**S**"):

The high-performance LAM Shape head is the fourth axis (C-axis) of the cutting machine. The head consists in an aluminium alloy body. IT bears the concentrator with high performance lamp assembly and drives it by interpolating the C-axis with X and Y axes. Also on this assembly some devices have been applied in order to get a safer and more performing machine.
Device to avoid the flash of the lamp:

1. Total cover of the working area.

Moreover:

2. Automatic optimization of the concentrator.

The "LAM Shape" always includes the "E" Easy Deletion option, limitation concerning LAM SHAPE fitting.

The sheet processing area is according to the customer's request (**BUT SUBJECT TO VERIFICATION BY BOTTERO S.P.A. TECHNICAL OFFICE**).

The "LAM Shape" group is not an fitting which can be installed later on.

NOTE: Only one of the above described devices "**L**", "**E**", "**P**" ed "**S**" can be added along with the cutting head.
The machine can execute any cutting, grinding or labelling 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).

KEY:

Jumbo = 353BCS-J
Regular = 353BCS-R

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)**	77 ± 2	
	L_W(A) dB(A)	***	

SOLUTIONS	FITTINGS				
	Cutting	"L"	"E"	"P"	"S"
1 Tool	X				
2 Tools	X	X			
	X		X		
	X			X	
	X				X

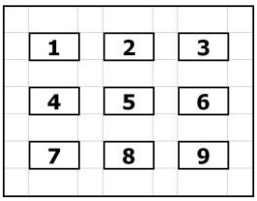
	AXIS HIGHEST PERFORMANCE					
	1 Tool		2 Tools (E)		2 Tools (L, P o S)	
	Speed m/min	Acc. m/s²	Speed. m/min	Acc. m/s²	Speed. m/min	Acc. m/s²
Cutting Bridge	140	3	140 Max 80 during grinding with Easy deletion	3 Max 1 during grinding with Easy deletion	140 **Max 100** during grinding TPF	3
			Depending on kind of glass and required quality		Depending on kind of TPF and required quality	
Head holder carriage	200	6	200 Max 80 during grinding with Easy deletion	6 Max 1 during grinding with Easy deletion	160 **Max 100** during grinding TPF	4,5
			Depending on kind of glass and required quality		Depending on kind of TPF and required quality	

GENERAL PERFORMANCE Cutting head without fittings	Jumbo	Regular
Air cushion power	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 "L")			Jumbo	Regular
HP grinding wheel Low-E	Grinding wheel rotation speed	rpm	2.800	
	Grinding wheel size	mm	D. 200 mm, W = 16 _ 19 (3/4") _ 20 _22,2 mm (7/8") _ 25 mm (1")	
	Glass Thickness	mm	3 ÷ 25	

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	

GENERAL PERFORMANCE (Fitting "S")			Jumbo	Regular
LAM Shape head	Max / min Workable shape	mm	on the customer's request (subject technical office verification)	
	Max / min Workable sheet size	mm		
	Processing shape		Only curvilinear cuts (subject Bottero S.p.A. technical office verification)	
	Glass Thickness	mm	Glass: 3 + 3 ÷ 8 + 8 PVB: 0.38 ÷ 4.56	

GENERAL PERFORMANCE (Fitting "P")			Jumbo	Regular
Label Printing Head	Glass Type		Flat glass. Please check with the supplier the compatibility of the stackers with the surface of labeling application.	
	Label material		As per technical specification and labeling machine operation manual	
	Print resolution	dpi	As per technical specification and labeling machine operation manual	
	Type of printed code		As per technical specification and labeling machine operation manual	
	Labelling area	mm	As per technical specification and labeling machine operation manual	
	Label position		Selectable on the 9 default points 	
	Information contained in the label:		As per technical specification and labeling machine operation manual	
	Glass thickness	mm	3 ÷ 25	

Exclusions

- The label will be placed only on final pieces with dimensions 20 mm per side bigger than the label itself (e.g.: label = 63 x 100 ➔ glass 103 x 140)
- Label application time is not included into the machine cutting and grinding time

CUTTING BRIDGE 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

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	
Work surface height	**mm**	930 +/- 40	
Weight max (Complete configuration)	**kg**	2250	1760
Installed Power	**KVA**	12.50	10.25
Additional power (With Tilting motion assembly)	**KVA**	2.75	
Additional power (With fitting "L")	**KVA**	2.50	
Additional power (With fitting "E")	**KVA**	1	
Additional power (With fitting "P")	**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
Tilting motion assembly		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**)
Loading Lugs (Standard supply with optional tilting assembly)		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).	
Manual Reference Lugs	**Front**	Single lug for manually squaring the sheet of glass (Quantity on demand _ Max 1 + 1).	
	Lateral	Single reference lug for manually squaring the sheet of glass	
		Quantity on demand Max 5	Quantity on demand Max 4
Glass Pushing Device		Pair of pneumatic cylinders that ease the glass loading with the aid of one glass grab. (Only with tilting surface option)	
Breakout-bars		2 + 1	1 + 1
		Pneumatic pedal-controlled breakout bars.	
Additional "X" breakout-bars		1	1
		Pneumatic pedal-controlled cross breakout bar.	
Double control for break out bar		Second pneumatic control for a single breakout bar via pedal on the floor.	
Cutting head approaching device		Cutting head approaching system driven by a pneumatic cylinder.	
Plastic cut		Incision system of the plastic layer placed on the glass before the sanding.	
Processable glass thickness increase **mm**		25	
Double Tank Kit (Standard supply with "L" or "E" fitting)		Second oil tank with selection from operator terminal.	

AVAILABLE OPTIONS	Jumbo	Regular
Glass transport mm	Plate max size	
	5940 x 3355 x 19	3650 x 2750 x 19
	Plate min size	
	300 x 1700 x 3	300 x 1500 x 3
12-metre Long Sheaths	Machine-Control panel connection with 12.000 mm long sheaths instead of standard 7.000 mm long sheaths	
Hydraulic connections	Length: 2 meters longer then standard	
Rollers module for machine coupling	Rollers module W=380mm for machine coupling (TC300).	
Air cushion module for machine coupling	Air cushion module W=380mm for machine coupling	
	TC201	TC200
Conditioner	Air conditioner for Electric al Cabinet, for installation in difficult environments.	
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.	
Residual current device for compatibility with TT power systems	Main switch with residual current device for compatibility with TT power systems	
Power supply unit	Adapter for power supply voltage different than 380-400-415V	
Fan silencer	Fan silencer system	
Glass Unloading Roller	Roller(s) to simplify the unloading of the sheet of glass	

The consumable materials like: 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) _ etc… are not covered by warranty.

For more details and information see the use and maintenance manual (SECTION CONSUMABLE MATERIALS) supplied with the machine.

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**

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