



[www.cugher.com](http://www.cugher.com)

**CUGHER**

Plants for glass screen printing

Reliable & Future Oriented

## Automotive

Silk screen printing machines and lines engineered and designed for Automotive Glass Makers. For all types of automotive glass, tempered and laminated.



# CUGHER

Plants for glass screen printing

Since over 50 years we are leaders in studying, developing and implementing of cutting-edge solutions for flat glass silk screen printing

Cugher is the ideal partner for companies that print on flat surfaces, it is able to provide highly customized solutions according to Customer production needs.

Competence

Cugher has implemented big investments in design and engineering to build up and anticipate proper solutions for the most complex customization requests.

Research&Development

Each activity in Cugher involves technical department, production, sales and marketing, purchasing and human resources. All Cugher departments work together to continuously increase product and service quality.

Structure

Automotive

Architectural

Home appliance

Application fields



## Cugher's solutions for the automotive industry

- Handling
- Dryers
- Print
- Vision systems

The automotive division provides silk screen printing lines with a high level of automation, precision and repeatability, for automotive car sets, tempered and laminated.



**CUGHER**  
Plants for glass screen printing

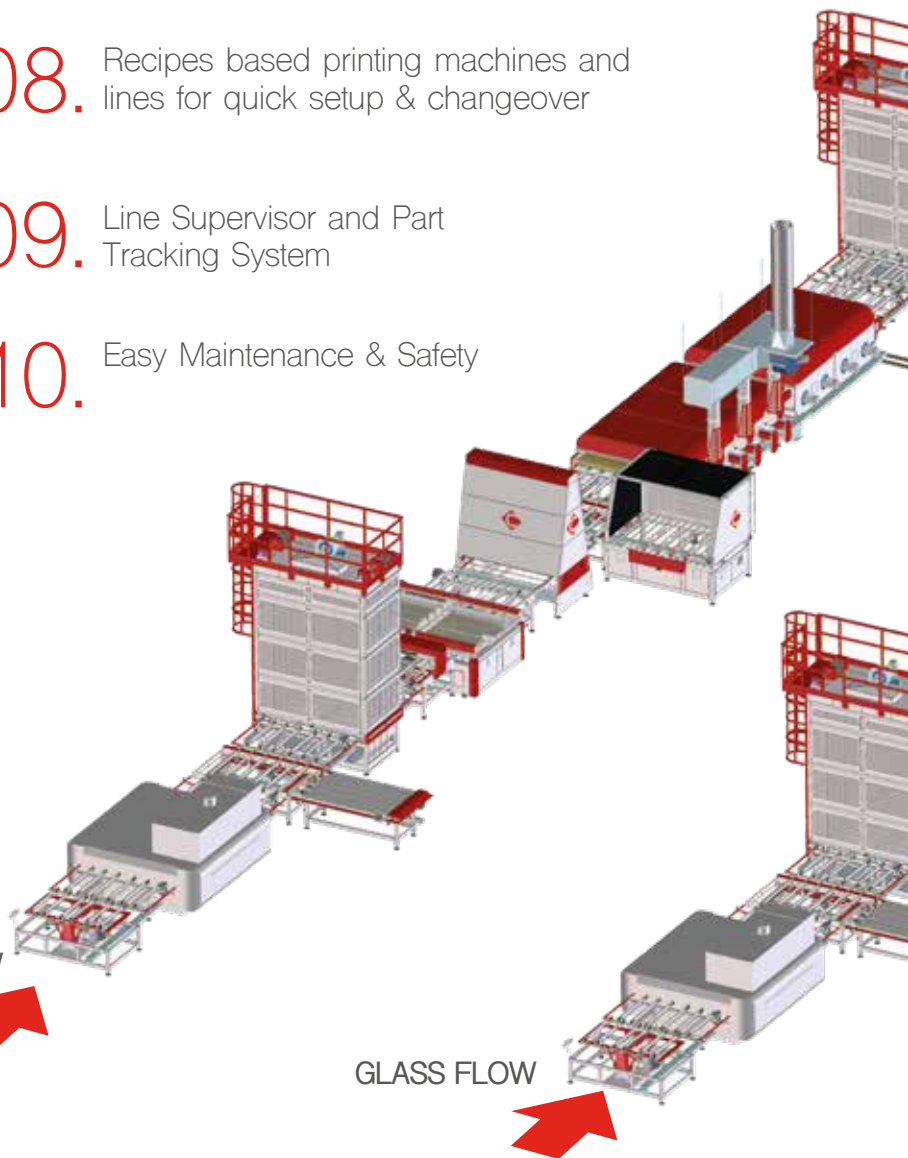
01. Centring System for Strongly Asymmetrical glasses
02. Quick set-up and changeover time (less than 5 minutes)
03. Printing repeatability  $< \pm 0,08\text{mm}$
04. Short Cycle Time (from 6 to 15 seconds)
05. Automatic ink thickness control
06. Zero clear border printing capability (E2E System: Blade & CNC)
07. Vision system: Broken Screen, Print & Glass Quality
08. Recipes based printing machines and lines for quick setup & changeover
09. Line Supervisor and Part Tracking System
10. Easy Maintenance & Safety

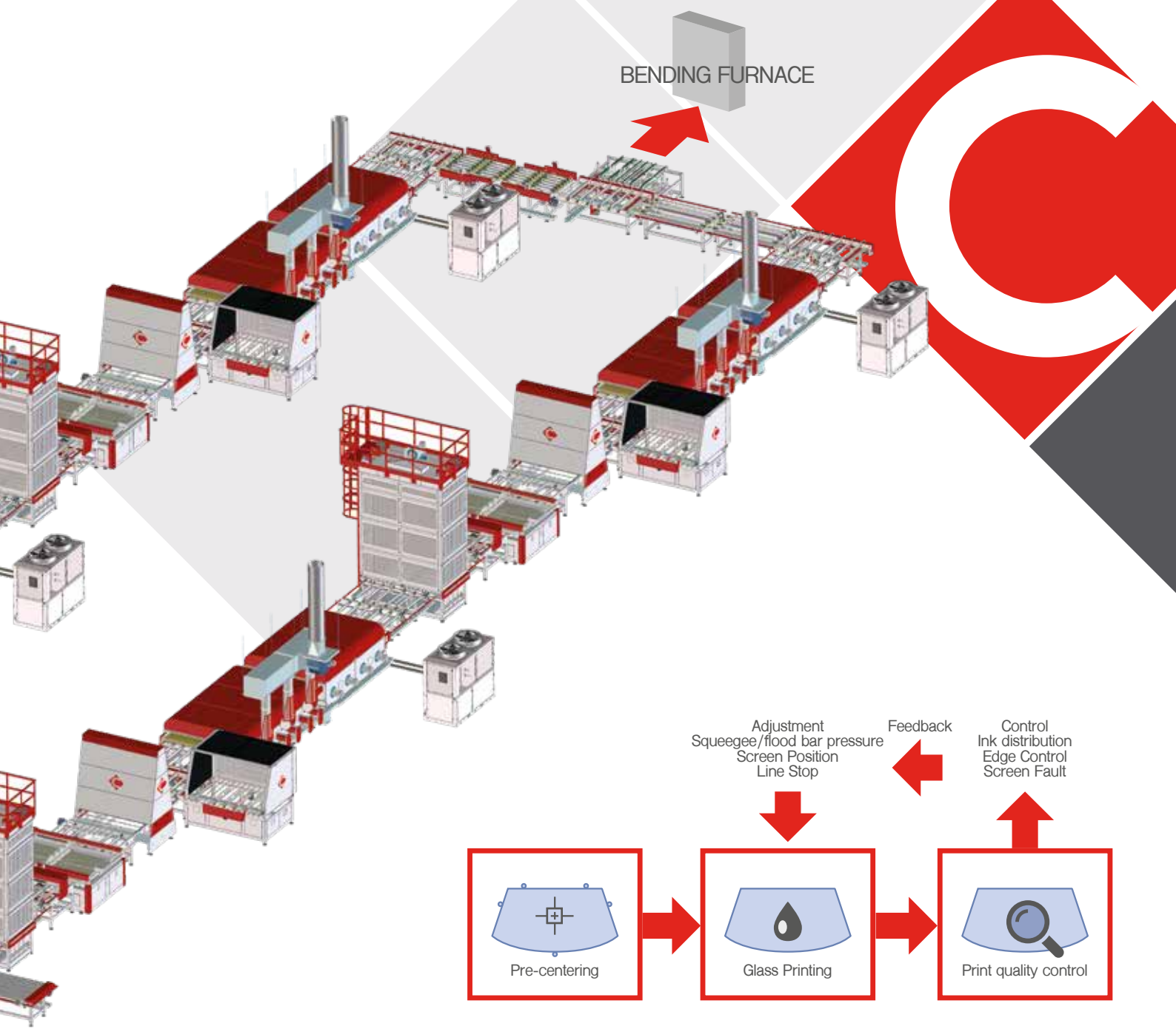
GLASS FLOW

GLASS FLOW



**CUGHER**  
Plants for glass screen printing



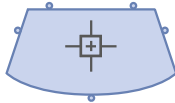


BENDING FURNACE

Adjustment  
Squeegee/flood bar pressure  
Screen Position  
Line Stop

Feedback

Control  
Ink distribution  
Edge Control  
Screen Fault



Pre-centering



Glass Printing



Print quality control

All Cugher silk screen printing machines can be designed for short edge leading or long edge leading glass flow orientation.





## Key plus

Different options are available to ensure high printing quality together with high productivity:

- Squeegee and Flood Bar Rotation To Speed-Up Silk Screen Changing And Cleaning
- Pneumatic Locking of Squeegee/ Flood-Bar Group
- Pneumatic Locking of The Frame, Pull Out of Screen for Cleaning
- Motorized Screen Movements
- Automatic Screen Registration System
- Digital Proportional Valves
- Anti-Drip System

## Strictness Quality

- Declaration of Conformity
- Risk Assessment
- Technical File
- Operation and Maintenance Manual

# Printer G Series & Printer J Series

We have developed two series of printing machines, with different levels of automation, able to satisfy each production need.

**The G Series**, with centring out of the printing table and **the J Series** for big formats, with centring directly on the printing table. Both can be connected in line with dryers for curing of the ink, using UV or IR technology, optionally chiller units for low glass exit temperature are available.





# Print

## G Series and J Series

The Cugher silk screen printing machines are able to print on symmetrical, asymmetrical, single, double and paired glasses, with standard dimensions up to 2500x4000 mm and thickness varying from 1,4 up to 10 mm.

We have achieved significant performances:

- Productivity Up To **620 Pieces/Hour**
- Print Repeatability Precision of  $\pm 0,08$  mm.



## G Series - Shuttle Transport System

The G Series printing machines transport the glasses through a shuttle with two independent cross shaped holders and centring out of the printing table. This solution enables reaching the maximum speed of the printing process for glasses with small and medium dimensions.

The system consists in one cross shaped holder with a vacuum cups system. The glass is collected by the walking beam while it is still in the centring device of the inlet conveyor; thanks to this operation it is possible to transport the glass with great accuracy. No further glass registrations are necessary before the printing process.



## J Series - Belt Transport System

The J Series provides transport through a flat belt conveyor designed for glasses with medium and large dimensions, as well as for drilled glasses.

The glass sheet arriving from the entry conveyor is transferred to the center of the printing table through motorized belts.

The belts will lower to printing table level, centring procedure and printing process will be performed, then the belts will lift for glass transportation to the exit synchronized conveyor.





## Logo Print Station

The Logo Print Station is a special equipment composed by a booking conveyor and a logo print system that, working jointly, are able to center and print the logo on the underneath glass.

The movement is given by pneumatic linear guide.

It is possible to adjust the squeegee and flood bar speed independently.

The up and down vertical movements of the Squeegee / Flood bar group are obtained by dedicated cylinder.

The Logo Print Station is equipped with its own PLC.

## OPTIONAL



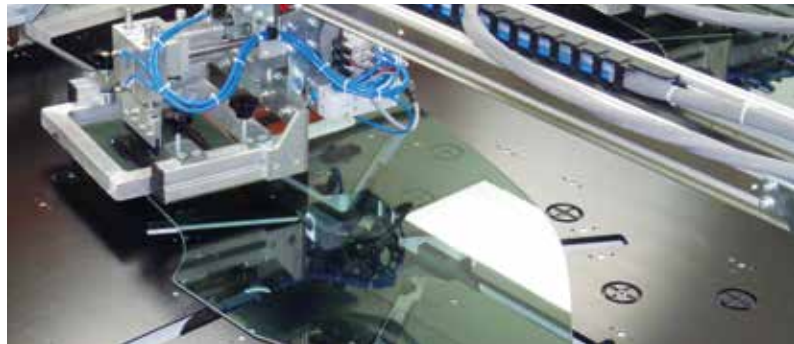
## Zero clear border printing capability: Edge to Edge Systems

### CNC Suction Nozzle System

The Edge to Edge system is suitable to realize silk printing on flat glass up to the edge of the glass. The system is very flexible and offers an extremely short cycle time. The structure holds and transports a dedicated suction nozzle which removes the extra ink from the screen avoiding unwanted dripping of ink on the glass edges.

### Blade System

The Edge to Edge Suction Blade is a mechanical structure moving on the same guides of the squeegee/flood bar group, moved by the same motor. This structure is mechanically connected to the squeegee/flood-bar. The system offers an extremely short cycle time.



## Logo Print Head

The logo-print head, can be installed on the printing machine, above the printing bridge. The printing cycle is automatic and controlled by the operator touch panel. The movement is given by pneumatic cylinders. It is possible to adjust the squeegee and flood bar speed independently.

## Broken corner detection unit

The inlet conveyor can be equipped with a Broken glass corner detection system that will alarm and stop the printing machine, to avoid serious damage to the screen and to the printing machine, in case that a glass with broken corner has been detected.

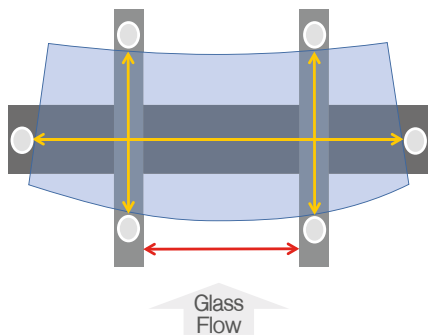
## Automatic Ink Distribution System

# Print Focus



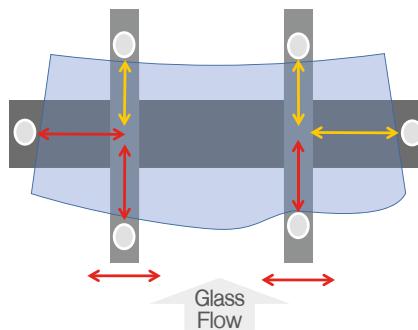
## Automatic Centring System

- The system allows to insert into the recipe system the position of each pin
- The operator can also define the pins' closing sequence, allowing the centering of extremely shaped glasses
- The precision of the centering systems can guarantee repeatability accuracy of  $\pm 0,08$  mm.
- Glass dimension control, with alarm in case of out of tolerance range glass
- Automatic print stroke setting



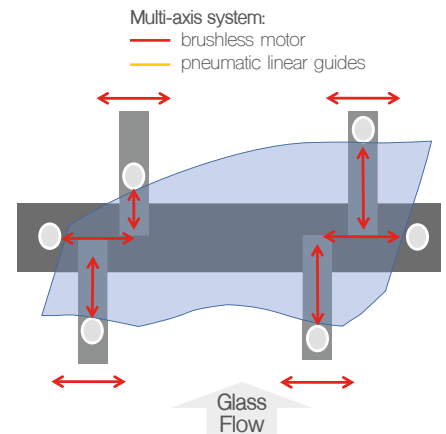
### SYMMETRIC GLASSES

1 axes controlled by brushless motor  
plus 3 axes controlled pneumatic  
linear guides.



### ASYMMETRIC GLASSES

5 axes controlled by brushless motors  
plus 3 axes controlled pneumatic  
linear guides.



### EXTREMELY ASYMMETRIC GLASSES

10 axes controlled by brushless  
motors linear guides.

## Our machine is like a Digital Caliber

Our system allows a perfect control of the height of the printing bridge, having a height position precision higher than 0,1 mm.

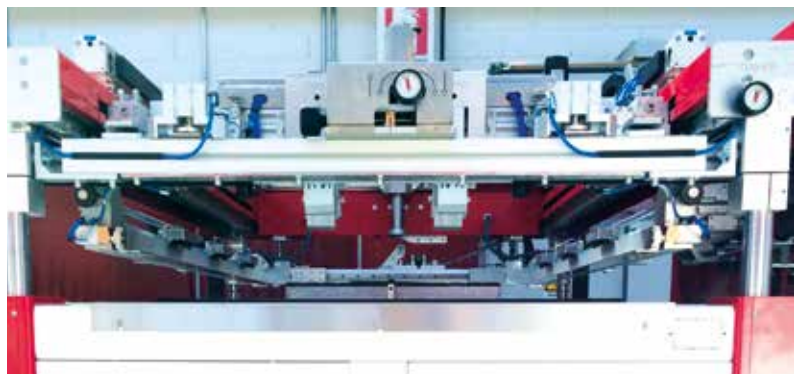
The vertical movements of the printing bridge are controlled as a digital caliber, which has the "zero" represented by the printing table (perfectly flat, even surface) and the operator can set the desired height into the touch panel.

## Easy Cleaning without losing Screen register

Pull out of screen with pneumatic Screen Frame Locking System.

The screen can be locked in position by means of pneumatic cylinders and it's possible to use frames of different heights.

Thanks to this feature, the operator doesn't need to lock manually the frame, and the insertion and extraction of the screen results to be an extremely fast and easy operation.



## Screen Positioning Systems

Our machines can be equipped with three different systems, according to customers' needs:

- Manual Calibers
- Motorized Calibers
- Fully Automated (see page Vision System)

All settings are controlled from the operator side.

## Uniform Ink Thickness

Printing bridge with digital proportional valves.

Thanks to pneumatic calipers the squeegee and flood bar can be easily inserted/replaced.

## No more drops on the screen

Anti-drip System: no more issue with light colours.



# Print - Double Glasses Technology

## High Productivity

Up to 1028 glasses per hour  
Repeatability precision 0,08 mm

SERIE G DLE		200x130	130x100
 double glass	Max	800x1300	550x1000
	Min	275x380	150x250
 single glass	Max	2000x1300	1300x1000
	Min	900x500	350x200

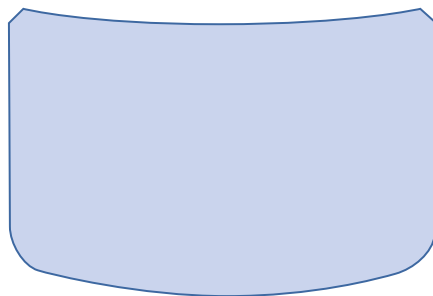
The Series G DLE (Double Lite Edition) has been engineered with the aim to have the maximum flexibility in a single printing line.

On one printing machine is possible to print two small glasses (sidelites or vents) or one single big glass (Backlite, Windshield or Sunroof).

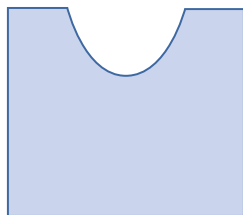
Its outstanding centring system is composed by 18 axes that allow to perfectly centre even extremely shaped glasses.

The possibility to process on the same line two different type of glasses (i.e. Sidelites & Backlites) allows a great saving in terms of industrial space and cost optimization with a faster ROI.

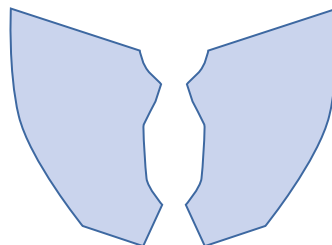
The DLE is available in different sizes, from vents size up to windshields.



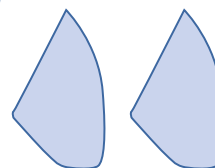
1673x1127



913x803



976x626



570x413

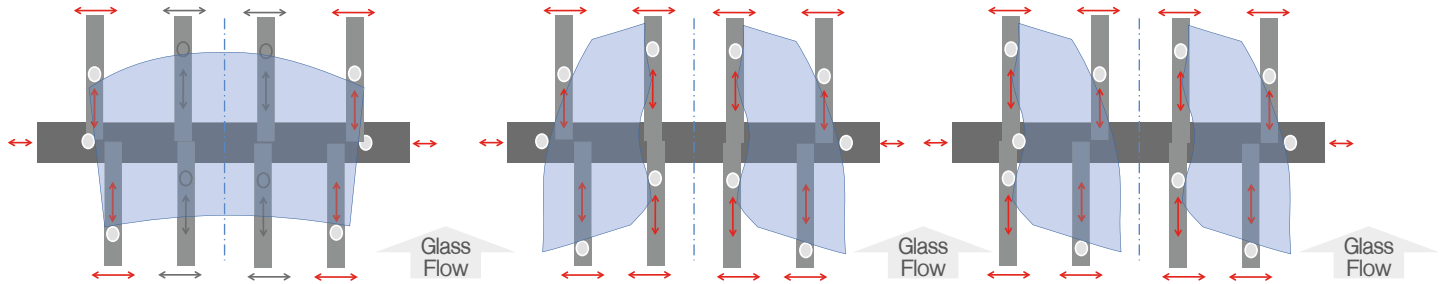


362x240



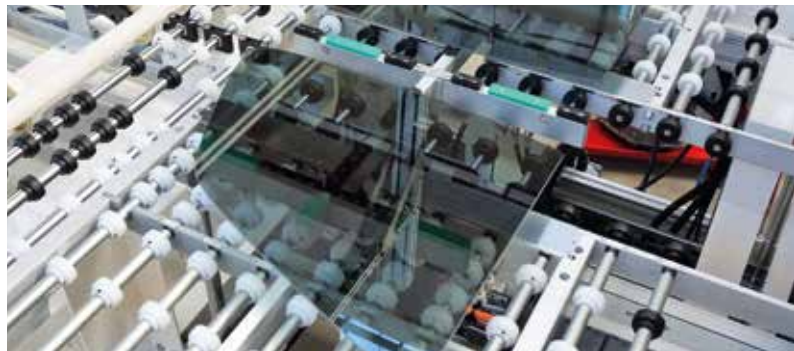
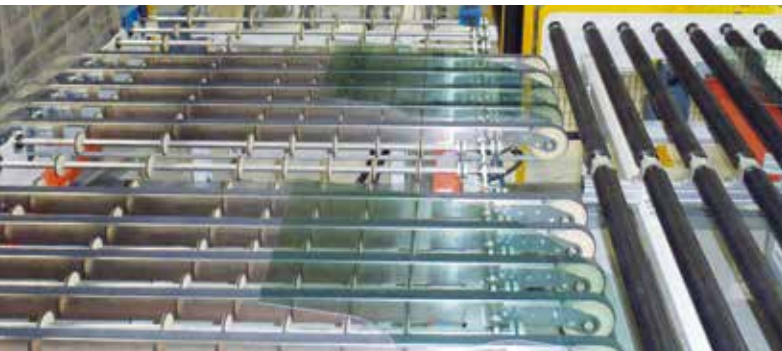
# The Automatic Centering System for Extremely Asymmetric Double Glasses

Its outstanding centring system is composed 18 axes controlled by brushless motors that allow to perfectly centre even extremely shaped glasses.



## Automatic Centering System

- The system allows to insert into the recipe system the position of each pin.
- The operator can also define the pins' closure sequence, allowing the centering of extremely shaped glasses.
- The precision of the centering systems can guarantee repeatability accuracy of 0,08mm.
- Glass dimension control, with alarm in case of out of range glass
- Automatic print stroke setting



# Dryers



All Cugher dryers comply with the highest energy standards and are designed as an integral part of the line, with the possibility to study and realize different temperature curves in each module, to ensure an improved productivity.

The Cugher Dryers are manufactured with the best existing materials to guarantee the maximum reliability of the line.

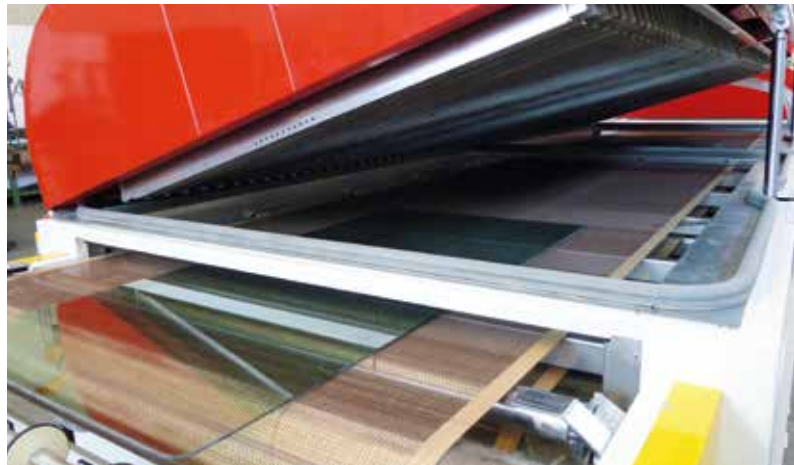
## IR Dryers

The drying technology of Cugher IR Dryer combines the effectiveness of the Infrared lamps and the air blades, in order to distribute the heat uniformly and obtain a better and quicker curing of the ink. The conveyor speed can be regulated to meet Customer productivity targets.

The **Power Saving** features, allows the operator to adjust the lamps power to the real necessities for each type of processed glass, avoiding useless power consumption. The power data can be stored in to a recipe that can be easily recalled by the operator panel.

In order to avoid any damages, the glasses are transferred by means of special Kevlar belts.

Inside the cold module, there is a controlled air circulation, which allows cooling of the glasses up to a temperature approximately of 30°C higher than the ambient temperature.





## UV Dryers

Cugher Digital UV Dryers are equipped with dedicated anti-reflection shields, placed on the dryer's inlet and outlet, to protect the operators from the UV radiation, allowing safe operations.

An innovative digital control system for lamps management allow power saving and productivity increase.

## IR/UV Combi dryers

Cugher Combi Dryers are composed by three sections. The first section is an IR dryer with hot modules, the second section is a UV dryer, while the last section is an IR dryer with cold modules (cooling section). When the UV dryer section is used, the first and third sections will operate as a conveyor, while when the IR dryer operation is requested, it will be the UV section to operate as a conveyor.

## PLUS

### EXHAUST SYSTEM

### HOT SWAP FAN

The fans can be replaced with the oven in production.

### FAN ROTATION CONTROL KIT

This kit allows to have an alarm in case of breakage of the pulley of the propellers of the hot section of the dryer.

## OPTIONAL

### CHILLER UNIT

To obtain lower glasses outlet temperatures, approximately between 25°C and 35°C, the cold modules of the dryers can be equipped with a cooling device (Chiller unit plus thermal exchangers).

### PYROMETER KIT

This kit is useful to verify the temperature of the glass at the exit of the hot section and at the exit of the cold section.



# Handling



The high range of Cugher handling products allows transportation and stacking of GLASSES WITH ANY DIMENSION AND SHAPE IN ALL THE DIRECTIONS inside production plant.

The material used and the assembly methods guarantee the maximum structural **SAFETY AND SOLIDITY** and require a **MINIMUM MAINTENANCE** activity.

Thanks to special design of Cipher systems, the handling happens using a **MINIMUM CONTACT SURFACE**, offering at the same time the **MAXIMUM GRIP**.

The excellent **INTEGRATION AND SYNCHRONIZATION** with all line components guarantee a very **HIGH PRODUCTIVITY** level.

**THE VISUAL INSPECTION SYSTEMS**, flat and vertical can be perfectly integrated inside the line, and allow to deeply check **PRINT QUALITY** without affecting production cycle.

## OPTIONAL

### COVER

To avoid any possible contamination of the glasses during the handling, the conveyors that are external to the printing room can be equipped with transparent Plexiglas covers. Granting an easy access to the underneath conveyors.

The conveyors cover will reduce significantly the presence of dust and particles on the glasses surfaces and they allow to have a higher final quality of the produced glasses.

### PRESSURIZING KIT

A dedicated fan equipped with an HEPA filter can be placed on the top of the stacker, on the auxiliary platform. With this kit, the internal air pressure of the stacker will be higher than the external pressure, avoiding the entrance of dust and the contamination of the stacked glasses.



BELT CONVEYOR



CORNER CONVEYOR



ROLLER CONVEYOR



PULLEY CONVEYOR



ROTATING TABLE



TILT CONVEYOR





# Handling

VERTICAL INSPECTION



FLAT INSPECTION



TILTING BRIDGE CONVEYOR



LIFT CONVEYOR



FLIP OVER TABLE



DOUBLE GLASS HANDLING





STACKER



FURNACE LOADING



COVER



CULLET BIN



# Vision systems



## Online Automatic Print Quality Control System

The Automatic Print Quality Control System, having a resolution up to  $60\mu\text{m}$  for the 1000 mm glasses and  $122\mu\text{m}$  for the 2000 mm glasses (on long edge leading), is able to verify the quality of the design up to a circular dot of  $0,09\text{ mm}^2$  and recognize any “slavering” or “widening” of the design’s details due to an excess of ink coming from the screen.

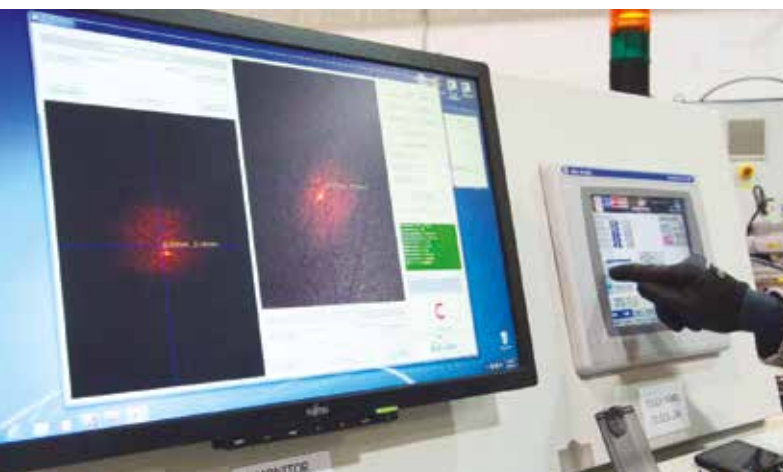
The system is able to detect fade out dots, pin hole, or if there are missing parts of the design and alert the operator to verify the possible cause (e.g. lack of ink, dried ink on the screen, etc...).

## Glass Quality Automatic Inspection

This system, typically installed downstream the washing machine, is able to scan the whole glass and detect any defect present on the raw glass.

The extremely high sensibility and the exclusive lightning system, allows to identify any scratches (even the lighter ones), shell chips, bad edgeworks, seeds, stones, adhesion chips and other surface defects.





## Automatic Screen Registration System

The use of the Automatic Screen Registration System, being able to realize the alignment of the screen in a blink of an eye, allows performing a complete model changeover in an extremely short time, since the machine setup becomes completely automatic and the operator's action is reduced only to insert the new screen in to the printing machine.



## Broken Screen Detection Unit

This special unit has been studied to control the glasses and to check the presence of ink spot on the lower surface of the glass. This unit is positioned just downstream the printing machine. The advantage of this innovative system, if compared with other "aged" system, is that doesn't matter where the screen has been broken or how "small" can be the hole; if there is a leakage of ink, this unit will detect it.

# Easy Maintenance & Safety



## Safety Fences

As requested by the new European Safety Regulation, adequate safety fences must be installed to keep under control the access to the printing machine and line. The fences, that have a height of 2000 mm, are equipped with interlocked doors that allow the entrance into the line. The access request is made by buttons controlled by the safety access software. Note: The installation of the safety fences is mandatory in order to obtain the CE Compliance Declaration for the equipment.

## Maintenance

All the machines are manufactured with high quality and efficient materials and for this reason the maintenance operations are almost negligible. The few parts that need maintenance operations can be reached easily thanks to the machine ergonomics.





# Line Automation Software



Dedicated software (PLC/HMI System), expressly realized to manage this line, allows the total control of the line and carries out the part tracking, managing all the emergency situations.

Adequate line control panels will allow the operators to control the printing area and the handling line. The main Panel shows a graphical view of the exact positions of the glasses on the handling line (parts tracking system), giving the operators a perfect idea of the line's situation and the capability to manage all the situations.



## PLUS

### LINE SUPERVISOR

This system allows to see the line as a whole, with all information for the part-tracking and it is where the recipes are stored (machine and dryer working parameters etc...). Thanks to the Line Supervisor is possible to automate the changeover. In the supervisor station is possible to store thousands of glass models recipes.

### PART TRACKING

It is the possibility to track the glass all across the line and contains all main information such as type of glass (inner, outer, paired) production ID number and other information related to the handling inside the line.

### DIAGNOSTICS

### TROUBLESHOOTING



### ALL PARAMETERS SET-UP INTO RECIPE

It is possible to store up to 200 different recipes, that can be recalled by the touch panel, to auto-set the machine for different glasses. Possibility to extend the number of stored recipes (included in the Line Supervisor System). General operation parameters for machine and dryers that are memorized inside our PLC/HMI System that allows a quick model change.

### VPN remote control & assistance

The VPN System it is a hardware that will be connected directly to the PLC of the printing machine and allows to perform a remote connection to the printing line. The presence of this System allows to have the support of the Cugher's software engineers without the needs to have a dedicated PC (with all the Software Licences loaded) to be connected to the PLC in case of necessity and doesn't require the intervention of operators to connect the PC and run the software.



ADVANCED

## FITTED\_PERFORMANCES

PLANTS FOR GLASS  
SCREEN PRINTING



### 360° Customer Service

Turnkey Solutions

Your partners in the pre - production  
settings and starting process

12 months warranty assistance  
(taking charge <24 H)

Customer Service &  
Technical support

World Wide Technical Assistance

Spare parts

DEDICATED CHANNEL - [service@cugher.com](mailto:service@cugher.com)

[www.cugher.com](http://www.cugher.com)



# CUGHER

Plants for glass screen printing

Cugher Glass Srl



Milan (ITALY)  
[info@cugher.com](mailto:info@cugher.com)



Naples (FLORIDA)  
[usa@cugher.com](mailto:usa@cugher.com)