



PERFORMANCES DRIVING to the FUTURE

when excellence is needed
for Solar

Plant and machinery customized for
**handling and screen printing of
solar panels**

CUGHER

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CUGHER

Plants and machinery customer oriented

WHO
WE ARE

PERFORMANCES
DRIVING to the
FUTURE

With Cugher Looking to the future since 1967

The Cugher plants were among the first in the world to automate the flat glass screen printing process.

This is why choosing a machine or a plant Cugher means knowing how to see far: because the continuous research that animates every project allows the company to always **develop and implement solutions cutting-edge and made to last over time.**

Automotive | Home appliance | Building & Interior Design | Solar



HOW
WE DO

A value journey into innovation

Cugher plants have been among the first in the world to automate the process of silk-screen printing on flat glass.

A **flexible engineering approach** and a strong emphasis on project customization have positioned the company as a recognized leader on a global scale.

Through close collaboration with leading glass makers, Cugher has enhanced its ability to anticipate customer needs across various sectors, including automotive, architectural, and home appliances.

Today, this very same approach is applied for **Cugher's Solar sector**, which develops advanced solutions for **silk-screen printing and handling**. With a history of excellence and forward-thinking, Cugher provides advanced products that exceed the evolving demands of the solar industry.



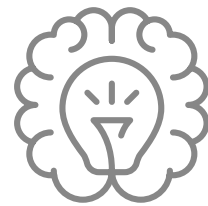
Step into the Cugher's world

Through years of numerous collaborations, Cugher's silk screen printing machines have developed strong quality skills. No project is standard; each production process requires in-depth study to meet the customer's specific requests. Cugher's methodology stands out for its flexible engineering, capable of suggesting and adapting each product to meet the standards required by individual productions. **Continuous dialogue, exchange of know-how, and high customization** are the cornerstones of the **Cugher Method**, which aims to achieve maximum customer satisfaction in every phase, from the development of initial specifications to installation and post-sale support.

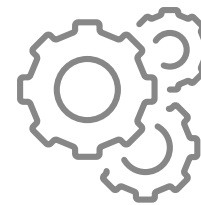
THE CUGHER METHOD



**Identification of
specifications**



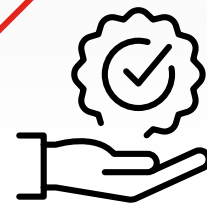
**Exchange of
knowledge**



**Development
of layout**



**Examination
and changes**



**Final
solution**

Empowering progress with cugher solar **technology**

Cugher plays a crucial role in the panel creation process, with a focus on two key areas: **glass screen printing and transport throughout the entire production line.**

Cugher's advanced technologies and expertise allow to automate and optimize the screen-printing process on flat glass surfaces, ensuring exceptional **precision and repeatability** for every print and guaranteeing a constant standard quality over time.

Beyond printing, Cugher is specialized in developing handling machinery that seamlessly synchronizes with all processes along the production line. Its integrated solutions ensure efficient and seamless transportation of glass panels throughout various stages of production. By **synchronizing machinery** with each step, Cugher enhances productivity and minimize downtime, delivering a streamlined workflow for its clients.

Through the commitment to innovation and excellence, Cugher nowadays is contributing to the strengthening of the solar panel process.



CUGHER for SUN POWER

Cugher is partner of **Bottero** in the development of the new **3Sun Gigafactory** of **Enel Green Power**

A **Record** project

Through the partnership with **Bottero S.p.A.**, sharing an innovative approach in the development of cutting-edge glass processing technologies, Cugher contributes to a remarkable history in the solar sector.

The financial agreement between **Enel Green Power and the European Commission** marked the beginning of a new historical project which includes the extension of the solar plant **3Sun Gigafactory in Catania** (Sicily, Italy) by 2024 to reach the capacity of 3 GW per year. The TANGO project is pivotal for Italy's technological role and promotes renewable energies, aiming to produce 5.5 TWh of electricity and prevent the emission of 25 million tons of CO₂.

Cugher has contributed to the realization of 5 new production lines for the Gigafactory, reaffirming its role in the solar sector, by leveraging its expertise in glass handling.

Through excellent synchronization and automation of all components, Cugher ensures high production and quality standards aligned with industry norms. Embracing the opportunities that solar energy offers, Cugher consolidates its commitment to a more sustainable world, and this project was just the beginning.



We believe that
**TOGETHER WE CAN MAKE A DIFFERENCE
FOR THE ENVIRONMENT!**

HANDLING

ROBOTIC
APPLICATIONS

STACKER

PRINTING
PROCESS

CUSTOMER'S
NEED?

Precision meets innovation

Cugher's expertise integrates advanced technology, durability, and customization options to address the evolving needs of the solar industry, enabling manufacturers to provide high-efficiency solutions. Cugher meets these demands through a range of solutions specifically tailored from extensive experience with various glassmakers. Its array of products supports the development of **complex and automated production lines or standalone machinery perfectly integrated.**

Cugher is more than just a machine supplier; it's a partner that delivers tailor-made solutions.

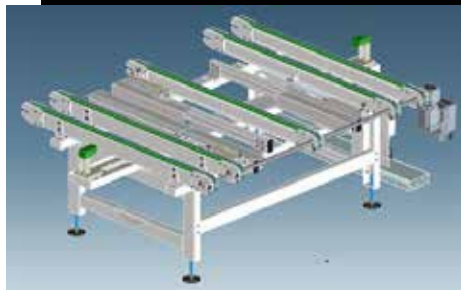
- That's why each project at Cugher begins with a deep analysis of customer's needs, ensuring that their **unique requirements are translated into a custom-made solution.**



Handling

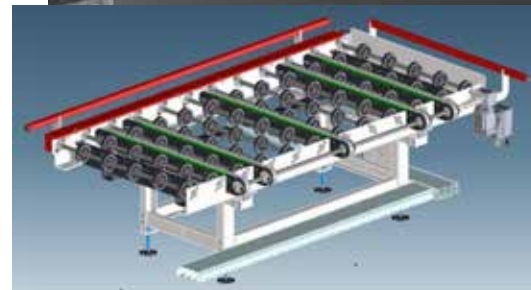
A wide range of handling systems enables the transportation of glass in all directions and its storage within the factory.

- The machinery is perfectly synchronized with the productivity of the line, and the movement of the glass and panel occurs with minimal contact surface, while ensuring maximum adhesion. The special design of the machinery guarantees safety and requires minimal maintenance.



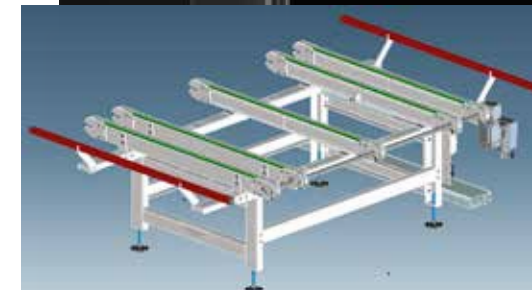
CENTERING

A centering station is a special device incorporated into a conveyor, allowing the module to be centered in a pre-defined position along the X and Y axes with a tolerance of ± 0.1 mm. The centering station can be considered an accessory, designed to be applied to every conveyor of the line according to production requirements. It is also possible to set registrations that enable the device to adapt to different production sizes.



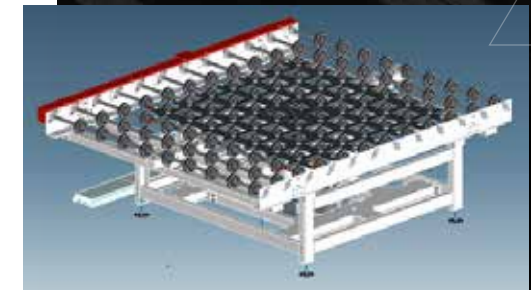
CORNER CONVEYOR

The corner conveyor is intended to axially deviate the solar module during the process and is composed of rollers and belts. Belts are drawn by pulleys coupled to a shaft moving in the same direction as the glass flow, with rollers providing adequate support to transfer the glass perpendicular to the line flow. Engineered to offer minimal contact surface with the glass while ensuring a secure grip, the conveyor structure is constructed from steel profiles powder-coated to prevent oxidation.



CONVEYOR

Conveyors are designed to linearly move the solar module during the manufacturing process. The conveyor structure is constructed from steel profiles powder-coated to prevent oxidation of the metal structures. Equipped with an AC motor driven by an inverter, the conveyors synchronize their movement with the entire line. The structures consist of modular elements assembled to create different lengths and widths.



ROTATING TABLE

A rotating table allows the solar module to rotate $\pm 90^\circ$ to change the conveying direction from LEL (long edge leading) to SEL (short edge leading) or vice versa. The transport system can utilize belts or pulleys. In both solutions, the module enters the conveyor, is stopped in the center, lifted, rotated, and then released for the following station. Rotating tables can also be utilized for manual inspection of panel assembly, where the rotation movement is performed by the operator. A proper sensor system assists the operator in finding the correct position of the panel to release it for the following station.



Stacker

Stackers can store a defined number of solar modules and are positioned along the production line in critical areas where panel storage is necessary. Designed to accommodate modules of all dimensions processed in the line, stackers are constructed from solid metallic structures and equipped with roller or belt conveyors.

When utilized as a conveyor, the stacker's conveyor can match the line speed.



- A set of bars for glass lifting is positioned among the rollers, connected to a chain, and located in the lower part of the stacker. The bottom of the stackers features an extractable cullet collection pan, facilitating cleaning operations and the removal of broken glass.

Printing process

Silk screen printing is an efficient method utilized for the decoration of solar panels glasses. The extremely accurate engineering of Cugher printing machines offer several advantages:

- Excellent image definition
- Print repeatability of $\pm 0,08$ mm
- Precise control over the thickness and uniformity of ink
- High productivity

printable
layer



SOLAR
GAMMA CUGHER



SOLAR
GAMMA CUGHER

Printing machine

J Series

The J series is a **fully automatic printing machine capable of processing medium to large-sized glass**, including drilled glass,

Reaching sizes of 2500x4000 mm (dimensions be adapted according to each project requisition)

The glass enters the machine through an entry conveyor thanks to motorized belt transport, which lowers directly onto the printing table to allow glass centering through adjustable pins. Once the printing process is complete, the belts lift again to allow movement of the glass towards the exit conveyor.





Cugher's dryers

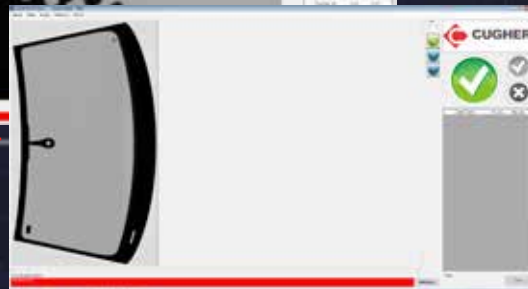
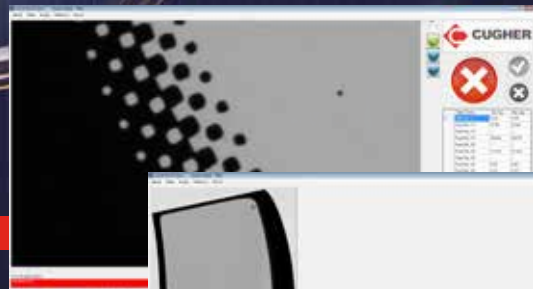
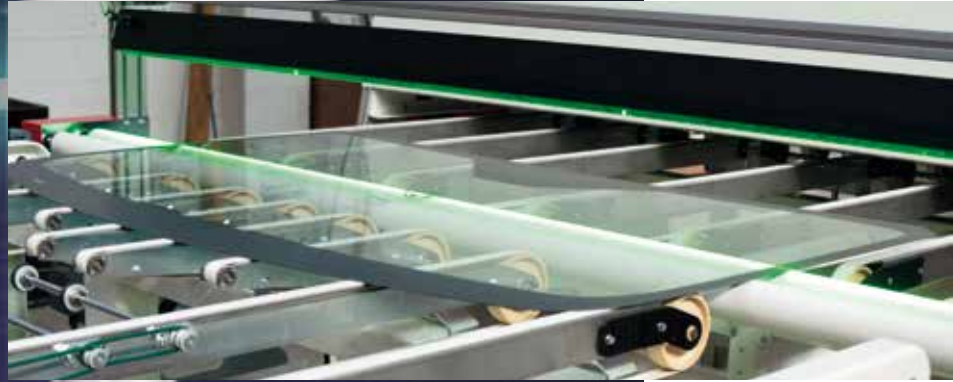
The screen-printing process can be completed with a Cugher Dryer. **They are designed to achieve the best energy standards** and are integrated, in line with the printing machines, for ink drying. The study on the dryer allows us to identify the correct configuration of hot and cold modules for each system and obtain different temperatures for each module to ensure greater productivity.

IR DRYERS

- The IR technology combines the action of infrared lamps with air knives to evenly distribute heat and achieve rapid drying of the ink. Air recirculation can be set according to the ink thickness, along with the temperature of each module and the speed of the conveyor belt or rollers. Cugher dryers are suitable for drying inks with thicknesses of 20/30 μm , typical of screen printing, as well as thicknesses of 60-100 μm , common in digital printing, meeting the production targets of each customer.

SOLAR

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Vision systems

Glass quality control

- Installed after washing, **it checks for any discrepancies in the glass**, such as scratches, breaks, air bubbles or water drops, following the sensitivity levels required by the production which can be set upstream on the different areas of the glass.

Quality print control

- Following the printing process, the system recognizes any imperfection by taking predefined parameters as references and tracing the defects directly on the video image of the glass. **The system also allows to automatically correct the position of the frame if errors arise from this without interrupting production.**



Automatic frame adjustment

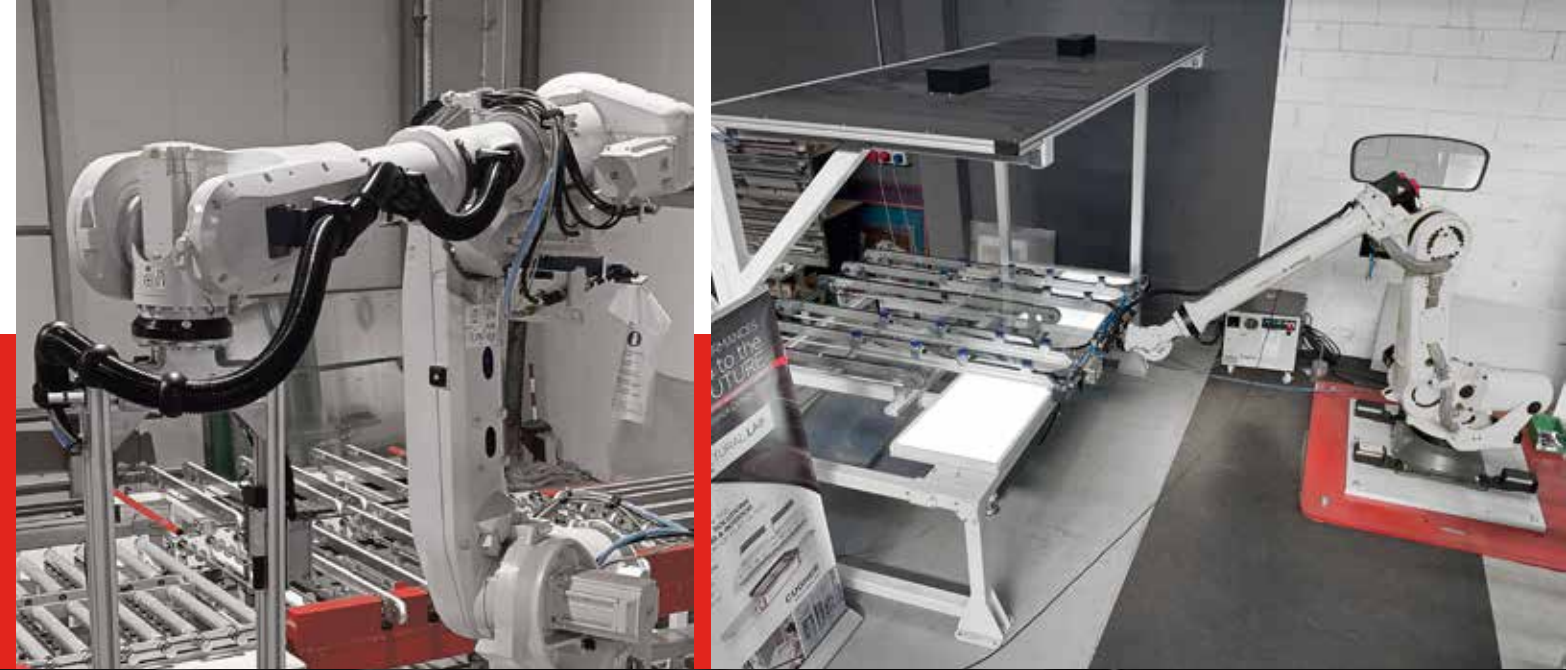
- The screen-printing frame is positioned autonomously by cameras and servomotors installed under the printing table, **drastically reducing format changeover times** to simply rapid frame insertion.

Broken screen detection system

Positioned immediately after printing, **the system checks for the presence of ink marks on the bottom of the glass** due to frame breakage as it passes over a white roller equipped with cameras.

SOLAR
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Industrial robots



Specializing in industrial automation has led Cugher to become a turnkey supplier and/or integrator of automated robotic solutions, aimed at increasing efficiency and reducing process costs for every plant. The company employs anthropomorphic robots with up to 6 axes, allowing for great flexibility in operations. It designs and engineers the manipulation tool placed at the end of the robotic arm and all the surrounding handling based on the operation required by the specifications of the production line.

Cugher implements two main families of solutions in its projects:

- **Robotic islands for material handling:** these are sets of machines organized within an automatic workspace, comprising robot manipulators controlled automatically for loading/unloading and palletizing, ensuring the continuity of operations.
- **Robots combined with vision systems:** the robot collaborates with the vision system, which sends real-time information to make various adjustments each time and ensure a consistent quality standard.



Always there with **HELP DESK**

Cugher's after-sales support service is designed to ensure continuous presence of experts and **timely specialist interventions** in response to any unforeseen circumstances. Cugher recognizes that attending to the customer's needs throughout the entire duration of the machinery is the key to building a lasting relationship of trust.

**Yes,
we help!**



Fast and timely **support**

- Dedicated team of experts
- Ticketing system to track all requests
- Direct line available Monday to Saturday, 7:00 AM - 12:00 AM
- On-site assistance if needed
- Custom service contracts for every need

We'll fix it fast

helpdesk@cugher.com



Request your specialized consultation for your **solar panel production line!**

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