535 AVL^{e} / 535 AVM^{e}

High performances automatic machine

535AVL^{e} _ 535AVM^{e}: MAIN FEATURES

Machine 535 is characterized by its high levels of "MODULARITY" and "AUTOMATION".

The overall machine is managed by a PC equipped with a flat screen, the operator interface.

The operator interface makes it easy to insert the production data and through the "Supervisor" function it displays the machine status and the machine current working cycle.

It is possible to install the Bottero production control software (Job Manager) on every machine.

The customer may also request electronic cards for the connection to the company network or modems for the "remote assistance" service connection.

The module and working table of machine 535 represent the core of Bottero technology in the laminated glass cutting sector.

Among the main characteristics of the Cutting module:

Oversized structural elements of the cutting and detachment bridges and related cutting and breakout carriages guides: electro-welded components for the structural parts and aluminium alloy units for the "dynamic" and precision elements.

Pair of bridges with automatic clamping system for glass sheet cutting and breakout or PVB detachment to obtain a product with a square cut, splinter-free, as per the BOTTERO PATENT.

Use of special clamping material to enable good glass detachment without risking to damage it or the LOW-E layer.

The PVB is separated by means of an infrared electrical resistance. The infrared rays heat the PVB without overheating the glass, thus avoiding the risk of glass breaking in the next cut.

Reference system for diagonal cutting (“Laser projector” device).

Machine 535 has a series of optional accessories, which complete its functionality and application field.

Working table:

Its structure is particularly accurate in terms of planarity, quality of the felt used and air cushion efficiency.

Frontal squaring bridge with retractable lugs. The operator can easily reach the machine working area.

Loading/unloading arms (option), assembled on the working table.

KEY:

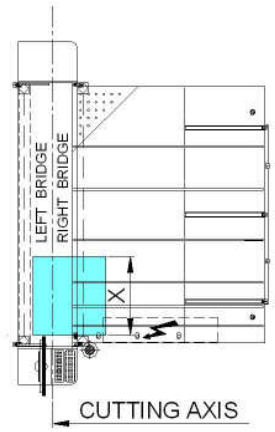
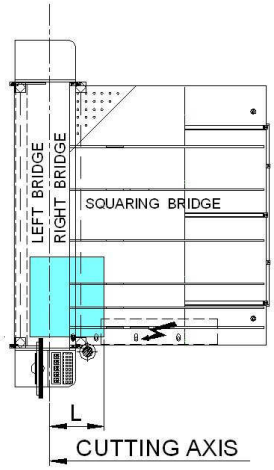
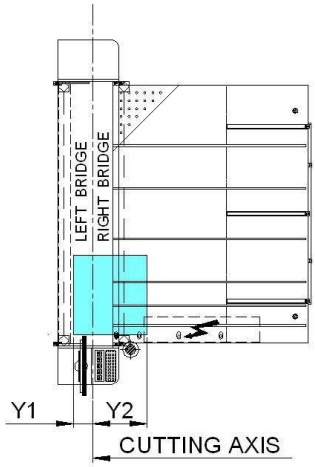
535AVL^{e} _ 535AVM^{e} / 37 = 535AVL^{e} _ 535AVM^{e} Maximum cutting lenght 3700 mm
535AVL^{e} _ 535AVM^{e} / 46 = 535AVL^{e} _ 535AVM^{e} Maximum cutting lenght 4600 mm
535AVL^{e} _ 535AVM^{e} / 61 = 535AVL^{e} _ 535AVM^{e} Maximum cutting lenght 6100 mm

TECHNICAL SUMMARY 1			535AVL^{e}_ 535AVM^{e}/37	535AVL^{e}_ 535AVM^{e}/46	535AVL^{e}_ 535AVM^{e}/61
Maximum cutting length		**mm**	3700	4600	6100
Minimum cutting length		**mm**	150		
Maximum measurement		**mm**	3210		
Minimum measurement		**mm**	125		
Processable glass thickness	Monolithic	**mm**	3 ÷ 8 (MAX cutting = 3300)		
	Laminated	**mm**	Glass	P.V.B. min / Max	
			2+2	0.38 ÷ 0.76	
			3+3	0.38 ÷ 0.76	
			4+4	0.38 ÷ 1.52	
			5+5	0.38 ÷ 2.28	
			6+6	0.76 ÷ 2.28	
			8+8	0.76 ÷ 4.56	
"Blade" device			Device for P.V.B. separation with blade. It improves considerably the cycle time when processing thick glass.		
"Blade" manual cycle		**mm**	3700	4600	6100
Maximum Cutting Carriage Speed		**m/min.**	140		
Maximum grinding speed (With optionalgrinding wheel)		**m/min.**	60		
Loading/unloading maximum glass weight with tilting arms (With optional tilting arms)			450 Kg_h min/max = 700/2400 mm		700 Kg_ h min/max = 700/2400 mm

Cycle time for L = 3210 mm (cut, breakout, detachment)

Time in seconds (at room temperature, equivalent to 18°C)

GLASS	P.V.B.			
	0.38	**0.76**	**1.52**	**4.56**
3+3	25"	32"	41"	- - -
4+4	26"	33"	43"	- - -
5+5	27"	34"	45"	- - -
6+6	28"	35"	47"	- - -
8+8	- - -	- - -	- - -	130"

TECHNICAL SUMMARY 2	535AVL^{e}_535AVM^{e}/37	535AVL^{e}_535AVM^{e}/46	535AVL^{e}_535AVM^{e}/61
	**Maximum cut** **X = 3700 mm** **Minimum cut** **X = 150 mm**	**Maximum cut** **X = 4600 mm** **Minimum cut** **X = 150 mm**	**Maximum cut** **X = 6100 mm** **Minimum cut** **X = 150 mm**
	**Maximum measurement** **L = 3210 mm** **Minimum measurement** **L = 125 mm**		
	**Minimum breakout** **For glass 2+2 to 8+8**		
	Y1 = 90 mm **Y2 = 125 mm**	**Y1 = 90 mm** **Y2 = 125 mm**	**Y1 = 90 mm** **Y2 = 125 mm**
	For glass 10+10		
	Y1 = 150 mm **Y2 = 150 mm**	**Y1 = 150 mm** **Y2 = 150 mm**	**Y1 = 150 mm** **Y2 = 150 mm**
	For glass 12+12		
	Y1 = 250 mm **Y2 = 200 mm**	**Y1 = 250 mm** **Y2 = 200 mm**	**Y1 = 250 mm** **Y2 = 200 mm**
Noise L_{eq}**(A)** **dB(A)** L_W**(A)** **dB(A)**	78 ± 2 102,7	78 ± 2 102,7	78 ± 2 102,7

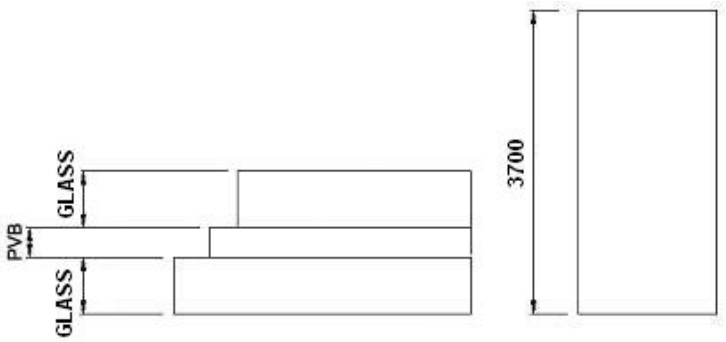
The glass quality, the PVB thickness and the environmental conditions in which the machine operates can strongly influence its performances and the cutting quality.

CUTTING BRIDGE ACCURACY		535AVL^{e}_ 535AVM^{e}/37	535AVL^{e}_ 535AVM^{e}/46	535AVL^{e}_ 535AVM^{e}/61
Squaring bridge positioning	**mm**	+/- 0,5		
Straightness tolerance (Cutting length ≤ 3 m)	**mm**	0,5		
Parallelism	**mm**	1		
Maximum difference in length between two diagonals. (Area rectangle < 2 m^2)	**mm**	2		

All tolerances are to be considered as measured on 3 mm glass.

SAFETY DEVICES	535AVL^{e}_ 535AVM^{e}/37	535AVL^{e}_ 535AVM^{e}/46	535AVL^{e}_ 535AVM^{e}/61
Electromechanical safety	Hardware safety circuits comprising special safety modules with safety switches placed on casing		
Moving Parts management	Block by means of electromechanical hardware brake (with mechanical safety switch)		

INSTALLATION AND CONDITIONS OF USE		535AVL^{e}_ 535AVM^{e}/37	535AVL^{e}_ 535AVM^{e}/46	535AVL^{e}_ 535AVM^{e}/61
Dimensions	**mm**	See layout	See layout	See layout
Working table Height	**mm**	930 +/- 20		
Module weight	**kg**	3000	3300	3950
Panel weight	**kg**	2000	2300	2900
Basic installed power	**KVA**	23	25,2	29,9
(Max) Air Consumption	**NL/Min**	280		
Air characteristic		Filtering : 5 micron Dew point : + 10°C room temperature		
Power supply		- Voltage: 400 V (+/- 10%) 3Ph + PE systems TN - TT Frequency 50 Hz o 60 Hz Or Voltage: 200 V–240 V (+/- 10%) 3Ph + PE systems TN-TT Frequency 50 Hz o 60 Hz Or Voltage: 440 V-600 V (+/- 10%) 3Ph + PE systems TN - TT Frequency 50 Hz o 60 Hz - Compressed Air: Minimum pressure 7 Bar Dew point < 5°		
Stocking: Temperature and moisture		From - 25°to+ 75°, Reference pressure 1 Bar 90% relative humidity at 20°C (without condensation) 50% relative humidity at 40°C (without condensation)		
Use: Temperature and moisture		From + 5°to + 40°, Reference pressure 1 Bar 90% relative humidity at 20°C (without condensation) 50% relative humidity at 40°C (without condensation)		

OPTIONS AVAILABLE	535AVL^{e} _ 535AVM^{e} / 37	535AVL^{e} _ 535AVM^{e} / 46	535AVL^{e} _ 535AVM^{e} / 61
Power supply unit	Power supply unit with transformer for adaptation of mains voltage		
Tilting Arms	Tilting arms to load and unload the sheets of glass		
Telescopic arms	Telescopic arms with pivotting wheels as glass support placed on the cutting, breaking and separating module		
Additional Structure (TC001)	Table with pivotting wheels for glass sheet support		---
Additional Structure (TC002)	---	Table with pivotting wheels for glass sheet support	
Additional Bar (TC101)	---	Additional bar with pivotting wheels for connection with not Bottero machine	
Additional Bar (TC103)	Additional bar with pivotting wheels for connection with not Bottero machine	---	---
"Considerable thickness" equipment	Equipment for 10+10 and 12+12 glass breakout PVB 0.76 ÷ 2.28		
Automatic PVB cutting with blade	Fully automatic cutting with blade cycle suggested for a max length of 3700 mm for the standard thicknesses (see chart Processable glass thickness) 		
Perimetral cover	Machine frame perimetral additional cover		
Double Tank Kit (Standard on 535AVM^{e})	Second oil tank with selection from operator terminal.		

OPTIONS AVAILABLE	535AVL^{e} _ 535AVM^{e} / 37	535AVL^{e} _ 535AVM^{e} / 46	535AVL^{e} _ 535AVM^{e} / 61
Additional P.C. on Panel	Additional P.C. for network connection		
Conditioner	Air conditioner for Electric al Cabinet, for installation in difficult environments.		
Fan silencer	Fan silencer system		
Glass Unloading Roller	Roller(s) to simplify the unloading of the sheet of glass		
"GRINDING WHEEL" device (Standard on 535AVM^{e}/xx) (refittable su AVL^{e})	Unit for LOW-E coating removal. Grinding width: 16 _ 19 _ 20 _ 22.2 mm = (7/8") Maximum grinding speed: 60 m/min Max thickness for grinding: 12 + 12 + 2.28		
Manual Rotator	---	---	Device for Manual rotation, placed on 101BLC table

MODULES FOR GLASS HANDLING.

Group of elements for laminated glass handling processes.

The machine 101BLC task is to take the glass towards the cutting module.

In case a 101BLC –Regular is part of the line, the processes described can be performed on Regular glass sheets only.

In case a 101BLC –Jumbo is part of the line, the processes described can be performed both on Regular and Jumbo glass sheets.

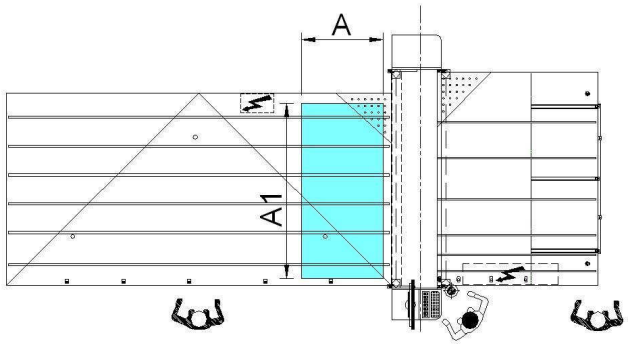
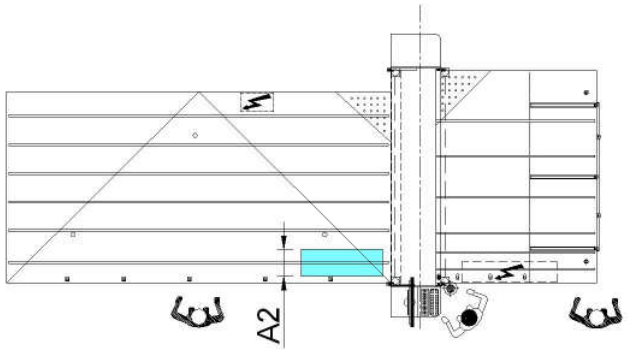
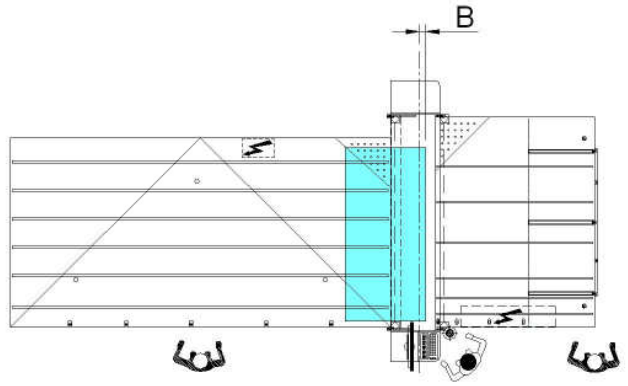
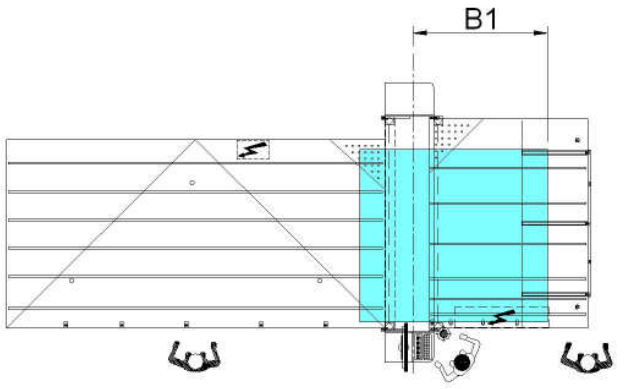
The function of the **MODULES FOR THE HANDLING** (AVL/AVM) is to enable the following working cycle:

- Loading of the sheet on the 101BLC (manual or by means of automatic loader)
- Automatic transport of the sheet from the 101BLC to the cutting machine, only for sheets A $\geq$ 1500 mm.
- Detection of the type of glass and consequent automatic setting of the machine.
- Automatic positioning of the sheet approximately 30 mm from the squaring bridge lugs, which were previously high, only for sheets A $\geq$ 1500 mm.
- Positioning of the sheet for the X cross cut by means of the squaring bridge which pushes the sheet on to the 101BLC.
- Once the sheet is positioned the cutting, breakout and detachment cycle begins.
- Once the X cross cut has been detached the sheet has to be handled manually by operator.
- Traverse rotation carried out manually by the operator.
- Carring on of the machine cycles by operator control.

The automatic working cycle is possible under the conditions of use specified in the chart following.

For glasses with external dimensions within the limits listed in the below “TECHNICAL DATA-SHEET 3” or with glass thickness higher than 6+6+2.28 up to 8+8+4.56, the handling and cutting, break out and separation cycle are with manual command from the operator’s console, which allow a correct positioning of glass, which is squared on the bridge.

For glass with external dimensions within the limits listed in the below “TECHNICAL DATA-SHEET 3” or with glass thicknesses higher than 8+8+4.56 up to 12+12+2.28 the glass sheet is handled manually on air cushion and it is squared on the bridge.

TECHNICAL SUMMARY 3	535AVL^{e}_ 535AVM^{e}/37	535AVL^{e}_ 535AVM^{e}/46	535AVL^{e}_ 535AVM^{e}/61
	**Minimum automatic transport** **A = 1500 mm** **Maximum automatic transport** **A1 = 3210 mm** **Max glass: 6 + 6 + 2.28**		
	**Minimum automatic transport** **A2 = 500 mm** **Max glass: 6 + 6 + 2.28**		
	**Minimum automatic squaring** **B = 125 mm** **Max glass: 6 + 6 + 2.28**		
	**Maximum automatic squaring** **B1 = 2500 mm** **Max glass: 6 + 6 + 2.28**		

PROJECT AND PRODUCTION STANDARDS	Adopted Standards
The machine is designed, built and installed in consideration of the safety standards in force. Importance is placed upon the following aspects: Easy approach. Workstation ergonomics. Easy access to parts requiring maintenance. Reliability of the machine and its components. Reduced noise levels. Power savings.	**The following versions are available:** **Equipment in compliance with the European Standard, CE marking.** **IEC 204/1, CELENEC EN 60204-1, CEI 44-5,** **Guideline 2006/95/CE** **Guideline 2006/42/CE** **Guideline 2004/108/CE** **Equipment in compliance with the North American regulations** **Equipment in compliance with the regulations and standard planning suggested by APAVE France.**